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of the
2013 AAVA/IVAS Joint Conference
On
Veterinary Acupuncture
May 16 – 19, 2013
Hotel Monteleone
New Orleans, Louisiana, USA

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<table>
<thead>
<tr>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>WELCOME MESSAGE FROM THE AAVA PRESIDENT</td>
<td>vii</td>
</tr>
<tr>
<td>WELCOME MESSAGE FROM THE IVAS PRESIDENT</td>
<td>vii</td>
</tr>
<tr>
<td>SPEAKERS</td>
<td>ix</td>
</tr>
<tr>
<td>PROGRAM SPONSORS</td>
<td>xi</td>
</tr>
<tr>
<td>EXHIBITORS</td>
<td>xi</td>
</tr>
<tr>
<td>SCHEDULE</td>
<td>xiii</td>
</tr>
<tr>
<td>Current Status of Research and Evidence as Applied to Acupuncture</td>
<td>19</td>
</tr>
<tr>
<td>Dr. Bonnie Wright</td>
<td></td>
</tr>
<tr>
<td>Acupuncture for Gastro-Intestinal and Renal Disease</td>
<td>23</td>
</tr>
<tr>
<td>Dr. Bonnie Wright</td>
<td></td>
</tr>
<tr>
<td>Acupuncture for Immune Modulation</td>
<td>29</td>
</tr>
<tr>
<td>Dr. Bonnie Wright</td>
<td></td>
</tr>
<tr>
<td>Controversies in Veterinary Medicine-Surgical Versus Non–Surgical Approaches</td>
<td>33</td>
</tr>
<tr>
<td>Dr. Bonnie Wright</td>
<td></td>
</tr>
<tr>
<td>Small Animal Rehabilitation</td>
<td>39</td>
</tr>
<tr>
<td>Dr. Dr. Maria Glinski</td>
<td></td>
</tr>
<tr>
<td>The Role of Laterality in Musculo-Skeletal Pathology</td>
<td>49</td>
</tr>
<tr>
<td>Dr. Kerry Ridgway</td>
<td></td>
</tr>
<tr>
<td>Chinese Herbs for Acupuncturists</td>
<td>59</td>
</tr>
<tr>
<td>Dr. Signe Beebe</td>
<td></td>
</tr>
<tr>
<td>The Role of Muscles Specific Acupuncture in the Rehabilitation of Musculo-Skeletal Pathology</td>
<td>69</td>
</tr>
<tr>
<td>Dr. Kerry Ridgway</td>
<td></td>
</tr>
<tr>
<td>The Role of Acupuncture and Integrative Modalities in Soft Tissue Rehabilitation</td>
<td>77</td>
</tr>
<tr>
<td>Dr. Kerry Ridgway</td>
<td></td>
</tr>
<tr>
<td>Equine Interstitial Lung Disease</td>
<td>87</td>
</tr>
<tr>
<td>Dr. Ina Gösmeier</td>
<td></td>
</tr>
<tr>
<td>Equine and Canine Ear Acupuncture</td>
<td>93</td>
</tr>
<tr>
<td>Dr. Uwe Petermann</td>
<td></td>
</tr>
<tr>
<td>Dr. Chris Bessent</td>
<td></td>
</tr>
<tr>
<td>Chinese Herbal Medicine for Equine Sports Injuries</td>
<td>119</td>
</tr>
<tr>
<td>Dr. Cynthia Lankenau</td>
<td></td>
</tr>
<tr>
<td>Xiao Chai Hu Tang in Veterinary Medicine - The Role a Traditional Chinese Herbal Formula can make in Disease Management, Palliation and Treatment</td>
<td>131</td>
</tr>
<tr>
<td>Dr. Barbara Fougere</td>
<td></td>
</tr>
</tbody>
</table>
# Table of Contents

- **A Critical Approach on Acupuncture for Treating Chronic Pain** ......................................................... 143  
  *Dr. Stelio Luna*

- **San, Wan, Tang, Powder, Pill, Extract, or Decoction** ................................................................. 147  
  *Dr. Chris Bessent*

- **Feline TCM Therapy** ......................................................................................................................... 155  
  *Dr. Michele Gaspar*

- **Pathophysiology of Chronic Pain and Neurophysiologic Effects of Acupuncture the Treatment of Chronic Pain** ........................................................................................................... 171  
  *Dr. Isabelel Iff*

- **Designing Acupuncture Trials** ........................................................................................................... 179  
  *Dr. Rebecca McConnico*

- **Traditional Chinese Veterinary Medicine (TCVM) Food Therapy** ................................................. 185  
  *Dr. Signe Beebe*

- **Effect of Acupuncture on Generalized Peripheral Edema in Two Intensive Care Patients with a History of a Liver Lobectomy** ................................................................. 191  
  *Dr. Wendy Wallace*

- **Proof of Acupuncture Effectiveness: Are Double-Blind Studies the Only Choice for Validity?** ...... 197  
  *Dr. Michelle Schraeder*

- **Pulse Diagnosis Made Easier** ............................................................................................................ 207  
  *Dr. Steve Marsden*

- **Stimulating Acupuncture Points** ........................................................................................................ 215  
  *Dr. Steve Marsden*

- **Why Do We Have Acupuncture Points?** .......................................................................................... 221  
  *Dr. Steve Marsden*

- **Rehab Techniques for the TCVM Practitioner Wet Lab Notes** ....................................................... 231  
  *Dr. Janice Huntingford*

- **Can Myofascial Kinetic Lines be an Anatomical Foundation for Acupuncture Meridians?** .......... 247  
  *Dr. Rikke Schultz*
WELCOME MESSAGE FROM THE AAVA PRESIDENT

Come see us in New Orleans in May - the weather is great, the city is busy, and the food is fantastic. Oh, and we have really special speakers for your continuing education!

This year, we have partnered with IVAS for a combined conference that is bigger and better than ever. We have feline medicine, equine medicine, rehabilitation, research updates, new speakers, and some of your perennial favorites. Brush up on your tongue and pulse skills, and if you're trained in acupuncture but shaky on your herbs, we have an introductory class on Chinese herbs.

The conference hotel will give you a truly special flavor of New Orleans, and the banquet on Friday night will stay in your memories for a long time to come. This conference truly has something for everyone. See you there!

Susan G. Wynn, DVM
President AAVA

WELCOME MESSAGE FROM THE IVAS PRESIDENT

Welcome to the international AVAA/IVAS Combined Congress 2013 and to the fascinating city of New Orleans. New Orleans has an incredible multicultural heritage, the perfect place to bring together our friends, Affiliates and IVAS family from countries all around the world. This year is a little different and we have collaborated to combine the annual meetings of the AAVA and IVAS. Organizing a single meeting is a challenge, but organizing a combined Congress is a testament to the abilities and terrific effort of Vikki Weber (IVAS) and Simon Flynn (AAVA) and their respective teams. Like the Mississippi, its taken tireless and continued energy to keep it smooth flowing and generating lots of great Qi for us! Thank you!

This Congress also brings together hard working committee members from IVAS Affiliates and your elected Board. People who work hard to educate and to raise the profile and benefits of veterinary acupuncture for the health and welfare of animals across the globe. Please make sure to introduce yourself to your House of Delegate representatives and Board members and tell us what you want or need and find out from us how you can make a difference by getting more involved.

A Congress would not be a Congress without exceptional speakers and educators, a special thanks also goes to Dr. Kim Samuelsen and our IVAS Conference Committee and Dr. Susan Wynn and her team for pulling together this wonderful program and the social events that go with it! New Orleans is the Big Easy. So please relax and enjoy the Congress and the hospitality of IVAS and AAVA this week. We want you to leave with good memories, new knowledge and skills and despite lots of great food, a healthy Spleen and Liver too!

Barbara Fougere
President IVAS
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EXHIBITORS

A Time to Heal (Booth 20)
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Website: http://www.newvita.com

CEFCO, Inc (Booth 19)
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Companion Therapy Laser by LiteCure (Booth 15)
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Email: grand@litecure.com
Website: www.companiontherapy.com

Darwin's Natural Pet Products (Booth 14)
1505 S 93rd St., Ste. BP
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Website: www.darwinspet.com

Dr. Buzby's ToeGrips for Dogs (Booth 5)
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Website: www.toegrips.com

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<table>
<thead>
<tr>
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<tbody>
<tr>
<td>Herbsmith, Inc. (Booth 18)</td>
<td></td>
<td>455 East Industrial Drive, Ste. 1</td>
<td>Hartland, WI 53029</td>
<td>(800) 624-6429</td>
<td></td>
<td><a href="mailto:mail@herbsmithrx.com">mail@herbsmithrx.com</a></td>
<td></td>
<td><a href="http://www.herbsmithrx.com">www.herbsmithrx.com</a></td>
</tr>
<tr>
<td>Jing Tang Herbal (Booth 13)</td>
<td></td>
<td>9700 W Highway 318</td>
<td>Reddick, FL 32686-2219</td>
<td>800-891-1986</td>
<td></td>
<td><a href="mailto:order@tcvm.com">order@tcvm.com</a></td>
<td></td>
<td><a href="http://www.tcvmherbal.com">www.tcvmherbal.com</a></td>
</tr>
<tr>
<td>Kan Herb Company (Booths 1 &amp; 2)</td>
<td></td>
<td>380 Encinal St., Suite 100</td>
<td>Santa Cruz, CA 95060</td>
<td>(831) 438.9450</td>
<td></td>
<td><a href="mailto:customer@kanherb.com">customer@kanherb.com</a></td>
<td></td>
<td><a href="http://www.kanherb.com">www.kanherb.com</a></td>
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<td>Lhasa OMS, Inc. (Booth 6)</td>
<td></td>
<td>230 Libbey Pkwy</td>
<td>Weymouth, MA 02189-3102</td>
<td>(800) 722-8775</td>
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<td></td>
<td><a href="http://www.lhasaoms.com">www.lhasaoms.com</a></td>
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<td>Mayway Corporation (Booth 16)</td>
<td></td>
<td>1338 Mandela Parkway</td>
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<td>(800) 262-9929</td>
<td></td>
<td><a href="mailto:info@mayway.com">info@mayway.com</a></td>
<td></td>
<td><a href="http://www.mayway.com">www.mayway.com</a></td>
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<td>Multi Radiance Medical (Booth 17)</td>
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<td>31200 Carter St</td>
<td>Solon, OH 44139</td>
<td>(440) 542-0761</td>
<td></td>
<td><a href="mailto:info@multiradiance.com">info@multiradiance.com</a></td>
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<td><a href="http://www.multiradiancevet.com">www.multiradiancevet.com</a></td>
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<td>Respond Systems, Inc (Booth 4)</td>
<td></td>
<td>20 Baldwin Dr.</td>
<td>Branford, CT 06405-6501</td>
<td>(203) 481-2810</td>
<td></td>
<td><a href="mailto:brian@respondsystems.com">brian@respondsystems.com</a></td>
<td></td>
<td><a href="http://www.respondsystems.com">www.respondsystems.com</a></td>
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<tr>
<td>RJ-Laser (Booth 7)</td>
<td></td>
<td>79183 Waldkirch-Kollnau, Germany</td>
<td></td>
<td>+49 30-3236857</td>
<td></td>
<td><a href="mailto:janssen@rj-laser.com">janssen@rj-laser.com</a></td>
<td></td>
<td><a href="http://www.rj-laser.com">www.rj-laser.com</a></td>
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<tr>
<td>Rx Vitamins, Inc (Booth 10)</td>
<td></td>
<td>150 Clearbrook Road</td>
<td>Elmsford, NY 10523</td>
<td>(800) 792-2222</td>
<td></td>
<td><a href="mailto:info@rxvitamins.com">info@rxvitamins.com</a></td>
<td></td>
<td><a href="http://www.rxvitamins.com">www.rxvitamins.com</a></td>
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<tr>
<td>The Honest Kitchen (Booth 11)</td>
<td></td>
<td>145 14th St</td>
<td>San Diego, CA 92101</td>
<td>(866) 437-9729</td>
<td></td>
<td><a href="mailto:info@thehonestkitchen.com">info@thehonestkitchen.com</a></td>
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</tr>
</tbody>
</table>
# SCHEDULE

## Tuesday, May 14, 2013

<table>
<thead>
<tr>
<th>Time</th>
<th>Title</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>10:00-5:00</td>
<td>IVAS Board of Directors Meeting</td>
<td>Bonnet Carre</td>
</tr>
</tbody>
</table>

## Wednesday, May 15, 2013

<table>
<thead>
<tr>
<th>Time</th>
<th>Title</th>
<th>Location</th>
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<tbody>
<tr>
<td>9:00-noon</td>
<td>IVAS House of Delegates Meeting</td>
<td>Royal Salon B</td>
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<tr>
<td>2:00-5:00</td>
<td>IVAS Committee Meeting</td>
<td>Pontalba Room</td>
</tr>
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</table>

## Thursday, May 16, 2013 – Exhibits open 9:00 a.m. to 8:00 p.m.

<table>
<thead>
<tr>
<th>Time</th>
<th>Title</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>10:00-10:50</td>
<td>Current Status of Research and Evidence as Applied to Acupuncture - Dr. Bonnie Wright</td>
<td>East/West Ballrooms</td>
</tr>
<tr>
<td>11:00-12:00</td>
<td>Acupuncture for Gastrointestinal and Renal Disease - Dr. Bonnie Wright</td>
<td>East/West Ballrooms</td>
</tr>
<tr>
<td>12:00-1:00</td>
<td>LUNCH – Queen Anne / Parlor / Bonnet Carre</td>
<td>East/West Ballrooms</td>
</tr>
<tr>
<td>1:00-1:50</td>
<td>Acupuncture and Immune Modulation - Dr. Bonnie Wright</td>
<td>East/West Ballrooms</td>
</tr>
<tr>
<td>2:00-3:00</td>
<td>Controversies in Medicine: Surgical Versus Non-Surgical Approaches - Dr. Bonnie Wright</td>
<td>East/West Ballrooms</td>
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<td>2:00-5:00</td>
<td>AAVA Board of Directors Meeting</td>
<td>Beauregard Room</td>
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<tr>
<td>6:00-8:00</td>
<td>Welcome to New Orleans Reception</td>
<td>Queen Anne / Parlor / Bonnet Carre</td>
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<tr>
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</tr>
<tr>
<td><strong>SMALL ANIMAL TRACK</strong></td>
<td><strong>LARGE ANIMAL and GENERAL INTEREST</strong></td>
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</tr>
<tr>
<td>8:30-9:20</td>
<td>Small Animal Rehab - Dr. Maria Glinski</td>
<td>La Nouvelle Orleans West Ballroom</td>
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<td>9:30-10:20</td>
<td>Small Animal Rehab (cont'd) - Dr. Maria Glinski</td>
<td>La Nouvelle Orleans West Ballroom</td>
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<tr>
<td><strong>10:20-10:50</strong></td>
<td><strong>COFFEE BREAK – Queen Anne / Parlor / Bonnet Carre</strong></td>
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<td>10:50 - 11:40</td>
<td>Small Animal Rehab (cont'd) - Dr. Maria Glinski</td>
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<td>11:50 - 12:40</td>
<td>Small Animal Rehab (cont'd) - Dr. Maria Glinski</td>
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<td>1:40-2:30</td>
<td>Canine Ear Acupuncture, Easy Entry to Acupuncture by Western Thinking – Dr. Uwe Petermann</td>
<td>La Nouvelle Orleans West Ballroom</td>
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<tr>
<td>2:40-3:30</td>
<td>Canine Laser Acupuncture, A Symbiosis of Acupuncture and Low Level Laser Therapy – Dr. Uwe Petermann</td>
<td>La Nouvelle Orleans West Ballroom</td>
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<tr>
<td>3:40-4:30</td>
<td>A Critical Approach on Acupuncture for Treating Chronic Pain – Dr. Stelio Luna</td>
<td>La Nouvelle Orleans West Ballroom</td>
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<td><strong>ANNUAL GENERAL MEETINGS</strong></td>
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<td>6:00-7:00</td>
<td>IVAS Annual General Meeting of the Membership</td>
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<td>7:00-8:00</td>
<td>AAVA Annual Meeting</td>
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### Saturday, May 18, 2013 – Exhibits open 8:00 a.m. to 6:00 p.m.

<table>
<thead>
<tr>
<th>Time</th>
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<th>Location</th>
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<tbody>
<tr>
<td><strong>8:30-9:20</strong></td>
<td>Feline TCM Therapy – Dr. Michele Gaspar</td>
<td>La Nouvelle Orleans West Ballroom</td>
<td>Equine Ear Acupuncture, Easy Entry to Acupuncture by Western Thinking - Dr. Uwe Petermann</td>
<td>La Nouvelle Orleans East Ballroom</td>
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<td><strong>9:30-10:20</strong></td>
<td>Feline TCM Therapy (cont’d) – Dr. Michele Gaspar</td>
<td>La Nouvelle Orleans West Ballroom</td>
<td>Equine Laser Acupuncture, A Symbiosis of Acupuncture and Low Level Laser Therapy - Dr. Uwe Petermann</td>
<td>La Nouvelle Orleans East Ballroom</td>
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<tr>
<td>10:20-10:50</td>
<td><strong>COFFEE BREAK</strong> – Queen Anne / Parlor / Bonnet Carre</td>
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<tr>
<td><strong>11:00-12:00</strong></td>
<td>Traditional Chinese Veterinary Medicine (TCVM) Food Therapy – Dr. Signe Beebe</td>
<td>La Nouvelle Orleans West Ballroom</td>
<td>Effect of Acupuncture on Generalized Peripheral Edema in Two Intensive Care Patients with a History of a Liver Lobectomy - Dr. Wendy Wallace</td>
<td>La Nouvelle Orleans East Ballroom</td>
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<td><strong>12:00-1:00</strong></td>
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<tr>
<td><strong>1:00-2:00</strong></td>
<td>Traditional Chinese Veterinary Medicine (TCVM) Food Therapy (cont’d) – Dr. Signe Beebe</td>
<td>La Nouvelle Orleans West Ballroom</td>
<td>Proof of Acupuncture Effectiveness: Are Double-Blind Studies the Only Choice for Validity? - Dr. Michelle Schraeder</td>
<td>La Nouvelle Orleans East Ballroom</td>
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<tr>
<td><strong>3:00-4:00</strong></td>
<td>Can Myofascial Kinetic Lines Be An Anatomical Foundation For Acupuncture Meridians? - Dr. Rikke Schultz</td>
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<td><strong>3:30-4:30</strong></td>
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<tr>
<td><strong>4:30-5:30</strong></td>
<td>Can Myofascial Kinetic Lines Be An Anatomical Foundation For Acupuncture Meridians? (cont’d) - Dr. Rikke Schultz</td>
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<tr>
<td><strong>5:00-6:00</strong></td>
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<tr>
<td><strong>7:00-Midnight</strong></td>
<td><strong>BANQUET and DANCE</strong> – East/West Bienville Ballrooms</td>
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</tbody>
</table>

### Sunday, May 19, 2013 – Exhibits open 8:00 a.m. to 1:00 p.m.

<table>
<thead>
<tr>
<th>Time</th>
<th>Title / Speaker</th>
<th>Location</th>
<th>Title / Speaker</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>8:30-9:20</strong></td>
<td>Pulse Diagnosis Made Easier – Dr. Steve Marsden</td>
<td>Royal Salon A, B</td>
<td>Rehab Techniques for the TCVM Practitioner (cont’d) - Dr. Janice Huntingford</td>
<td>Royal Salon C, D</td>
</tr>
<tr>
<td><strong>9:30-10:20</strong></td>
<td>Stimulating Acupuncture Points – Dr. Steve Marsden</td>
<td>Royal Salon A, B</td>
<td>Rehab Techniques for the TCVM Practitioner (cont’d) - Dr. Janice Huntingford</td>
<td>Royal Salon C, D</td>
</tr>
<tr>
<td><strong>10:20-10:50</strong></td>
<td><strong>COFFEE BREAK</strong> – Queen Anne / Parlor / Bonnet Carre</td>
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<tr>
<td><strong>11:00-12:00</strong></td>
<td>Why Do We Have Acupuncture Points? – Dr. Steve Marsden</td>
<td>Royal Salon A, B</td>
<td>Can Myofascial Kinetic Lines Be An Anatomical Foundation For Acupuncture Meridians? - Dr. Rikke Schultz</td>
<td>Vieux Carre Room</td>
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<tr>
<td><strong>12:00-1:00</strong></td>
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<tr>
<td><strong>1:00-2:00</strong></td>
<td>Why Do We Have Acupuncture Points? (cont’d) – Dr. Steve Marsden</td>
<td>Royal Salon A, B</td>
<td>Can Myofascial Kinetic Lines Be An Anatomical Foundation For Acupuncture Meridians? (cont’d) - Dr. Rikke Schultz</td>
<td>Vieux Carre Room</td>
</tr>
<tr>
<td><strong>2:00-6:00</strong></td>
<td>Pulse Diagnosis Made Easier; Stimulating Acupuncture Points; Why Do We Have Acupuncture Points? – Dr. Steve Marsden</td>
<td>Royal Salon A, B</td>
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</tbody>
</table>
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2013
AAVA/IVAS
Joint Conference
on
Veterinary
Acupuncture
Current Status of Research and Evidence as Applied to Acupuncture
Bonnie Wright, DVM, DACVA, CVMA, CVPP, CCRP

- “Traditional Chinese Medicine serves as an ethnomedical backdrop for scientific development of the acupuncture.”
- Ethnomedicine /eth·no·med·i·cine/ (eth”no-med”i-sin) medical systems based on the cultural beliefs and practices of specific ethnic groups.
- Ethnomedicine is concerned with the study of medical systems from the native’s point of view. Native categories and explanatory models of illness, including aetiologies, symptoms, courses of sickness, and treatments are investigated (Kleinman, 1978; Kleinman, 1980). The ethnomedical approach proves particularly useful for the study of indigenous therapeutic agents because it allows the researcher to understand treatment patterns according to native explanatory models instead of only through the lens of biomedicine. by Peter Giovannini

Levels of Evidence Fundamental to Evidence Based Medicine in 2013
• Top Tier: Meta-analysis of RCT clinical trials
• Second tier: Placebo-controlled, double blind studies
• Third tier:
  - Physiological Basic-Science Studies
  - Laboratory Based efficacy studies
• Fourth tier: Clinical Case Studies
• Emerging debate: patient centered outcomes

2013 AAVA/IVAS Joint Conference on Veterinary Acupuncture
Top Tier Evidence in Acupuncture (117 Cochrane Studies):

<table>
<thead>
<tr>
<th>Meta-analysis Topic</th>
<th># studies (#people)</th>
<th>High/Low Quality</th>
<th>Conclusions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cancer Pain 2011</td>
<td>2 (204)</td>
<td>1 / 2</td>
<td>Insufficient Evidence to Judge</td>
</tr>
<tr>
<td>IBS 2012</td>
<td>17 (1806)</td>
<td>5 / 12</td>
<td>No benefits of acupuncture relative to a credible sham acupuncture control</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>for IBS symptom severity or IBS-related quality of life.</td>
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<td></td>
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<td>Comparative effectiveness trials:</td>
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<tr>
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<td></td>
<td></td>
<td>greater benefits from acupuncture than from drugs shown to benefit IBS.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Future trials needed.</td>
</tr>
<tr>
<td>Rheum Arthritis 2009</td>
<td>2 (84)</td>
<td>Medium</td>
<td>1+ and 1- Insufficient quality to conclude- assumes no efficacy</td>
</tr>
<tr>
<td>Appendixic Arthritis 2010</td>
<td>16 (3498)</td>
<td>Not stated</td>
<td>SS short term + over sham but did not meet clinically relevant thresholds.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Waiting list controlled trials show SS and relevant benefits</td>
</tr>
<tr>
<td>Shoulder Arthritis 2008</td>
<td>9 (&gt;500)</td>
<td>0 / 9</td>
<td>Little can be concluded: possible short term benefit</td>
</tr>
<tr>
<td>Asthma 2009</td>
<td>12 (350)</td>
<td>All poor</td>
<td>Insufficient evidence. Further research needs to consider the complexities</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>and different types of acupuncture.</td>
</tr>
<tr>
<td>Low Back Pain 2005</td>
<td>35</td>
<td>0 / 35</td>
<td>Acute LBP- no evidence of efficacy</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Chronic LBP acupuncture is more effective for pain relief and functional</td>
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<tr>
<td></td>
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<td></td>
<td>improvement than no treatment or sham treatment immediately after treatment</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>and in the short-term only.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Need HQT</td>
</tr>
<tr>
<td>Repro (embryo T) 2011</td>
<td>13</td>
<td>All small</td>
<td>+ results on day one of ET Placebo effect not excluded</td>
</tr>
<tr>
<td>Pelvic Pain 2011</td>
<td>24 lDed only 1 (67) met incl. criteria</td>
<td></td>
<td>The single included trial defined pain scores and cure rates according to the Guideline for Clinical Research on New Chinese Medicine.</td>
</tr>
</tbody>
</table>


The purpose of clinical trials of acupuncture is to help clinicians and patients make decisions about treatment. Yet this is not straightforward: some trials report acupuncture to be superior to sham (placebo) acupuncture while others show evidence that acupuncture is superior to usual care but not sham, and still others conclude that
acupuncture is no better than usual care. Meta-analyses of these trials tend to come to somewhat indeterminate conclusions. This appears to be because, until recently, acupuncture research was dominated by small trials of questionable quality.


Second tier: Placebo controlled double-blind studies

- Placebo treatment- not required to have a non-treatment (wait-list) group

Cochrane analysis of Placebo 2011: Hróbjartsson A, Gotzsche PC.

We did not find that placebo interventions have important clinical effects in general. However, in certain settings placebo interventions may influence patient-reported outcomes, especially pain and nausea, though it is difficult to distinguish patient-reported effects of placebo from response bias.

The results of this review do not imply that no-treatment control groups can replace placebo control groups in randomised clinical trials without a risk of bias.

Further research is needed to study the impact of bias (such as response bias and bias due to co-intervention) on the estimated effect of placebo, to study the association between type of outcome and bias, to explore which factors in the clinical setting are associated with different effects of placebo, and to explore the duration of effects.

- Blinding efficacy (Pill versus complex intervention).
- Binary outcomes favored (conception rates, number of cigarettes smoked).
  The streetlight effect and measurable outcomes.

Third Tier Studies: Physiologically Based and Laboratory Based Evidence

- FMRI studies: 282 studies (Nat’l library of science).
- Neurotransmitter measurements
- Physiological outcomes such as bowel motility, blood pressure, rate of healing
- Blood flow measurements
- Laboratory-based reduction in pain behaviors

Fourth Tier Studies: Clinical Case Studies

- Veterinary-species specific papers on a variety of treatments:
  o Intervertebral disk disease: dogs, ferret, cat
  o Pain control: dogs, cats, horses, goats
  o Otitis Externa: dogs
  o Laryngeal hemiplegia: horses
  o Arthritis: dogs, horses, tortoise
Patient Centered outcomes in Veterinary Medicine

**Kaptchuk: Placebo studies and ritual theory (ethnomedical relationships)**

- Rituals have neurobiological correlates. This suggests that patient improvement is not only report bias or desire to please the healer but represents changes in neurobiology. Specific areas of the brain are activated and specific neurotransmitters and immune markers may be released.
- Biomedical treatment with powerful medications has a ritual component that is clinically significant.
- As with pharmaceuticals, each type of ritual, for example, fake needles versus fake pills, has a unique outcome.
- Components of rituals can be disaggregated and incrementally combined in a manner analogous to a dose response. For example, adjusting components of a ritual could make it more or less persuasive.
- When engaged in a ritual, patients do not abandon practical sensibilities. Hope, openness and positive expectancy are tempered with uncertainty and realistic assessment.
- Different healers can have different effects on patients even when they perform an identical prospectively defined precise scripted interaction.
- At a minimum, healing rituals provide an opportunity to reshape and recalibrate selective attention [71–73]. In a more expanded model, rituals trigger specific neurobiological pathways that specifically modulate bodily sensations, symptoms and emotions. It seems that if the mind can be persuaded, the body can sometimes act accordingly. Placebo studies maybe one avenue to connect biology of healing with a social science of ritual. Both placebo and ritual effects are examples of how environmental cues and learning processes activate psychobiological mechanisms of healing.
Acupuncture for Gastro-Intestinal and Renal Disease
Bonnie Wright, DVM, DACVA, CVMA, CVPP, CCRP

Biochemical and neuro-physiological rationale for acupuncture’s effects on visceral structures:

1) Viscero-somatic convergence


2) Organ blood flow


- ST-7 and LI-4 dry needling (10 twists at 2 minute intervals over 30 minutes) altered organ blood flow in the muscle, kidney, brain and heart (P>0.05, versus control),
- Acupuncture stimulation increases the blood flow of several organs by modulating the central circulatory systems, and the effects differed with sites of stimulation.
Gastro-intestinal disease and acupuncture:

Table with permission: ©Narda Robinson: Medical Acupuncture for Veterinarians, 2012

<table>
<thead>
<tr>
<th>Human and Experimental Animal Studies</th>
<th>Outcome</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Effects of acupuncture on intestinal motility</strong></td>
<td>Acupuncture at certain points either increases or decreases intestinal motility. These results suggest that acupuncture at ST-36 induces dual effects, either stimulatory or inhibitory, on gastric motility. The stimulatory effects are mediated in part via vagal efferent and opioid pathways.</td>
</tr>
<tr>
<td><strong>Gastric myoelectric activity</strong></td>
<td>Electroacupuncture can promote gastric myoelectric activity, regulated by the vagal nerve and nuclei.</td>
</tr>
<tr>
<td><strong>Treatment of liver damage</strong></td>
<td>Acupuncture may be effective in treating liver injury induced by carbon tetrachloride in rats.</td>
</tr>
<tr>
<td><strong>Inhibition of gastric acid secretion</strong></td>
<td>Strong stimulation of certain acupuncture points results in a significant reduction in gastric acid secretion.</td>
</tr>
<tr>
<td><strong>Acupuncture for GI endoscopy</strong></td>
<td>Acupuncture produces effects similar to conventional premedication.</td>
</tr>
<tr>
<td><strong>Gastric emptying in dogs</strong></td>
<td>EA at ST 36 attenuated rectal distension-induced delay in gastric emptying. This stimulatory effect was blocked by noloxone.</td>
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</tbody>
</table>

1) **Gastric Motility**


- Molecular mechanisms behind efficacy of ST-36 for GI motility disorders 2-3m A pulse of 0.5ms duration at a frequency of 4Hz for 20 min by a pair of needle electrodes inserted 3mm depth into the skin.
- Control CV-12 The abdomen point was also inserted to a depth of 3mm and stimulated with the same protocol.
- Enhanced NMDAR-mediated synaptic transmission in gastric-projecting neurons of the dorsal motor nucleus of the vagus (DMV)
- Intra gastric pressure dramatically increased by ST-36 and decreased by CV-12
- suppression of presynaptic μ-opioid receptors may contribute
2) Gastric Mucosal Integrity and Healing


- Four groups: no treatment, injury only, treatment after injury, treatment before
- Acupuncture was applied to "Zusanli"(ST-36), "Zhongwan" (CV-12) and "Neiguan" (PC-6) for 20 min, once daily for 5 days
- Gastric mucosal ulcer index, plasma and hypothalamic beta-endorphin
- Gastrointestinal propulsion rate was increased remarkably in the prevention group (P < 0.05), and the gastric mucosal ulcer indexes and the contents of plasma beta-EP level were decreased obviously in both treatment and prevention groups (P < 0.05, P < 0.01). The contents of hypothalamic beta-EP were increased
- Acupuncture of ST-36, CV-12 and PC-6 can promote the repair of gastric mucosal injury and improve gastrointestinal function, which may be related to its effects in reducing plasma beta-EP and up regulating hypothalamic beta-EP level. Acupuncture also has an effect in preventing gastric mucosal injury.
Kidney Disease and Acupuncture


- Electroacupuncture bilateral ST-36 for 30 minutes daily x 5 days using 2 Hz continuous frequency.
- Reduction in renal hypertension and measured increase in Nitric Oxide Synthase


- Electroacupuncture bilateral Zusanli (ST-36) and Neiguan (PC-6) for 30 minutes prior to kidney injury
- Plasma cytokines, plasma nitrite, renal inducible nitric oxide synthase (iNOS) and nuclear factor κB (NF-κB), Blood urea nitrogen (BUN), creatinine (Cr) and histopathological score for renal tubular damage were measured
- Electroacupuncture pretreatment significantly decreased: tumour necrosis factor-α, interleukin (IL)-1β, plasma nitrite, renal iNOS and NF-κB activity and increased plasma IL-10. It also significantly decreased LPS-induced BUN, Cr and the renal histopathological score.
- These findings suggest that electroacupuncture pretreatment at the ST-36 and PC-6 acupoints attenuated inflammatory response and mitigated acute kidney injury.


- Groups: no surgery, sham surgery, 1 and 7/8 nephrectomy surgery, surgery +acup and surgery + electroacup
- Zusanli (ST-36) and Taixi (KI-3) for 10 minutes daily for 10 days
- Significant for EAP versus sham and no surgery (returned to baseline) and EAP versus surgery only
EA treatment also showed:
- Glomerulosclerosis and tubulointerstitial fibrosis were attenuated
- Reduced albuminuria relative to RF group
- BUN and creatinine concentrations were decreased
- Increases in insulin-like growth factor-I (IGF-I) mRNA and protein levels were increased in both the kidney and the serum
- Decreased markers of oxidative stress (inducible nitric oxide synthase, heme oxygenase and thiobarbituric acid-reactive substance expression),
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Acupuncture for Immune Modulation
Bonnie Wright, DVM, DACVA, CVMA, CVPP, CCRP

Diseases referable to alterations in immune modulation:
Allergic Disorders (asthma, urticaria, rhinitis, otitis externa)
Infections
Auto-immune diseases
Immune deficiency syndromes
Cancer

Proposed Mechanisms of Immune Modulation:

1) Reinforcement of natural killer (NK) cell cytotoxicity
2) Modulate balance of T-cell sub-types
3) Neural-immune communication

NK cells:
- Lymphocytic cell that recognizes and attacks tumor cells or virus infected cells without previous sensitization.
- Acupuncture at ST-36 has been shown in multiple studies to upregulate NK cell activity and improve binding to target cells

T-cells:
- Th1 cells produce IL-2, IFN-γ and TNF-β that are primarily responsible for cell-mediated immunity or delayed type hypersensitivity (DTH)
- Th2 cells produce IL-4, IL-5, IL-10 and IL-13 that are mainly involved in humoral immunity.
- Imbalance between the two subtypes has been proposed as a cause for infectious, allergic and auto-immune disease, with an over-production of Th2 producing IL-4
- Electro-acupuncture at ST-36 (but not at distant non-acupoints) suppressed IL-4, and noradrenergic signaling played a role
- Rheumatoid arthritis is thought to be more Th1 cell related. In a RA model ST-36 EA stimulation (3 times a week for 1–2 months) reduced arthritis-incidence, prevented histological destruction of joint and downregulated serum levels of IFN-γ and TNF-α
- Acupuncture treatments have dual immunomodulatory effect in either Th1- or Th2-skewed conditions to maintain homeostasis.

**Neural-immune System:**
- Acupuncture and EA facilitate release of a wide variety of neurotransmitters (Opioids, cannabinoids, serotonin, norepinepherine, etc.) and activate either the sympathetic or parasympathetic nervous systems in a spatio-temporal specific pattern. These effects elicit measurable psychophysical responses including analgesia, regulation of visceral functions and immune modulation.
- EA treatment activates the hypothalamus (primary center for neuroendocrine-immune modulation and regulator of the autonomic nervous system)
- Circulating endorphins can modify the activity of a variety of immune cells which express opioid receptors (including NK cells)
- Non-opioid systems are also involved. EA and GV-4 showed a suppressive effect on delayed-type hypersensitivity that was not reversed by opioid antagonists. Both catecholamines and serotonin have been implicated.
- Acupuncture treatment may affect somewhat different neural-immune signaling pathway depending on the condition (e.g. normal vs. Th1-dominant vs. Th2-dominant conditions).
### Veterinary Studies

<table>
<thead>
<tr>
<th>Condition</th>
<th>Description</th>
</tr>
</thead>
</table>
| **Recurrent otitis in dogs** | Dogs receiving verum acupuncture experienced fewer episodes of otitis relapse than did dogs receiving sham acupuncture in a randomized controlled trial of 31 dogs.  
| **Canine otitis externa**    | Dogs with naturally acquired otitis externa received either antibiotics (control), bee venom injection, or both bee venom and antibiotics. Bee venom was injected into TH 17, SI 19, GB 3, and TH 3 bilaterally. Both groups receiving bee venom api-acupuncture exhibited decreased bacterial cell counts compared to control. |
| **Wound healing in dogs**   | A single treatment of dry needling acupuncture in dogs following soft tissue or orthopedic surgery did not appear to produce any beneficial effects in surgical wound healing. |

### Table

<table>
<thead>
<tr>
<th>Technique</th>
<th>Acupoints</th>
<th>Immune Function</th>
<th>Reference(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acupuncture</td>
<td>PC-6, LI-4, ST-36, CV-4</td>
<td>Increases CD3(^+), CD4(^+)/CD8(^+) ratio</td>
<td>(Wu 1995; Wu et al. 1996)</td>
</tr>
<tr>
<td>Acupuncture</td>
<td>PC-6, LI-4, ST-36, SP-6</td>
<td>Increases CD3(^+), CD4(^+)/CD8(^+) ratio</td>
<td>(Yuan and Zhou 1993)</td>
</tr>
<tr>
<td>EA</td>
<td>PC-6, LI-4, ST-36, SP-6</td>
<td>Increases CD3(^+), CD4(^+)/CD8(^+) ratio</td>
<td>(Wang et al. 2004)</td>
</tr>
<tr>
<td>Acupuncture</td>
<td>ST-36, LI-11, CV-6</td>
<td>Increases IL-2 levels, NKC</td>
<td>(Wu et al. 1994)</td>
</tr>
</tbody>
</table>
Immune stimulation acupoints:
   Hegu (LI-4)
   Quchi (LI-11)
   Taichong (Liv-3)
   Tianshu (ST-25)
   Zusanli (ST-36)
   Shangjuxu (ST-37)
   Xuanzhong (GB-39)
   Sanyinjiao (SP-6)
   Dazhui (GV-14)
   Dazhu (BL-11)
   Pishu (BL-20)
   Shenshu (BL-23)
   Qihaishu (BL-24)
   Dachangshu (BL-25)
   Guanyuanshu (BL-26)
   Xiaochangshu (BL-27)
   Pangguanshu (BL-28)
   Guanyuan (CV-4)
   Zhongwan (CV-12)

Immune suppressive effects: Zhishi (BL-52)
Anti-febrile points GV-14 and ST-36
Controversies in Veterinary Medicine-Surgical Versus Non–Surgical Approaches
Bonnie Wright, DVM, DACVA, CVMA, CVPP, CCRP

• Top Tier: Meta-analysis of RCT clinical trials
• Second Tier: Placebo-Controlled, Double Blind Studies
• Third Tier: Physiological Basic-Science Studies Laboratory Based Efficacy Studies
• Fourth Tier: Clinical Case Studies

Evidence-based veterinary medicine (EBVM) is the conscientious, explicit and judicious use of the current best evidence in making decisions about the care of individual patients. Acupuncture is frequently excluded from designation because it does not hold up in the top tier of evidence based medicine, has mixed results in the second tier, and relies heavily on the third tier. However, it would be false pride to assume that most of conventional veterinary medicine DOES fulfill the requirements of EBVM, and it is very instructive to apply similar scrutiny to several conditions in which surgery has been taught to be the standard of care.

Intervertebral Disk Disease: Typically promoted standard of Care in VM- immediate surgery.


Fusion is no more effective than intensive rehabilitation, slightly to moderately more effective than non-intensive therapy. Surgical disk removal moderately superior for 2-3 months, but after that the two groups are similar in many studies. Laminectomy for spinal stenosis is moderately superior to non-surgical therapy for 1-2 years only.

Paraplegia: Pollard, Apple. Factors Associated With Improved Neurologic Outcomes in Patients With Incomplete Tetraplegia. Spine Issue: Volume 28(1), 1 January 2003, pp 33-38 Neurologic recovery was not related to the following interventions: high-dose methylprednisolone administration, early definitive surgery, early anterior decompression for burst fractures or disc herniations, or decompression of stenotic canals without fracture.

Background. Back pain is a common problem and a major cause of disability and health care utilization. Purpose. To evaluate the efficacy, harms, and costs of the most common CAM treatments (acupuncture, massage, spinal manipulation, and mobilization) for neck/low-back pain. Data Sources. Records without language restriction from various databases up to February 2010. Data Extraction. The efficacy outcomes of interest were pain intensity and disability. Data Synthesis. Reports of 147 randomized trials and 5 nonrandomized studies were included. CAM treatments were more effective in reducing pain and disability compared to no treatment, physical therapy (exercise and/or electrotherapy) or usual care immediately or at short-term follow-up. Trials that applied sham-acupuncture tended towards statistically nonsignificant results.

**Canine meta-analysis:** None available

**Second tier studies** (RCT trials): There are no RCT’s in Veterinary Medicine comparing surgical approaches with intensive non-surgical approaches. All surgical studies compare to no treatment, minimal treatment or questionnaire. The following reference is an exception, but it is >48 hours post-injury (considered poorer prognosis despite surgical repair)

Joaquim, Luna, Brondani. Comparison of decompressive surgery, electroacupuncture, and decompressive surgery followed by electroacupuncture for the treatment of dogs with intervertebral disk disease with long-standing severe neurologic deficits. *J Am Vet Med Assoc*, 2010 Jun 1;236(11):1225-9 The proportion of dogs with clinical success was significantly higher for dogs that underwent EAP (15/19) than for dogs that underwent DSX (4/10); the proportion of dogs with clinical success for dogs that underwent DSX + EAP was intermediate (8/11).

Conclusions and Clinical Relevance: EAP was more effective than DSX for recovery of ambulation and improvement in neurologic deficits in dogs with long-standing severe deficits attributable to thoracolumbar IVDD.
Third Tier Studies:
Table used with permission © Narda Robinson, Medical Acupuncture for Veterinarians’ 12

<table>
<thead>
<tr>
<th>Spinal cord injuries in humans</th>
<th>The use of auricular acupuncture and electroacupuncture, when implemented early in acute spinal cord injury, can contribute to significant neurologic and functional recovery. 86</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wobbler syndrome in dogs</td>
<td>Dogs receiving acupuncture for presumed wobbler’s syndrome improved with acupuncture. 89</td>
</tr>
<tr>
<td>Peripheral nerve injury</td>
<td>Acupuncture facilitates recovery of peripheral nerves, including the median nerve 100,101 and radial nerve. 102</td>
</tr>
<tr>
<td>Spinal cord plasticity in cats</td>
<td>Following removal of dorsal root ganglia in cats, acupuncture reverses the decrease in glial cell line-derived neurotrophic factor and basic fibroblast growth factor. 103</td>
</tr>
</tbody>
</table>


Cruciate Disease: Typically promoted standard of Care in VM- immediate surgery limits arthritis with a preference for TPLO, especially in large or active dogs.

Human Meta-analysis:

Some authors assumed that the incidence of further meniscus lesions could probably be reduced if the torn ACL was surgically reconstructed. But, we have no evidence to believe that this would be due to the surgical repair rather than to a decrease of involvement in strenuous activities. At present it is not demonstrated that ACL-plasty can prevent osteoarthritis. Numerous factors could explain evolution to arthrosis whatever the treatment for the ACL-ruptured knee. Studies comparing surgical and conservative treatments confirm that ACL reconstruction is not the pre-requisite for returning to sporting activities. More recent and scientifically well-designed studies demonstrate that conservative treatment could give satisfactory results for many patients.

CONCLUSION: At present there are no evidence-based arguments to recommend a systematic surgical reconstruction to any patient who tore his ACL. Knee stability can be improved not only by surgery but also by neuromuscular rehabilitation. Whatever the treatment, fully normal knee kinematics are not restored. While the patients wish to go back to their sport and want everything possible done to prolong their ability to perform these activities, they should be informed that the risk of further knee lesions and osteoarthritis remains high, whatever the treatment, surgical or conservative.

AUTHORS’ CONCLUSIONS: There is insufficient evidence from randomised trials to determine whether surgery or conservative management was best for ACL injury in the 1980s, and no evidence to inform current practice. Good quality randomised trials are required to remedy this situation

Canine Meta-analysis:


“At this time, the application of evidence-based medicine in analyzing the current available evidence suggests that there is not a single surgical procedure that has enough data to recommend that it can consistently return dogs to normal function after CCL injury. The requirement for assessing and categorizing the available evidence becomes increasingly important as more data becomes available and the quality of research improves. An evidence-based medicine paradigm did not provide sufficient evidence favoring 1 surgical technique for management of canine CCL injury.”

This review assesses the evidence for the efficacy of therapies used in the management of osteoarthritis in dogs on the basis of papers published in peer-reviewed journals in English between 1985 and July 2007. Sixty-eight papers were identified and evaluated. They considered four alternative therapies, one use of functional food, two intra-articular agents, six nutraceutical agents, 21 pharmacological agents, two physical therapies, three surgical techniques and two combinations of weight control. There was a high level of comfort (strong evidence) for the efficacy of carprofen, firocoxib and meloxicam, and a moderate level of comfort for the efficacy of etodolac in modifying the signs of osteoarthritis. There was a moderate level of comfort for the efficacy of glycosaminoglycan polysulphate, licofelone, elk velvet antler and a functional food containing green-lipped mussel for the modification of the structures involved in the disease. There was weak or no evidence in support of the use of doxycycline, electrostimulated acupuncture, extracorporeal shockwave therapy, gold wire acupuncture, hyaluronan, pentosan polysulphate, P54FP (extract of turmeric), tiaprofenic acid or tibial plateau levelling osteotomy.
Third Tier Studies

Large number of physiologic and radiographic studies for both surgical approaches and non-surgical approaches.

Table with permission: ©Narda Robinson: Medical Acupuncture for Veterinarians, 2012

<table>
<thead>
<tr>
<th>Human and Experimental Animal Studies</th>
<th>Outcome</th>
</tr>
</thead>
<tbody>
<tr>
<td>Calcaneal tendon repair</td>
<td>Following full thickness “splitting” of the calcaneal tendon in 10 dogs with a scalpel blade, 5 dogs received EA to GB 39 [the paper states “GB 30” but the figure showing treatment looks more like GB 39 or GB 36/7], BL 40, and ST 36. The other 5 received no treatment. Dogs in the acupuncture group had fewer periarticular adhesions, with fewer inflammatory cells, no tenosynovitis, and regular as well as parallel arrangement of collagenous fiber bundles of normal thickness in the epitenon and peritenon. Researchers concluded that acupuncture promoted tendon healing and faster remodeling of collagen fibers.</td>
</tr>
</tbody>
</table>

Veterinary Studies

| Bone healing in radius-ulna fracture in dogs | EA applied twice weekly for 4 weeks to dogs with radius-ulna fracture did not demonstrate accelerated bone healing or bone mineral density during the 45-day follow-up. |


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Small Animal Rehabilitation  
Maria Glinski, DVM, MS, CVA  
CARE Center  
Aiken, SC, USA

Definition

Physical rehabilitation has been defined as the “science of the application of biomechanics, physics, anatomy, physiology and psychology to patients with dysfunction, injury, pain or physical abnormalities.” From a veterinary perspective, rehabilitation is a non-invasive way to restore optimal mobility and function to an animal’s musculoskeletal system. Rehabilitation allows veterinarians to facilitate the return to normal function as soon as possible following disease, injury or surgery. It is also used to relieve acute or chronic pain.

Benefits

The benefits of rehabilitation include decreased pain, inflammation, and swelling; reduced recovery time; reduced post-op complications; stimulation or restoration of the neuromuscular system; reduction and prevention of muscle atrophy; minimized secondary trauma due to surgery or injury; improved joint biomechanics and flexibility; improved cardiovascular function and stimulation of blood circulation; improved performance, speed, strength, endurance, and quality of movement; improved weight management; enhanced conditioning for canine athletes, obese or deconditioned pets; positive psychological effects; and prevention of further injury through owner education.

Pre-Hab

Another lesser-known aspect of rehabilitation is the concept of “pre-hab” where the practitioner can assist with fortifying muscle groups at risk for atrophy while preparing a patient for orthopedic surgery. This method of rehab is especially helpful for high risk or obese patients; however, any patient can benefit from a period of pre-hab. During this period before surgery, supporting muscle mass can be increased, weight loss can be initiated in overweight patients, abnormal blood values can be addressed, and the cardiovascular system can be stabilized. As a side benefit, surgery is occasionally unnecessary after four to six weeks of an intensive pre-hab program.

Common Conditions Treated

Commonly treated conditions in veterinary rehabilitation include the following:

- Gait Abnormalities
- Obesity
- Post-Surgical Recovery
  - CCL Repair
  - Coxo-femoral Joint Replacement
Disc Surgery
FHNE
Patellar Luxation Repair
Amputation

Congenital Disorders
Elbow Dysplasia
Hip Dysplasia
Shoulder OCD
Patellar Luxations

Geriatric Disorders
Osteo-arthritis
Spondylosis

Neuro-muscular Disorders
Degenerative Myelopathy
Intervertebral Disc Disease
Laryngeal Paralysis
Cauda Equina Syndrome
Vestibular Disorders

Trauma or Injury induced
Medial Shoulder Instability (MSI)
Collateral Ligament Tear
Supraspinatus Muscle Tear
Bicipital Tenosynovitis
Carpal Sprains
Cranial Cruciate Tear
Iliopsoas Muscle Tear
Wound Management
Spinal Injuries
Joint Dislocations
Peripheral Nerve Injury
Spinal Misalignments

Therapeutic Modalities

Common modalities used in rehabilitation include manual techniques, thermal therapy, therapeutic ultrasound, acupuncture, electrical stimulation, cold laser, and shockwave.

Manual techniques include range of motion, stretching, cross-fiber, soft tissue mobilization, massage, myofascial release, joint mobilization, and chiropractic care.
Thermal therapy is the use of physical agents to heat or cool the tissue up to one cm beneath the surface of the skin. Cold (cryo) therapy is used to decrease pain and inflammation, decrease sensory and motor nerve conduction velocity, and reduce cellular metabolism and permeability. It also helps to constrict blood vessels, thus decreasing swelling and/or bleeding post-op or post-trauma. Heat therapy increases collagen’s ability to stretch, increases blood flow, decreases pain and spasms, increases tissue enzyme activity (thus enhancing the rate of healing), and increases muscle contractility and extensibility.

Therapeutic ultrasound can heat tissues up to five cm beneath the surface of the skin. Ultrasound increases circulation; increases the ability of muscle tissue to contract and relax; decreases pain and muscle spasms; decreases inflammation; and speeds wound healing. Phonophoresis is the use of sound waves to deliver medication locally through the skin. It reduces the risk of side effects related to the oral or injectable delivery.

Acupuncture may be defined as the stimulation of a specific point on the body, referred to as an acu-point. Stimulation of an acupoint activates nerve fibers. These fibers conduct electrical signals that stimulate the release of endorphins and other neurotransmitters. Acupuncture has also been found to help increase local circulation. Physiological changes in response to acupuncture point stimulation are the basis of clinical treatment. Acupuncture is exceptionally useful in rehab because of its ability to disrupt the pain cycle.

There are several types of electro-stimulation used in rehabilitation. Electro-acupuncture is used to enhance an acupuncture treatment. Neuro-muscular electro-stimulation (NMES) is the application of low-level electrical current to stimulate a muscle contraction. It mimics strength training for non-weight bearing animals; it prevents atrophy post-op or post-trauma; and it can be used to increase strength for muscles that are chronically under-utilized. Micro-current is used to stimulate healing on a cellular level. Interferential current is commonly used for relieving discomfort. Transcutaneous electrical stimulation (TENS) is used to block the body’s perception of pain.

Laser therapy (also known as “cold” laser) uses L.A.S.E.R. (Light Amplification by Stimulated Emission of Radiation) to repair tissues through photo-bio-stimulation. It works on a cellular level to speed the healing process. Laser therapy relieves muscle and joint soreness; relieves the symptoms of osteo-arthritis; relaxes muscle spasms; and increases blood flow.

Extracorporeal shockwave therapy (ESWT) utilizes a series of focused high-pressure acoustic pulses (sound waves) that travel from the probe through the skin and soft tissue to help relieve pain and enhance healing caused by osteo-arthritis and soft tissue (tendon and ligament) injuries.
**Therapeutic Exercise**

There are several examples of therapeutic exercise that can be prescribed for rehabilitation patients. A personalized home rehab program is designed for patients in the process of healing from a soft tissue injury or recovering from orthopedic surgery. This is a critical period because many owners are impatient and want to get their dog back into the home routine or back into competition as soon as possible. It is important for the rehabilitation therapist to carefully educate the owner to help prevent re-injury. As the patient is healing, the following facets of therapeutic exercise are incorporated into a therapeutic home exercise plan (HEP): 1) Strength, 2) Flexibility, 3) Endurance, 4) Balance and Proprioception, 5) Preparation & Recovery and 6) Skill-Specific Training. Some of these facets cannot help but overlap, thus complementing each other.

Strength training is closely linked to speed – the stronger the patient becomes, the faster he becomes. The following are some examples of strength training that can be done indoors, as well as outdoors:

- Begging – Sitting up and then standing up on hind legs
- Sit to Stands and Down to Stands
- Tugging – Low and high
- Spinning – Left and right
- Rolling over – Both sides
- Catching a ball – Low and high
- Crawling – on carpet or grass, or under a heavy piece of furniture
- Backing-up – on secure surface
- Jumping – known as plyometrics
- Retrieving
- Trotting/galloping up hills
- Playing with other dogs (no body slamming)
- Stair Stepping
- Wheel Barrowing (holding up hind legs and walking forward)
- Dancing (you holding up front legs and walking backwards)

These exercises move the body over short distances - they target the core, front quarters and hindquarters. An especially effective core strengthener is the “beg.” This may take several days to train and some dogs may only be able to hold for one to two seconds to start. The goal is to encourage the dog to sit up in a beg position and hold for 15 seconds; sit for 15 seconds; repeat three times. The next step is to have the dog stand up on his hind legs and hold the beg position for 15 seconds; sit for 15 seconds; repeat three times. It is important to instruct the owner to always perform these exercises on a firm, non-slip surface. As the patient gets stronger, the beg position can be performed on an incline or decline. Owners can even progress to a soft bed or air mattress; an egg shaped exercise ball offers a more advanced challenge. It is important to make sure the patient stays as still as possible during the exercise for maximum core strengthening. Begging is an excellent strengthening tool – many canine athletes have weak abdominal muscles because many owners do not know how to target these core muscles. It is
recommended that owners work on building strength three times per week, working up to 15-minute sessions.

Flexibility is linked to the dog’s ability to lengthen the stride and reach forward through the shoulders – to accommodate the trunk through the weaves (for instance) with suppleness – to stretch the hind legs with maximum spread over jumps.

There are two types of stretching: active vs. passive. Active stretching helps prepare the body through the full range of motion that will occur during extreme exertion, such as a competition. Active implies that the dogs are doing the stretches themselves, with encouragement and guidance from the owner. The following active stretching exercises will improve flexibility:

- Play bowing – ventral extension of the spine
- Figure Eights – lateral flexion and extension of the trunk
- Cookie stretches – lateral, dorsal and ventral flexion/extension of spine
- High Fives – pectorals, deltoids and triceps

During passive range of motion (PROM), the owner is performing the stretch for the dog. PROM has been found to be most beneficial after vigorous exercise, and has actually been found to hinder competition performance if done immediately prior to an event. During a complete PROM session, every joint in the body is flexed and extended from the front digits to the shoulders and from the hind digits to the hips. Active stretches can be done daily and can be incorporated into the warm up portion of the endurance program. Passive stretches can also be done daily and can be incorporated into the cool down portion of the endurance program. Flexibility exercises are generally done for 5 to 20 seconds for 3 to 10 reps. The timing of the flexibility exercises is based on the personality of the dog, previous injuries, timing and environment. It is more important to do 3 high quality reps for 10 seconds with the dog relaxed and cooperating than trying to achieve higher reps with a dog and handler struggling through the process.

Endurance, often called stamina, is linked to the dog’s cardio-vascular conditioning program. Conditioning is generally done five days per week, with two non-consecutive days off. Power walking is an ideal form of conditioning. From a baseline walking program with a built in warm up and cool down, an owner can gradually add a trotting or jogging segment to build up to a total of 20 to 40 minutes, depending on the owner’s goals. Dogs can do this faster segment as an owner runs or bicycles along beside the dog. A golf cart or land treadmill can also be utilized. It is generally recommended not to “overuse” a land treadmill because it can sometimes cause a constricted gait, especially when human treadmills are utilized for larger dogs. Owners can also choose to use swimming or the underwater treadmill for variety. The following table is an example of an endurance program. The owner’s goal was to ultimately have a 60-minute conditioning program to follow. The owner declined interval training because of personal limitations. She wanted to build in slow jogging, but no sprinting. Interval work can be incorporated into this baseline program after the dog is warmed up. In this example, we repeat each set three times before progressing. This is variable, based on patient’s
baseline level of conditioning, owner’s competition goals, other endurance work that the
dog may be doing, and timing of any previous injuries.

Endurance Program – Example

<table>
<thead>
<tr>
<th>Potty Walk - minutes</th>
<th>Brisk Walk - minutes</th>
<th>Trot/Jog - minutes</th>
<th>Brisk Walk - minutes</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>5-10</td>
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</tr>
<tr>
<td>5</td>
<td>20</td>
<td>20</td>
<td>20</td>
</tr>
</tbody>
</table>

General suggestions for owners:

- Avoid concrete, asphalt for walking program – grass is ideal.
- Repeat each set for three days before progressing.
- If you skip one day of power walking, repeat previous time.
- If you skip two consecutive days of power walking, go back one set.
- If you skip three consecutive days of power walking, go back to beginning
  and call or email for guidance.

Balance and proprioception is linked to the dog’s awareness of where the paws
and limbs are located in space. As an explanation to an agility competitor, good balance
helps prevent dogs from falling off the dog walk, knocking bars or missing contacts
during a competition. The following are some examples of balance or proprioception
exercises:
- Ladder walking: Walk over a ladder on the ground; forward and then backward
- Cavaletti: Walk over a series of poles about 18 inches apart
- Plank walking: Walk on a 10-inch wide plank; 8-12 feet long
- Sidestepping: Walk 5 steps in each direction
- Walking/heeling backwards: Walk 10 steps as straight as possible
- Slow pivots: Walk in both directions
- Ball Balancing: Stand on 2, 3 or 4 legs on a gently bouncing exercise ball
- Curb walking: Walk up and down a curb for 20 to 30 strides in each direction
- Hill walking: Walk up and down a hill; go backward and sideways

To add challenge, owners can gradually build up to working on different surfaces and different inclines/declines. They can choose a combination of any of these and build up to 10 minutes, three times per week. Generally, the balance exercises are performed for five to ten reps.

Preparation and recovery are terms that refer to the warm-up and cool-down phases for canine athletes. Most competition dog owners are familiar with this concept, especially if their dog has gone through a rehabilitation program for a previous injury. The warm up and cool down phases are integrated into the endurance and sport specific training program. These are essential tools for performance enhancement as well as injury prevention. Research has shown that human athletes run 7% faster if warmed up first. It has been shown that it takes 15 minutes of consistent movement for a muscle or tendon to become warmed up to maximum extensibility. Warming up increases circulation and prepares the muscles for more intense activity (like an agility run). Obviously, the warm-up phase has to be appropriate to the activity. As an example, in agility, a good warm-up sequence could be five minutes of potty walking, ten minutes of walking with intention, trotting for two minutes, going over two to four practice jumps, and then tugging for one to two minutes.

Cooling down is just as important as warming up. It enables the dog’s heart to gradually return to normal, helps decrease muscle temperature, removes lactic acid, and helps to prevent soreness. A typical cool-down after an agility run would be a ten-minute brisk walk on leash, followed by passive range of motion stretches. It is common for owners to stop after their agility run and chat with other competitors. It is the rehab therapist’s responsibility to educate owners that the post-run period is an essential time to walk away and accomplish their cool down phase in order to help prevent injuries.

A good post-run passive range of motion stretching routine should include three to five reps of the following (@ 5 to 10 seconds each):

- Front Digits – flex, extend and rotate all joints (checking for “jammed” toes that may have been injured during the run)
- Carpus – Flex, distract and rotate (important to stretch apart and not hyper-extend)
For most owners, skill training is the “fun” part of training. It is important to counsel owners that they need to warm up first – do short training sessions, rather than long periods of drilling – offer variety – cool down after the training session. Sport specific training can be done two to four times per week, depending on the owner’s schedule. If their style is to train more frequently, then they need to shorten their sessions. A sample six-week graduated skills training plan for a competitor with a 16-inch competition height in agility would be the following:

<table>
<thead>
<tr>
<th>Week</th>
<th>Jumps</th>
<th>A-Frame</th>
<th>Teeter</th>
<th>Dog Walk</th>
<th>Weaves</th>
<th>Tunnels</th>
<th>Chutes</th>
<th>Pause Table</th>
</tr>
</thead>
<tbody>
<tr>
<td>One</td>
<td>6 straight @12”</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Two</td>
<td>12 straight @12”</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Three</td>
<td>6 straight @12”; 6 with turns @12”</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>1</td>
<td>2</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Four</td>
<td>6 with turns @16”; 6 straight @16”</td>
<td>1-2</td>
<td>1-2</td>
<td>2</td>
<td>1-2</td>
<td>2</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Five</td>
<td>12 with turns @16”</td>
<td>1-2</td>
<td>1-2</td>
<td>3</td>
<td>1-2</td>
<td>3</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Six</td>
<td>One to two sequences @ competition height – max 20 jumps</td>
<td>2-3</td>
<td>2-3</td>
<td>3</td>
<td>2-3</td>
<td>3</td>
<td>3</td>
<td>3</td>
</tr>
</tbody>
</table>

The most important training tip is to counsel the owners to use common sense when training. Although it is helpful to have a program to guide training, they need to remember that it is just that, a guide. When deciding what workout to do on a given day, they need to be flexible and take the weather and their dog’s physical demands into account. For example, if the weather suddenly becomes much warmer, they may want to consider skipping the training or substituting a shorter run. They could reschedule the long run for a cooler day. They need to monitor how their dog is responding to the
training. If the dog lags during runs or skill training, flops down immediately afterwards or shows post-run soreness, stiffness or fatigue, they need to go back one or two weeks in the program. The goal is not to push their dog on every run, but rather to gradually build a consistent conditioning foundation.

Additional guidelines for owners would include the following:

1. Gradually increase frequency and intensity when performing each category.
2. When walking, use a walking harness that is not restrictive across the shoulders.
3. Remember the anatomy of the injury and, when possible, start with non-injured area first and work up to using the injured area last.
4. Monitor the dog’s interest; watch for signs of fatigue, boredom and discomfort.
5. Consider keeping a retraining/training journal to become accustomed to keeping track of the exercise plan; journaling helps prevent over-working as well as under-working.
6. Although the dog’s physical conditioning is important, mental conditioning is just as important. It is important to offer frequent periods of play and to incorporate play into skill training exercises. Games such as tug-of-war and chase-the-owner are a great way to prevent stress and will help increase focus on the owner.
7. It is important not to over-train; two non-consecutive days off per week is generally recommended. It is acceptable to take a leisurely 20-minute walk on these days, but a day off is designed to be a day of rest for complete physical and mental relaxation (no vigorous exercise).
8. It is important to take time off in between competition seasons – ideally three months off per year. During this time off, owners can maintain five walks per week with two non-consecutive days off. Owners can also experiment with different activities like hiking, swimming – a different skill, i.e., trick training or rally or free style – it is essential to not keep “drilling” on the agility equipment all year long.
9. Although it is essential to keep dogs hydrated when exercising, it is actually more important to not let dogs get overheated. With heavy coated dogs, it is vital to stay aware of the temperature and make sure the dog stays comfortable.
10. Ideally, return to a rehab practitioner monthly during the competition season for a “performance check”. This is a low cost physical exam with a focus on the musculo-skeletal system. Spinal alignment, muscle tone and joint range of motion (including toes) are all checked. Quarterly exams are recommended during the off-season; just after the last competition and just before the first.
11. Because of the physical demands of a canine athlete, compared to a house pet, owners should consider a once yearly complete physical exam, blood monitoring (CBC, blood chemistry, tick panel) and fecal check. These services can be performed by the family veterinarian.
Rehabilitation Training for Veterinarians

University of Tennessee/Northeast Seminars offers the only University based certificate program in veterinary rehabilitation. They offer two certification programs for veterinary professionals: Certified Canine Rehabilitation Practitioner (CCRP) and Certified Equine Rehabilitation Practitioner (CERP). You can visit their website at www.utcaninerehab.com for more information.

The Canine Rehabilitation Institute, Inc. (CRI) provides veterinary professionals with training in canine rehabilitation. They offer two certification programs: Certified Canine Rehabilitation Therapist (CCRT) for Veterinarians and Physical Therapists, and Certified Canine Rehabilitation Assistant (CCRA) for Veterinary Technicians and Physical Therapist Assistants. They also offer a variety of continuing education opportunities year-round. Their certification and CE courses are offered in Florida, Colorado, and other locations. More information may be obtained on their website at www.caninerehabinstitute.com.

Veterinary Rehabilitation Organizations

The American Association of Rehabilitation Veterinarians (AARV) is a national association of veterinarians dedicated to improving the quality of life in animals through physical medicine and rehabilitation. As a registered non-profit organization, AARV promotes education and research in the field of veterinary rehab. Members attend continuing education programs offered by AARV in conjunction with national veterinary meetings. More information may be obtained on their website at www.rehabvets.org.

The International Association of Veterinary Rehabilitation & Physical Therapy (IAVRPT) is dedicated to the practice, teaching, and research of veterinary rehabilitation and physical therapy, furthering scientific investigation, and providing better patient care based on scientific study. Membership cycle is two years and begins on January 1 of the year in which the international symposium is held (1 January 2012, 2014, 2016, etc.). More information may be obtained on their website at www.iavrpt.org.

Resources

Multimodal Management of Canine Arthritis, Fox & Millis, Manson Publishing, 2011

Animal Physiotherapy, McGowan, Goff & Stubbs, Blackwell, 2007


Canine Rehabilitation & Physical Therapy, Millis, Levine & Taylor, Elsevier, 2004
Laterality. What is it? What does it mean to you as a veterinarian, a rider or a trainer? How does it affect balance and athletic ability? Are many horses affected by laterality? Can it cause unsoundness in a horse? What can we do about it? These are questions that might come to mind when you read the title of this paper and these are the questions that I want to address. The topic is enough for an entire book, but let me at least introduce you to the subject.

Using the human biped as an example and a starting place; laterality is the state of being right-handed or left-handed. We are not just hand dominant; we share that dominance with our eyes, our shoulders, our legs and our brains. To understand the physical effects of such dominance, we must talk about balance. Balance in our body systems is what we need to survive. It is what keeps skyscrapers and bridges from falling. It is critical to athletic ability and performance. It is also necessary to prevent injuries. Think of the people doing extreme sports, such as motocross, extreme skateboarding, extreme snowboarding, bull riding, or other endeavors like gymnastics, ballet or Olympic diving. These people require exquisite balance and they need to be equally strong and skilled on both sides of their bodies.

The state of being markedly right or left-handed is the enemy of balance and athletic ability. The more right-hand dominant we are for example, the more difficult it is even to write our names with our left hands. Add to this the fact that we may also be right-eye and right-leg dominant and we are, overall, less coordinated on our left sides. Therefore, if we start to stumble, we catch ourselves with our right leg. If we further lose our balance and fall, we break the fall with our right arm. Highly right-dominant people, unlike star athletes, are awkward when they attempt to throw or kick a ball with their left limbs.

Now, how does this pertain to the horse? It all starts with the biomechanics of the horse in its natural state. The horse evolved to eat forage at ground level. If he had the choice, this is what he would do for 17 to 20 hours each day. To be able to graze comfortably for most of the day, the horse developed itself to be very significantly “on the forehand.” Recall that sixty percent of a horse’s weight is borne on his front legs.

The front limbs are, almost literally, pillars that support and balance the weight of the head and neck in a grazing posture. They do literally provide the muscular sling in which the thorax is supported. The hind limbs are designed to move the horse forward to the next blades of grass. As the horse moves a hindlimb forward, a front leg must also move forward to prevent the horse from stumbling or falling on its nose.

When it comes to the posture and the biomechanics required for athletic performance, however, the state of being on the forehand is strike one against the horse. When we train horses for performance, we require them to shift their balance to their hind
limbs, or lighten their forehands.

Like people, horses are born either right- or left-handed (having a “right or left forelimb dominance.”) Most horses, like most people, are right-handed. This means that 75 to 80 percent of all horses will use the right front limb as the primary support limb. They will very often graze with the left forelimb advanced in front of them, the right forelimb straight up and down, or slightly retracted and the right hindlimb slightly advanced.

Riders, trainers, vets, farriers and body workers all recognize that horses have an “easy side” and a “difficult side,” which is sometimes described as a “hollow side” and a “bulged side.” The left side is more typically the “easy” side. A horse with a right dominant forelimb finds it much easier to pick up the left lead because he preferentially uses his right forelimb for support, thus freeing the left leg to pick up the canter lead. Thus, the right-handed horse is generally more difficulty turning to the right because of the dominance and stronger supporting function of his right front limb.

If strike one against the athletic horse is his natural state of being on the forehand, strike two is that horses in their untrained or natural state are not designed to move well in small circles. How often do you see horses in an unconfined natural setting go around in true circles? The biomechanics required for circles are quite different from those required by the horse in its natural setting. With those considerations in mind, we must ask the question, how are almost all horses “started?” Most are started in a round pen or by longeing. These techniques can be valuable if one understands the biomechanics and how to use the round pen and longe line to lift the dominant shoulder and make it as free as the non-supporting shoulder.

All that you have read this far pertains to the “Natural Crookedness” that the great riding masters of the 15th, 16th and 17th centuries described in their writings. The natural crookedness of the horse is the enemy of straightness. It’s an old adage that “a straight horse is a sound horse.” The corollary to this is that a crooked horse is either unsound already, or on its way to becoming unsound. One of the primary goals of the classical riding masters was to create balance and straightness and minimize crookedness. It is generally not possible to eliminate crookedness altogether. Horses and people are alike: we can become more ambidextrous, but we will always retain some elements of our right-or left-handedness.

Perhaps the greatest difference between the riding masters of old and those of today is that the classical masters generally achieved straightness and self-carriage by emphasizing training the horse from the ground, before placing a rider on its back. They achieved balance through careful in-hand work, longeing techniques and work between two pillars to change the horse from a “leg mover” to a “back mover.” They worked to shift the horse’s center of gravity to rearward and developed the core and abdominal muscles so that weight was taken off the forehand. The horse would then no longer be using the right forelimb for its support, but would be able to lift either shoulder and become more ambidextrous.
How does crookedness affect soundness? Every horse that exhibits any significant degree of laterality moves its center of gravity off the midline during locomotion, especially locomotion at higher speeds. Liken this to the human gymnast who somersaults off the “horse.” She or he is supposed to land in perfect balance with equal weight distributed on each foot and then take the bow. But even at the Olympic level, many right dominant gymnasts have to catch themselves with their right foot and take an extra step - and for which they are penalized. Repeat the performance enough times when the center of gravity is displaced and pathology will occur at the musculo-skeletal level. If we want to make our horses straighter and keep them sounder, we need to go back to the lessons of the old masters and find techniques that can minimize their laterality.

As equine health care professionals that constantly deal with the consequences of lack of balance and coordination, I think laterality is both a fascinating and important topic. I have worked with biomechanics, gait anomalies and soundness issues for over 30 years, but it is only in the last few years have I come to recognize that much of what I see and treat is the result and direct consequence of the so called “natural or inherent crookedness.”

The greatest percentage of my practice now is acupuncture and chiropractic work. My background for the 25 years prior to going into integrative medicine was conventional medicine with an emphasis on equine sports medicine. The physiology and pathology of muscles has always been a focus for me. The first manifestations of early performance and subclinical lameness issues can, most often, be found in the muscle system. Next, they appear in medium density tissues such as tendons and ligaments, and finally at the third level, in the joints and bones of the horse. However, treating the problems, even when they first appear in the muscles, does not answer the question of why there are problems. To understand the pathology, we must first identify the underlying source of the problem.

Before I institute any treatment, we must always examine the whole horse. This means perform a gait analysis as well as do the conventional palpation of limbs and so on. For the past several years, I have noted that the muscle and chiropractic patterns that I see are essentially the same whether the horse is a reining horse, a jumper, a dressage horse, a polo horse, a barrel horse, an endurance horse or even a trail horse.

I expected that every discipline would show muscle patterns specific to that horse’s use. But this is not the case. I see the exact same muscle pattern in 75 to 80 percent of the horses, and the mirror image of that pattern in 20 to 25 percent of horses. So in essence, I see the same muscle patterns on 100 percent of the horses. Moreover, I also find the same chiropractic patterns in horse after horse. For purposes of this paper, we will consistently use the right forelimb dominant horse in our discussion since they are the prevalent group.

From an understanding of laterality, we can quite accurately predict which limb will likely suffer tendon strain versus suspensory strain, which foot will first show navicular or “posterior heel syndrome,” and so on. Even ultrasound images and X-rays show a tendency for the same patterns of joint disease in the lumbar area of the horse’s
There has to be a common denominator, and this common denominator appears to be laterality. Problems arising from the laterality can be found in horses at all levels of training. These patterns are significantly prevalent even in upper level horses, regardless of their sport. We spent time in Germany two summers ago. While there we attended a large, premier horse event. We watched all the dressage Grand Prix classes. From the stands, it was obvious that the majority of these top-level horses from all over Europe were plagued by laterality problems. They became most observable in the passage and the pirouette. They were unable to lift the “knees” as much on one side as the other. If I had access to the horses, I am sure I could demonstrate the consistent muscle patterns of laterality in every one of them.

The good part of the story in dealing with laterality is, that, with some team effort, we, as integrative medicine practitioners, can do a very good job of helping maintain the performance and soundness of affected horses. Note that I use the term “maintain” rather than correct or “cure” the problems. We cannot accomplish the “cure,” no matter how good our therapy is or how thorough and diligent we are. Correction of crookedness can only be accomplished by correct ground and riding work that will change the biomechanics of the “natural” horse to the biomechanics of the “riding horse.” The goal is to move the horse in the direction of ambidexterity. An ambidextrous horse will need fewer visits from the integrative or conventional veterinarian. The horse will also be a more pain free and will stay sound significantly later in life.

The limb dominance is of small consequence to the horse in nature and actually helps keep the herd packed together when in flight. It fits for their grazing lifestyle and inherent “fright and flight” survival mechanisms. The horses with the same dominance tend to turn as a group, and the horse with an opposite limb dominance will turn more easily in the opposite direction and get separated from the herd. As such these are more likely to enter the food chain of predators in pursuit of the heard. Thus, the natural horse with its natural set of biomechanics generally lives a long and good life. It is sometimes a difficult life with regard to lack of food supplies and the prevalence of predators and, of course, it eventually it meets its destiny as captured prey.

In review, our goal is to alter the horse from its inherent natural biomechanics to a riding animal that is now bearing weight on its back. When we do so, we encounter three strikes that we must deal with. One: the horse in nature is genetically designed to be on the forehand for grazing. Two: it is not, by nature, designed to go in circles, especially small ones. (However, with correct training they can learn to go in small circles and be balanced) Three: possessing a significant degree of right or left limb dominance is antagonistic to athleticism.

When we compare the posture of the horse in its natural state with the horse with the posture of the “trained” athletic riding horse, we observe that the horse in nature travels with its back hollow, and its head elevated. There is minimal engagement of the hindquarters and at speed, the hind feet remain in the push phase for a longer time before retracting to commence the next stride. That is to say that there is a lack of engagement
and little to no impulsion present.

**A Down Swinging Back**

**An Upward Swinging Back**

The natural hollow, “down-swinging” back is amplified by the weight of the rider; that is to say that the horse becomes locked into a hollow back, and in an “on the forehand” way of going.

In order to deliver an athletic level of performance, while carrying the weight of the rider, the horse must be trained to move in a state of relaxation (i.e. lack of tension), with rhythm, impulsion, and a free “up-swinging” back. Without these the horse’s days of soundness are numbered.

Posture is the key to balance. *Balance is keeping the center of mass always in dynamic equilibrium with gravity.* The key to posture and balance is proper use and development of the correct muscle sets. We must realize that the joints (including all the tiny joints of the spine) only function correctly because of proper action of a given set of muscles.

In the ridden horse, significantly different sets of muscles are required verses the horse in nature. The muscles that are required of the athletic riding horse must be symmetrical in development and of equal tone on both sides of the body. *In the horse that exhibits right or left forelimb dominance, they are neither symmetrical nor equal in tone.* Thus as much laterality as possible must be extinguished.
As a sport horse directed veterinarian, I have become acutely aware of the muscle imbalances, asymmetry and painful muscle patterns associated with essentially all horses. It was thus that I sought more insight. Though I recognized the patterns, I did not truly understand the implications of the forelimb dominance aspect. Fortuitously, Christine, my wife, and I have had the opportunity to work with Klaus and Gabriele Schöneich at their facility “The Center for Anatomically Correct Horsemanship” near Dusseldorf Germany, as well as hosting them in the USA.

Through recognition of the work of the riding masters of the old world, Klaus and Gabrielle have made it their passion to understand how to start young horses and how to rehabilitate “crooked” horses. They have, for the past twenty-five years, trained or retrained over 5000 horses to overcome the obstacles created by laterality and to acquire balance, coordination, and harmony between horse and rider.

The first, and today often forgotten, principle espoused by the old Riding Masters was that the horse must be balanced and be adequately developed to carry the weight of a rider before being trained under saddle. It is nearly impossible to significantly extinguish laterality and create a proper “up-swinging back” by in-saddle training prior to proper development of the unmounted horse. In other words, straightness, while unmounted, must come before mounted training.

The Schöneichs take many upper level horses, whose careers have prematurely ended, back to their particular system of basic groundwork (as if they had never been ridden). Very often the problems have resulted of having gone under saddle before the horse has the strength and balance to carry the rider. This period of retraining is typically in the neighborhood of three weeks duration. *Remember, each horse is an individual and some may take longer.* They are then retrained under saddle, with what I would call remarkable results. To my chagrin, many of the “unsoundness” issues that concerned me as a veterinarian resolved without veterinary interference or use of medications. Having said that, we have found that retraining happens quicker and more easily if the horse has been treated appropriately with acupuncture and chiropractic prior to the retraining work. It is also very helpful to do maintenance treatment during the entire retraining period.

With this background, let us look at some of the biomechanical issues that must be addressed. Most of the problems that arise are associated with two major forces - shear force and centrifugal force. *Shear force* is strain in the structure of a substance produced by pressure that shifts structural elements laterally in relation to each other (i.e. thus, shear force on joints, ligaments, muscles). *Centrifugal force* is force that acts outward on a body moving around a center, and arising from the body's inertia. An example is swinging a ball with a string attached around in a circle. The horse, in motion, must then brace against any centrifugal forces. In the case of the natural horse, the force is driven via the shortest route (in the case of the right dominant forelimb horse) from the left hip to the right shoulder. In the simplest terms, this creates shear force through the horse’s sacro-iliac joints and through the vertebral joints of the loin and thorax as well as creating shear strain in the stifles and hocks. *This force moves the center of gravity off of*
the midline and to the right. Balance of movement is then impaired and agility is lost.

Moreover, it acts on the hindquarter and creates a centrifugal force that the horse must brace against. The force driven into the right shoulder limb causing it to be less mobile, more tense and act as a post or pillar around which the body must rotate and thus adding a centrifugal component. The larger and the stronger the hindquarters are, the more the shear force generated.

Thus, typically, the right forelimb dominant horse finds it difficult to turn to the right, but easier to the left. It can pick up the left lead more easily, but in the process, tends to fall onto the left shoulder and “pop” the right shoulder outward due to shear forces placed upon it. To get the feel of this, try walking with a cane in your right hand acting as the right forelimb. You will note the tendency of your body to somewhat swing around the cane each time you plant it on the ground and move forward.

The shear and centrifugal forces cause the muscles to develop unevenly from side to side. This results in a crooked horse. A straight horse (one that tracts with its feet in line whether turning or going straight ahead), is, per the old adage, a sound horse. It is an established fact that a crooked horse will not remain sound.

So how does one go about creating a balanced horse? Try these two simple exercises. If you are right handed, visualize yourself throwing a ball or a football. Note how your balance and support moves to your left leg and foot when you raise your right arm and shoulder. Now let your shoulder literally drop forward and downward toward the ground. When you now attempt to throw the ball without being able to lift your shoulder, only freedom of your forearm remains, and your throw is seriously impeded. This is precisely what happens to the horse whose forelimb is grounded by the forces traveling from the hind limb into the shoulder.

Next visualize yourself kicking a soccer ball. Again note that you shift your weight and balance onto your left leg, and as in the previous example, you raise your right shoulder as you kick. Then, again, allow the direction of force of your right shoulder to push toward the ground and repeat the exercise. You will see how much your ability to bring your right leg through and kick the ball effectively is restricted. The horse cannot extend its gait, and it cannot follow through with its right hind leg when the force of the shoulder is toward the ground.

The value of this system can be illustrated by another exercise with you taking the part of the horse. Bend well forward at the waist, so that your arms can simulate the forelimbs. Stay relaxed; have your partner, who is on your right side, grasp under your chin so his or her hand is gently holding your left cheek. The partner then gently lifts and bends your head and neck toward him (the inside of the circle). See how this exercise causes you to lift your shoulder thus lightening your “forehand.” It shifts your weight off the shoulder and onto your left leg.

This is exactly what you need to do for the horse via your longeline. The horse should not be allowed to go “long and low” until he is able to maintain the longitudinal
and vertical balance required for a supple, relaxed and up-swinging back. The down swing or up-swing can be monitored using the rails of the round pen as a marker.

Going “long and low” before balance and structural development is attained, literally “dumps” the horse back onto the forehand and you will see the stride immediately shorten and back tension increase.

*In the left drawing note the counterflexing of the neck when the forces are driven into the right shoulder. In the right drawing when the head is brought into the circle and the shoulder is lifted, the forces are now from the shoulder to the hip.*

Here is a natural, biomechanically, right forelimb dominant horse on a longe line. It is counter-flexing its neck to the left to counteract the shear and centrifugal forces.

*Do note that my previous comments about the horse not being designed to move in small circles is with regard to typical longeing or round-penning techniques as verses a correct form of correct and corrective longeing, with the head brought into the circle.*

Thus, the biomechanical secret of balancing the horse and preparing it to properly use its back, is to reverse the direction of thrust; i.e. re-direct the forces going from the hip to the shoulder so that the forces are now directed from the shoulder to the opposing hind quarter via lightening the forehand. Though the entire forehand must be lightened, initially, more attention is required to enable the horse to lift its shoulder on its more difficult side. (Most often the right shoulder) When the shoulder is lifted, it moves the center of mass back to the centerline of the horse. The direction of force will be reversed and now travel from the shoulder to the opposing hip. The lightening of the forehand is actually changing the biomechanics to be somewhat in line with an athletic biped.

This is accomplished by a correct technique of longeing at a walk and trot in a round pen that is only eleven to twelve meters in diameter. The outside wall of the pen acts as the outside rein of a rider. The natural horse tries to balance the shear and
centrifugal forces by counter-flexing its head and neck to the outside. When working correctly on the longe, you have the ability to bring the horse’s head into the line of the circle. The longeing is best done with a cavesson rather than a bridle and definitely not well accomplished with a halter. It works best to attach the longeline to the ring on the top of the noseband. An eleven-meter circle allows the handler to walk with the horse and stay positioned so that he or she remains perpendicular to the horse’s head.

A long whip is helpful to touch the shoulder, as needed, to encourage lifting of the shoulder. The whip should not be used on the hindquarters. More time would be spent on circles to the right if the horse is right forelimb dominant. Sessions should be limited to no more than 20 minutes and should be continued until balance and strength of the wither and neck muscles is achieved. Patience will be rewarded.

As one then progresses to the riding phase, it may be necessary to re-evaluate saddle fit. The horse’s back shape and topline often changes so much that the saddle that had been used may no longer fit. The space limitations of an article such as this can only touch on the principles and not describe the details desired to fully accomplish the on the ground technique let alone the details of the training under saddle. I will, at the end of the article, include references that will be very helpful to your learning.

When starting the under saddle phase, the horse tends to revert back toward its “natural horse’s” inherent biomechanics, so it is well to continue the longeing, but now with the rider up. Once the horse is again in good carriage with an up-swinging back, the rider can work to equalize the horse’s tracking in both directions on the circle and strengthen the muscles of the haunches in order to achieve proper collection. Riding is started with the right hand lifted toward the rider’s breast. With a give and take rein, the horse is encouraged to lift the shoulder. This would be the right rein in the case of the right forelimb dominant horse. (Remember the exercise where you were the horse and your partner brought your head gently inward and upward and the shift in you balance that occurred.)

The next key to balance is to work the (right forelimb dominant) horse on shoulder-in movements while turning to the right, and using a haunches-in movement while going to the left. Here, I would refer those riders who have not been trained in the use and production of these movements to find a good instructor who can help you understand, learn and properly use the shoulder-in and haunches-in.

Though the descriptions here are, of necessity, very brief and not detailed, the results of performing the steps will yield wonderful results. No matter how well trained your mount is, there is value in periodically going back to the in-hand work and practicing the balancing exercises. This is particularly true if, for whatever reasons, the horse has had a lay-up period. The natural biomechanics are deeply imbedded and will come back into play if allowed to do so.

There are always multiple paths to the top of any mountain and ways to do a task, including achieving balance and creating a more ambidextrous horse. The system discussed in this article works well. After our first trip to the Schöneichs we started a new
3-year-old filly with this system. After the in-hand phase was established the riding phase was instituted. After the fourth riding session, my wife commented that it was the first time she had ever started a young horse that it did not feel like she was driving a big truck. Enough said!

References and further reading:


* The drawings used in this article are the kind permission of Klaus and Gabriel Rachen-Schöneich. The source is their book “Correct Movement in Horses.” For use in this manuscript, Dr. Ridgway has modified the drawings.

Information on clinics and seminars can be found on [www.drkerryridgway.com](http://www.drkerryridgway.com)

*Dr. Ridgway can be contacted through his office, Equine Therapeutic Options, at 803-643-9188.*
These lectures are intended as a basic introduction to Chinese Herbology for veterinary acupuncturists. So why use Chinese herbs? Chinese herbs can be used to treat conditions or diseases recognized by conventional medicine and many that aren’t. They can be used to strengthen the body after illness, injury, chemotherapy and radiation, as a primary medical system when drug sensitivities develop or conventional therapy is ineffective, they can be used as part of an integrative approach to pet health care with conventional drugs and as a preventative health system to strengthen and support the body before disease develops. Chinese medicine treats the pattern of illness; not a specific disease. Despite not having a diagnosis of a western defined disease, Chinese medicine can still be used to treat a problem based on pattern differentiation/recognition. Acupuncture points are selected and Chinese herbs are prescribed based on the pattern of disharmony diagnosed. In China, herbs have been combined with acupuncture for thousands of years to produce synergistic effects that produce a stronger healing response than either modality used alone. Herbal medicine is considered to be Yin compared to acupuncture that is Yang. Acupuncture moves Qi and Blood in the channels whereas herbs provide the body with the building blocks it needs to treat deficiencies to repair the body. It is said in Chinese medicine that severe disease requires strong material treatment; that is herbal medicine. Most serious internal medicine conditions will not respond to acupuncture alone and the use of herbal medicine in these cases is essential. This is especially true of chronic disease conditions such as diabetes, hyperthyroidism, osteoarthritis, immune disorders (pemphigus, arthritis, anemia), asthma and for failing organs systems especially kidney, liver and heart. For many of these disease conditions no effective conventional medicine treatment exists. In these situations the use of acupuncture and herbs together can be lifesaving. Many of these complex and chronic disorders require an integrative approach to the animals health care; the problem won’t resolve without using a combination of Chinese and conventional medicine. An integrative approach is often needed to treat difficult diseases. Chinese herbs and acupuncture can help prevent and treat the side effects of pharmaceutical drugs and or work synergistically with them to improve therapeutic effects to promote optimal treatment outcomes.

**What is the Difference Between Pharmaceutical Drugs and Herbal Medicines?**

Pharmaceuticals and herbs are both drugs. A drug is any chemical or combination of chemicals that has biological activity within the body above and beyond their purely nutritional value. Many pharmaceutical drugs are derived from herbs and before the advent of modern pharmaceuticals most native cultures used herbs as a primary modality to treat disease. Pharmaceutical drugs isolate the active ingredients from plants or make synthetic ingredients to produce strong medicinal effects that makes them well suited for acute and emergency care. However this property also causes them to have adverse effects or side effects over time and can damage the body with chronic use. Herbs contain the “whole plant” and in addition to the active ingredients that provides a natural
buffering action and causes them to be milder in action and balances the overall medicinal effects. This makes them well suited for chronic conditions and long term usage. Herbal medicine uses all the constituents of the plant; including the cellulose therefore few to minimal side effects are produced. Herbal medicine and conventional drugs can be taken together safely, in many cases they have synergistic effects and are complementary in action. That is not to say that there are some categories of herbs that can produce toxic effects, but by and large most herbal medicines when prescribed by a qualified herbalist can be safely used for prolonged periods of time. Chinese herbal formulas are comprised of a balanced combination of herbs and have a long history of safety when properly prescribed. Chinese herbology as it is practiced today, is a system of medicine that was developed over centuries of empirical observation and clinical trial and error. The court physicians were charged with keeping the Emperor healthy and disease free and often lower subjects were used to test herbal remedies. Written records of Chinese herbal medicine extend over 3,000 years into the past. Throughout these years, the experience and knowledge of herb characteristics and function and their effects on the human body to treat disease has gradually been recorded and passed on.

The Divine Husbandman’s Classic written during the Han Dynasty (106 BC-220 AD), and was the first book to focus on and describe individual herbs. Therefore it is the source and archetype of China’s tradition of Materia Medica. It describes 365 Chinese herbs. Legend attributes the authorship of the Divine Husbandman’s Classic to Emperor Shen Nong of China. He was supposed to have tasted the 100 herbs out of compassion for the masses. The Ben Cao Gang Mu, by Li Shi-Zhen, is one of the most important texts of Chinese herbal medicine, and took the author 27 years to write. It contains detailed descriptions and illustrations of 1,892 individual herbs, 374 of which had not been previously documented. In 1765 AD, the Ben Cao Gang Mu Shi Yi, was written by Zhao Xue-Min which expanded on the above text by adding 716 new herbs, many of which had been used in folk medicine but not formally documented. There are currently 11,146 herbs documented so far in the Chinese Materia Medica and it is the oldest clinically documented herbal medicine in the world.¹

What are the sources of Chinese Herbs?
Approximately 80-85% of Chinese herbs are from plant origin, the remainder is derived from animals, birds, fish, insect, mineral, shellfish and reptiles. Herbal formulas made from non-plant products are stronger in action as they contain more jing. Humans are biologically more closely related to other animals than to plants and so these herbals have stronger effects. ¹,²

Why are there so many different names for Chinese Herbs?
Chinese herbal medicine is made up of a wide variety of medicinal substances. Because of the wide variety of sources and the unique individual characteristics, the function and indications for the use of each Chinese herb is significantly different. Often the original name of the herb and the botanical or scientific category in which it is placed offer clues to these characteristics. Chinese herbs are named according to color, smell, taste, shape and physical characteristics, functions, specific plant parts, plant life cycles, geographical location, the person that discovered the herb, the country of origin and the
preparation of the herb. Chinese herbs are classified by: source of the herbs (plant, mineral, fish etc.), by therapeutic actions and side effects (superior, medium and inferior), by what Zang Fu organ system/channels (Spleen, Heart, Lung, Liver, Kidney) they target/enter and how the herbs affect these organs/channels. The herb Gou Qi Zi (Lycium) is said to “tonify Liver Yin”, (nourish yin energy of the Liver) and Chai Hu (Buplerum) is said to enter the Liver and GB channels, to “relieve Liver Qi Stagnation and promote the smooth flow of Liver Qi”. The most common way herbs and formula are classified is according to their therapeutic function. It is an effective way of understanding an herb not by its constituents, but by its activity and effects on the human body. Herbs can be described as having the ability to: harmonize the Liver and Spleen, drain Damp, tonify Qi and Blood, calm Shen, regulate the Blood, clear Heat, warm the Cold, extinguish Internal Wind, release the Exterior, astringe the Essence and moisten Dryness.

Why do we need to know individual herb properties and functions?

Properties of herbs are highly interdependent with herb functions and vice versa. In order to obtain a good clinical response you must know the nature and properties of the individual herbs you want to use, in order to build a formula that incorporates herbs that address the particular pattern of disharmony that is identified, and to avoid toxicity.

Throughout countless years of observation and evaluation the overall effects of herbs are clearly understood, their functions and characteristics well established. There are four major properties of herbs that include: thermal property, taste, directional and channel effects.

Thermal property describes the temperature of an herb. Any herb can be placed along a continuum that runs from cool to cold to neutral to warm to hot. Recognition of the temperature of a disease process is followed by the selection of herbal medication with the appropriate thermal properties to effectively treat it. Cold and cool belong to Yin whereas hot and warm belong to Yang. When treating hot diseases, cold or cooling herbs should be used. Likewise, warming herbs would be Yang and used to treat conditions where Cold has accumulated. Neutral herbs walk the line between Cold and Heat and are often used to harmonize formulas and tonify vital substances and the Zang Fu organs.

Because disease as identified by the Eight Principles is classified as hot or cold in nature, herbs that have these energies have the ability to oppose or counterbalance a cold or hot disease. “Cold diseases must be warmed and Hot diseases must be cooled”.

Herbs with cool or cold energies such as isatis, forsythia blossoms, and gentian root are used to treat disorders characterized by Heat such as polyarthritis, fever, and pyoderma. Biomedically, this group of herb would have anti-biotic, anti-viral, inflammatory, anti-spasmodic and sedative actions. It’s a matter of degree. They also can help detoxify the body via their effects on the liver. Warm and hot herbs such as dried ginger, cinnamon bark and aconite can be used to treat diseases characterized by cold and hypo-metabolic function, like osteoarthritis, hypothyroidism and diarrhea from cold. These herbs help to improve organ function, promote circulation and digestion, and
Tastes

The taste of an herb is associated with specific physiological effects and may correlate to the biochemical constituents of the herb. There are Five Fundamental Tastes in the classic literature. Since this time two additional categories (bland, astringent) have been added. Herbs may have more than one flavor. Coptis tastes bitter because it contains a high percentage of berberine, and isoquinolone alkaloid. Many of the individual chemical constituents have been identified but research is ongoing to further elucidate active compounds. Tastes and functions do not always correspond to each other. Herbs with specific therapeutic effects don’t always have the usual corresponding tastes. Ge Gan (puerariae root) acts to dispel heat and release the exterior but it doesn’t taste acrid/pungent.

Acrid/Pungent: release the exterior, disperse outwards, move Qi and Blood, stimulates circulation, these herbs contain terpenoid volatile oils, allyl-sulphides, glucosinolates

Sweet: tonifies deficiency, relieves spasm and pain, and harmonizes/regulates internal organ functions, sweet-tasting herbs counter the toxicity and adverse effects of other herbs. They contain immune stimulating polysaccharides, fructans, saponins, phenylpropanoids, glycosides. Selected herbs in this group are commonly used to balance or harmonize herbal formulas

Sour: stabilize and bind, reduce and prevent loss of body fluids, promotes digestion, contains tannins, high percentage of acids-malic, citric, ascorbic, flavonoids

Bitter: herbs in this category sedate, clear heat, drain downward and dry dampness. The anti-fungal, anti-biotic, anti-viral, and anti-pyretic herbs are in this group, they contain a large amount of alkaloids, iridoids, phenols, anthraquinone glycosides

Salty: purge excess (constipation), softens hardness, diuretic, Hai Zao seaweed naturally contains a large amount of mineral salt. Salty herbs are often used in cancer therapy to dissolve masses

Bland: these herbs act like diuretics and promote urination

Astringent: are essentially the same as sour taste they function to stabilize and bind (stop diarrhea), reduce and prevent loss of body fluids (stop sweating) and contract flaccid tissues (bladder, colon)

Direction is a term used to describe where an herb will send its energy within the body. Herbs have upward, downward, outward and inward directions in terms of their ability to influence the physiologic activities of the body. This quality is what allows them to target specific locations or organs in the body. It tells you where the energy of the herb goes.
**Upward directing** herbs have lifting energy and are used for diseases associated with weak or collapsed Qi, prolapse of organs, coldness, depression, low energy, and fatigue. These herbs direct the Qi upwards and go to the chest, head, and front limbs. **Downward directing** herbs are used to treat diseases whose symptoms express themselves in an upward direction including, vomiting and cough. These herbs have the ability to purge or promote circulation in the lower part of the body, and direct Qi downward. **Outward directing** herbs disperse the surface (induce sweating) or consolidate the exterior. These herbs usually have diaphoretic properties and are used for the initial stages of upper respiratory tract infections, fevers and eruptive skin diseases. **Inward directing** herbs sedate and can penetrate more deeply into the body and can help direct formulas to specific Zang fu. After ingestion they go inward to strengthen and nourish the internal organs.

**Channel** It was observed over time that different herbs target and have specific effects on the 14 major channels of the body. These have been recorded over hundreds of years. Thus they can be further categorized by which channels they enter and have an effect on. Many of these herbs function as “guides” to a specific channel. Guide herbs can be added to herbal formulas to direct them to open or dredge specific channels or to treat a specific Zang Fu organ. These herbs can greatly enhance the effects of acupuncture on the channels.¹

The **safety of Chinese herbs** is one of the biggest concerns for veterinarians wanting to practice herbal medicine. The therapeutic efficacy of an herbal product can only be guaranteed with tests to verify authenticity, potency, purity, and safety.¹³ Herbal medications should be purchased from reputable companies that are processed in facilities certified as “Good Manufacturing Practices” or GMP. The manufacturers must be licensed in production of proprietary Chinese medicines, and prove that they follow the requirements of good practices in manufacturing and quality control of proprietary Chinese medicines. There are two types of GMP; food GMP that ensures safety, and pharmaceutical GMP that ensures safety and potency. Most herbs in the U.S. are produced under food GMP standards. However there are some herbal companies that manufacture herbal products using the higher-level pharmaceutical GMP standards. High quality herbal companies insure safety and authenticity of the herb species to identify counterfeit herbs by using Thin Layer Chromatography (TLC), this is a chemical “fingerprint” of the herb that guarantees authenticity. Potency refers to the quantity of bio-active ingredients present in the herbs. High Performance Liquid Chromatography (HPLC) is a standardized testing technique performed on all pharmaceuticals to ensure that the bio-active constituents are present in adequate concentration, confirming potency and consistency. Herbs are classified as dietary supplements in the US. Because of this U.S. manufacturers are only required to ensure safety, but not efficacy. There are herbal companies that also perform this test on their products to ensure therapeutic efficacy. All Chinese herbs are thoroughly processed to ensure purity. This is necessary to enhance or alter the herb therapeutic action, minimize loss of active components and facilitate maximum extraction of active constituents, increase the surface area of herbs to facilitate extraction, to clean the herbs, prevent spoilage and to reduce side effects and/or toxicity. Herbs can contain drugs and other contaminants including heavy metals. To ensure safety
and efficacy, all products should be tested and have a certificate of analysis (COA) available for practitioners to review. A COA should be performed on each and every batch of product not randomly to ensure safety of the herbal products. There are many types of herbal medicines products on the market these include raw herbs (require cooking to make a decoction) extra-concentrated granules, capsules, powders, pills, teapills, tablets, lozenges, tinctures, liquids, syrups, topical sprays, liniments and patches, moxibustion and injectables (not approved for use in the US). The most common way to give Chinese herbs to animals are extra-concentrate granules, powders, capsules, pills, tablets and tinctures. In order to use Chinese herbs safely and effectively one must have a good understanding of Chinese Medicine theory, diagnostics, herbal formulas and individual herb functions/characteristics. An accurate diagnosis is essential for correct herbal prescribing. There are approximately 300 formulas are commonly taught to Chinese herbalists in training in China that are over 2000 years old. Many of these formulas are very effective and commonly prescribed in veterinary medicine today. The modified classic formulas also called patent herbal formulas are ready made preparations typically derived from a classical formula and may have the classical name. Most have standardized (same) proportions of herbal ingredients. Custom herbal formulas are hand made by advanced herbalists using single herbs and or classical formulas to closely tailor the treatment to the individual patient’s imbalance. It is important before starting herbal practice to first have a basic understanding of herbal medicine as a whole and then single herbs. The next step would be to have a good understanding of the constituent herbs and therapeutic effects of the classical formulas. If one has a good understanding of the classic formulas, a practitioner can then more easily select and accurately prescribe the modified classic or patent formulas that are available. Modified classical formula have had additional herbs added to them to make a “new formula” that is then patented by the specific herbal company that sells this formula. If one does not know what is in the classical formula it is difficult to understand why the additional herbs were added and what they do. That is, how the additional herbs changed the therapeutic effect of the classical formula. Many modified classical formulas have very good therapeutic effects but due to the vast number of herbal products it is best to begin with a basic understanding and education in the classical formulas when possible. There are many excellent classical formulas that have clinically been proven to provide good therapeutic effects in veterinary medicine. They can be purchased in concentrated granule form or as a patent medication. Chinese herbs have a long history of safety and efficacy. The most common side effects seen in veterinary practice are vomiting and or diarrhea. These effects typically resolve within 24 hours of stopping the herbal medication. The Chinese medicine diagnosis and the formula chosen should be reviewed, and if appropriate, the dose should be decreased by one half and given again. If vomiting and or diarrhea persist, discontinue the formula and choose another. If more than one formula is prescribed, it is best to start with one and administer the other formula after it is clear the first formula is being well tolerated. Before prescribing more than one herbal formula, it is important to be certain that the formulas are compatible to avoid adverse herb-to-herb interactions. A thorough knowledge of each individual formula, the herbs that make up each formula, the overall effect of the formulas, and any contraindications associated with them is advised. It is important to note that cats are sensitive to the effects of herbal medications that contain aconite and ephedra (ma huang): exceeding the recommended dose is not
It is not advised to give cats herbal tinctures made with alcohol without first boiling off the alcohol. The alcohol in the tincture typically causes foaming and excessive salivation. Tinctures prepared with glycerin are a good alternative. Chinese herbal medications should be discontinued 5-7 days before and 5-7 days after anesthesia and surgery of any kind. In general, herbal therapy can resume 7 days post-operatively. As many of the interactions between Chinese herbal medications, Western drugs, and anesthetic agents are unknown; it is prudent to make this recommendation until further information is available. It is important when prescribing Chinese herbs to carefully question the owner and evaluate all drugs, supplements, etc., an animal may already be taking to assess the potential for adverse interactions before prescribing them.

As research on the interactions of herbal medications and pharmaceutical drugs emerges, informational guidelines will become available to practitioners of conventional and Chinese medicine to safely and effectively maintain the health of companion animals when prescribing both types of medications. In general, when Chinese herbal therapy is combined with pharmaceutical drugs in veterinary medicine, the dose of the pharmaceutical drug is typically decreased if possible. This is because many drugs can cause side effects when used long-term as a single therapeutic agent. Most pet owners who seek out a Chinese medical approach want to avoid or decrease the long-term side effects of pharmaceutical drugs, enhance or improve therapeutic effects, and improve the quality of life for their animals. Herbal medications used concurrently with pharmaceutical drugs that have the following therapeutic actions have been associated with the highest incidence of side effects. Many, but not all, of the side effects seen are the result of combined additive or synergistic effects. Caution is advised when prescribing herbal formulas to use in combination with these drug categories. These include anticoagulants and anti-platelet drugs, diuretics, sympathomimetics, antidiabetic preparations, cardiac and anti-hypertensive drugs. The formulas listed below have been used in veterinary practice for the past 15 years. Most of these formulas have been studied in clinical trials and many of the active medicinal components have been identified. This information will be discussed where available. More formulas than those listed below will be discussed time permitting. A dosing chart for herbal medications has been included in this presentation that has been excerpted from Chinese Herbal Formulas for Veterinarians.

- **Liu Jun Zi Tang**: treatment of acute and chronic gastrointestinal disorders: pancreatitis, cholangiohepatitis, cholangitis, diabetes mellitus, chronic gastritis, gastric ulcer, anorexia, poor digestion, weight loss, diarrhea, vomiting, inflammatory bowel disease. Supportive care post surgery, post cancer therapy, aids in digestion and absorption of other formulas
- **Shen Ling Bai Zhu San**: Chronic gastrointestinal and lung disorders: chronic gastroenteritis, chronic diarrhea with undigested food in the stool, exocrine pancreatic insufficiency (EPI), diabetes mellitus, inflammatory bowel syndrome, nephritis, poor immune function, supportive therapy for chronic disease, cancer, nausea accompanying chemotherapy and radiation, debility after chronic illness, edema, damp-heat skin
- **Ren Shen Yang Ying Tang**: treatment of anemia, poorly healing wounds, immune deficiency, supportive care for cancer, canine hypoadrenocorticism, canine hypothyroidism
- **Sheng Mai San**: cancer, cardiomyopathy, congestive heart failure, arrhythmia, immune deficiency, chronic cough, chronic bronchitis
- **Zhi Gan Cao Tang**: treatment of congestive heart failure, cardiomyopathy, arrhythmia, atrial fibrillation, hypotension and anemia
- **Gui Pi Tang**: non-regenerative anemia, aplastic anemia, anemia secondary to cardiac disease, Immune-mediated hemolytic anemia (IHA), immune-mediated thrombocytopenia (ITP), behavioral disorder with restlessness, anxiety and fearfulness, cognitive dysfunction
- **Shi Quan Da Bu Tang**: treatment of regenerative and non-regenerative anemia, leukopenia, cancer, supportive care during chemo-radiation therapy, recovery from chronic illness, supplemental formula for aging patients
- **Huang Qin Tang**: treatment of vomiting and diarrhea secondary to chemotherapy
- **Liu Wei Di Huang Wan**: treats chronic renal failure, chronic glomerulonephritis, nephrotic syndrome, chronic back pain, osteoarthritis, deafness, endocrine disorders, neurological and musculoskeletal developmental abnormalities
- **Jin Gui Shen Qi Wan**: treats chronic renal failure, nephritic syndrome, endocrine disorders
- **Ma Zi Ren**: treat habitual constipation, post-surgical constipation, drug-induced constipation, and constipation in geriatric, postpartum and chronically debilitated animals
- **Xue Fu Zhu Yu Tang**: treats head trauma, post-concussion syndrome, cardiovascular disease, congestive heart failure, cardiomyopathy, arrhythmia, thromboembolic disease, stroke, cerebrovascular accident, vasculitis secondary to snake bite, sarcoidosis
- **Yin Chiao San**: treats fever, viral and bacterial pneumonia, acute canine infectious tracheobronchitis, feline rhinotracheitis, beginning of any febrile disease, epidemic encephalitis (early stage)
- **Long Dan Xie Gan Tang**: treats acute otitis media, allergic dermatitis, food allergy dermatitis, feline miliary dermatitis, damp-heat dermatitis, pododermatitis, anal gland sacculitis, perianal fistula, hyperthyroidism and feline eosinophilic granuloma complex
- **Ba Zheng Tang**: treats acute urinary tract infection, urethritis, pyelonephritis, urolithiasis, and prostateitis
- **Duo Huo Ji Shen Tang**: treats chronic back pain, osteoarthritis of the spine, hips, stifles, and hocks; spondylosis, thoracic-lumbar intervertebral disk disease, lumbosacral disease, canine hip dysplasia, tears of the anterior cruciate ligament, patellar luxation pain and orthopedic post-surgical recovery
- **Gui Lu Er Xian Jiao**: non-union of fractures, poor wound healing, weak ligament and tendons, neurological and musculoskeletal developmental abnormalities, back pain, cervical pain, intervertebral disk disease, degenerative myelopathy, osteoarthritis, cognitive dysfunction, geriatric tonic, recovery from chronic illness chemotherapy and radiation therapy, endocrine diseases
- **Yunnan Pai Yao**: used to treat hemorrhage and bleeding, disperses Blood Stagnation and relieves pain
- **Xiao Chai Hu Tang**: treats hepatitis, chronic active hepatitis, hepatic cirrhosis, hepatic carcinoma, acute and chronic toxic hepatopathy, hepatic lipidosis, jaundice, cholecystitis, cholelithiasis, pancreatitis, fever of unknown origin, fever in cancer, chronic glomerulonephritis, chronic renal insufficiency, chronic urinary tract infection, upper respiratory infection, bronchitis, recurrent pneumonia, chronic gastritis, postpartum infection and postpartum fever.
References


**VETERINARY DOSING CHART**

**Special Dosing Note**: herbal formula may also be administered via rectal enema. This route of administration may be necessary in emergent cases and for those patients for which oral administration is contraindicated or not possible. Extract granular herb formulas are best suited for rectal use and are easily prepared by mixing with warm water. The dosage required to obtain an effective therapeutic effect is 3-4 times that of the recommended oral dose, and the herbal enema solution retained for a minimum of 5-10 minutes to promote maximum absorption.

Puppies, kittens, foals, and other newborns should be dosed at half of the adult dose.

<table>
<thead>
<tr>
<th>Weight</th>
<th>Powder</th>
<th>Extract Granules</th>
<th>Tablets</th>
<th>Pills</th>
<th>Tincture</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Dogs</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Up to 15 kg (Up to 25 lbs)</td>
<td>0.5-1.5 g bid</td>
<td>0.5-1 g bid</td>
<td>½ bid</td>
<td>1-3 bid</td>
<td>2-5 drops bid</td>
</tr>
<tr>
<td>15-30 kg (25-50 lbs)</td>
<td>1.5-3 g bid</td>
<td>1-2 g bid</td>
<td>½-1 bid</td>
<td>3-4 bid</td>
<td>5-10 drops bid</td>
</tr>
<tr>
<td>30-45 kg (50-75 lbs)</td>
<td>3-4 g bid</td>
<td>2-3 g bid</td>
<td>1-1½ bid</td>
<td>4-6 bid</td>
<td>10-15 drops bid</td>
</tr>
<tr>
<td>45-60 kg (75-100 lbs)</td>
<td>4-6 g bid</td>
<td>3 g bid</td>
<td>1½-2 bid</td>
<td>6-8 bid</td>
<td>12-20 drops bid</td>
</tr>
<tr>
<td>60-75 kg (100-125 lbs)</td>
<td>6-7 g bid</td>
<td>3-4 g bid</td>
<td>2 bid</td>
<td>8-10 bid</td>
<td>15-25 drops bid</td>
</tr>
<tr>
<td>Up to 6 kg (Up to 10 lbs)</td>
<td>0.25-.5 g bid</td>
<td>0.25-.5 g bid</td>
<td>½ bid</td>
<td>1 bid</td>
<td>1-2 drops bid</td>
</tr>
<tr>
<td>6-9 kg (10-15 lbs)</td>
<td>0.5-1 g bid</td>
<td>0.5 g bid</td>
<td>1 bid</td>
<td>1-2 bid</td>
<td>2 drops bid</td>
</tr>
<tr>
<td>&gt;9 kg (&gt;15 lbs)</td>
<td>1-1.5 g bid</td>
<td>0.5-1 g bid</td>
<td>1 bid</td>
<td>2 bid</td>
<td>2-3 drops bid</td>
</tr>
<tr>
<td><strong>Horses</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Minis Ponies</td>
<td>5-10 g bid</td>
<td>5-10 g bid</td>
<td>3-5 bid</td>
<td>20 bid</td>
<td>Tinctures in</td>
</tr>
<tr>
<td></td>
<td>10-20 g bid</td>
<td>10-15 g bid</td>
<td>6-8 bid</td>
<td>40-60 bid</td>
<td>horses are not</td>
</tr>
<tr>
<td></td>
<td>20-30 g bid</td>
<td>15-20 g bid</td>
<td>10 bid</td>
<td>Impractical</td>
<td>advised due to</td>
</tr>
<tr>
<td>550-725 kg (900-1200 lbs)</td>
<td>30-40 g bid</td>
<td>20-25 g bid</td>
<td>15 bid</td>
<td>Impractical</td>
<td>volume</td>
</tr>
<tr>
<td>725-900 kg (1200-1500 lbs)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>requirements</td>
</tr>
</tbody>
</table>

*Ruminants, camelids, and pigs may be dosed like horses, extrapolating for like weights.

Excerpted from *Chinese Herbal Formulas for Veterinarians*
The Role of Muscles Specific Acupuncture in the Rehabilitation of Musculo-Skeletal Pathology

Kerry J Ridgway, DVM
Equine Therapeutic Options
Aiken, S.C.

Why this paper on muscle specific acupuncture rather than more traditional approaches such as eight principles, 5 Element, 6 levels, etc. when dealing with Musculo-skeletal problems? The purpose of this paper is not to denigrate the value of any other approach, but rather to look at musculo-skeletal issues from a different perspective—one that has proven itself to be very effective in the author’s hands.

It would seem that most of us have been educated to look at a hock problem, a stifle problem, a shoulder joint problem, a tendonitis, a desmitis, etc. and develop our treatment around those specific findings. I would postulate that in so many cases of musculo-skeletal pathology we are treating the “branch” rather than the “root.” I say that because my experience indicates that the “root” might rest with the muscles that directly involve the joint, tendon or ligament rather than those specific structures.

We must realize that each of the aforementioned structures functions only as a response to the action of the muscles upon them. When neurologically stimulated, the muscles respond, of course, by shortening and increasing their tonicity. The shortened muscle then places tension on the joints, tendons, ligaments, etc.

The pathology arises when the muscles experience contraction, but do not immediately relax after the contraction has accomplished its function. Shortened muscles exert a constant pull on their tendons of origin and insertion, thus causing tendonitis. If the pull is prolonged in the agonist muscle and is not balanced against its antagonist muscle there is a non-balanced tension in the ligamentous structures stabilizing the joint. The result then is non-aligned stresses on the joints and on the stabilizing ligaments themselves. The consequential pathology is desmitis, soft tissue arthritis and eventually osteoarthritis.

Trauma, overuse/fatigue (as in prolonged repetitive work) or poor nutrition and mineral imbalances create a state of prolonged muscle contraction creating in an inappropriate energy metabolism in the muscles as inflammation. The inflammation is responsible for the formation of passive and active acupuncture points.

To better understand how this all comes about; let us look at the neurophysiology of muscle contraction and relaxation and its role in musculo-skeletal pathology. In all cases, the involved muscle(s) must receive an electrical signal from a motor neuron in the central nervous system (CNS). When that happens, the muscle fiber(s) release stored calcium from the sarcoplasmic reticulum (SR) into the cytoplasm of the cell. It is this calcium release and transfer that triggers the muscle fiber contractility. The concentrating of calcium in the muscle cell causes a linking together of two linearly aligned proteins—actin and myosin. These then slide against each other, lock and shorten the muscle, i.e.
the coupling puts the muscle(s) into a contracted state. Energy is required to move the calcium in and out of the muscle cytoplasm.

If the muscle is injured or excessively fatigued calcium is not pumped back out of the cell to the sarcoplasmic reticular membrane; the muscle remains in its contracted state without further input from the central nervous system. This linking or coupling utilizes a huge amount of energy in the form of adenosine triphosphate (ATP).

Under normal circumstances, the CNS input is momentary and, the calcium returns to its storage site in the sarcoplasmic reticulum (membrane). The lowered calcium in the muscle cells cytoplasm allows the actin and myosin to uncouple. The muscle then returns to a resting state. However, if the muscle is sufficiently traumatized, the muscle remains contracted and an energy crisis occurs. The sarcoplasmic reticulum (membrane) cannot re-uptake the calcium. The actin and myosin are not able to decouple in the presence of the retained cytoplasmic calcium, so the muscle remains in its contracted state and huge energy consumption continues.

It is this energy crisis that then creates what we identify as tender muscle bands and tender acupuncture points. The micro-vessels and nerves within affected muscles undergo compression, so oxygen to the tissues is diminished and, eventually, leads to atrophy of the involved muscles.

So what happens when we place an acupuncture needle into points? The needle creates a tiny wound in the muscles that result in micro-bleeding in the muscle and surrounding tissues. This stimulates the body’s own healing responses to come into play. The bleeding releases many healing substances, such as substance P (a growth factor) and neurotrophic factors. The needling also creates a “current of injury” that is in the micro-amperage range. The bleeding and the micro-current promote healing and DNA synthesis of new proteins and collagen to repair damage. The muscles immediately relax and allow for better circulation and function of the micro-nerve supply within the muscle. The healing of the damage from the needle may take two to five days, since the current of injury continues and is in part the significant stimulus for healing.

Over the past year and a half I have, most fortuitously, had success in identifying muscle specific acupoints that lie above the coronary band on front and hind feet. This band of acupoints is found approximately 1.5 to 2 cm above the “dimple” of the coronary band. It is more proximal than most practitioners place the “Ting/Jing Well” points and may correlate with the ECIWO line of points as identified by Are Thoresen of Norway. These points and their use are described in the subsequent pages of this paper.

Obviously a good knowledge of the anatomy and muscle location as well as the action of that muscle or group of muscles is required for effective muscle specific therapy. Likewise the ability to palpate muscles to identify tension within a muscle or group of muscles is a required skill. The coronary band area points themselves must be located by palpation rather than by an anatomic description. Palpation should be a touch as light as a fly landing on the skin. I find that increased palpation pressure makes the
points more difficult to identify.

The question always arises, “how long will the treatment last? An accurate answer depends on a number of factors. How extensive is the pathology? How hard is the work that the horse is asked to perform? Has the “natural” inherent crookedness of the horse been adequately addressed? How good are the rider’s hands? What are the emotional characteristics of the horse? It is so very important that the client understands this and realizes that to get the most from any integrative treatment these underlying “root causes” must also be addressed. We are capable of managing the horse but our work can be readily “sabotaged” by the owner’s lack of understanding of these other influences.

Having said that, I find that if these “outside factors” are not severe, treatments will last three weeks and occasionally more. With successive treatments the results get better in that fewer muscles are involved and the treatments last longer and longer. Ideally, it would be good to treat initially on a once a week basis.

This mapping of coronary band muscle specific acupoints is an ongoing process and I anticipate being able to significantly expand its use over the next year or two.

My procedure is to locate an easily found Jing Well point that can be used as a reference point. For example on the lateral side of a hind foot, my reference point is BL-67a (at a level 1.5 – 2 centimeters above the coronary band.) I am using the suffix “a” to indicate that it is somewhat higher than the Jing well points as indicated by IVAS. The other foot reference points will be shown on following diagrams and pictures.

![Fig. 1](image)

- I locate my “reference” point with the tip of my index or middle finger. My finger is palm side down and parallel to the ground surface.
Once I have located my reference point, I rotate my finger and palm 90 degrees so that my fingernail of my middle finger is now in a vertical position. Note that my finger is still parallel with the ground surface.

To locate my next coronary band (CB) point, I will move my finger (fingernail) cranially or caudally until it “falls” into the next “slot.” (I refer to these as “slots” because the “points” are thin, narrow and elongated and the fingernail falls quite easily into them.) On the average sized foot they are approximately 0.7 centimeter apart.

To accurately locate these “slot shaped” “points,” I palpate with my middle finger/fingernail while holding the needle between my thumb and index finger. This saves me from having to shift my finger position or to divert my eyes from the exact acupoint location. If you divert your eyes to pick up a needle you may find yourself having to re-locate the acupoint.

I have adopted the following system for identifying/naming these “slot shaped” points is as follows: The reference point on each foot is the Ting/Jing well point (as located in this system) 1.5 to 2.0 centimeters above the depression at the top of the coronary band. As I move cranial on the foot I designate the next point forward as “+1,” the next as “+2” and so on. As I move caudal to the point just over the collateral cartilage I designate as “-1.”
My reference point for the lateral aspect of the hind foot is BL-67a (the designation “a” indicates that it is a more proximal location than BL-67 is listed on most charts.) Locate the reference point with your index or middle finger as described on the preceding page.

The “-1” acupoint is located above the most proximal level of the lateral cartilage. It lies just caudal to the vein that is visible. (note that the vein appears highlighted in the picture).

This point will very effectively repolarize the Semimembranosus m. and almost always, the Semitendinosus muscle as well (there are exceptions).

♦ The “+1” acupoint will repolarize all three branches of the Biceps femoris muscle.

♦ The “+2” acupoint will repolarize the Superficial Gluteal muscle.

♦ The “+3” acupoint will repolarize the Middle Gluteal muscle.

My reference point for the medial view of the hind foot and coronary band area is SP-1a (once again, the “a” suffix indicates a more proximal level than where most charts place SPI-1). I have more mapping to do on this medial aspect.

This SP-1a point, when needled causes a remarkably effective release for the Psoas Group of muscles.
SP 1a will also remove hypertension arising from muscle pull that causes pain bilaterally in sacro-iliac joints, the lumbro-sacral joint, and the Multifidae muscles from T-12 to L-3. This pain seems to be triggered by hypertonicity of the Psoas minor muscle(s).

It also addresses the pain palpated over the arch of ribs T16, 17 and 18 where they overlie the origin of the Psoas major muscle.)

The other significant acupoint on the medial aspect is LIV 1a. This point will depolarize the Internal and External Oblique muscles. This muscle group is part of the core muscle system and can mimic the Psoas muscle hypertonicity. This acupoint will also remove the myofascial pain pattern over the cranial border of the scapula (covering the Subclavian m.). Sometimes it is necessary to utilize both acupoints (SP 1a and LIV 1a) if both the Psoas group and Internal/Oblique muscles are involved.

When the Psoas is not directly involved, LIV 1+ will remove the pain over the lumbosacral joint, the S/I joint pain, as well as the Oblique muscle group. This point can take the place of 6 or more needles that I would have traditionally placed to accomplish these depolarizations.

My reference point for the lateral view of the front foot and coronary band area is HT-9a with the suffix “a” on HT-9a indicating a more proximal location than most charts show for HT-9.

The “-1” acupoint will depolarize the hypertonic Triceps muscle group.

The “+1” acupoint will depolarize (remove the hypertonicity and muscle shortening) the neck muscles such as the Splenius muscle, the Scalene muscle, and the Omotransversarius muscle.

At this time, I cannot be sure of my accuracy of the preceding sentence, but this is my best hypothesis at this time.
The longitudinal muscles of the neck are typically hypertonic on the side of laterality, i.e. dominance. Therefore the tension is much more common on the right side of the neck.

The “+1” point will also relax the *Biceps brachii muscle*.

The acupoints TH-14 and SI-9 are reactive when there is pain involving the *Biceps brachii muscle*. These points become non-reactive when “+1” point is needled. If within a short time these points are again reactive, ultrasound evaluation of the bursa, tendon, ligament and scapular area is indicated.

SI-1a is indicated to depolarize the *Infraspinatus muscle*.

HT-9a will depolarize the *Subclavian muscle*.

This concludes the list of “CB points” that I have identified at the time of this writing. I expect to identify more muscle specific points in the already described line of points above the coronary band. It would be most appreciated if readers identify further points that they be shared with me.
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The Role of Acupuncture and Integrative Modalities in Soft Tissue Rehabilitation
Kerry J Ridgway, DVM, CA
Equine Therapeutic Options
Aiken, South Carolina, USA

As a full time clinician practicing only integrative equine medicine; and whom no longer practices conventional equine medicine, I get called primarily for performance issues; saddle fit problems, back pain, podiatric consultations, etc. The calls often turn out to be a sub-clinical or low-grade lameness and/or related musculo-skeletal conditions. I try to work closely with veterinarians who are doing allopathic medicine and surgery and often refer back to them. It is the conventional practitioner who is more often, and more appropriately, called for the full-blown lameness case. There is obviously much overlap in what type of cases both of us see, but we will use different modalities of treatment, and often, different diagnostic methods.

Many of the cases that I see do involve lameness or at least low grade lameness. We have in our hands a too little used, but wonderful diagnostic tool. Through our acupuncture and/or chiropractic training we have a more developed sense of touch and often and enhanced ability to palpate tissue for pathology. Too often the conventional practitioner is much quicker to go to nerve blocks, X-rays or ultrasound, when a well-developed sense of palpation would provide a quick and inexpensive way of providing a diagnosis.

Since the advent of all the imaging tools, many of the conventional equine practitioners have never bothered to refine their palpation skills beyond limb flexions. When they do palpate they often do so with hands like meat hooks. Both groups, of course, do evaluate gate for lameness and if present, under what circumstances and in what limb.

In the integrative biomechanical and postural approach, the evaluation of movement is geared beyond just determining if and where lameness is occurring. We place a lot of emphasis on posture, relationship to gravity, and what muscle patterns are occurring and the significance of affected muscle groups. We should also place a lot of emphasis on the determination of laterality. See the next paper regarding “laterality,” (also known as inherent or natural crookedness). This concept is, pretty much of a foreign concept to the average veterinary client. The concept unfortunately is also, at this time, is foreign to nearly all-equine veterinarians, including those in integrative medicine.

In line with my concept of improper muscle balance and function as the root of so many soft tissue and even joint pain problems, I feel that it is imperative that the veterinarians doing acupuncture, chiropractic, or other integrative modalities understand the ramifications of laterality (right or left forelimb dominance). Our clients, their trainers and their farriers, should also understand this critical phenomenon. Suffice it to say at this point that, essentially every horse exhibits laterality and associated problems in the
musculo-skeletal system. These include not just the back and joint issues, but also are often the root cause of tendonitis, desmitis, joint pain, and hoof imbalances.

It is also my opinion, that it is the obligation of those practicing good integrative medicine to call upon their conventional skills. Every horse should receive a conventional evaluation if it is manifesting any signs of overt lameness or subacute lameness or not. In our veterinary training, we all received excellent conventional veterinary, skills and procedures for lameness evaluation. For the good of the horse, as well as legal ramifications we need to integrate our new integrative training with good conventional medicine. All too often I see my holistic colleagues ignoring our conventional training and relying only on our acupuncture, chiropractic, etc.

After getting a history, good medicine dictates that we evaluate posture by examining from four vantage points - from in front; from behind; and from both sides. The horse should be walked and trotted in a straight line. Then ask for the horse to be longed in both directions and at all three gaits. We absolutely need to evaluate for any known or unknown lameness in every horse. You may have been told that there is no lameness problem; but remember, the last one who touches the horse gets the blame if it turns up lame following any treatment you may have administered (even though the treatment had nothing to do with the lameness).

Let me give you a classic example. Many years ago a good and regular client called me. She had spent over a year rehabilitating a suspensory injury by conventional means only on her upper level dressage horse. She wanted chiropractic, but not acupuncture, as she did not “believe” in acupuncture. The horse had been sound and in work for several weeks. She was, on that day, planning on transporting the mare to the state dressage championships. She had worked the horse hard that morning and was very pleased at how well the mare worked and was sound. So when I arrived two hours after her work, I asked to see the horse for movement evaluation. She insisted that it was not necessary, as she knew the horse was moving very well and was sound. She just wanted me to go over the mare for chiropractic issues prior to her loading to travel to the show. I asked her to humor me. When the mare was trotted out, she was grade 3 of 5 lame. Palpation revealed that the same suspensory ligament had torn again. Can you imagine the consequences if I had done some chiropractic manipulations and she had then loaded the mare for the 65-mile trip and had then unloaded a very lame horse? In the last 25 years, I have had this scenario repeated enough times in one form or another, that I now insist that I be allowed to perform a static/postural and motion examination horse on every horse.

Rarely does a client object and, in fact, they are pleased with the thoroughness of the examination. It is actually a client builder. Having gone through the previous examinations, we should now be in a position to tell the client what we see and comment on the root causes of the postural, muscular and movement imbalances.
Tendon and Ligament Injuries

As I have previously stated, I feel that so much tendon and ligament pathology starts with muscle tension resulting muscle metabolism (as well as poor riding and a lack of balance and the horse’s core muscle strength being other sources). Tendons, ligaments and joints should be evaluated and treated with these conditions and aspects in mind. These conditions are, in my experience important, not only in a differential diagnosis, but also as an important and ongoing part of a rehabilitation program. I sincerely believe, from long-term experience, that the ability to treat and balance the muscular system, can decrease the healing/rehabilitation time.

I have worked closely for several years with Dr. Carol Gillis, DVM. PhD, DACVSMR, a very top-notch equine ultrasound specialist. She has many years of experience and had created the ultrasound program at the College of Veterinary Medicine, University of California, Davis. I had utilized her services while we were in California and it was my good fortune that she has moved her practice to Aiken, South Carolina, USA and is nearby to my practice.

Her results in returning, top-level horses of every discipline, to their original level of performance, are far greater than programs outlined by most equine practitioners. Through her results and conclusions, based on ultrasonographic findings and clinical experience with more than 22,000 cases of tendon and ligament injury she has developed very effective rehab program. These programs are often lengthy, but amazingly effective. I am going to directly quote her from her paper on “Tendon and Ligament Rehabilitation.” In order to emphasize important aspects I have placed italics in her text:

“The first step to healing a soft tissue (tendon or ligament) injury is an accurate and complete diagnosis. Unless there is obvious pain heat and swelling of the affected structure, this should include a lameness evaluation with flexion tests and nerve blocks as indicated. Once the suspect area is identified, a thorough ultrasound exam will include short and long axis views with cross-sectional area measurements of the affected tendon or ligament and any discrete lesions seen. Permanent images should be kept in the form of hard copy prints and/or digitized records.”

“The goal of treatment and rehabilitation is healing of the tendon or ligament to the extent that normal athletic activity can be resumed without re-injury. A large study of equine athletes several years ago showed that 90 days of stall rest followed by 9–12 months of pasture turnout resulted in only 22–26% of horses returning to work for one year without re-injury.”

“Likely reasons for the low success rate of pasture turnout include a relatively short duration of pain and inflammation compared with the long healing time for tendon and ligament. This means that the horse feels good after a few weeks and plays until the weakened structure sustains a re-injury and the cycle of inflammation and pain begins again. Also, normal tendon and ligament are close to their breaking strength when the horse is at full gallop, therefore injured soft tissue can sustain more fiber tearing at lower
speeds. In fact, horses which have had months or years of pasture turnout for a soft tissue injury rarely have healed tendons or ligaments prior to returning to work, rather ultrasound evaluation reveals partial healing with chronic thickening and a fiber pattern that lacks the appearance of sufficient strength to withstand work."

“Controlled exercise, which is well accepted for bone fractures, is essential for optimum healing of tendons and ligaments. It is useful to think of a soft tissue injury as being comparable to a fracture that can’t be casted or plated for stabilization. Rather, we rely on corrective shoeing, medical therapy and controlled exercise over a several month period, to regain normal tendon and ligament structure and strength. Ultrasound examinations at regular intervals allow us to tailor the amount of exercise to each horse’s particular stage of healing so the risk of re-injury doesn't increase from adding work too quickly or so that unnecessary training or competing time is not lost due to resting for too long.”

“Overall prognosis for return to work without re-injury after successful completion of a controlled exercise rehabilitation program is good, meaning 85% or better. The most common reasons for failure to achieve 95% healing (normal soft tissue strength) on the final ultrasound examination are:

1) Owner/horse non-compliance with a controlled exercise program.
2) Failure to recognize and treat other injuries or syndromes that are contributing to the soft tissue injury. [* This is where we, as integrative practitioners can really help – in both diagnosis and supplemental treatment – emphasis by KJR] For example, a horse with (even slightly) sore hocks will not heal a front leg suspensory ligament injury well even if the rehab program is being followed due to constant low grade overloading of the injured ligament.

Based on ultrasonographic findings and clinical experience with more than 22,000 cases of tendon and ligament injury, the following rehabilitation protocols have been developed.”

Discussion

“Successful cases usually require 8–9 months of rest and rehabilitation to return to (their) previous full workload. {*note by KJR – This does not meant that the client will have to be off the horse that entire time. A significant portion of the rehab may be done under saddle.} Advancing too quickly often results in worsening of the lesion; advancing too slowly results in a loss of productive athletic use of the horse. The basic purpose of controlled exercise rehabilitation is to initially encourage resolution of inflammation and maintenance of tendon gliding function through rest and walking. Gradually increasing workload provides stimulation to the tendon to continue the healing process, bearing in mind that the tendon is relatively weak after injury and gains strength over several months.”
“It is important that the increase in exercise be graduated, so that fatigue or overload injury to the healing tendon does not occur. Owners or trainers should be advised that there is an increased risk of injury to the affected tendon or ligament during healing and that an ultrasonographic examination should be performed if at any time during the rehabilitation program clinical signs recur. Please note that none of the rehabilitation protocols include free pasture turnout or uncontrolled exercise before the horse is ready for full work. Although controlled exercise requires time, effort and money, coupled with accurate interpretation of regular clinical and ultrasonographic examinations, it provides the best opportunity for successful resolution of tendon injury.”

**Procedure**

At the initial examination, grade of lameness and clinical signs of pain on palpation, heat and swelling are noted. The affected tendon’s/ligament’s ultrasonographic changes in size (cross-sectional area; CSA) echogenicity and fiber pattern are recorded at the most proximal site of damage, at the most severely damaged site, and also at the most distal site of damage. If a discrete core lesion is found, the CSA and echogenicity of the lesion are also recorded at the same sites. An initial period of stall confinement and hand walking is then initiated

For further information, the full paper and guidelines see the reference at the end of this manuscript. The guidelines that she presents are precisely guidelines and not a substitute for ongoing clinical evaluation and serial ultrasounds.

In my opinion, I see too many of those of us in integrative medicine relying only on our acupuncture or other modalities to heal these injuries. From the quoted material, and from my experience, we both can, and need to do a much better job of designing and healing tendon, ligament and joint injuries. We need to understand how to design a good rehab program. We can improve our case outcomes significantly if we integrate our skills with those of a good imaging expert. We need, as well, to educate our clients - making them more aware and comprehending of the physiology of soft tissue injuries. Along with that, they must be brought to an understanding of the time frame and requirements for effectively rehabbing these slow healing tissues. Remember the adage: “treat them like a fracture.” You don’t heal fractures with pasture turn out.

**Equine Behavior as a factor in Rehabilitation**

Horses, as a prey species, are always on the alert and prone to becoming tense; especially if they are poorly trained, or aggressively handled. We seldom think about it, but fear and tension can be one of our biggest obstacles to healing and good case outcomes. Many horses we see as patients have, often through ignorance, been ridden in tension or may have been roughly handled.

I would like to share with you a couple of quotes about the effects and danger of riding the horse in tension.
“Let us beware of upsetting the young horse. His gentleness and good will are like the bloom of a flower, which once lost, never returns.” by Pluvinel, riding master to King Louis XIII – 1623.

Riders who hold in their horses are insignificant riders and will never advance. Riders who give their horses freedom are those who will taste the delicacies of the equestrian art” by Nuno Olivera from his “Reflections on Equestrian Art”

Hyoid Muscle Issues:

A huge percentage of horses hold tension in these key muscles. It is amazing how a relatively small group of muscles designed to aid in the swallowing of food, when in tension, can create major performance issues. The bilateral Omohyoid muscles originate from the fascia under the cranial edge of the scapula and they insert on the lingual process of the Basihyoid bones. The Sternohyoid muscles originate from the manubrium, and, likewise, insert on the Lingual Process of the Basihyoid bone. The lingual process is actually embedded in the root of the tongue. This means that the tongue is, literally, connected to the shoulder and therefore, movement of both the jaw and the shoulder is compromised when these muscles are tense. Tension tends to result in a higher (more open at the throatlatch) head carriage and by restricting the scapular movement the stride of the front limbs is shortened. It is a fact that if the jaw is restricted, it is very difficult for a horse to perform lateral movements.

The tendency to hollow the back when tension exists in these muscles, leads to more weight on the forehand, inability to raise the back, “kissing spines” issues, back pain, stiffness of movement and lack of engagement of the hind quarters. This in turn leads to hock and stifle problems. Temporal-mandibular joint pain is also a feature of this condition.

Because of the time limitations, the corrections for this too common problem will not be covered in the lectures. I am willing to send copies of my full manuscript on this subject to participants of this IVAS/AAVA Congress lectures.

Psoas Muscle Group

When horses are worked in tension, the Psoas group is the other major recipient of chronic muscle contraction/shortening. In fact it is my hypothesis that when the Psoas Muscle Group (Psoas major and Psoas minor) is held in chronic tension, it becomes the common denominator for low back and hindquarter problems. When present, it is often in concert with chronic contraction and shortening of the Internal and External Oblique muscles. It is often a key aspect and consequence of the laterality issues (right or left forelimb dominance). See my paper on laterality in the proceedings.

Again, I have addressed this subject in other papers which I can make available to the lecture participants, or which could be published in “The Point” journal. There will not be time in the lectures to cover this critical aspect.
Laterality

When a horse exhibits specific forelimb dominance, either right or left, there are specific muscles that become chronically tense, painful and reactive. They tend to be unilaterally distributed, but in long standing cases may become more bilaterally tense and painful as more and more muscles become recruited. For an understanding of “laterality,” please read the in-depth paper on this topic. For the acupuncture treatment of these muscles, please read my paper on “Muscle Specific Acupuncture.” The patterns present will be presented in-depth in the lectures.

To prevent confusion, I will address only the muscles involved in right forelimb dominance. Be aware, that if you are dealing with left forelimb dominance, the patterns of muscle tension will be mirror images of a “right handed” horse.

I do all my muscle testing for reactivity with a needle cap. With practice this has allowed me to clearly identify reactivity in specific muscles. Diagnosis is critical to effective muscle specific acupuncture treatment. Be aware that using any palpation tool aggressively will make any muscle react. The needle cap should be used with a light to moderate amount of pressure. The technique is not only effective, but also very helpful in alleviating stress on the examiner’s hands. For testing discrete areas, or reactivity of acupuncture points, I use the tip of the needle cap, holding it in a manner such that the end of the cap provides a hard spot on the pad of my index finger. This allows me to use a light pressure when testing. On broad muscles, such as the Middle or Superficial Gluteal muscles, I use the flat side of the needle cap. Used in this flat-sided manner, I apply moderate pressure. One can only develop skill with reference to the amount of pressure to be properly applied by comparing normal muscles, with those that are tense. Bilateral comparisons are helpful.

Muscle Patterns in Right Forelimb Dominance

The right forelimb dominant horse will present with painful neck muscles on its right side. These typically include the Scalene muscle, and the Omotransversarius muscle. The muscles on the left side will usually not be reactive. (Bear in mind that the Hyoid muscles may also be in excess tension, but are not, technically a part of the laterality pattern. Rather, they are an indication that the horse moves with tension in his neck muscles.

As the examiner moves to the right shoulder, pain and reactivity will be found at TH-14 and SI-9, indicating pain in the Deltoid muscle, and medial head of the Triceps muscle. Next, palpate the long head of the Triceps muscle, the Infraspinatus muscle, the Ascending Pectoral muscle, and the Serratus Ventralis Thoracis muscle. They will all be tight, painful and reactive to palpation. The muscles in the “wither pocket” are usually very reactive and are a result of the shear forces that occur in the laterality/crookedness syndrome. The shear forces are acting upon the thoracic vertebrae T-3 through T-11 and will respond to chiropractic manipulation. The muscles and upper thoracic vertebrae may also be reactive because of “kissing spines in the upper thoracics.”
If the reactivity is due to the laterality syndrome, the Rhomboid muscle, and Trapezius muscle, are likely to be more reactive on the right side. The left dominant horse will exhibit a mirror image muscle pattern.

Typically, horses exhibiting right forelimb dominance are bilaterally reactive over the lumbosacral joints and reactive over the middle gluteal muscle on the right side. There may be mild reactivity over the Biceps femoris group, the Semitendinosus muscle and the Semimembranosus muscle. As we move to the left hindquarter of the right forelimb dominant horse, the Biceps femoris muscle group will be found to be acutely reactive. This will be most noticed if one lightly palpates (with an object such as a needle cap) starting from BL-35, moving distally down the groove between the Biceps muscle and the Semitendinosus muscle. Reactivity to this testing at this upper croup area is essentially pathognomonic of a hypertonic/tense Biceps group.

The Semimembranosus muscle is usually found to be very reactive as one palpates (lightly) with a needle cap. Follow a line of palpation that traverses cranially to caudally along the bottom of the inner thigh bulge. The Gracilis muscle and the underlying Adductor muscle intersecting with the Semimembranosus form this thick muscular area on the inner thigh. Maintain a safe position. I have not had a horse kick while doing this, but it is always a potential consequence.

Many horses will also exhibit chronic contraction/hypertonicity of the Internal and External Oblique muscles – typically found bilaterally. They have part of their insertion on the last rib. Using a needle cap or other object, lightly palpate starting proximally and proceed distally along the caudal border of that eighteenth rib. This will elicit reactivity and spasm when these muscles are involved. Check the origin of these muscles along the cranial border or the coxal tuber in the same manner. However, because of the direction of hair growth it is more definitive to evaluate from distal to proximal.

When the Oblique muscles are involved, a line of reactivity will be present that can be identified using the needle cap and tracing a horizontal line from the ventral aspect of the coxal tuber and crossing the Tensor Fascia Latae muscle to the hip joint; then tracing around the coxofemoral joint. The joint and muscle insertions on the greater trochanter are stiff and painful when the Internal/External Obliques are in a state of chronic tension. Also if one tests the lateral gaskin over the Lateral Digital Extensor muscle, it is also often found to be reactive. This entire area is within the province of the Gallbladder Channel.

A single needle placed in LIV 1a (See my paper on the coronary band area points) will remove all the tension/shortening in all the areas mentioned in the previous paragraph.

The condition of laterality is so pervasive that you will find a lot of value in learning these muscle patterns and how to treat them. The muscle treatment protocol is easy to learn. Because the only long term control and straightening of the horse comes
through correct groundwork, longeing and riding techniques, do not expect to “cure” these horses. They can, however, be helped tremendously by maintenance work. Especially during competition seasons, the horses should, ideally, be treated on a monthly basis.
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**Equine Interstitial Lung Disease**

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Acupuncture and Traditional Chinese Herbal Medicine have a great healing effect in the therapy of respiratory diseases. This paper will give a special view on the diagnosis and therapy of interstitial lung disease also known as interstitial pneumopathy in horses. For better understanding a short review of TCVM pathophysiology of lower respiratory diseases:

Remember: The lung (Fei) as the primary organ of the respiratory system is in charge to generate Qi. All basic Qi movements as ascending, descending, going out and coming in are controlled by this organ. Since the lung opens to the outside it is easily affected by pathogenic factors. The organ opens and regulates the water channels and is connected with skin and body hair. Sweat, moisture and resistance of the skin are controlled by the lung. Lung controls and harmonizes the flow of blood by controlling all Qi functions. It opens into the nose and connects with the throat. The mental aspect of the Lung is grief and its season is autumn.

In the acute stage exogenous pathogenic factors (EPF) such as cold, heat, damp, summer heat and dryness enter the lung often unrecognized by the owner or rider of the horse. If the EPF invades deeper and stays longer in the body chronic conditions of Excess and Deficiency Patterns develop. There can be deficiency in the lung which may be associated with Kidney Qi- or Yin-Deficiency as well as Spleen-Qi Deficiency and Spleen-Yang-Deficiency. This either results in chronic dry or weak cough or productive cough with yellow or white sputum. At this point the rider recognizes the illness and asks for treatment of the horse.

The examination of a patient with respiratory pathologies in TCVM includes pulse, tongue, the quality of the cough and the specific time of occurring during the day as well as the color and quantity of sputum—all that supplies us with a lot of information to find the correct TCVM-diagnosis and choose the right TCVM-therapy.

During the last ten years of accompanying sport horses I did treat chronic equine interstitial lung disease with TCVM. Most of these patients have not shown lung symptoms as coughing or signs of phlegm or dyspnea, but they had developed a great lack of power and a declining response to the riders claim. To be successful in TCVM treatment of chronic interstitial pneumopathy, I had to modify my usual lung disease acupuncture treatment protocol.

**Definition of interstitial lung disease**

From the western point of view interstitial pneumopathy in humans is described as idiopathic interstitial pneumonias (IIPs) which gives a conferrable explanation for the equine interstitial lung disease of horses.
“IIPs are a group of diffuse parenchymal lung diseases (DPLDs), a group also described as interstitial lung diseases. The IIPs are a heterogeneous group of non-neoplastic disorders resulting from damage to the lung parenchyma by varying patterns of inflammation and fibrosis. The interstitium includes the space between the epithelial and endothelial basement membranes and it is the primary site of injury in the IIPs. However, these disorders frequently affect not only the interstitium, but also the airspaces, peripheral airways, and vessels along with their respective epithelial and endothelial linings (1).

Diffuse lung diseases such as emphysema or chronic obstructive lung disease (COPD), bronchiolitis, and pulmonary hypertension are excluded from this discussion. Idiopathic indicates unknown cause and interstitial pneumonia refers to involvement of the lung parenchyma by varying combinations of fibrosis and inflammation, in contrast to airspace disease typically seen in bacterial pneumonia. (2)

In horses the results of arterial blood gas analysis, tracheobronchial mucus cytology and radiological examination of the lungs are similar to above definition and they are different from results found generally in horses suffering from chronic obstructive pulmonary disease.(3). Intoxication with Perilla keton in horses induced an acute interstitial pneumopathy that can resolve over 60 days. (5)

**Clinical symptoms in the horse**

The following symptoms are usually present in chronic interstitial lung disease of the horse: no coughing, lack of power;

1) Poor blood gas values: low oxygen, high carboxygen,
2) X-rays: thickening of interstitial connective tissue with volume loss of functional lung tissue (alveolar),
3) Bronchoscopy without pathologic findings – no phlegm (sometimes slight thickening of bifurcation),
4) BAL - lavage: not meaningful
5) Lung biopsy gives the best advice for the diagnosis.

Regularly standard therapy uses corticosteroids in combination with β-receptor-agonists to manage the disease. Though this leads to temporary symptomatic improvement relapses are common. Due to this fact horses are often referred for holistic diagnostics and treatment.

In horses the results of arterial blood gas analysis, tracheobronchial mucus cytology and radiological examination of the lungs are found in a typical combination, and they are different from results generally found in horses suffering from chronic obstructive pulmonary disease.(3)

**TCVM symptoms of the horse**

As discussed previously chronic equine interstitial pneumopathy does not show lung symptoms as coughing or signs of phlegm and strange dyspnea, except if it is comes
along with other lung diseases like chronic obstructive lung disease or bacterial lung infections.

The following symptoms appear in the horse:
1. Lack of vitality, weakness from the beginning of exercise, low resilience during exercise, but horses in good body condition
2. Tense or pain in the thoracic region,
3. Sensitivity of Ki-Meridian (pectoral region),
4. Sensitivity of traditional TVCM-Point(s): Fei Pan, Fei Men, Bo Lan, Bo Jian,
5. Sensitivity of intercostal muscles (respectively TCVM-Points LIV13, 14, GB 25),
6. Heavy and early sweating during exercise, starts sweating again spontaneously after cool down,
7. Dry skin and coat,
8. Back pain, often cool lumbar region
9. Pulse: variable pulse manifestation: deep, slow or fast esp. on the left side; can be slippery;
10. Tongue: white or red or purple, often more slack and flappy as expected, but also can be dry, sometimes purple spots at the edges,
11. Mental signs depending on constitutional TVCM Type: either depressed or contrary to the rider. Rider reports a lack of concentration in the horse.

Normally horses with chronic obstructive lung disease start exercising vitally and gets tired during exercise. The horses affected by equine interstitial pulmonary disease are always lethargic and weak, they do not want to move, and develop just a slight longer breathing recovery time after exercise, but no dyspnea.(3)

TCVM Etiology
To understand the development of interstitial lung disease in horses in TCVM, the etiology and symptomatology internal phlegm needs to be considered.

“Traditional Chinese medicine has two general categories of phlegm: ‘broadly defined’ phlegm and ‘narrowly defined’ phlegm. The narrowly phlegm is generally regarded as the visible substance secreted by the Lungs and upper respiratory tract which can be either coughed or spat out, or vomited up. This is also often known as “external phlegm” or “substantial phlegm”. Broadly defined phlegm is often the consequence of internal disruption of the body’s fluid metabolism, either through Qi Stasis, Yang Qi Deficiency or similar reasons. Because this type of phlegm is not visually obvious to an observer, and because the etiology is internal, it is also known as “internal phlegm”. It should not be referred to as ‘insubstantial phlegm’ because this type of phlegm is quite capable of producing very substantial nodules.”(4)

Normal fluid metabolism depends on Spleen’s transport function, Lung’s rhythmic descent actions and Kidney’s normal function of Qi Transformation.
Disharmony in any of these organs can allow fluids to slowdown in circulation accumulate and thicken into phlegm. Similarly, the influence of San Jiao (Triple Heather) is extraordinarily important, because San Jiao is the pathway for the ascent and descent of Qi and is also the pathway for body fluids (Jin Ye), reaching outward to the surface tissues, inward to the Zang Fu, up to the head and down to the feet. If the San Jiao is blocked, channel Qi cannot flow and is obstructed causing Jin Ye to stop and gather without proper circulation, accumulate to form phlegm. Therefore, any phlegm that arises as a result of Spleen-, Lung- or Kidney-imbalance can be carried anywhere in the body by the function of the San Jiao and accumulate there. In the same way fluid at any point of the San Jiao pathway can accumulate into internal phlegm. Therefore diseases involving phlegm are among the most complicated ones in TCM.

If internal phlegm lodges in the chest and ribs causing local obstruction it can lead to pain in the ribs or flanks. If internal phlegm obstructs any ascending and descending of Yang Qi or Yin Qi movements, the connection between heart and kidneys can be imbalanced. Phlegm can compromise the Shen and also the Heart Shen may be disturbed, and symptoms such as insomnia, palpitations result.

Phlegm is a Yin pathogenic factor with a sticky nature that may stay latent deep inside the body. This latent deep-lying phlegm can constrict the Yang Qi from moving properly therefore Yang increases internally and builds up heat. Attention should be paid that pathogenic fire is a factor in phlegm formation. ‘Pathogenic fire’ does not mean just an invasion of exogenous heat into the body. Emotional over-activities in form of fury, joy, worry, grief and fear can cause fire.(4) If you transfer this pathophysiology to horses, you need to consider that the big effort sport horses are demanded and/or willing to do can lead to emotional over activities and therefore to “pathogenic fire.”

In TCVM, based on the above points, we can summarize the most influential factors in the production of **internal phlegm in interstitial lung disease** as follows: The functional irregularity of the San Jiao, Disharmony by Lung Qi or Lung Yin, Spleen Qi, Kidney Yang, Yuan Qi and the over activity of pathogenic fire. Also obstruction of Liver Qi can be involved in production of phlegm. Because Qi must carry the fluids around the body, any slow-down in this movement can allow fluids to stagnate and become phlegm.

**TCVM Diagnosis:** Interstitial lung disease in horses is defined as Lung Yin Deficiency, Internal Phlegm due to disharmony of San Jiao, Qi Stagnation of the chest, Deficiency of Kidney Yang, Deficiency of Spleen Qi and Liver Qi Stagnation.

**Zhu Dan-Xi:**
‘Those who treat phlegm effectively do not treat the phlegm, but first treat the Qi. When the circulation of the Qi is smooth and ordered, this will lead the body fluids in a smooth and ordered circulation as well.’

He explains: ‘the substance of phlegm follows the Qi in its rise or fall, so that every place in the body may be reached.’ (7)
**Treatment Principle:** Resolve the Internal Phlegm by harmonizing the San Jiao, move Qi Stagnation, tonify Lung Yin, tonify Kidney Yang, support Spleen, persuade Liver Qi.

**Acupuncture Treatment:** each horse needs an individual treatment, the following acupuncture points are the basic concept

- TH 10
- TH 6 + GB 34
- Ren Mai (LU 7, KI 6)
- Sinew Channel: LU (LU 11, LU 9, GB 22)
- CV 17
- CV 12
- LIV 14, 13

**Herbs:** Bai He Gu Jin Tang
- Bu Fei San
- Chai Hu Zhi Jie Tang

**Summary:**

Horses are presented for medical treatment showing back pain, mental problems or general lack of vitality and not primarily because of lung issues like cough. (2)

Due to the extraordinary appearance of chronic interstitial lung disease in horses, in both, Western- and TCVM terms riders and practitioners often underestimate or misinterpret clinical signs like “lack of power” or “mental changes in the behavior”

The TCVM explanation of interstitial lung disease of the horse is not necessarily based on invasion of an EPF into the body. It can be explained as Lung Yin Deficiency, Internal phlegm due to Disharmony of San Jiao, Qi Stagnation of the Chest, Deficiency of Kidney Yang, Deficiency of Spleen Qi and Liver Qi Stagnation. Therefore the etiology is different from other chronic lung diseases.

TCVM treatment with focusing on the San Jiao and the Stagnation of Qi is essential to successfully treat and cure this disease. Hence it is necessary not just to treat Lung, Spleen and Kidney but put more emphasize on the regulation of Body Fluids (Jin Ye), harmonization of the San Jiao and movement of Qi.


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Equine and Canine Ear Acupuncture / Equine and Canine Laser Acupuncture
Dr. Uwe Petermann, DVM
Melle Germany

- Equine and Canine Ear acupuncture, easy entry to acupuncture by western thinking
- Equine and Canine Laser acupuncture, a symbiosis of acupuncture and low level laser therapy
- Lecturing time 5h

Summary
The Pulse Controlled Laser Acupuncture Concept (PCLAC) is a modern form of therapy, where traditional acupuncture is combined with Low Level Laser Therapy (LLLT), Ear Acupuncture and RAC Pulse Control to use the synergetic effects of these therapies. Beside stimulation of acupuncture points the laser light also can be used for the therapeutic impact of LLLT in tissue. A huge range of acute and chronic disease can be treated very effectively. By use of vegetative reflexes, so called RAC or Nogier- reflexes, which emerge from stimulation of active (imbalanced) acupuncture points, has been developed a very sensitive diagnostic system, especially if we use Ear Acupuncture where we find the reflex points of the complete body including all meridian points in the small area of the ear. This is a really holistic diagnostic system which shows us (nearly) all backgrounds in the body that lead to chronic disease. All active or imbalanced points the patient shows to us are in the same way important treatment points because the strength of the RAC reaction is a measurement of the strength how the point balances the Qi in the patient.

Introduction
After acupuncture in human medicine has developed itself from outsider medicine to a recognized high effective therapy we can recognize acupuncture in veterinary medicine in the same way. As hardly any other treatment acupuncture seems not only to treat symptoms rather it always tries to find the root of the disease and use it as a central element of its treatment. Only through this really causal treatment the impressive successful outcome in so many previously not treatable diseases is to explain.

Controlled acupuncture is a further development of traditional acupuncture and far more than just the treatment of points with a mild laser light instead of needles. This medicine is a synthesis of two each for its own very effective therapies: acupuncture and LLLT (Low Level Laser Therapy) that means local laser treatment of diseased tissue.

In addition a vegetative Reflex in the patient helps the therapist with the choice of the points to be treated. This reflex gives information on whether the point gives a strong therapeutic response. Controlled acupuncture in this way can also be used as an excellent diagnostic tool.
To go at the root of the disease and not just dealing with a symptom is the particular concern of controlled acupuncture. Thus especially for chronic illnesses, it is essential to uncover underlying causes. For this just ear acupuncture is very useful, because the ear provides us with a small-scale representation of the physical discomfort of the patient and makes acupuncture diagnostics so much easier. We only have to scan this small area of the ear which represents the whole in an extremely detailed matter. All the relevant points are lying close to each other and are thus easily to check in a few seconds. The active ear points found by RAC control give us both possibilities as well in orthopedics (lameness), as well as in internal disorders: diagnostic and treatment. This kind of diagnostic gives us a far-reaching assessment of all thinkable disorders in the body. Very often I am absolutely surprised what I find, but in the same moment I wonder why I didn’t see this connection between symptoms and the underlying illness before acupuncture diagnostic. The outcome is always logic and understandable.

**PCLAC rests on four pillars**

**The main pillar is traditional acupuncture**

The main pillar clearly is traditional veterinary acupuncture, based in a 3000 years old tradition and experience since Sunjang who was the father of veterinary acupuncture. This is not the main issue of this lecture but some aspects should be mentioned here.

Here the function circles or meridians play a fundamental role. They are responsible for a smooth transport of Qi, the individual force of life. A modern part of this life force is ATP, which is produced in the citric acid circle within the Mitochondria of the body cells. Here the aerobic respiration takes place and produces ATP that provides the body with energy for all life processes from synthesis of enzymes to the relaxation of muscles, which means for all energy consuming processes in the body.

In any disease of the organism we have a disturbance of the optimum flow of the Qi, what has the consequence, that the balance in the traditional sense between Yin and Yang, in the medical sense between parasympathic and sympathetic nervous system, is disturbed. An example may clarify this.

In case of a blockage in the upper thoracic spinal column we have an irritation of the roots of the efferent nerves. This leads to a contraction of the back muscles and also simultaneously the blood vessels in the concerning body segment. On one hand, this contracture of the muscles solidifies the resulting blockage. On the other hand the contraction of the muscles results in a poor blood perfusion. This simultaneously is strengthened by a contraction of the blood vessels in this segment by the same process arising from the irritated nerve. The supply of oxygen and nutrients is reduced. The provision with ATP, what the muscle cells need for relaxation, stagnates. The muscles indurate more and more and a vicious circle of clamping and occlusive disease has its beginning. The production of ATP and so flow of Qi is disturbed. We have Qi Stagnation.
In addition, if this affected segment possibly is responsible for the vegetative control of cardiac function, the growing irritation of the nerve root will influence vegetative regulation of the heart. The result is autonomic disorders of cardiac function with under certain circumstances life-threatening consequences.

At this point it should be noted that in my experience in many horses and dogs which suffer from heart disease a significant proportion in similar incidents is based in such failures of vegetative control. This mutual influencing of organ function and back pain in a segment is obviously not only for the heart problems but also for all other organ- and many, especially chronic orthopedic disease.

**The second pillar of controlled acupuncture is ear acupuncture**

A second pillar of controlled acupuncture is ear acupuncture. An important aspect of ear acupuncture is its ease clarity for western trained physicians, since this kind of acupuncture originates in western thinking. Its inventor, the French acupuncturist Dr. Paul Nogier empirically found out that the ear reflex points have a direct impact on diseased structures of the spinal column and the whole limbs. These new points on the ear at that time had not any connection with traditional acupuncture points. When he stated to pierce these points, as usual in *traditional acupuncture*, with needles, *ear acupuncture* was born. In the course of his following work and experience he established a complete image of the whole body on the ear, at first for the orthopedic points, thus spinal column and joints and the accompanying muscles and tendons, and even subsequently for organs. These points follow its sphere of influence, named: *knee point, elbow point, hip point, point of 2. neck vertebra*, but also *lung point vegetative heart point, kidneys point*, etc.

The neurological connections of ear points with the central nervous system and the periphery can now be shown by FMRI. In continuation of Nogier’s idea ear acupuncture was explored and developed further in the German Academy for Acupuncture (DAA) under the leadership of Prof. Bahr.
There were found points for nerves, ganglia, the spinal cord, endocrine and exocrine glands and various parts of the brain. Also points with super ordained influences were found: Endorphin point, Histamine point, Prostaglandin point, β-adrenergic point, ACTH point etc., just to mention some of those.

In the last twenty-five years I have, more or less in lockstep with human medicine, found almost all of these localizations also at the ear of dogs and horses with clear determinations and could summarize these points to ear maps. Figure 3 shows my first equine ear map from 1989. All these points can be combined for modern medical aspects for therapeutic purposes with outstanding therapeutic success.

If ear acupuncture is combined with RAC controlled acupuncture, the finding of the active points open the patient's medical history with (almost) all its causal relationships to the investigator.

In orthopedic diseases “controlled acupuncture” can be used as a thorough lameness diagnostic I compared the outcome of ear lameness diagnostic for more than 10 years with classical examination and nerve block anesthesia and had such a good relationship with both outcomes that in the last 15 years I disclaim nerve block anesthesia to save time. The same is true for diagnostic of internal disorders.

Figure 3: Skeletal structures identified by the author and an auricular map of these created in 1989. Points 1-7 on the auricular map have been found to have special effects and are superordinated points in ear acupuncture (Reprinted with permission from Petermann U. Pulse Controlled Laser Acupuncture Concept (PCLAC). 2007: [www.akupunkturtierarzt.de](http://www.akupunkturtierarzt.de))

Figure 4: orthopedic ear Map of the Dog (Reprinted with permission from: Petermann U. Kontrollierte Laserakupunktur bei Hund und Pferd. Sonntag Verlag in MVS Medizinverlag. Stuttgart, Germany: Thieme Verlagsgruppe 2011)
The system is very reliable and in some cases, even more sensitive than clinical diagnostigs, laboratory diagnostics and diagnostic with the help from image giving procedures.

So we can uncover and treat disturbances in a preventative way already before clinical manifestations achieves. The combination with clinical diagnostics to mutual verification and supplementation has been extremely well-proven. With the finding of active points at the ear, I have beside diagnosis also very important acupuncture points for treatment of these ailments. By needling or by lasering these points I can balance vegetative regulation, and thus set the Qi flow in motion again.

In the meantime, the meridians and all traditional acupuncture points are also transposed from the body to the ear. Thus we have the complete meridian system not only on the body but also on the ear. This has the advantage that we can combine the modern ear-points of the joints or the organ points at the ear in a traditional aspect with all thinkable acupuncture points without switching for and back between body- and ear- acupuncture. E.g. in a case of a lung infection we can treat the lung point at the ear and we combine it, according to the Midday-Midnight rule (traditional acupuncture rule), with the two “anti-infective” Luo points SP 4 (which is the Interferon-point) and TH 5 (which is the Thymus-point) on the ear.

Still much more interesting seems to me the aspect that, because knowing the locations of all meridian points at the ear, the traditional and modern concept directly can be compared. Almost naturally it showed itself as a complete balanced coverage of TCVM with western medicine. So, when we transposed the Lung meridian to the ear we found the point Lu 7 in the same place, as the ear point (the organ point) of the lung. The same happened when transferring the other meridians. The Kidneys point is identical to the point KID 7, the Liver point to LIV 8, the Stomach point to ST 41, the Uterus point to SP 6, are just a few examples. This is not surprising; finally modern medicine and TCM describe the same facts only from different angles and with different cultural background. Nowhere else as in this aspect of ear acupuncture is so clearly to see, how well TCVM and modern medicine are in harmony with each other. That shall not mean that we copy the mistakes that nowadays very often happen in western medicine like treating only the symptom, not the whole patient!

Twenty-two years ago I started to develop ear maps with the orthopedic localizations and the organ points, first for horses, later for dogs. Finally 2006 for my ear acupuncture book I could finish even the maps for the entire meridian system at the ear in
horses and dogs (figure 7, example pathway of the Heart meridian at the canine ear), another map of psychic points at the ear and some other maps with points with special actions. So now we have almost the whole range of acupuncture diagnostic, as described above available for horses and dogs.

After so-called "Gold Bead Implantation" became more and more important to treat chronic degenerative joint diseases and spondylitis, an interesting application of ear acupuncture is also the implantation of gold beads into the ear points. This is a very simple applied but nevertheless very effective alternative to the conventional method.

A few years ago human ear acupuncture became more recognized also outside Europe, especially in the United States, when Dr. Richard C. Niemtzow from the US Navy took up the idea of ear acupuncture and developed a special very simplified pain acupuncture for the army, called “battlefield acupuncture” where soldiers apply semi-permanent ear needles to their comrades when hurt in the battlefield. This simplified ear acupuncture is established in the army now and one of the “first aid” treatment concepts.

The third pillar of controlled acupuncture is the so-called RAC-control

The third pillar of controlled acupuncture is the so-called RAC-control. RAC means “Reflex Auriculo Cardial” and is also attributed to the genius of Dr. Nogier. He watched as he initially by chance felt the pulse of a patient, while he was setting an acupuncture needle, that the sting of the needle spontaneously evoked a marked change in the pulse quality. This again is not the main issue of this lecture but some facts should be mentioned.

Because, as it was his nature, he challenged all things, he found out that this happens quite often, but not in all cases and not always in the same clarity. He could finally see that only points, which also show a strong therapeutic reaction in the patients, showed this strong pulse reaction. His next step was to find a tool for getting better provocation results that means stronger RAC reactions to active acupuncture points.

Because Dr. Nogier new that acupuncture points have different electric potentials to the surrounding tissue, he tried to provoke the RAC reaction with electric fields of different voltage if he approached to a certain point. He found out that the best result was to achieve with a voltage of 3 Volt. Now he built a diagnostic tool called “3 Volt-hammer”.

After this knowledge, he tried to find relationships between known orthopedic disorders and active points at the ear. With help of his observation of the RAC he could...
develop an ever more complete map of the joint localizations and even the organ localizations at the ear.

The points of the spine are at the so-called Anthelix in the ear, the limbs are represented at the Scapha and the organ points at the Concha of the ear. From this resulted an image of a curled-up embryo lying in the ear. With help of the RAC one can now search systematically for active, vegetative troubled points using these points for assistance in diagnosis of lameness or diagnosis of inner disorders.

Thus if we find the hip point at the ear as an active point, we know that the hip in its function is disturbed, if we find the point of the 4. Lumbar vertebra, we know that this also is disrupted and very likely is involved of mutual causal link with the hip problem.

Or if we have an active pituitary gland, liver, kidney or pancreas point at the ear we can act on the assumption of a troubled pituitary, liver, kidney or pancreas function. As mentioned, the determined active points are also responsible for treatment.

The RAC diagnosis is not only possible in ear acupuncture but also in the body. A very simple way to get an overview of the pathology of a patient is to make a segmental RAC check, passing along the spine with the 3 Volt hammer and looking for active Shu points.

These have importance in orthopedic disease as vertebra points in connection with back pain but importance as well in internal medicine in connection with the segmental assigned organs. Here we see another holistic aspect of acupuncture. Each orthopedic disease also has an influence on the inner organs and vice versa.

In acupuncture we consider both of these connections automatically.

But even though I intend to operate with quite traditional aspects of acupuncture, I can prove my concept with the RAC check and check out whether the selected points are effective or not. Finally RAC helps us to locate the acupuncture point very simply and exactly. This makes many discussions about point locations unnecessary, because one has to stick the needle there, where the body shows the strong RAC reaction.

**The fourth pillar is local laser therapy.**

As the fourth pillar, will be amended local laser therapy. Originally, this therapy has nothing to do with acupuncture but it has proved that these two therapies support each other excellently. It is important to stress out that laser acupuncture not only means the stimulation of acupuncture points by the laser beam instead of the needle, but that the application of local laser light is added as an essential component of curative effects to acupuncture treatment, or vice versa, acupuncture as a vegetative therapy supports the local regulatory impact of the laser. Acupuncture and Local Laser Therapy, also called *Low Level Laser Therapy (LLLT)*, are two therapies of same value, each for its own very
effective, but only in its combination in laser acupuncture came together to this holistic approach.

It was once again Dr. Nogier who discovered the capabilities of the laser for acupuncture and again it was the RAC that helped him to optimize the use of lasers in therapy and for acupuncture point stimulation. After Mester, the pioneer of medical laser therapy could demonstrate already 1969 the effect of the laser light to support wound healing, Nogier came to the idea that laser, basing on its way it works in tissue, could be useful to stimulate acupuncture points. The first results were successful but not comparable with needle stimulation. His next idea was that the stimulation of acupuncture points (and even tissue) could not only depend on the wavelength of laser light, e.g. blue or red light, as well as different wavelengths in the infrared spectrum. This is of importance for the absorption of laser light in tissues and thus for the effect, but also the frequency of the light pulses at pulsed lasers or a frequency which is modulated on the continuous basic beam at continuously emitting lasers (where the power of the laser beam will alter in the modulated frequency in the form a sine wave).

He experimented with is continually changing frequencies and watched with help of the RAC, in which frequencies the strongest reactions had been to achieve. He developed a row of frequencies, called Nogier-frequencies that also in clinical experiment could be proven as very efficient later on.

These frequencies were characterized by special resonance to certain tissues but also to certain tissue conditions. The frequency A is particularly useful for treating inflammation, frequency B has special affinity to ligaments and tendons, frequency C to the bones and joints, the frequency E is stimulating function on the nervous tissue and the frequency F and G on the lower or higher areas of the brain. With these resonance frequencies the point stimulation was much stronger now. A little advantage comparing to needle acupuncture is the short stimulation time of only 20 sec and painless or even contactless point stimulation which makes sense e.g. in treatment of LIV8 (the organ-point of the liver) in a nervous stallion.

Some years later was found another very important row of frequencies from Bahr also by the help of the RAC. These Bahr-frequencies, which mainly led to the present possibility of a very differential diagnosis in acupuncture, are also very effective therapeutic frequencies. With these Bahr-frequencies one can find out e.g. what is the most important point for treatment. The so called “deep point” – you only find one in a patient – is that point where illness started. One example: in most cases of lameness we don’t find the ISJ or the elbow or the Spavin as the deep point, but a special vertebra that influenced the joint to develop chronic lameness. Or another example: in all cases of RAO in horses we don’t find the Lung as the deep point but the Kidneys etc. Another important issue of the Bahr frequencies is finding and treatment of psychic points in a patient. But most important is fr. 7 according to Bahr, which is a special frequency for finding and treatment of disturbing foci in the teeth. In many cases even in chronic disease one sees symptoms disappear at once after treating the related tooth with laser fr.
7. As the last row of frequencies I will mention here, still relatively new, are “Meridian frequencies” according to Reininger.

Reininger could also find with help of the RAC-diagnostic resonant frequencies to all the known meridians, which are in the meantime also proved as important therapeutic frequencies not only to stimulate the respective Meridian points in the sense of acupuncture but also for local tissue therapies, for example, treating the liver with the frequency of the Liver meridians, of the stomach with the frequency of the Stomach meridian, etc. (table 1).

Table 1: Comparison indications and attributes of the Nogier, Bahr and Reininger frequencies used for low-level impulse laser therapy

<table>
<thead>
<tr>
<th>Nogier Frequencies</th>
<th>Frequency</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>F</th>
<th>G</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hz</td>
<td></td>
<td>292</td>
<td>584</td>
<td>1,168</td>
<td>2,336</td>
<td>4,672</td>
<td>73</td>
<td>146</td>
</tr>
<tr>
<td>Indications</td>
<td>Wounds, inflammation, irritable foci in body and teeth</td>
<td>Tendonitis, arthritis, fractures, organ acupoints</td>
<td>Tendonitis, arthritis, fractures, all body acupoints except feet</td>
<td>Acupoints of the feet</td>
<td>Nerve and spinal cord diseases</td>
<td>Mandibular joint and subcortical brain disorders</td>
<td>Cerebral cortex and mental disorders</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Bahr 1 Frequencies</th>
<th>Frequency</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hz</td>
<td></td>
<td>599.5</td>
<td>1,199</td>
<td>2,398</td>
<td>4,796</td>
<td>9,592</td>
<td>19,184</td>
<td>38,368</td>
</tr>
<tr>
<td>Indications and Attributes</td>
<td>Deep tissue layer, “deep” points (source of illness)</td>
<td>Central tissue layer, hormonal and nervous system</td>
<td>Surface tissue structures, Omega Ren Channel</td>
<td>Omega Du Channel</td>
<td>Opening acupoints of the Eight Extraordinary Channels</td>
<td>Governing Vessel</td>
<td>Conception Vessel, abnormal foci in teeth</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Reininger Frequencies*</th>
<th>Channel</th>
<th>LIV</th>
<th>ST</th>
<th>HT</th>
<th>PC</th>
<th>LI</th>
<th>GB</th>
<th>KID</th>
<th>BL</th>
<th>SP</th>
<th>TH</th>
<th>SI</th>
<th>LU</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hz</td>
<td></td>
<td>442</td>
<td>471</td>
<td>497</td>
<td>530</td>
<td>553</td>
<td>583</td>
<td>611</td>
<td>667</td>
<td>702</td>
<td>732</td>
<td>791</td>
<td>834</td>
</tr>
</tbody>
</table>

*Used for treatment of acupoints on specific Channels and topical treatment of related organs; LIV=Liver, ST=Stomach, HT=Heart, PC=Pericardium, LI=Large Intestine, GB=Gallbladder, KID=Kidney, BL=Bladder, SP=Spleen, TH=Triple Heater, SI=Small Intestine, LU=Lung Channels

Indications in Dogs and Horses

Where can laser acupuncture be helpful?

- Acute bronchitis
- Chronic bronchitis
- Pneumonia
- Liver disease
• Kidney disease
• Heart disease
• Ovary disease
• Incontinencia
• Acute and chronic lameness
• Discopathia
• Strain
• Contusion
• Arthrosis
• Laminitis
• Back problems incl. “Kissing Spines”
• Hip dysplasia
• Elbow dysplasia OCD
• Paralysis
• Teeth cysts
• Sinusitis
• Eye injuries
• Wound healing
• postoperative wound healing
• postoperative convalescence
• Abscess maturation

…and many others

Even if I basically will not miss local laser therapy in any treatment any more, there are some examples where local laser therapy is of a very special importance. This is the therapy of infected joints and tendon sheets, tissue infection especially with multi resistant germs including MRSA-infections, in wound healing, especially with wound healing disturbances, tendonitis of the horse, nerve lesions and paralysis.

By means of some examples I will demonstrate the options of laser acupuncture.

Case Examples
The following case examples illustrate the application of PCLAC; pulse controlled (guided) laser acupuncture. First the auricular points are checked (scanned) with the laser to quickly evaluate the whole body for “active” points. Next the corresponding body acupoints and in some cases the teeth are scanned with the laser devices on specific diagnostic frequency settings. Next the treatment strategy and acupoint selection are made based on the pulse changes and knowledge of basic TCVM. Finally all “active” acupoints on the ear, body and limbs as well as acupoints with special effects and in some cases the auricular points are treated with LLLT using a Physiolaser Olympic device at the optimum frequency for the acupoint, Channel, organ or dysfunction. All acupoints are treated for 20-30 seconds. Local tissues on the body or organs are usually treated with the Physiolaser Olympic LLLT unit using the cluster probe (large areas) or single probes (teeth) for 1-5 minutes.
Case example 1

A six year old male Scotch terrier was bitten by a male Doberman. Three-quarters of the skin circumference around the neck was lacerated. Picture 1 shows the dog one week after the wound was stitched in a veterinary clinic. In spite of wound drainage and giving antibiotics to the dog one sees that a complete wound dehiscence starts to occur (Figure 8a, see the black gangrenous tissue marked by a white arrow). Two days later the dog came to me with a complete dehiscence and the wound was as big as the size of the whole hand. Over the course of 12 days four laser acupuncture treatments were needed to close the wound completely (Figure 8b, see the thin scar along the black arrows) without any other surgery and without any further antibiotics or other drugs. For each treatment we did LLLT of the wound with 5x 30 Watt laser shower for ten minutes and TH 5 for wound demarcation, SP 4 for treating wound infection and SP 2 for wound repair were treated with 90 Watt pulse laser for 30 sec each, nothing else!

Case example 2

MRSA infection in a dog

The case of an MRSA infection in a dog shows the excellent anti-infective effect of Laser Acupuncture even in such cases, in which antibiotics have no effect. You can go as far as here that Laser Acupuncture is currently the only successful treatment possibility.

A three year-old German shepherd mix was presented for Laser Acupuncture after a four months permanent treatment in a small animal hospital. It had been completely unsuccessful and had been stopped. Euthanasia of the dog was recommended to the owner, because there was finally no way to help. But the owner asked me whether Laser Acupuncture would be able to cure MRSA infection. I answered truthfully that I didn’t treat MRSA infections before, but many other antibiotics resistant infections have successfully been treated.

The dog was introduced to the pre-treating veterinary hospital because of a small wound unclear in origin. The wound was cleaned and antibiotically supplied. Despite the therapy, the wound swelling gained rapidly, showed suppurative fistulation and pain. It
was then taken a tissue sample from the infected area investigated. A MRSA infection could be verified.

The clinic tried a further therapy with selected combinations of antibiotics that were diversified several times. But this also showed no improvement. Swelling, fistulation and pain gained further on. As a last resort was considered, a wide-scale excision of the diseased tissue which was carried out very carefully. But the wound, already after a few days, showed a dehiscence with massive infection. The clinic advised to euthanasia of the dog, as the infection and pain got too strong and was no more manageable. There was no chance of healing any more.

At that state the dog came to me. The wound showed a highly destructive infiltrative infection. The granulation tissue was tubercular and awesome secreting (figure 9a). At the beginning of the Laser Acupuncture medical therapy (antibiotics and anti-inflammatory drugs) was spontaneously discontinued.

In addition to LLLT of the wound with the frequency A' for 10 minutes the immune stimulating points TH 5 (Thymus point) and SP 4 (Interferon inducing point) were treated. Already during the first session the wound showed a typical spontaneous superficial secretion and a spontaneous reduction in pain could be observed. After 10 days (5 treatments) a significant contraction with beautiful epithelization and clean granulation tissue was to see (figure 9b). One month after the start of Laser Acupuncture the wound had healed without a visible scar (figure 9c).

Case example 3
A four year old male German Shepherd Dog with extreme pyoderma from its birth was treated for its whole life with conventional medicine without success. This is an example how a disturbing focus in the navel was caused by Mercury pollution the dog got from its mother. This was responsible for an atopic dermatitis from its birth on. The dog was itching all day long and had significant loss of weight. The dog was extremely
nervous. One could see its ailments on its skin. The area of Lung, Liver, Kidney and Large Intestine showed loss of hair and inflammation.

Following treatment was applied once a week: LLLT of the disturbing focus navel with Fr.A, TH 5, KID 3 (Fr. 5), KID 7, LIV 8, LU7, LI 11 (Fr. B). The treatment was carried out once a week. Figure 11 shows the same dog 8 weeks later: 15 kg increase of weight with full hair, no itching, calm and healthy the first time in its life.

**Case example 4**
A two year-old crossbred stallion with a tarsal joint infection

![Figure 10a: A right tarsal joint infection of 6 months duration in a two-year-old crossbred stallion. On presentation the hock circumference was 61 cm.](image)

At another veterinary clinic, a bone fragment was found in the left tarsal joint of this stallion, during routine radiographic examination and was removed endoscopically. A post-operative joint infection developed and was treated with joint lavage, different antibiotics and parenteral steroids and non-steroidal anti-inflammatory drugs (NSAIDs). Over the next six months, the client sought help from three other veterinarians who treated the infected joint in a similar manner with no response. The author was finally consulted six months after the onset of the infection. On initial examination, the circumference of the infected tarsal joint was 61 cm, while the healthy tarsal joint was 42 cm (Figure 10a). The horse could not put weight on the affected limb and hobbled along on three legs with great effort. This first example will be described more in detail.

**PCLAC diagnosis and treatment**

First the auricular points were scanned for an RAC (VAS) using Bfr-1 (599.5 Hz), the best frequency to detect “deep” points. The auricular point for the hock was “active” and determined to be the “deep” point (Figure 3). Therefore the hock appeared to still be the primary area affected and treatment of that region was performed first. Topical LLLT, using a 5 x 30 Watt impulse laser with the Physiolaser Olympic cluster probe was applied to the dorsal, medial and lateral surfaces of the hock joint for 5 minutes each, using Nfr-A (292 Hz) known to reduce inflammation.

An RAC (VAS) scan of local tissues was also performed using Nfr-A (292 Hz, for inflammation) and a strong reaction was found at the tracts where the endoscope was inserted.
These areas were treated with Nfr-A (292 Hz) with a 90 Watt LLLT single probe for 1 minute each.

The Tendinomuscular Meridians (TMM or Sinew Channels) are a system of superficial Channels that control the tendons, muscles and skin and are related to the regular Channels. The TMM of the Liver and Gallbladder Channels that passed by the joint infection were treated with Rfr-LIV (442 Hz) and Rfr-GB (583 Hz).

Then acupuncture points on the body were tested for an RAC (VAS) reaction with the positive pole (red side) of the 3-volt hammer and with the LLLT device on the diagnostic setting at specific frequencies to detect Deficiencies and LIV-1, LIV-8, GB-44, GB-43, SI-18 and CV-3 were “active” acupoints.

LIV-1 (Ting point) and LIV-8 (Liver tonification point) were treated with Rfr-LIV (442 Hz) for 20-30 seconds.

GB-44 (Ting point) and GB-43 (tonification point) were treated with Rfr-GB (583 Hz) for 20-30 seconds.

SI-18 (Reunion point of the Yang TMM of the foot) with Rfr-SI (791 Hz) for 20-30 seconds.

CV-3 (Reunion point of the Yin-TMM of the foot) was treated with Bfr-7 (38,368 Hz) for 20-30 seconds.

The Cardinal (Opening) points of the Eight Extraordinary Channels (LU-7, KID-6, SP-4, PC-6, SI-3, BL-62, GB-41 and TH-5) were tested for a RAC (VAS) with Bfr-5 (9,592 Hz) useful for detecting “active” Opening points.

GB-41 and TH-5 were detected as “active” Opening points and were treated for 30 sec with a 90-Watt impulse laser.

Back Shu Association points were tested with the positive pole of the 3-volt Hammer to detect Deficiencies.

BL-18 and BL-23 were found to be “active” and were treated with Nfr-C (1,168 Hz) for 30 seconds.

The same treatment was given seven times over a 2-week period and the circumference of the joint reduced to 47 cm and the horse walked without lameness (Figure 10b). After 5 minutes of trotting, he could also trot without lameness. He was

Figure 10b: The right tarsal joint infection of 6 months duration in a two-year-old crossbred stallion; After seven LLLT treatments over a 14 day period, the circumference had reduced to 47 cm. (Reprinted with permission from: Petermann U. Kontrollierte Laserakupunktur
doing so well that the client began exercising him, but within 3 days of beginning the exercise program, inflammation of the joint re-appeared and the body temperature increased to 41°C (105.8°F). The horse was not treated with antibiotics or any other drugs. Again only local LLLT and pulse controlled laser acupuncture were used as before, but treatment of SP-4 (Interferon point) with Reininger fr-SP (702 Hz) was added to the next four treatments to further reduce the inflammation. After approximately one month and twelve additional treatments, the patient had recovered. Over the following three months, training was gradually increased to full capacity. The horse was then sold six months later as a competition horse and passed purchase inspection by a veterinarian.

**Case Example 5**

A 13 year-old Arabian mare with recurrent airway obstruction (RAO) for nine years.

The mare’s RAO had become so severe in the past few years that the client and referring veterinarian were considering euthanasia. As a last resort the horse was referred to the author for acupuncture. On the initial examination, the respiration rate was 56 breaths/minute and the horse had extreme abdominal contraction on expiration. The horse had respiratory distress and the nostrils were severely flared and his panic showed in his eyes (Figure 11a). Loud wheezing respiratory sounds could be heard, 20 meters away from the patient. The lung percussion field had dilated to about two hands width and loud percussion sounds could be heard in this area. Bronchoscopy could not be performed because of the critical condition of the horse. Only after the second LLLT acupuncture treatment was the horse’s condition stable enough for bronchoscopy. On bronchoscopy there were cobweb-like threads of high viscosity mucous inside the trachea and the stem bronchi. The mucous membranes were very reddened especially at the bifurcation of the trachea. The stem bronchi sometimes would collapse during expiration. Since abnormal foci in the teeth are often responsible for hyperactivity of the immune system and RAO, the teeth were tested for an RAC (VAS) with the laser Bfr-7 (38,368 Hz), the optimum frequency to evaluate abnormal teeth foci. The 2nd molar of the upper jaw on each side induced an RAC (VAS) and so were treated with topical LLLT at the same frequency (Bfr-7) for 3 minutes with the Physiolaser 90w/904nm LLLT single unit. An RAC (VAS) was found at the following auricular points using the Bahr frequencies as indicated and were treated with the same frequencies: the auricular Kidney point (KID-7) diagnosed and treated with Bfr-1 (599.5 Hz) for 20-30 seconds. The auricular Lung point (LU-7) was diagnosed and treated with Bfr-2 (1,199 Hz) for 20-30 seconds.

Figure 11a: A 13-year-old Arabian mare that had suffered from recurrent airway obstruction (RAO) for the past 9 years duration. On presentation the horse had severe respiratory distress with flared nostrils and an expression of panic in her eyes. Her respiration rate was 56 breaths/minute.
The auricular β-receptor point (ST-40) was diagnosed as Deficient with Rfr-ST (471 Hz) and ST-40 on the pelvic limbs was treated for 20-30 seconds with the same frequency, the auricular Yuan Source point for Kidney (KID-3) was diagnosed as Deficient using Bfr-5 (9,592 Hz) and KID-3 on the pelvic limbs was treated for 20-30 seconds with the same frequency, the auricular Thymus point (Opening point for the Yang Wei Channel) was diagnosed as Deficient with Bfr-5 (9,592 Hz) and TH-5 on the thoracic limbs was treated for 20-30 seconds with the same frequency.

During the treatment of the teeth with topical LLLT, the horse sighed and breathing began to improve. By the end of the complete LLLT treatment, the respiration rate had decreased by 50% to 28 breaths/minute, the panic was gone and the nostrils were no longer flared (Figure 11b). Seven similar treatments were given every three to four days. A month after the seventh treatment, the horse was clinically normal and capable of galloping across the fields without any problem (Figure 11c). Bronchoscopy was repeated and no abnormalities were observed in the airways. The lung field detected by lung percussion had returned to normal. The horse has remained healthy now for approximately two years and according to the caretaker has been healthier than she had ever been.

Even if this shows only a small number of many comparable cases I saw in the last 25 years and a small insight into the complete concept of Pulse Controlled Laser Acupuncture I hope to wake up some interest for this wonderful modern holistic treatment concept.

I believe we should save and cherish all ancient knowledge in acupuncture, but that cannot mean that there shall not be an improvement. Times, life, diseases, environment and technique has changed in the last 3000 years since Sunjang the father of
veterinary acupuncture already treated horses successfully with acupuncture. We should keep the tradition but shouldn’t ignore modern concepts in acupuncture.
1. Literature


8. www.akupunkturtierarzt.de button “English site”

Chris Bessent, D.V.M.
Herbsmith Rx
Hartland, Wisconsin, U.S.A.

Quality control testing of herbal products should be required and monitored by the profession. The single ingredient and the finished product should undergo rigorous testing prior to marketing to the veterinary profession and the public.

The first step in manufacturing an herbal product is the verification and authenticity of the accompanying Certificate of Analysis (C.O.A.). C.O.A.s should accompany every single herbal ingredient. Although this may seem obvious, many inexpensive single ingredients may not have this basic requirement. The COA encompasses a multitude of tests, including sulfur content, microbial analysis, heavy metal analysis, and pesticide analysis. Microbial analysis includes bacterial standard culture plate count (CFU/gram of herb) and mold and yeast counts (CFU/gram of herb). There is testing done for the presence of E. coli and/or Salmonella. There is a zero tolerance for either microorganism. Heavy Metal Analysis includes detection of lead (pb), cadmium (Cd), arsenic (As), and mercury (Hg). Pesticide Analysis includes testing for the presence of DDT and Benzene Hexachloride.

Quality control standards among herbal manufacturers should require random testing of received C.O.A.s to validate their vendors. Particularly, the additional testing should be done at a qualified laboratory preferably within the United States. In addition, the third tier of testing should be laid upon the finished product particularly for microbial counts.

US Pharmacopoeia, Australian TGA and California Proposition 65 have set standards for heavy metal content in herbs. Although rigorous, these standards are not required rather recommended. It is up to the prudent veterinarian to require this level of testing on all supported products prior to dispensing.

Authenticity and Purity

Each individual herb needs proper identification. In verifying species, microscopic examination is done and compared with the standards in the People’s Republic of China Materia Medica monographs. For more difficult to identify species, samples are sent to outside labs for TLC (Thin Layer Chromatography) or HPLC (High Performance Liquid Chromatography). TLC is used to identify the makeup of individual substances. The TLC fingerprint confirms the chemical composition and authenticity of each herb. The herbs may also undergo HPLC testing, to confirm the identity, consistency, concentration and active constituents of the compound.
Safety Testing:

Testing for moisture content, dissolution, sulfur content, heavy metals (lead, arsenic, mercury, cadmium), microbial content, and pesticides are performed on every batch, including Aristolochic Acid and Chloramphenicol testing as necessary.

**Heavy metals: lead, arsenic, mercury, cadmium**

Manufacturing has greatly increased the rate at which heavy metal ores are found in the environment. Metals such as lead, mercury, cadmium, nickel, copper, gold, silver, arsenic, manganese and selenium are all used in the manufacturing of every day products. For example, lead is used to stabilize plastics, which we could hardly live without. Mercury and arsenic are the main components of many pesticides, fungicides, and herbicides commonly used in agriculture as well as in homes.

With the industrial boom in China, factories producing these products discharge toxic smoke into the air and dispose of wastewater contaminated with heavy metals and other toxins into the water and soil. As plants mature they take in components of the soil and water in which they grow. In this way these toxins concentrate into the locally grown herbs.

There are presently no State or Federal heavy metal guidelines for traditional Chinese medicines. The U.S. Pharmacopoeia (USP) determines safe heavy metal levels. Acceptable USP levels are as follows: lead 10 ppm, cadmium 3 ppm, arsenic 3 ppm, and mercury 3 ppm. Australian Therapeutic Goods Administration (TGA), Australia's FDA equivalent, heavy metal guidelines are lower for lead at 5 ppm. California Proposition 65, formerly called “The Safe Drinking Water and Toxic Enforcement Act of 1986, is considered with reference to the levels of heavy metals in Chinese herbal preparations. For review of the proposition 65-List of toxic substances see http://www.oehha.ca.gov/prop65/prop65_list/Newlist.html

Each single ingredient has an analysis of Lead (pb), Cadmium (Cd), Arsenic (As), and Mercury (Hg) levels listed on the C.O.A. As additional Quality Control, third-party laboratories are employed for verification testing of heavy metals, pesticides and contaminants.

**Microbial content:**

Microbial analysis includes bacterial standard culture plate count (CFU/gram of herb), mold and yeast counts (CFU/gram of herb). There is testing done for the presence of E. coli and /or Salmonella. There is a zero tolerance for either microorganism.

**Aristolochic Acid and Chloramphenicol testing:**

Aristolochic acid, a chemical constituent and known nephrotoxin can be found in any aristolochia species and some asarum species. Correct species identification and testing for Aristolochic Acid is extremely important for any Aristolochia species, or other
herb species that may be substituted for it. Ma Dou Ling (Aristolochia debilis fruit), Qing Mu Xiang (Aristolochia debilis root), and Mu Tong contain the nephrotoxin. Chuan Mu Tong (Clematis armandii stem) and San Ye Mu Tong (Akebia Trifoliata stem) are two types of Mu Tong that have the same functions and are considered to be interchangeable. For formulas using Fang Ji, Han Fang Ji (Stephania tetrandra root) is the safe version and Guang Fang Ji is considered unsafe. Adulteration is common, and therefore verifying the species is important.

In Belgium in 1993, 70 people suffered kidney failure after taking a slimming product in which Guang Fang Ji (Aristolochia) had been used instead of Han Fang Ji (Stephania). The raw powder form of Guang Fang Ji was taken in relatively large doses over an average of one year. The herbs were not prepared or administered according to traditional Chinese medical standards. This incident eventually lead to the banning of all Aristolochia species, but even suspected species such as Asarum, Clematis, and Akebia in most of Europe. Many Aristolochia species are banned in the US.

Guang Fang Ji has been in use in traditional Chinese medicine for several hundred years. It had always been used as a water decoction. Aristolochic acid is insoluble in water, which could explain why there have not been reported cases of toxicity in TCM decoctions or products made from traditional water decoctions. As the Belgium slimming regimen used the Guang Fang Ji in raw powdered form, the Aristolochic Acid was present and absorbed by the patients. Although the clinic thought that what it was administering was Han Fang Ji (Stephania tetrandra) and not Guang Fang Ji, it is also evident that the clinic was not using or preparing the herb in a traditionally prescribed manner.

Many herbs containing toxic substances have therapeutic merit and have been used safely and effectively throughout Chinese medicinal history through correct processing, preparation, administration, dosage and diagnostics.

**Pesticide Analysis - DDT and Benzene Hexachloride:**

COA testing includes the presence and measurement of and setting limits for DDT and Benzene Hexachloride, two very toxic and banned pesticides. Data on soil pollution where herbs are grown is monitored.

**Trust, but Verify - Good Manufacturing Policy (GMP)**

Why do we use Chinese herbs? Thousands of years of mastery of their use, the beauty of the TCVM thought process of health and disease, generations of agricultural knowledge on growing techniques and lastly the correct growing parameters including climate, land slope, precipitation patterns to grow the highest quality herbs, that is the answer to why we use Chinese sourced herbs.

Within China, each herb or formula is manufactured according to official Peoples Republic of China Pharmacopoeia guidelines or other government sanctioned references.
These references contain individual monographs that have been reviewed and chosen from different references across China by a governmental scientific committee. The monographs specify the ingredients, process, and quality control protocols that must be followed in order to manufacture a specific formula. These official guidelines help to support that products are sourced, formulated, extracted, and tested according to detailed parameters.

Preferable manufacturers uphold to Chinese Good Manufacturing Practices (GMP). GMP certification means that the site and methods employed in the production of herbal products has been subject to a thorough quality control investigation and is certified to be in compliance. The GMP certification process covers all aspects of manufacturing, including inspection of the building and grounds, the air and water purification systems, the handling and processing of raw herbs, the product manufacturing process, the operation and cleaning of equipment, the training of personnel and quality control testing and documentation. The adherence to guidelines established in the Chinese Pharmacopoeia, Standard Operating Procedures (SOP) and Quality Control Protocols are necessary to control the quality of the final product.

In addition, when imported products arrive in the United States (US) for manufacturing, they are subject to additional review by the U.S. Food and Drug Administration prior to entrance into United States.

Many manufacturers also abide by the Australian Therapeutic Goods Administration (TGA) standards. The TGA holds all dietary and herbal supplements to the same stringent standards as pharmaceuticals. To become TGA certified, a manufacturer must meet standards set for the building and grounds, equipment, personnel and training, sanitation and hygiene, air and water purification, production and documentation. TGA certification is considered the most stringent.

Testing is as much of a buzzword as “scientific findings” or “research shows”. But who did the testing and was it verified is worth questioning. Through in house testing is an important first step. But then repeat testing is necessary to verify COAs and for vendor monitoring. Therefore we should look for in house testing, third party testing, and verification testing as well. Testing should be in China but also within the U.S.

National Animal Supplement Council Audits:

The National Animal Supplement Council (NASC) is an American based organization, which acts as an intermediary between the FDA and US herb manufacturers. To be an audited member of the NASC the manufacturer is subjected to stringent oversight including a GMP audit. Each NASC audited company has to pass a GMP audit. The audit is performed every three years to retain NASC certification. The audit is extremely detailed including building standards, record analysis, production processes, and operation manuals with standard operating procedures, marketing analysis. Qualifying a company vendor is an important part of an audit. The manufacturer is expected to audit each vendor it does business with. A qualified company employee visits each vendors operation to do his or her own vendor audit. A vendor audit includes
building standards, record analysis, production processes, operations manuals with standard operating procedures, pest management, humidity controls etc. Once a vendor has passed the audit then they are considered an acceptable vendor. But the evaluation does not end there; COAs received from the vendors are randomly retested to qualify the results of the supplied COA. When doing business with a foreign company this company should be audited as well preferably by a US based auditing firm.

Hazard Analysis Critical Control (HACCP) planning is another integral part of manufacturing. If a problem were to arise the manufacturer needs to be able to follow the chain of supplies to determine the source. So each individual ingredient or item needs to be traceable. The end product should have a lot number. That lot number is coded to a batch record in which every ingredient used has a lot number and accompanying COA. The repeat testing results can also be identified. Each finished product lot number has a portion of the material held this is called a “retain”. Retains of each lot number are held in an environmental secure site for at least five years after production. The product retain can be reevaluated if necessary.
References:


2. Yan, Wu, Practical Therapeutics of Traditional Chinese Medicine, Paradigm Publications, 1944.


7. Mitchel, Craig, Feng Ye, and Wiseman Nigel, Shang Han Lun On Cold Damage by Zhang Ji (Zhang Zhong – Jing) (circa 150-219 c.e.).


9. Maway.com Website

10. HerbsmithRx.com Website.

11. FDA.com Website.
PRODUCT INFORMATION & SPECIFICATION SHEET

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**Heavy metals**

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Reference/Test Method

2010 PRC Pharm./ Materia Medica
Product Picture
# PRODUCT INFORMATION & SPECIFICATION SHEET

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<td>2010 PRC Pharm. App. IX Q</td>
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Allergen(s) | None |

Storage | Store under normal conditions 15-30°C (59-86°F). Not directly on ground. |

**Label**

```
B
A
R
C
O
D
E

BAI SHAO  
白芍  
Paeonia lactiflora root  
Batch#xxxxxxx  
Net Wt 1.1 lb (500 g)  
```
Traditional Chinese Herbal Medicine is an ancient and sophisticated medical system that has been used in the treatment of animals for thousands of years. This has been recorded since the Shang Dynasty (1600 to 1100 B.C.). During the Western Zhou to the Spring- Autumn period (1100 to 476 B.C.), fulltime veterinarians were already tubing animals with herbal decoctions. The knowledge to treat sports injuries was evident in “The Divine Farmer’s Materia Medica “(200 BC) “Xu Duan (Radix Dypsaci) treats incised wounds and welling abscesses, joins broken sinews and bones. Xi Er Shi (Fructus Xanthii Sibirici), current name is Cang Er, treats hypertonicity and pain of the limbs, and malign flesh and dead muscles. Tao He (Semen Pruni Persicae) was to treat blood conglomerations (blood accumulations due to falls and knocks) (1).

Sports injuries in the horse are all too frequent. They typically involve long recovery periods and often the individual never is able to return to pre-injury performance levels. This paper will illustrate that CHM is able to help sports injuries including those that have a poor prognosis according to conventional medicine including osteomyelitis, bone pain from bruising, tendonitis, acute traumatic joint inflammations, and muscle injuries. Suspensory Ligament, Deep and Superficial tendon injuries lead the list of sports related injuries. The incidence of tendon injuries is approximately 30% among Thoroughbred racehorses in training, mostly in the SDFT of the forelimbs. Bowed tendons force 25% of racehorses to retire and is the most common non-fatal career ending injury. Racehorses are so often retired after tendinitis because as many as 70% will not be able to return to their previous level of performance and more than 66% of them will have a recurrence of injury. The goals of conventional therapy for acute tendinitis are to decrease inflammation, minimize scar tissue formation, and promote restoration of normal tendon’s structure and function. The initial inflammation results in hematoma formation within the tendon. These vascular lesions are very difficult to resolve since tendons in general and the Superficial Digital Flexor Tendon in particular have a poor blood supply (2). Poor blood supply is implicated in the development of hyperthermia, hypoxia, and free radical production during exercise stress; all of which leads to cell damage. Poor blood supply also causes an inability for the body to repair damage. Although many therapies are currently being used, from laser therapy, electromagnetic therapy to surgical interventions and drug therapy, there is a great need for a treatment that can positively affect the hemodynamics of the tendon to stimulate healing and minimize scar formation in a faster more complete fashion. Herbal therapy can achieve this.

According to Rick Henninger of Pen Paddock Equine Center, (3), there has been no uniformly successful method to treat acute tendinitis, and the mature repaired tissue
rarely equals that of a normal, uninjured tendon. BUT Chinese Herbal Medicine can improve the quality of healed tendon tissue and increase the rate of healing. A study done in China showed that tendon healing can be accelerated and the quality of tendon healing can be improved (4)

Let’s start off with a truly incredible tendinitis case.

     Jules is a 9 year old appendix Quarter Horse mare. She had been performing intensively as a hunter/jumper two years earlier and currently is aggressively ridden on some of the toughest trails in western NY State.

     Jules was originally trained as a roping horse but when she was four years old she was “tied down” and then was reported to be emotionally unstable. At her home as a trail horse, Jules was seen charging after other horses through very deep thick mud again and again and again, and became acutely three legged lame

     On examination, her left fore Superficial and Deep flexor tendon were very grossly swollen with heat and was painful to the touch. She was three-legged lame. The “bow” was in the proximal area of her tendon sheath and her check ligament also seemed swollen and painful. Her conventional diagnosis was an acute tendinitis of the left Superficial and Deep flexor tendons or in common terminology a bowed tendon. The swelling in these tendons are areas of micro-hemorrhage.

     Her tongue was slightly red/purple and dry; her pulse was fast, thin and tight. She had slightly injected scleral vessels. She was irritable and restless. She had pain and reactivity on the following points: Bl 15, 17, 18, 23; Warmth on HT 7, PC 7, 8, 9, and TH 8, SI 9. Her coat was slightly dry.

     The Chinese medicine perspective on this horse was that the trauma caused Blood Stagnation (with heat); there was subsequent channel obstruction in the PC/HT meridian and overall an underlying Kidney/Liver Yin Deficiency. The swelling, pain and heat of the tendon, pain at Bl 15, 17, and SI 9, the purple/red tongue and the fast pulse indicate the blood stasis and stagnation with secondary heat. The Channel obstruction was evident by palpation of the tendon. The underlying Kidney yin deficiency is evident from the pain at Bl 23, the past history of an emotional trauma with subsequent evidence of emotional instability, the thin fast pulse and the dry tongue. The underlying Liver Yin deficiency is evident by the current aggression, the dry, red tongue, red eyes, dry coat, thin, fast pulse and the susceptibility of the tendons to injury. Her TCVM diagnosis was acute tendinitis of the left fore Superficial and Deep Flexor tendons. Her treatment was: Her TCM herbal prescription was a variation of Bu Gan Qiang Jin San called Tendon/Ligament (a) with additional Corydalis (Yan Hu Suo). Tendon/Ligament uses Bu Gan Tang as the basic Liver yin/blood tonic with Lycium (Gou Qi Zi) and Cornus (Shan Zhu Yu); Morus, Sang Zhi, to open the channels and collaterals and it reduces swelling; Acanthopanax (Wu Jia Pi) is used to strengthen tendon and ligaments;
Achyranthes (Niu Xi) to strengthen the KI and benefit the knees, and then Psolera (Bu Gu Zhi), Epimedium (Yin Yang Huo), Chuan Xiong, Ligusticum to activate the Qi and blood circulation; Angelica (Dang Gui) and Rehmannia (Shu Di Huang) nourish and move the blood; Cinnamon (Gui Zhi) warms and opens the channels and collaterals; and White Peony, Bai Shao Yao to nourish Blood and Yin and soothe Liver Yang (5). The owner was instructed to give four tablespoons two to three times a day. Corydalis (30 grams three a day) was added to activate Qi and blood circulation and for pain relief. Jules was in extreme pain.

Additionally she was wrapped with Mag-Paste (Epsom salt ointment) in a heavy support wrap and instructed to have stall rest with only 10 minutes of hand walking twice a day. No other treatment was given on initial day. The plan was to Ultrasound her tendon the next day to assess the full extent of the injury. Her prognosis was guarded due to the extreme pain she was in.

Well, Jules had other ideas about her treatment; she ate almost a whole 600 gram tub of the herbal formula. The next day, she was a complete idiot in her stall, and her owner, in complete frustration, let her out with the herd. She appeared to be sound. When the leg was unwrapped, there was only a slight amount of swelling and within a week; she was completely normal, even better than before the injury as her emotional state was improved; she was calmer, much less aggressive.

So what happened?

The susceptibility for tendon damage and the lack of efficient healing of tendon injuries is primarily due to poor hemodynamics in the tendon itself. The basis of herbal medicine is to influence the hemodynamics of tissues. Herbal Medicine is one of the oldest modalities that have been used to manipulate blood flow in the body. Modern recognition of herbal influence is seen in study of the impact most herbs have on nitric oxide synthesis. Stimulation of Nitric oxide (NO) in a tissue will increase its blood perfusion and on the opposite side, suppression of nitric oxide synthesis will decrease blood perfusion.

Eucommia, Du Zhong, is one of the herbs that increase Nitric Oxide production. This herb is noted in TCM to have a very influential effect on tendons. Eucommia is classified as a Yang-tonifying herb that nourishes the Liver to benefit the tendon and sinews and tonifies the Kidney to strengthen the bone. In Tendon Ligament formula, White Peony, Bai Shao Yao is used to Nourish Blood and yin and soothes Liver Yang; it is classified as a Blood Tonic herb and is especially valued for its use in painful conditions of the muscles, tendons and sinews caused by lack of nourishment. Bai Shao Yao is known to promote Nitric Oxide synthesis. Epimedium, Yin Yang Huo, another Yang tonifying herb, which has anti-oxidative flavonoids, can increase intracellular NOS activity significantly in vitro and increase the intracellular cGMP through the enhancement of NOS expression and NOS activity (6). Epimedium treats Bi Zheng (Painful Obstruction Syndrome) of the channels and unblocks the circulation of Qi and Yang to the extremities.
Angelica, Dang Gui, elicits both a nitric-oxide dependent and Calcium influx mediated relaxation in aorta tissue which can greatly moderate blood perfusion (7). Dang Gui is another herb classifies as a Blood Tonic which invigorates Blood Circulation and relieves pain. It is traditionally known to activate blood circulation and disperse Blood Stagnation, stops pain and disperses coldness in the channels and tendons. Dang Gui working synergistically with Poria, Fu Ling, and Atractylodes, Bai Zhu, has been shown to be beneficial in treating conditions with ischemic damage (8). These synergistic effects of the herbs in Chinese formulas are only beginning to be appreciated. Most of the scientific papers look only at one chemical within an herb yet the beauty of many of these formulas is the cooperative manner in which many herbs work.

Research has shown there is a synergistic action of Angelica and Corydalis in analgesic effects (9). Corydalis, Yan Hu Suo, has demonstrated on its own to have strong analgesic effects due to its dl-tetrahydropalmatine and corydalis I compounds. This effect creates no dependence and is compared to the analgesic effects of morphine. Corydalis is classified as a Blood-Invigorating and Stasis-removing herb. Corydalis is one of the most commonly used and most effective herbs to relieve pain because it has an excellent ability to activate Qi in the Qi level and invigorate blood circulation in the xue level. (10) Lycium, Gou Qi Zi, a Yin-tonifying herb, one of the main herbs in Tendon and Ligament Formula, has shown an ability to help areas of cerebral circulatory insufficiency (11) and can affect blood pressure (12), clearly showing that this herb can has a significant influence on blood flow and perfusion. This herb traditionally is used in cases of Liver Yin deficiency to treat soreness and weakness of the lower back and knees and steaming bone sensations. Ligustrazine is a compound isolated from the rhizome of Ligusticum Chuanxiong, another herb classified as a Blood Invigorating and Stasis Removing herb. It has been reported to be effective for the treatment of a variety of vascular diseases. It can attenuate endothelial injury and restore antioxidant capacity and superoxide dismutase 1 activity while decreasing the MDA generation (13). Tetramethylpyrazine, another constituent of Ligusticum has been shown to exert a neuroprotective effect against spinal cord ischemia-reperfusion injury thought to work via an anti-inflammatory mechanism (14). Acanthopanax, Wu Jia Pi, is classified as a Wind-Damp Dispelling and Tendon and Bone-strengthening herb. It has an ability to dispel water retention, reducing the edema in the tendon.

So this formula, Tonifies Blood; moves Blood Stagnation thereby moving the micro-hematomas in the tendons while strengthen the tendon. Herbal therapy should be an important aspect in the rehabilitation of any tendon and suspensory injury. There are a number of formulas and herbs that can be used but all would include some of the following classifications of herbs: 1. Clearing and Blood-Cooling Herbs—for example, Chi Shao, Red peony 2. Blood Invigorating and Stasis removing Herbs (traumatic injuries lead to obstruction of Qi and blood circulation) for example, Chuan Xiong (Ligusticum or Sichuan lovage); Yan Hu Suo; Corydalis; Yu Jin. These are some of the Blood Stagnation herbs that have an inhibitory effect of thrombus formation (micro-hematomas in bowed tendons) Dan Shen, Salvia; and Chi Shao, Red Peony; examples of those that have a thrombolytic effect are Chi Shao, Red Peony; Dan Shen, Salvia; Yi Mu Cao, Leonurus; Dang Gui, Angelica; E Zhu, curcuma; those that have an analgesic and
anti-inflammatory effect are Dan Shen, Salvia; Dang Gui, Angelica; Chi Shao, Red Peony; Ru Xiang, Frankincense; Mo Yao, Myrrh; Yan Hu Suo, Corydalis; Yu Jin, Curcuma; and Wu Ling Zhi, pteropus feces; some examples of those that have an antibiotic effect are Chi Shao, Red Peony; Mu Dan Pi, Moutan; and Chuan Xiong, Ligusticum or Sichuan Lovage.

In addition to the needed blood moving aspects of the formula, a Yang tonifying aspect is needed to strengthen the tendon and sinews. Some of the Yang tonic herbs that could be used are Lu Rong, deer antler, to strengthen sinews and bone and combined with Huang Qi (Astragalus), Wu Jia Pi, (Acanthopanacis); Gu Sui Bu, Drynaria; and Yin Yang Huo, Epimedium to treat delayed healing of broken or fractured bones. Cordyceps, Dong Chong Xia Cao will tonify Kidney Yang and augments Jing to help with essences and convalescing. Other tonics include Ba Ji Tian, Morinda, medicinal Indian mulberry root which will strengthen sinews and Bones and treats Bi Zheng (Painful Obstruction Syndrome); Yin Yang Huo, Epimedium; Du Zhong, Eucommia, tonifies the Liver, and Kidney; strengthens bones and sinews, Xu Duan, Dipsacus, tonify Liver and Kidney; and Gu Sui Bu, Drynaria, promotes mending of bones and relives pain.

Jules’s response to the herb was incredible. Her owner allowed her to ingest a very large dose, 400 grams, initially over the typical 30 gram dose. It is probable that this large loading dose allowed her injury to quickly resolve the micro-hematomas in her tendon. From a severely injured tendon, Jules was back in full work in one week’s time. This is the type of hemodynamic healing that is needed to decrease the rehabilitation time for these tendon/ligament injuries.

A final interesting note is that since the tendon injury, Jules’s behavior has greatly improved. The blood nourishing effects and the Liver/Kidney Yin tonification of the formula seems to have balanced her underlying Kidney and Liver deficiency allowing a truly curative response in both her mind and body.

Another leading Sports injury is bone bruising, and joint inflammation from repetitive exertions or traumatic insults. So a case example is Forest.

Forest, a 6 year QH gelding, used as a hunter jumper, lacerated his hock during a show. His hind leg was trapped in a rail and was lacerated into his Intertarsal joints. His leg was attended by the show vet. The laceration was sutured and he was placed on Tribriissen. Within five days, the joint was inflamed and grossly infected. The conventional vet had given a grim prognosis even with aggressive lavaging. The rationale for this prognosis and treatment is due to the special characteristics of an infection in a closed space. In a synovial cavity, it is felt that the removal of debris from the fluid and adjacent bone is imperative (15). The ischemic nature of the bone is also an obstacle for healing. Organisms thrive in avascular bone and scar tissue and the latter acts as an impenetrable membrane for the diffusion of antibiotics. The presence of inflamed synovial tissue and the associated by-products can perpetuate cartilage destruction. For an equine athlete, this cartilage destruction can cripple that individual for life. Due to the expense and guarded prognosis, many horses are destroyed when no
alternative is offered. Thus there is a great need to use and develop successful alternative therapies in cases of osteomyelitis. The Chinese Herbal Formula, Xian Fang Huo Ming Yin, facilitated a cure in this case of osteomyelitis.

Xian Fang Huo Ming Yin clears Heat and eliminates toxins; reduces swelling and breaks the hardness; activates the blood circulation and stops pain. The formula combines Jin Yin Hua, Lonicera, to clear heat and eliminate toxins; Fang Feng, Saposhnikoviae, and Bai Zhu, Angelica dahurica, to disperse and dispel heat toxins; Dang Gui Wei, Angelica sinensis, Chi Shao, Red Peony, Ru Xiang, Frankincense, and Mo Yao, Myrrh, to activate blood circulation and remove Blood Stagnation; Bei Mu, Fritillary, and Tian Hua Fen, Trichosanthes, to resolve phlegm, reduce swelling, dispel pus, and break the hardness; Chuan Shan Jia, Squama Manis, and Sao Jiao Co, Spina Gleditsiae, to drain abscesses and soften nodules; Chen Pi, Citrus, to regulate Qi flow; and Gan Cao, Licorice, to clear heat, eliminate toxins and harmonize the formula. Bensky and Barolet (1990) consider the formula, Xian Fang Huo Ming Yin, to be indicated where a fire toxin or phlegm-fire causes a transformation of a pathogenic influence in the channels often from a trauma with transmission of toxic Qi. Fire toxin or phlegm-fire causes the clumping of stagnate Qi and blood in the relatively superficial levels of the body, which in turn causes the fluids to simmer (16).

There are several reports on how *Angelica dahurica* can protect against sepsis. Several compounds, furanocoumarins, isoimperatorin, oxypeucedanin, (+/-) byakangelicin, and (+)-oxypeucedanin hydrate, were identified as the specific agents that protect against sepsis (17). While other studies have shown that *Angelica dahurica* has strong anti-microbial action especially against Gram positive bacteria (18). *Angelica sinensis*, another Angelica that is in the formula, is strongly protective against endotoxemia and sepsis by attenuating systemic accumulation of a late proinflammatory cytokine, HMBG1 (19).

Bei Mu, Fritillary, traditionally is considered to resolve phlegm, reduce swelling, dispel pus, and break the hardness. Again, science is starting to support the wisdom in traditional medicines. Verticinone, an alkaloid isolated from Bei Mu has been shown to help decrease inflammatory pain (20). Substantial research has focused on the strong ability of Trichosanthes to enhance the capabilities of chemokines to stimulate chemotaxis and G protein activation (21). Most of the research has been focused for the use of this herb and its derivative in the treatment of HIV infection. But the research clearly illustrates this herbs strong immune modulating effect.

The anti-inflammatory effects of Glycyrrhiza have been well-documented (22). On physical exam, Forest’s tongue was red and wet; his pulse was forceful and surging. The meridians over his hock were hot and turgid. Bl 19, 20, 21, 23, and 40 were hot and reactive. His Chinese medicine diagnosis was marked Heat with Damp with toxins with channel obstruction. He was given 30 grams of Xian Fang Huo Ming Yin twice a day. He steadily improved. He was performance sound in three weeks.
Chinese Herbal Medicine can be used to heal augment the healing of Bone fractures. Peng, et al, have data on an herbal formula used topically to increase the rate of healing in bone fractures. He applied a paste used for fracture healing (FH), consisting of the extracts of six herbs, Radix Dipsaci, Ramulus Sambucus Williamsii, Rhizoma Notoginseng, Flos Carthami, Rhizoma Rhei and Fructus Gardeniae. FH significantly increased with an increased cell proliferation. It’s important chemical components asperosaponin VI, ginsenoside Rg1 and emodin were shown to be acting positively in the respective in vitro studies. FH paste significantly improved the bone healing in the rabbit fracture model, as was indicated by the increases in callus size at weeks 2-5, and the elevations in bone specific alkaline phosphatase activities at weeks 5-6. (23)

Brandy, a 15 year old Hunter/Jumper pony somersaulted down a steep incline during a Hunter Pace, fracturing the wing of C2. During initial presentation, she was very neurologic and could stand only if propping herself against the stall wall. Her tongue was dark purple; her pulse was forceful and rapid. She was reactive on her local cervical points, Bl 14, 23. Her TCM diagnosis was channel obstruction with severe Blood Stagnation with Wind Stroke (Zhong Feng.). She was given three Chinese herbal medicines; Jin Gu Die Shang Wan, 20 tea pills twice a day; Xiao Huo Luo Dan, One tablespoon, 15 grams, twice a day, and Neck Formula 6 pills twice a day (b) and received weekly acupuncture treatment to help. Within a week, she could safely walk in her stall and over the next three months has become performance sound.

Jin Gu Die Shang Wan is a patent medicine called, “Muscle, Bone Traumatic Injury Pill”. It invigorates blood, breaks blood stasis, tonifies blood, stops bleeding, strengthens sinew and bone, dredges and opens the channels and collaterals, relieves pain.(24) It uses Dipsacus, Xu Duan, as the principal herb (25.8 %); Xu Duan can strongly invigorate the flow of blood in the channels and collaterals with a strong fracture healing ability. Also in this formula are Notoginseng, Tian Qi; Paeonia, Chi Shao; Boswellia, Ru Xiang; Myrrha, Mo Yao; Carthamus, Hong Hua; Daemonorops, Xue Jie; Sparganium, San Leng; Paeonia, Bai Shao; Sappan, Su Mu; Glycyrrhiza, Gan Cao; Corydalis, Yan Hu Suo; Angelica, Dang Gui; Euplophyaga, Tu Bie Chong; Moutan, Mu Dan Pi; Cucumis, Tian Gua Zi; Persica, Tao Ren; Ledebouriella, Fang Feng; Akebia, Mu Tong; Drynaria, Gu Sui Bu; Citrus Aurantium, Zhi Shi; Artemesia, Liu Ji Nu; Platycodon, Jie Geng; and Curcuma, Jiang Huang.

Xiao Huo Luo Dan is a Damp-Cold dispelling formula that contains Zhi Chuan Wan, prepared Aconite; Zhi Cao Wu, prepared Aconite to dispel the Wind and to dredge the collateral and relieve pain; Tian Nan Xing, Arisaematium resolves any dampness and resolves phlegm; Ru Xiang, Olibanum; Mo Yao, Myrrha activate Qi and blood circulation and remove blood stasis; and Di Long, Phereitima opens the channels and collaterals. This formula was used due to the severe neurologic signs or Wind Stroke (Zhong Feng) with Blood Stasis and obstruction in the channels and collateral with numbness in the extremities.

Neck formula is another Patent Chinese Medicine with Codonopsis, Dang Shen; Astragalus, Huang Qi; Rehmannia-raw, Sheng Di Huang; Paeonia, Bai Shao; Halitosis,
Shi Jue Ming, Salvia, San Shen; Vaccaria, Wang Bu Liu Xing; Pueraria, Ge Gan; Ophicalcirum, Hua Nui Chi; Clematis, Wei Liang Xian; Ligusticum, Chuan Xiong; Prunus, Tao Ren; Phellodendron, Huang Bai; Gentiana Large leaf, Qiang Jiao, Notopterygium, Qiang Huo; Atractyloides, Cang Zhu; Pheretima, Di Long; Carthamus, Hong Hua; Boswellia, Ru Xiang; Myrrha, Mo Yao; and Euployphaga, Tu Bie Chong. This formula was added for two reasons; firstly it contains herbal carriers to the neck, Ge Gan; and secondly there are Heat clearing herbs in this formula. Due to the severe Blood Stagnation, there will be secondary Heat produced (inflammation). Ehman et al had studies of the anti-inflammatory effects of these Heat clearing Chinese herbs. The targets comprised cyclo-oxygenases 1 & 2 (COX), p38 MAP kinase, c-Jun terminal-NH (2) kinase (JNK) and type 4 cAMP-specific phosphodiesterase (PDE4). The results revealed that multi-target inhibitors are common in Chinese herbs. (25)

Brandy was on a large number of herbs. But the owners had been given only one option from their conventional veterinarian, euthanasia. The fracture was minimally displaced and the owners had a well-bedded secure stall for her to recover. Her neurologic systems resolved very quickly. Jie Gu Die Shang Wan prioritized the fracture repair, Xiao Huo Lou Dan aggressively opened the channels and collaterals; while Neck formula carried the effect of all of the herbs to the neck and cooled the inflammation from the severe Blood Stasis.

Kim, et al showed that Chinese herbal Yang tonics had a protective effect on nervous tissue (26) mostly due to decreasing oxidative stress which accelerated nerve regeneration.

In all sports injuries there is pain and muscle trauma. The stress of such pain has very negative effects on the body’s ability to heal. We have already discussed many of the pain relieving herbs such as, Dan Shen, Salvia; Dang Gui, Angelica; Chi Shao, Red Peony; Ru Xiang, Frankincense; and Mo Yao, Myrrh. Wang, et al studied the effect of these “blood-activating and stasis-dispelling” herbs. He showed that the blood flow was moderated preventing the formation of edema (26). Tatsumi et al has studied the analgesic effect of Coix and Moutan on neuropathic pain. The extracts of Moutan cortex and Coicis semen dose-dependently alleviated the PGF2alpha-induced allodynia, hyperalgesia and tactile pain. NADPH diaphorase activity in the spinal cord associated with neuropathic pain was also blocked by these extracts. (27)

In conclusion, three severely injured horses returned to pre-injury performance ability with accelerated healing times due to the use of Chinese Herbal Medicine. Chinese Herbal Medicine is so well suited to help these injured horses heal; by moving blood, it accelerated healing and minimized pain; it strengthened the tendons, ligaments and bones allowing them to return to full function.
Footnote:
   a. Jing Tang Herbal, Inc. Reddick, FL 32586
   b. May Way Corp, USA 1338 Mandela Parkway, Oakland CA 94607

Reference:


2. Goodship, A., et al;” The Pathobiology and Repair of Tendon and Ligament Injury”; The Veterinary Clinics of North America-Tendon and Ligament Injuries I; W.B.Saunders; 1994; August: 10 (2); P.323-347.


5. Xie, H.; Chinese Veterinary Herbal Handbook; Chi Institute of Chinese Medicine, Reddick, Fl; 2004; p.63-64


16. Bensky and Barolet; Chinese Herbal Medicine, Formula and Strategies; Eastland Press, Seattle, WA; 1990, p 83.


18. Lechner, D. et al; “The Anti-staphylococcal activity of Angelica dahurica (Bai Zhi”); Centre for Pharmacognosy and Phytotherapy; The School of Pharmacy, University of London; 2006; p. 29-39.


20. Xu, F., et al.; Antinociceptive efficacy of verticinome in murine models of inflammatory pain and Paclitaxel induced neuropathic pain”; Biol Pharm Bull; 34 (9); 34 (9); 134-182.


28. Tatsumi S, et al; Analgesic effect of extracts of Chinese medicinal herbs Moutan cortex and coicis semen on neuropathic pain in mice; Neurosci; 2044; Nov 11; 370(2-3); 130-4.
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Xiao Chai Hu Tang in Veterinary Medicine - The Role a Traditional Chinese Herbal Formula can make in Disease Management, Palliation and Treatment
Barbara Fougere, BSc, BVMS

Xiao Chai Hu Tang has an important role in veterinary Chinese herbal medicine and unrealized potential in mainstream veterinary medicine. Its biomedical functions include hepatoprotection, immune stimulation, and anti-inflammatory activity. The formula is best researched for its use in liver disease and cancer in humans however its uses in veterinary medicine extend from Addison’s, behavioral conditions, neuroendocrine cancer to hemangiosarcoma and emergency treatment of liver failure and gall bladder obstruction and renal disease. Several veterinary cases are described using this formula.

Introduction
Xiao Chai Hu Tang (also known as Minor Bupleurum formula and Sho-saiko-to) is a traditional Chinese herbal formula consisting of seven herbs:

<table>
<thead>
<tr>
<th>Species name</th>
<th>Common Name</th>
<th>Pin Yin name</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bupleurum falcatum</td>
<td>Bupleurum root</td>
<td>Chai Hu</td>
</tr>
<tr>
<td>Pinellia ternate</td>
<td>Pinellia tuber</td>
<td>Ban Xia</td>
</tr>
<tr>
<td>Scutellaria baicalensis</td>
<td>Scutellaria root</td>
<td>Huang qin</td>
</tr>
<tr>
<td>Zizyphus jujuba</td>
<td>Jujube</td>
<td>Da zao</td>
</tr>
<tr>
<td>Panax ginseng</td>
<td>Ginseng</td>
<td>Ren Shen</td>
</tr>
<tr>
<td>Glycyrrhiza uralensis</td>
<td>Licorice</td>
<td>Gan cao</td>
</tr>
<tr>
<td>Zingiber officinale</td>
<td>Ginger root</td>
<td>Sheng jiang</td>
</tr>
</tbody>
</table>

Traditionally it is used to harmonize “Shaoyang” stage disorders. In Traditional Chinese Medicine the “Shaoyang” exists between Yin and Yang or between the interior and exterior. Shao Yang syndromes include both Triple Heater Obstruction and Gall Bladder Obstruction. The Triple Heater moves Qi longitudinally along the interior of the body, while the Gall Bladder channel moves Qi to the exterior of the body and is important in limb movement(1). The syndrome classically manifests in humans as intermittent fever, chest and hypochondrial fullness and discomfort, abdominal discomfort, nausea, agitation and a wiry pulse. Traditional use of Xiao Chia Hu Tang is it is also used to harmonize and tonify the middle jiao and in veterinary medicine, its use extends to treating Phlegm Accumulation, Qi Stagnation, Spleen Qi Deficiency and Kidney Qi Deficiency (1).

The traditional properties of Xiao Chai Hu Tang are attributed to its constituents. Chai Hu is bitter, pungent and cool and has ascending and dispersing properties. It clears heat in the Shaoyang, relieves Qi Stagnation and promotes dispersion of pathogens, it is the emperor drug in the formula. Huang Qin is bitter and cold and so assists Chai Hu in clearing heat from the Shaoyang and is the minister drug in the formula. Ban Xia and Sheng Jiang descend Stomach Qi and treat nausea. Rebellious Stomach Qi is caused by pathogens that lodge in the shaoyang invading the Stomach so that the Stomach Qi...
rebels upwards resulting in poor appetite and nausea. These two herbs are assistant drugs in the formula. Ren Shen, Gan Cao and Da Zao help strengthen the vital Qi to help expel pathogens and prevent pathogens moving further into the body, they are also assistant drugs.

Veterinarians can employ this formula in a number of clinical conditions without an in-depth knowledge of Chinese herbal medicine by knowing its pharmacological effects, research and clinical studies that support its use in various conditions, herb drug interactions and safety.

Biomedical Research
Studios on Xiao Chai Hu Tang (Sho-saiko-to) demonstrate the following actions:
- Anti-inflammatory (2)
- Antioxidant (3)
- Immunomodulatory (4)
- Renoprotective (5)
- Hepatoprotective, reduces hepatocyte necrosis and enhances liver function (6)
- Anti-hepatic fibrotic (7)
- Antineoplastic (8) on liver cancer (9, 10) and ovarian cancer cell lines (11) nasopharangeal adenocarcinoma (12) and inhibits metastasis of carcinomas (13)
- Protects against endotoxemia and septic shock (14).

Individual herbs and their active constituents that contribute to the formula have been identified and well researched.

**Bupleurum falcatum**
- Chai Hu has a strong ascending and dispersing function and helps to spread Liver Qi. It also lifts Liver Yang and is used to treat Kidney Yang and Qi Deficiency (15).
- Bupleurum is immune modulating, anti-inflammatory, analgesic, antimicrobial, hepato-protective (16)
- Bupleuran 2 IIc enhances cytokine secretion of intestinal epithelial cells and improves intestinal homeostasis (17)
- A polysaccharide fraction of Bupleurum falcatum L. (BR2) was effective in speeding healing of gastric ulceration induced by acetic acid in rats (18)
- An extract of bupleurum showed a reduction in depression and anxiety like behavior in rats (19)
- Saikosaponin (triterpine saponin) has significant antiepileptic activity in a variety of epilepsy models in vivo (20)
- Saikosaponin has anti-inflammatory, immunomodulatory, and anti-bacterial activities (21)
- Saikosaponins increased the levels of monoamine neurotransmitters in the brain of “depressed” rats (22)
**Pinellia ternate**
- Ban Xia (Rhizoma Pinelliae) dries Dampness and dissolves Phlegm which is causing Obstruction in the Triple Heater System. It also redirects abnormally rising Stomach Qi and relieves nausea and vomiting (15)
- Pinellia is antiemetic, expectorant, styptic and a sialogogue and febrifuge (15)
- High doses of *Pinellia* extract effects thermogenesis and fatty acid oxidation in rats (23).
- Pinellian G demonstrated significant reticuloendothelium system-stimulating activity(assists in antineoplastic effect) and a reduction in inflammation (24)

**Scutellaria baicalensis**
- Huang Qing (Scutellaria Baicalensis) is bitter cool and descends Yang from the Upper Burner to the Lower Burner (25). It also clears Heat and Dries Dampness (15)
- Scutellaria has anti-inflammatory, antiviral, antibacterial, and antineoplastic activity (15). Its active constituent flavonoids, including baicalin and wogonin.
- Scutellaria has adaptogenic activity: stressed rats given Scutellaria showed normalization in ACTH, insulin, and glucose levels (26)
- Scutellaria was demonstrated to be effective in treating acute induced ulcerative colitis (27)
- Baicalein inhibits oxidative stress induced cellular damage via scavenging ROS and inhibiting apoptosis (28)
- Baicalin is a known prolyl endopeptidase inhibitor having possible nootropic and antidepressant effects (29), Prolyl endopeptidase enzyme is involved in maturation and degradation of polypeptide hormones and neuropeptides including luteinising hormone, angiotensin, oxytocin, substance P and vasopressin. Animal research demonstrates antidepressant effects (30).
- Baicalin is antineoplastic and induces cell cycle arrest and apoptosis (31) and induces apoptosis in pancreatic cancer cells (32).
- Baicalin is protective in acute pancreatitis (33)
- Baicalein has been shown to inhibit lipoxygenases (34) and acts as an anti-inflammatory agent (35).
- Wogonin demonstrates anxiolytic properties in mice without exhibiting the sedative and muscle-relaxing properties of benzodiazepines (36).
- Preliminary in vitro studies indicate wogonin triggers apoptosis in osteosarcoma cell lines (37).

**Zizyphus jujuba**
- Da Zao tonifies Spleen and Stomach Qi, tonifies Blood and calms the Shen (15).
- Da zao polysaccharides have a strong antioxidant activity (38)
- It has an inhibitory effect on Glu-mediated excitatory signal pathways in the hippocampus which explains its sedative effect (39)
- Other compounds with hypnotic and sedative effect are flavonoids, saponins and polysaccharides (40)
Panax ginseng
- Ren Shen (Radix Ginseng) is a major Yuan Qi tonic. It tonifies Spleen Qi and Lung Qi and indirectly tonifies Qi and Blood. It also calms the Shen (15).
- Ginseng has inhibited multidrug resistance in cancer treatment and has other cytotoxic and antimetastatic effects (41)
- Polysaccharides in Panax ginseng can recover immune function in induced immunosuppression in mice (42)
- It has neuroprotective effects (43)
- Ginsenoside Rg2 could protect memory impairment via anti-apoptosis in a rat model with vascular dementia (44).

Glycyrrhiza uralensis
- Gan Cao tonifies the Spleen and harmonizes other herbs (15).
- Glycyrrhizin is hepatoprotective against chemical induced injury and is used in the treatment of chronic hepatitis and cirrhosis and carcinoma in Japan. It also inhibits the growth of several DNA and RNA viruses, inactivating herpes simplex virus particles irreversibly (45)
- Glycyrrhizin disrupts H5N1 influenza and H5N1-induced pro-inflammatory gene expression (46).

Zingiber officinalis
- Sheng Jiang warms and harmonizes the Middle Burner, directing rebellious Qi downwards and relieving nausea and vomiting (25)
- Ginger’s effectiveness for treating nausea, vomiting and gastric hypo motility may be based on a weak inhibitory effect of ginerols and shogaols at M (3) and 5-HT (3) receptors (47)
- Gingerol seems to be effective in an animal model of rheumatoid arthritis(48)
- Gingerol has been investigated for its effect on neoplasia in the bowel (49) breast tissue (50) ovaries (51) the pancreas (52) among other tissues, with positive results.

This selection of research findings provides evidence for some of the actions and clinical effects of the formula and individual plants and constituents within the formula. Cumulatively this “polypharmacy” effect goes some way towards providing a rationale for the use of the formula for the following potential indications.

Potential Indications
A prescription form of Sho-saiki-to has been used extensively in Japan mainly for the treatment of chronic hepatitis, liver cirrhosis and various chronic inflammatory diseases (53). Clinical trials also support its use for liver cirrhosis, prevention of liver cancer and for hepatitis, infectious disorders (with intermittent fevers), cholecystitis and cholelithiasis, pancreatitis, chronic renal insufficiency, nephritis, fever, bronchial asthma, gastritis, allergic rhinitis, tonsillitis and other conditions in humans (54).

Potential veterinary indications include neoplasia: abdominal, hemangiosarcoma, lymphoma, hepatic adenocarcinoma, renal disease: glomerulonephritis, renal
insufficiency, renal failure, urinary incontinence, pyelonephritis as well as bronchitis, pneumonia, collapsing trachea, enteritis, constipation (megacolon), gastric dilatation and vlvulus, systemic lupus erythematosus, hypoadrenocorticism, hypoglycemia, degenerative myelopathy, epilepsy, vestibular syndrome, disc herniation, tremors, encephalitis, meningitis, arthritis, myasthenia gravis, degenerative joint disease, hepatitis, splenomegaly, granulocytopenia, thrombocytopenia, hemolytic anemia (1) as well as hepatic lipidosis, jaundice, fever in cancer, metritis, postpartum infection and postpartum fever (54).

Safety
To date, in human medicine there have been reports of side effects of Xiao Chai Hu Tang particularly with the development of interstitial pneumonia and acute respiratory failure in patients with liver disease. A recent review suggests the incidence of side effects is increased by other variables such as coadministration of interferon, length of treatment and increasing age of patients (55). More recently a toxicity study was performed in rats using dose rates of 2 grams per kilogram per day over 4 weeks, and it was concluded that it is a very safe formula (56).

Herb Drug Interactions
There is a potential for adverse events associated with concurrent use of interferon; a positive synergistic effect against cancer with intereleukin 2, lamivudine, 5- fluorouracil; possible altered bioavailability with carbamazepine, phenobarbital, tolbutamide but not olfoxacin (54).

Dose Rates
Dose rates will vary according to product form and formulation. Check with manufacturer. As a guide 0.5 gram per 5 kilograms / 10 lbs twice daily. For acute emergency treatment it can be given rectally in a slurry 6-8 times the normal dose three to four times daily for several days until it can be given in capsule form orally and then mixed with food once appetite has returned.

Cases
Neuroendocrine cancer and chronic renal failure.
“Bindi” a spayed female cattle dog with a history of autoimmune polyarthritis in 2004, which resolved, acute renal failure following administration of a NSAID in 2009 which progressed to chronic renal failure and a recent diagnosis of a highly undifferentiated neuroendocrine tumor in the mesentry in November 2009. She was 11.5 years of age and was given a grave prognosis. She presented with hyperadrenocorticism like signs including abdominal distension and elevated liver enzymes. Bindi was managed with acupuncture, Xiao Chai Hu Tang, silymarin, a normal diet (supplemented with a phosphate binder), fortekor then amlopidine. She had an excellent quality of life until 30 months later when she was euthanized at 13 years of age following a rapid decline in her renal function over two weeks.
Hemangiosarcoma

“Finn” a male neutered ten year-old Nova Scotia Retriever presented at the end of June 2011 two weeks post splenectomy for hemangiosarcoma with a grave prognosis because the tumor had burst prior to surgery and multiple metastases were also observed during surgery, the owner was advised euthanasia. On exam Finn was painful in his hypochondral area, his tongue was lavender, his pulse was wiry and his head was hot. He was started on Xiao Chai Hu Tang and Bilberry and an Antioxidant formula. He is still treated with acupuncture and this herbal medicine regime. To date it is 19 months and he is an active, bright and alert geriatric.

Gall Bladder Obstruction

“Quilpie” presented January 2011 with a ten day history of pancreatitis, treated by the regular veterinarian in hospital but she still wasn’t normal. She had mild jaundice and was dehydrated on presentation. She was sent for observation and IV fluids at an overnight referral facility. She deteriorated and over the next 48–72 hours developed hepatobiliary stasis and liver failure, ultrasound revealed occlusion of the bile duct. Her prognosis at this stage was grave and surgery was considered risky. The owner requested the specialist contact me. She was treated rectally with Xiao Chai Hu Tang 4 times daily, two days later her bile acids and liver values were declining and I attended the dog in hospital for acupuncture—she accepted liver treats. By day 4 appetite was returning. She was discharged from hospital 7 days after admission. To date she has completely recovered but the owner insists on continuing the formula at a low dose.

Gall Bladder Obstruction/ Pancreatitis

“Odin” presented to another Specialist practice 29 October 2012 with acute pancreatitis, followed soon by hepatobiliary obstruction and liver failure. The owner contacted me because of financial stress associated with the estimated cost of surgery and poor prognosis. On the basis of Quilpie I was able to negotiate treatment with the internal medicine specialist. Xiao Chai Hu Tang was administered rectally, the dog was discharged 3 days later and has returned to normal. The specialist has indicated he would be keen to try this again in similar cases. His liver values remain normal.

Chronic vomiting, diarrhea, urinary incontinence and anxiety

“Yoga” is a 21 month old male neutered West Highland white terrier who had been vomiting since 7 months of age up to weekly. His Western diagnosis was IBD after ruling out pancreatitis, small intestinal bacterial overgrowth and exocrine pancreatic insufficiency. Intestinal biopsy was declined. He presented for TCM consultation April 2012 with a 14 month history. Physical exam revealed epichondral distension and tension, cool paws and a warm head and a deep fast wiry pulse, a history of borborygmus and active points along the GB meridian- a TCM diagnosis of stagnation in the middle burner due to Phlegm accumulation, secondary to Spleen Qi deficiency causing vomiting and burping, accumulation of Yang in the Upper burner contributing to anxiety and for the inability of Yang and Qi to descend causing weakness in the lower burner in the form of urinary incontinence. Two weeks after commencing treatment with Xiao Chai Hu Tang the vomiting had stopped, there was no more diarrhea, burping, Wu wei zi was added to the formula. Two weeks later there was a marked improvement in
urinary incontinence and reduced anxiety. Two months after this only occasional
incontinence, Yoga was much more playful and interactive at home (Lam S Treatment of
Chronic Vomiting, Diarrhea and Urinary Incontinence in a one year old West Highland
White Terrier with acupuncture and The Chinese herbal formula Xiao Chai Hu Tang
CIVT 2012).

**Hypoadrenocortism**

“Flossy” a 10 year old spayed female terrier cross presented in July 2007 with a
two year history of poorly controlled hypoadrenocortism with episodes of weakness,
tremors and vomiting becoming more common. The owner was not particularly
compliant and wanted an alternative to the conventional treatment. She was started on
Xiao Chai Hu Tang. Ginseng and licorice in the formula may work synergistically for
this condition. In a rat model, ginseng saponins, and the active components ginsenosides,
have been shown to stimulate an increase in ACTH and secondarily corticosterone
through ACTH stimulation on the adrenals and this effect was suppressed when rats were
pretreated with dexamethasone; leading to the conclusion that ginseng increases cortisol
by its effects on the hypothalamus (57). Glycyrrhetinic acid inhibits a steroid
dehydrogenase enzyme, blocking the conversion of active cortisol to inactive cortisone,
the outcome being that active cortisol remains in circulation longer (58). The overall
effect of the two herbs is that ginseng stimulates cortisol output and licorice prolongs its
effect. Licorice also has a mineralocorticoid-like effect and is able to increase sodium and
water re-absorption in the renal tubules and increase excretion of potassium (15).
However, at high doses this can result in hypertension and edema formation and effective
pseudoaldosteronism (15).

**Conclusion**

Herbal formulas are often perplexing to veterinarians because of their lack of a
single mechanism of action. However having more than one action and a complex
chemistry of multiple phytochemicals, as well as a high safety margin also offers the
opportunity to treat challenging cases where conventional options are limited or
ineffective.
References


26. Marsden, S 2006, Chinese Veterinary Herbal Medicine, Sydney Institute of Traditional Chinese Medicine, Sydney 8-15 November 2008


30. Tarragó, T; Kichik, N; Claasen, B etal. Baicalin, a prodrug able to reach the CNS, is a prolyl oligopeptidase inhibitor. Bioorganic & medicinal chemistry 16 (15): 7516–24 2008


42. Park JD, Rhee DK, Lee YH. Biological activities and chemistry of saponins from Panax Ginseng CA Meyer. Phytochemistry Review. 2005;4:159-175.


A Critical Approach on Acupuncture for Treating Chronic Pain
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Acupuncture has been usually used to treat acute and chronic pain, although the efficacy of this technique should be evidenced based. According to that the aim of this review is to critically investigate the efficacy of acupuncture for treating chronic pain in veterinary medicine, including clinical and scientific evidences, as well as possible mechanisms of action and most indicated techniques.

In man lumbar pain has been successfully treated by acupuncture (Yuan et al 2008, Rubinstein et al 2010) and according to Yuan et al (2008) acupuncture should be combined to conventional care and take part of the European directives for treating low back pain. Unfortunately few studies match specific scientific criteria, as reported by Trigkilidas (2010), where from 50 controlled randomized studies analyzed, only four fit the selection criteria. In all cases acupuncture was superior to conventional treatment for treating chronic lumbar pain (Trigkilidas 2010) and was also efficient to treat muscle squeletal pain (Kalichman & Vulfsons, 2010).

The possible mechanisms of action behind the acupuncture effects are: 1) inhibition of nociceptive transmission, inflammation and muscle tension and spasm; 2) improvement of blood flow, proprioception and neuropathic pain, by activation of Aß fibers, neurotransmitters and peptides, as well as 3) immune modulation.

Few clinical evidence studies reported the use of acupuncture to treat chronic pain in veterinary medicine. Kapatking et al (2006) reported no effect of electroacupuncture on severity of lameness in dogs with chronic elbow joint osteoarthritis secondary to elbow joint dysplasia. However possible lows of the study was the small number of animals (n=9), the short period of evaluation (three weeks), use of low frequency electro stimulation, where high frequency would be more appropriate, and lack of information about the expertise of the acupuncturist. The study was also not blind.

Hielm-Bjorkman et al. (2001) evaluated the effect of gold implants at acupuncture points in dogs for treating osteoarthritis induced by hip dysplasia. Thirty eight dogs with hip dysplasia were divided in two groups of same number where 19 were treated with gold implants and 19 were placebo control. Locomotion score and pain signs were reduced in both groups, but there was no difference between groups. Again some limitations of this study were that some animals had been previously submitted to surgery and were above 11 years old.

Another study investigated the long term effects of gold implants in dogs using a good number of dogs with hip dysplasia (Jaeger et al. 2006). In this random double blind study, 36 dogs received gold implants and 42 were treated with sham acupuncture (false points). Dogs were followed for six months. Dogs receiving gold implants showed a better humor, dysfunction index and appetite; otherwise quality of life improved in both
groups. Owners of the dogs' visual analogue scale pain scores reduced by 65 and 36% in animals submitted to gold implants and sham acupuncture respectively and sum of lameness and dysfunction scores were significantly lower in the first group. The same dogs and other dogs which received gold implants were followed for 18 months by the same authors, and the positive effects of gold implants were maintained for two years (Jaeger et al 2007).

The possible mechanisms behind the effects of gold implants are that there is a: continuous stimulation of the acupoints (Danscher 2002), reduction in calcium (Ca++) deposition (Cantwell 2010), formation of aurocianide, which inhibits inflammatory cell lisossomal enzymes and reduction of nuclear in beta kappa ligation factor, which reduces the formation of pro-inflammatory cytokines (Cantwell 2010).

What about scientific evidences of the effect of acupuncture in disk disease? There is convincing data showing that disk extrusion produces, besides compression, a considerable immunomediated inflammatory process due to the glycoprotein material (Maccarron 1990). Innervation is greater in the degenerated disks when compared to healthy ones. According to our experience several dogs with a considerable spinal compression shown by diagnostic image have less severe neurological signs when compared to dogs with less spinal cord compression. This might be related to the role of inflammation as mentioned before.

Some veterinary studies investigated the effect of acupuncture for treatment of neurological signs associated with disk diseases in dogs. Hayashi et al (2007) performed a prospective controlled clinical study comparing electroacupuncture combined with medical treatment against only medical treatment to treat thoracolumbar intervertebral disk disease in 50 dogs undergoing from grade 1 to 5 neurologic dysfunction. After about one month of treatment time to recover ambulation in dogs with grade 3 and 4 dysfunction was 10 ± 6 days and 21 ± 12 days in the combined and pharmacological treatment respectively (p<0.05), as well 100% of dogs were able to walk again when received the former treatment compared to pharmacological treatment alone (67% - p<0.05). Three out of six dogs without deep pain perception (grade 5 dysfunction) and only 1 out of 8 dogs treated conventionally recovered pain sensation. When all data was combined the success rate was significantly higher in the acupuncture group (88.5% - 23/26 versus 58.3% - 14/24). Besides that recovery of control of miction, proprioception and locomotion were 80%, 92% and 96% in the acupuncture group and 50%, 54% and 58% in the conventional group.

Our group compared the effect of electroacupuncture versus decompressive surgery to treat dogs with grades 4 and 5 toracolumbar intervertebral disk disease (Joaquim et al 2010). Clinical success was higher in dogs treated with electroacupuncture (15/19), compared to dogs undergoing surgery (4/10), as locomotion was observed in 79% of the animals treated with acupuncture against 40% submitted to surgery.
In our practice some animals receive countercurrent pharmacological treatment combined to acupuncture and it is important to mention that the clinician should have an integrative therapeutic approach for pain management, as pain is a complex phenomena and pharmacological therapy should not be disregarded in combination with acupuncture in some cases.

References


3. Hayashi et al *JAVMA* 2007;231:913–918


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San, Wan, Tang, Powder, Pill, Extract, or Decoction
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Determining the correct TCVM pattern and selecting the correct herbal formula sets the groundwork for therapeutic success; but then the practical difficulties begin. Deciding on the proper herb form for your patient takes consideration. The advantages and the disadvantages of various forms of herbal formulas on the market should be considered. The actions of a formula are associated with its prescription form. With the same ingredients and doses, a formula may have different actions and indications when it is prepared in a different prescription form.

The most obvious hurdle is to get the veterinary patient to consume the herbs. Choosing a tea pill versus a liquid for cats to powder or extract decoction for horses, the form of the herbs affect the acceptance. The actions of the forms matter as well. Is the form prescribed quick acting, easily absorbed, safe and gentle for the sensitive patient etc.? In general, a decoction is a prescription form that produces a quick and drastic effect. A pill or a bolus prescription form produces a slow and lasting effect. Extracts are bio available and have a smaller mass per dose, whereas powders have a large mass per dose containing active and inactive ingredients. The inactive ingredients, cellulose, etc. have their place in herbal medicine to dampen the negative effects of the active ingredients.

There is a multitude of forms and functions of herbs available to veterinarians today. The pin yin name of the formula is used to convey the form it is in. The last word of the formula signifies the form. Tang is decoction. San is powder. Wan is a pill. So for example, Long Dan Xie Gan Tang is a decoction form. Long Dan Xie Gan San is the powder form. Pin yin pronunciation is hard enough to master, adding in all the versions of that formula can be daunting.

Common Forms of Prescriptions

1. Decoctions (tang ji)
Example: Long Dan Xie Gan Tang

Traditionally a decoction is the most commonly used prescription form in human TCM practice. An appropriately made decoction and the right administration, is the premise of good therapeutic effectiveness.

Traditionally, earthen jugs or pots were used. In modern practice, glass pots, enamelware or aluminum pots are used as well. Iron or copper pots are forbidden because some herbs when heated in iron or copper, may generate sediment, become less soluble or even lead to chemical reactions and adverse effects. Usually, a large capacity pot is used to provide a favorable condition for boiling herbs thoroughly and accelerating the extraction of active constituents. A lid is necessary to prevent water from evaporating.
too fast, which is not good for the complete extraction of active constituents. The lid should not be opened often to avoid the loss of volatile components.

The water used must be pure and clean. Ancient Chinese used to use running water, spring water, and rice-washing water. Sometimes it is necessary to use liquor or watery wine according to the characteristic of herbs as well as the illness being treated. The amount of water used, depends on the amount and quality of herbs and time needed for cooking. Normally 200–300 ml water is used for decocting 30g of herbs. As prepared herbal pieces are dry and are able to absorb large amount of water, adequate amounts of water must be put in the pot for boiling. Usually a dose of herbs is decocted twice, some three times. For the first decocting, water is added until the herbs are 3-5cm underwater, and 100-200 ml of water may be used for the second and third decocting.

This process includes strong heat and mild heat. Usually strong heat is used until the water boils, followed by mild heat for certain duration, to avoid boiling over of the decoction or the herbs from burning. The choice of heat should be based on the herb's property and decocting time needed. Strong heat is preferable for herbs with the function of relieving exterior syndrome and promoting diuresis. These are decocted for a short time and in a relatively small amount of water. Mild heat is advisable for herbs with nourishing function, which are decocted for longer time and in larger amounts of water. The herbs in a prescription are usually decocted together after they have been thoroughly soaked for 20-30 minutes, so that the active ingredients may be readily decocted out.

Some special decocting methods are noted as follows:

Decoct first
Shells and minerals are solid in quality with active constituents, which are difficult to extract. They should be broken up and decocted first for about 20-30 minutes before adding the other herbs

Decoct later
Aromatic herbs with volatile oil, such as Bo He, Sha Ren, and Dou Kou etc. are to be added to the mixture and decocted only for about 3 minutes so that volatile components are retained. All herbs to be decocted later also need to be soaked first in a separate container.

Wrapped herbs for decocting
Some herbs should be wrapped in a piece of gauze before they are decocted together with other herbs to prevent making the decoction turbid, producing irritation to the throat or sticking to the bottom of the pot.

Simmer or decoct separately
Some rare and expensive herbs should be simmered or decocted separately so as to prevent their active elements from being absorbed by other herbs when decocted together. For example, Ren Shen should be cut into small slices and put in a bowl with a lid and simmered in the pot for 1–2 hours.
Melt by heating
Some glutinous, sticky and easily-dissolved herbs, such as E Jiao (Gelatinum Corn Asini), Lu Jiao Jiao, Gui Ban Jiao, maltose, and honey should be dissolved by heating them separately to prevent them from burning or sticking to the pot and compromising their therapeutic effect. After dissolving, the herb is added to the boiling decoction. Or mix them together with the decoction when it is still hot.

Infuse for oral use
Some aromatic or rare herbs are not suitable for heating or boiling. They should be smashed into a fine powder and taken after being infused in a medicinal solution or warm boiled water.

Advantages of Decoction:
Easily absorbed and quick curative effects, especially for acute cases
Flexibility of modifications

Disadvantages of Decoction:
Large volume of the decoction;
Poor availability of components that are not water-soluble;
Inconvenience of cooking;
Bitter taste of most decoctions

2. Powder (San Ji)
Example: Long Dan Xie Gan San

Traditional herbal powders are finely cut and ground. Each herb is processed to the standards of the PR Chinese Pharmacopoeia as recommended. The pulverized powder includes the active and inactive ingredients and as such is milder and safer.

The animals’ gastrointestinal tract is considered a method of decoction.

Powders can be boiled for ten minutes to make a draft, which allows the dosage to be smaller than a decoction. Drafts are useful when the situation requires a prompt treatment with the strength of a decoction. Pulverized herbal powders are considered stronger than pills but weaker than a decoction.

3. Medicated Tea (cha Ji)
Soaking herbs in hot water.

4. Pill (Wan Ji) and Tablet (Pian Ji)
Example: Long Dan Xie Gan Wan or Long Dan Xie Gan Pian

Pills are usually slower in absorption, but have lasting potency, small volumes, and are convenient for carrying and administration. They are commonly used to treat chronic diseases or diseases with deficiency syndromes.
Combining fine powders of pulverized herbs with a viscous medium makes powder tablets. Tablets often include some excipients such as magnesium stearate, to bind the fine powder. Powder tablets are milder in nature and slower to take effect than a decoction.

Extract tablets are a form of concentrated pills that is actually made up of highly concentrated herbal extracts. Most concentrated tablets on the market are 7.5:1 and 5:1 extracts. They are good for acute situations. The disadvantage of tablets is their availability, shorter shelf life, and the inability to modify the formula.

5. Capsules (jiao nang ji)

Gelatin capsules are filled with either pulverized herbal powder or concentrated herbal extract granules. Capsules come in a multitude sizes so the size of the capsule determines the usefulness in veterinary practice. Many capsules are just too big for cats and small dogs.

Herbal powder filled capsules has a narrow range of usefulness. The powder contains active and inactive ingredients and has a relatively larger mass. Capsules are not filled under pressure or compressed so the number of powder capsules to treat a medium to large dog can be large. Capsules filled with herbal extract granules are more useful. The volume of the herbal granules is smaller and therefore the therapeutic dose can fit into a smaller number of capsules.

6. Pellets (dan ji)

Pellets are called tea pills. Tea pills are often made of extracted herbs and combined with a sticky base such as honey. The tea pills have varying sizes depending on the manufacturer. Tea pills are small round pills that are easy to administer to smaller animals such as cats. Tea pills include honeyed pills or boluses, water-paste pills, paste-pills, and concentrated pills. The disadvantage of tea pills is their availability and the inability to modify the formula.

7. Medicated Liquor (Jiu Ji)

Medicated liquor is an alcoholic solution obtained by soaking herbs in a distilled spirit or Chinese rice wine for oral or external use. This prescription form increases the effect of the herbs in the formulas of promoting blood circulation, removing obstruction in the meridians, eliminating Wind and Dampness and invigorating vital energy. It is used to preserve general health, and treat rheumatism and traumatic conditions. Orally administered alcohol based solutions are seldom used in veterinary practice. Glycerin based solutions can be substituted for the alcohol extractions.

A Tincture is a special form of medicated liquor. The concentration of herbs in the tincture is usually 20% with regular herbs, and is limited to 10% for the formula with toxic herbs. Some manufacturers may use concentrated herbal extracts to prepare tinctures, which makes the final product more potent.
8. Medicinal Wines (jiu ji)
Steeping various medicinal substances in wines makes medicinal wines. This is one of the oldest forms of preparation. Wine is thought to possess nourishing, blood-invigorating, channel-unblocking properties, and therefore is effectively used in Wind-Damp-Bi, trauma, and deficiency induced disorders.

9. Granule (chong Ji)
Granules are made from herbs extracted under a low heat/high-pressure extraction method then mixed with the proper amount of fine powdered herbs. They are administered as a powder or after being infused with boiled water. It is a relatively new prescription form. Herbs prepared in granule form take effect quickly, are strong, small in volume and convenient to use. The granules also allow for the modification of formulas.

Concentrated herbal powder is often provided in the form of granules e.g., 5:1 concentrated powders. The preparation of extracted herbs is similar to decoction in which the herbs are processed to extract the active ingredients. Large industrial vats are used to heat and pressurize the herbs in water until the thickened fluid is formed, the dregs are discarded and the remaining thickened solution is dehydrated to produce the extract. The extract is then blended with an herbal powder to produce the finished granules. The concentration level is determined by the amount of initial herb used to the finished extract ratio. In the example of a 5:1 extract, 5 pounds of herbs will be extracted down to 1 pound of extract.

10. Syrups (tang jiang ji)
To make a herbal syrup decoct various herbs in water, reduce the strained decoction to a thick concentrate, and then add sugar or honey.

Most appropriate for debilitating diseases, cough, and sore throat.

11. Plasters and Ointments (gao ji)
Plasters and ointments are two forms applied externally for the treatment of dermatological disorders such as abscesses and boils, painful obstruction in the joints and musculature, fractures and sprains, and fixed masses. Plasters can be applied to the distal extremities of horses as a poultice. Depending on the herbs used in the plasters and ointments may require wrapping to avoid ingestion of toxic herbs that are for topical use only.

One form is called plaster medicine made by slowly simmering medicinal herbs in oil, discarding the residue, adding beeswax, and then paper or cloth for application. Another form is called medicinal plaster, which is prepared by adding powder of medicinal substances to a heated mixture of oil and beeswax.

12. Injection (zhen ji)
Subcutaneous, intramuscular, and intravenous injection administration of herbs is used in China. These administration forms are not available in the United States.
13. Specialty forms
Herbs can be baked into biscuits and treats. Most herbs can withstand the heat of baking with the exception of herbs, which are high in volatile oils such as acrid herbs.

Herbs can also be freeze dried into an energetically appropriate meat for carnivores. Freeze drying subjects the herbs to freezing and drying and eliminates heat. Through the process of sublimation the water in the frozen material is converted from the solid state to a gas state.

Modification to a formula:
Jia jian at the beginning of a formula name means modified or that changes, partial or minor, have been made to the formula to “make it better”.

Jia Wei at the beginning of a formula name means augmented or increasing the size of the formula by adding one or more herbs.

For example, Jia Wei Long Dan Xie Gan Tang means the formula Long Dan Xie Gan Tang is the base formula and that an herb or herbs have been added to the base formula. In some cases, the modification may drastically change the relationship among the herbs in the formula. The modified formula has actions and indications different from that of the original formula, and sometimes even the modified formula is named differently.

Modification of a dose:
This refers to increasing or decreasing the dosage of an herb in a set formula without any change in its ingredients so as to change its potency or compatibility, as well as its action and indication. This sort of modification may make the modified formula more suitable for the situation, while the relationship among the herbs in the formula; its chief actions and indications remain unchanged. Some herbal formulas have a wide range of safety. Dosage modifications of these formulas are acceptable and in some cases highly recommended. Herbs that have a more narrow therapeutic range require careful scrutiny and analysis prior to dosage increases.

Administration Methods and Times:
A formula for tonification, with rich herbs, or cloying herbs should ordinarily be taken before the meal. Purgatives or antihelminthics should be taken before meals. Formulas that may cause irritation to the stomach or a decoction for treating eye conditions should be taken after meals. The administration time for herbs, which treat acute conditions should be taken as needed.

Sometimes a prescription is to be taken at a specific hour, e.g., Ji Ming San (Powder to Take at Cock’s Crow), a formula for cold dampness, is taken as a warm decoction in the early morning on an empty stomach. Herbs for the treatment of insomnia should be taken before going to bed.
Usually one prescription dose of whole herbs is decocted 2-3 times and the combined decoction is to be used for one day, 2-3 times daily. Generally, decoctions are taken while still warm, but there are exceptions. Decoction for heat patterns should be taken cool while decoction for cold patterns taken warm, which enhances the potency. In an emergency case, it is advisable either to take a prescription dose at one time, so as to boost the potency or to take it several times daily as tea in order to achieve a lasting effect. Proper amounts of ginger juice may be added to the decoction for patients who are apt to vomit after taking a decoction.

In cases of chronic diseases, it is advisable to take herbs 2-3 times daily in the form of pill, bolus, powder, extract or medicinal liquor.

References:

3. Yan, Wu, Practical Therapeutics of Traditional Chinese Medicine, Paradigm Publications, 1944.
7. Xie Huisheng, Traditional Chinese Veterinary Medicine, Jing Tang, 2002.
12. Mitchel, Craig, Feng Ye, and Wiseman Nigel, Shang Han Lun On Cold Damage by Zhang Ji (Zhang Zhong – Jing) (circa 150-219 c.e.)

Introduction

Regardless of the scope of our practice situations, feline patients present several unique challenges: Cats are constitutionally stock, so they typically present to practitioners with more advanced diseases processes; they poorly tolerate foods that are adulterated with medications, including herbals, and nutraceuticals — this makes administration of substances difficult for clients and patients; most cats will not tolerate chronic, daily oral pilling; and the species tolerates visits to a veterinary practice less readily than their canine counterparts. Additionally, it is common for cats to present with multiple issues, so the typical feline patient who is unwell normally is a sick cat in need of significant intervention.

While the breeding of specific phenotypes and inauguration of various feeding regimens have adversely affected veterinary patients across species lines, cats have been significantly impacted by conformational breeding and food choices. We will spend much of these sessions reviewing common feline issues in practice, reviewing the most current understanding of pathophysiology of diseases from a Western perspective, as well as reviewing beneficial non-Western treatments (acupuncture and herbal medicine, along with a short review of manipulative therapies). The goal is to provide practitioners with a solid grounding in our increasing understanding of feline medicine. As always, treatment goals should be: To do no harm; optimize response; and reduce stress in patients and clients. From both a Western and non-Western perspective, while polypharmacy is possible, with feline patients it is often not helpful or necessary. The rent in the human-cat bond can be significant and quality of life, as always, is paramount. From this clinician’s perspective, most clients with feline patients are exceptionally involved in the care and welfare of their animal companions. This involvement, however, can be a two-edged sword as the help that can provided at home is sometimes significantly and negatively impacted by the neediness of these clients. This can be a significant source of emotional fatigue and burnout.

The Importance of Constitutional Understanding

Like other species, most feline patients present as mixtures of Yin and Yang. Five Element Theory has been exceptionally helpful to this clinician in the initial assessment of feline patients. As descendants of desert dwellers, domestic cats are fundamentally Yin beings. Common constitutional presentations of feline patients include Metal cats, the prototypical “aloof” feline who is prone to lower airway disease and colitis (Lung Qi Deficiency is not uncommonly seen combined with Spleen Qi Deficiency in cats); Water cats, who are fearful and often have renal insufficiency; and Earth cats, generally large, mellow cats who are prone to disorders of the stomach and intestinal tracts. Included in this last grouping are the increasing number of cats who have diabetes (Spleen Qi Deficiency). Cats typically present with Phlegm disorders, with progression in many cases to formation of uroliths and uroliths. The current “epidemic” of calcium oxalate
Intestinal inflammatory disease/Spleen Qi Deficiency/Stomach Cold/Stomach Heat/Food Stagnation

Diabetes mellitus/Lung Heat/Stomach Heat/Kidney Yin Deficiency/Kidney and Qi Deficiency

Arthritis/Damp-Fixed, Painful Bi Syndrome/Kidney Qi/Yang Deficiency Bi Syndrome/Kidney Yin + Qi Deficiency Bi Syndrome

Chronic renal disease/Kidney Qi Deficiency/Kidney Yang Deficiency/Kidney Yin Deficiency and Kidney Jing Deficiency/Lin Syndrome

**Intestinal Disease/Pancreatitis**

Intestinal disease is common in cats and “inflammatory bowel disease” continues to be a poorly misunderstood syndrome in feline patients. Clients and clinicians often dismiss early signs of gastrointestinal disease (typically, the vomiting of food, fluid and/or hair) as “normal” for cats. As an obligate carnivore cats have a short and fast digestive tract. The vomiting of food, fluid and/or hair (“Rebellious Qi”) is symptomatic of decreased motility and warrants prompt intervention. Sadly, by the time many cats present with intestinal disease to the holistic practitioner, the symptoms are chronic and weight loss, vomiting and/or diarrhea are commonplace. It should be noted that many cats with intestinal disease do not present with vomiting and most, in fact, only present with weight loss as their primary clinical sign.

Food has been a primary focus of the management of intestinal disease in cats and since the 1990s, work by veterinary gastroenterologists has focused on the types of proteins and carbohydrates that are less likely to induce intestinal clinical signs. Work in the early 1990s by Grant Guilford at Massey University in New Zealand, identified beef, lamb, seafood, corn, soy and wheat gluten as common dietary allergens in cats. Beef is problematic, as it is a large protein that is prone to attack by the immune system of the intestinal tract; lamb cross-reacts with beef; and seafood (primarily salmon, whitefish and tuna) develops large quantities of histamine, prior to processing into pet foods. Large quantities of carbohydrates are problematic in cats, as the species is “designed” to eat prey animals (rodents, birds and lizards) with approximately four percent carbohydrate.
From a Western perspective, intestinal disease in cats is considered multi-factorial with an interplay between decreased IgA, dietary allergens, genetic susceptibility and changes in intestinal flora.

In humans, susceptibility to intestinal disease has been increasingly linked to defects in innate immunity. Specifically, mutations in the innate immune receptor NOD2/CARD15, promote and perpetuate intestinal inflammation. In the presence of enteric microflora, these mutations lead to unregulated mucosal cytokine production, delayed bacterial clearance and increased bacterial translocation. In veterinary patients, including cats, advances in molecular microbiology have shown that intestinal inflammation is associated with a shift from gram positive to gram negative bacteria, predominantly Enterobacteriaceae. Increased numbers of Enterobacteriaceae have been found to correlate with mucosal inflammation and clinical signs in cats consistent with intestinal disease. However, it is still unclear whether this alteration in intestinal flora are the cause or consequence of inflammation. In one study, duodenal biopsies were performed in 27 cats; 17 undergoing diagnostic investigation of signs of gastrointestinal disease, and 10 healthy controls. Histopathology ranged from normal (10), through mild (6), moderate (8) and severe (3) intestinal inflammation. Mucosal inflammation was evaluated by objective histopathology and cytokine profiles of duodenal biopsies. The number of mucosal-associated Enterobacteriaceae, E. coli and Clostridium spp. correlated with abnormalities of mucosal architecture (primarily atrophy and fusion), upregulation of cytokine mRNA (IL-1,8 and 12, primarily) and the number of clinical signs in affected cats.

Given the likelihood that bacterial changes in the feline intestinal tract either result from or cause disease in patients, the use of a probiotic is a reasonable addition to a treatment protocol. Given concerns for the reliability and validity between the bacteria listed on the ingredients label of many probiotic compounds and the actual content of sachets and capsules, it is important that the practitioner choose a product that provides the promised flora.

Dietary therapy also has been shown to impact bacterial flora and a carbohydrate-rich diet most likely drives changes in intestinal bacteria in cats. Cats do best on a diet that is 50 percent protein, 40 percent fat and 10 percent carbohydrate. A recent study has shown that cats need 5.2 g protein/kg/day, just to maintain neutral nitrogen balance. Kittens require more protein than adult cats and cats over 10-11 years of age have a decreased ability to absorb protein, meaning that increased protein may be necessary when considering the feeding requirements of older cats. This recent evidence is contrary to the commonly held belief among many veterinarians that older cats, including those with renal disease, should eat a reduced amount of protein. Dietary allergens appear to play a more key role in younger cats and it is reasonable to use novel proteins, as possible, in an attempt to treat intestinal disease with food therapy. The author has used commercially-sourced rabbit and venison in her feline patients with intestinal disease with good success. In middle-aged and older cats, dietary allergens appear to be less of an issue and it is often difficult and counterproductive to attempt dietary change in this group of cats. Raw diets have been successfully used by the author in many cats with
intestinal disease. However, she typically has clients lightly cook the diets (10 seconds in the microwave on HI).

Due to the single, major duodenal papilla in cats, those with intestinal disease commonly have concurrent pancreatitis and hepatic involvement. Amylase and lipase are unrewarding measures of pancreatic disease in cats and many cats present to the holistic practitioner with fPLI (feline pancreatic lipase immunoassay) results that may be normal, borderline-high or extremely elevated. Broader utilization of pancreatic assay testing has shown a sensitivity of 67 percent with this test, a negative predictive value of 62 percent, specificity of 91 percent and positive predictive value of 92 percent. Cats with pancreatitis generally do not vomit and those with acute necrotizing pancreatitis are at risk for disseminated intravascular coagulopathy (DIC). Diabetes mellitus can accompany acute pancreatitis in cats and cats with acute pancreatitis are at risk for the development of diabetic ketoacidosis. Cats with intestinal disease and acute pancreatitis often present with increased liver enzymes, hyperbilirubinemia, hypoalbuminemia, hypocalcemia, hypokalemia, prerenal azotemia and hypocholesterolemia. Hypoglycemia can be seen in a subset of cats with acute pancreatitis that are septic. Feline patients with clinical signs consistent with acute necrotizing pancreatitis are ideally transferred for critical care support.

Many cats with ileal intestinal disease (as well as those with exocrine pancreatic insufficiency) are hypocobalaminemic. Supplementation of cobalamin, with the use of cyanocobalamin in acupuncture sites may be helpful in reversing the deficiency. In one study, 61 percent of cats with chronic signs of intestinal disease had cobalamin deficiency, as evidenced by subnormal cobalamin concentrations. Cobalamin is an essential cofactor for several enzyme systems and plays a major role in the metabolism of several amino acids. Dietary cobalamin is tightly bound to dietary animal-derived protein. Although most cats with cobalamin deficiency only have intestinal signs, anecdotally it is thought that such patients also may have immunodeficiencies and loss of appetite. Cats with small cell lymphoma are often cobalamin deficient. It is relatively easy to test cobalamin status in feline patients through a veterinary reference lab or the GI Lab at Texas A&M University. While patients who are clearly deficient should be supplemented with cobalamin, based on the information that serum cobalamin levels are higher than they are in tissue, it is recommended that cats whose cobalamin levels are in the lower half of the reference range also receive support. In the cobalamin-deficient cat, cyanocobalamin is given at 250 mcg sub-cutaneously once-weekly for six weeks, then every other week for six weeks and then once-monthly, long-term. Cats who are hypocobalaminemic generally respond to therapy within three or four weeks. Giving more cobalamin is not necessary and any excess is eliminated via the kidneys.

In the speaker’s feline practice, cats with intestinal disease who have weight loss generally receive cobalamin as a matter of course. Probiotics (Forti-Flora, Benebac or Culturelle) are used in most patients, although cats with acute necrotizing pancreatitis typically do not receive probiotics, as humans with acute pancreatitis are reported to have increased morbidity and mortality when these are employed in their treatment. No studies have been done in veterinary medicine to substantiate whether or not probiotics
are contraindicated in these very sick patients. Cats diagnosed with pancreatitis, based on fPLI, ultrasound or biopsies – as well as those who are judged as likely to have this disease on initial presentation and before test results are received – receive intravenous fluids and analgesia (buprenorphine 0.01-0.03 mg/kg sub-q q 8-12 hours).

Antibiotics are generally not given by this speaker to cats with intestinal disease, although metronidazole (10 mg/kg PO BID) can be given for its immunomodulatory effects. There is some concern regarding DNA strand breakage with long-term use of metronidazole, although there is no information on the length of time needed for this to occur. Prednisolone is used by this author especially for middle aged and older cats with chronic clinical signs, as well as those with a diagnosis of small cell lymphoma. The anti-inflammatory dose of prednisolone is 1-2 mg/kg of lean body weight BID for 30 days, with a slow taper. Cats with small cell lymphoma typically require Leukeran (chlorambucil) at a dose of 2 mg PO q 48-72 hours. Myelosuppression has been reported in a subset of cats receiving Leukeran, so CBC’s every three weeks for the first three months of therapy is prudent.

Acupuncture is commonly used as adjunctive therapy by the speaker in her treatment of cats with intestinal disease. PC-6 is a mainstay of therapy for vomiting and nausea; ST-36 is use for its spasmylytic effects, as well as for its impact on gastric hyperacidity. Generally, LI-4, LI-11, SP-6, BL-20 and BL-21 are also employed, specifically for patients who present with diarrhea. Other points are chosen, based on tongue/pulse diagnosis. Anorectic patients are often helped with acupuncture at Shan-gen and Mi-jiao-gan also can be used to stimulate appetite in feline patients. Cyanocobalamin is occasionally used in points specifically in patients who present with acute disease. However, patients with chronic clinical signs generally receive weekly cobalamin injections. Rarely, the speaker tonifies Qi with Ren-6, using moxa or laser. Slippery elm can be helpful as a tincture in cats with intestinal disease, given at 0.33-0.66 ml PO q eight hours. Marshmallow given as a cold infusion (5-30 grams in eight ounces of cold water, dosed at 5-10 ml three times daily) is sometimes useful as adjunctive therapy to cats with intestinal disease. However, Chinese herbs are used more commonly than Western ones in cats with intestinal disease in the speaker’s practice. Eight Gentlemen is used extensively for Spleen Qi deficiency; Happy Earth for stomach cold and stomach cold-damp and Jade Lady for cats with stomach excess heat. Tea pills are preferred in cats, with a dose of 3 tea pills BID.

**Diabetes Mellitus**

The increased incidence of diabetes mellitus is cats parallels that of humans. Within the past 15 years, diabetes has become a significant issue in feline patients and in many practices, the numbers of diabetic cats surpasses those with other endocrinopathies, including hyperthyroidism. While chronic pancreatitis with destruction of the islet cells accounts for some cases of feline diabetes, the majority of cats have Type II disease, brought on by increased energy intake with lack of exercise. The typical indoor cat of the 21st century is at risk for the development of diabetes, due to a lifestyle that discourages exercise and feeding strategies that are not congruent with the needs of cats. Risk factors for the development of diabetes mellitus in cats include: Obesity, advanced age, male
gender and neutering. Amyloid distribution in the pancreas is a common finding in diabetic cats over time and increases the likelihood of chronic disease.

Previously in this lecture we have addressed the dietary needs of cats. While much attention has been given to dry foods, dry foods are not to blame for the increased risk of developing obesity and diabetes among feline patients. Lack of exercise and obesity are independent risk factors for diabetes; a dry food diet is not. However, clients are often not counseled as to the appropriate amount of food to feed their cats and end up over-feeding. After ovariohysterectomy or orchidectomy, a cat’s energy requirement may decrease by 30 percent. One study found that cats gained an additional 40 percent of body weight in three months after ovariohysterectomy, if allowed to free feed. Holistic practitioners should advise clients with cats on proper feeding amounts, aiming to feed 70 percent of the RER for ideal weight to overweight patients. RER is calculated as: (30 x weight in kilograms) + 70.

Obese cats, as their human counterparts, are hyperinsulinemic and over time, exhaust beta cells in the pancreas. Chronic hyperglycemia induces glucose toxicity, which makes it difficult for the beta cells to recover. The goal of treatment for feline diabetes is appropriate reduction in glucose, utilizing a diet with sufficiently lower amounts of carbohydrates and insulin therapy. The longer a cat is maintained in a hyperglycemic state, the less likely it is for them to attain remission for their diabetes. In most cats, the goal of diabetic management is to achieve diabetic remission. It is estimated that 90 percent of cats can achieve diabetic remission, with appropriate care. Cats who are diabetic for longer than six months often cannot achieve remission; although the speaker has recently had four cats (some of whom were diabetic for several years) attain remission of diabetes. There is no evidence that supplementation with acarbose or similar treatments (such as are utilized in human medicine) positively impacts the feline diabetic patient. Because of this, such treatments are best avoided.

Clients with feline diabetics often present to holistic practitioners because these guardians wish to avoid the use of insulin. Reasons for avoiding insulin include needle phobia, physical disability that prohibits the client from administering the injections and the desire not to use medical intervention. These challenging client situations need to be addressed with compassion, but most clients can overcome their initial hesitancy regarding insulin and help their cats achieve remission.

Based on work done by Dr. Deborah Greco at Colorado State University, a low-carbohydrate diet is the cornerstone of diabetic management in cats. A raw diet will easily achieve this; canned diets can vary considerably in carbohydrate content and dry kibble diets are rarely sufficiently low enough in carbohydrates to meet this requirement. The speaker recommends a raw or canned diet with less than seven percent carbohydrates, although Dr. Jacquie Rand and her colleagues in Australia use a higher carbohydrate diet (Hill’s M/D) with excellent success. Canned diets that are not pate/ground foods and feature chunks and slices are often too high in carbohydrates to meet the low carbohydrate requirement of diabetic patients. Clinicians interested in identifying appropriate canned foods for diabetic and non-diabetic cats can access
appropriate tables at www.catinfo.org. The speaker has used EVO dry kibble for a small number of feline diabetics who will not transition to either a canned or raw diet. However, this diet has 626 kcal/cup, so must be fed appropriately. In some smaller cats, the small volume of this diet does not effectively satiate cats and proves to be unhelpful.

Depending on the diet previously fed, transitioning a diabetic cat to a low-carb diet can be sufficient to induce euglycemia. Cats who have previously eaten a higher carbohydrate ration and receive insulin along with a comparatively low-carbohydrate diet can see their insulin requirements dramatically reduced (as much as 50 percent). Depending on the level of hyperglycemia, it may be worthwhile to simply transition a diabetic cat to a lower carbohydrate for two-three weeks. The speaker has had cats achieve fast remission on this intervention alone. However, cats with very high serum glucohes (450+) and those who have been chronically diabetic typically will not respond to diet alone and require insulin therapy.

There are a number of insulin types that are used in the management of feline diabetes. Lantus (glargine) insulin has been used extensively and this insulin, coupled with a lower carbohydrate diet has been shown by Dr. Rand and colleagues to provide the best chance for remission in diabetic cats. Lantus has a published shelf-life of six months, if refrigerated, although there is some concern that this insulin loses its effectiveness after three or four months’ time. For this reason, the speaker recommends that Lantus vials be replaced more frequently than every six months. PZI insulin (Vetsulin) also can be used in cats and is a reasonable alternative for cats who do not do well on Lantus. Other insulins, such as NPH, are not recommended for use in cats, as they are typically too “fast” for adequate control. Most diabetic cats require insulin twice-daily, although Lantus can give up to 19 hours of adequate glucose control, when given once-daily. Clients who opt for once-daily Lantus for their diabetic cats need to be advised that remission is highly unlikely with this regimen. While remission should never be promised for a particular diabetic cat, it is the goal of treatment and clients should be urged to be proactive in the management of their diabetic cats because of the reality of diabetic remission in the species.

A reasonable starting dose for Lantus is one unit BID, with a 12-hour in-home blood glucose curve generated by the client done 72 hours after beginning Lantus. Insulin is increased by ½ unit/dose, with blood glucose curves done every 72 hours (as possible, within the constraints of the client’s schedule), with additional ½ unit/dose increases until euglycemia is reached. Fructosamines, spot checks and urine glucose monitoring are all problematic and do not provide useful information regarding diabetic management and control. Once remission has been achieved, the cat is gradually weaned down on insulin over a period of several weeks, allowing for the islet cells to return to normal functioning. An excellent resource on in-home glucose testing for diabetic cats is at: www.veterinarypartner.com

Diabetic neuropathy is commonly seen in diabetic cats, especially those with longstanding and poorly controlled disease. Once euglycemia is achieved, the nerves repair at a rate of approximately 1 mm/month. However, cobalamin injections (250-500
mcg sub-cutaneously every week) have been shown to improve diabetic neuropathy in some diabetic cats. Because of the increase in urine glucose, cats with diabetes are at risk for bacterial urinary tract infections and submitting periodic urine cultures is prudent, so appropriate treatment can be done and pyelonephritis avoided.

From a TCM perspective, diabetes mellitus is considered a disease of the lower jiao. The Chinese term Xiao-ke (wasting and thirsting) is due to the common clinical presentation of diabetic patients: Weight loss, polyuria and polydipsia. The disease is considered a Yin deficiency with heat and dryness the main mechanism. Lung Heat, Stomach Heat, Kidney Yin Deficiency and Kidney Yin and Qi Deficiency all can be seen in diabetic patients. Acupuncture points which can be useful as adjunctive therapy for diabetic patients include BL-13, 22, GV-14, LU-1/7/10, LI-4, 11 and SP-6. In the speaker’s clinical experience, Stomach Heat is the most common TCM presentation of feline diabetic patients and these cats are typically overweight/obese. It is not unusual for these cats to have a red tongue with yellow coating; pulses are slippery and forceful. Jade Lady (Yu-Nu-Jian) can be helpful to these cats, giving three tea pills BID. Additional points for these patients include CV-12, ST-40, 44, KID-3, SP-8,9 and LIV-13. Some clients have shown interest in utilizing the acupuncture points for insulin injection sites. Generally, any site on the cat’s body can be used for insulin injections, with the caveat that clients avoid injections at the nape of the neck, where the skin is thickened and absorption can be poor.

Cats who present with diabetic neuropathy typically have a combination of Qi and Yin deficiency. These cats will have a pale tongue with white coating and deep, thread and weak pulses. Jian-Tang-Cha is an herbal formulation used to treat severe Qi Deficiency and mild Yin Deficiency; Rehmannia 11 treats severe Yin Deficiency and mild Qi Deficiency. Additional acupuncture points which may be of use to these patients include KID-7/10, BL-23/24/26 and CV-4/6.

Blood Stagnation is the most severe form of diabetes in feline patients and leads to the development of a wide range of clinical signs, including hepatic lipidosis, chronic renal disease, chronic UTI and chronic pancreatitis. The combination of Yin and Qi Deficiency, with resultant Heat and Stagnation cause damage and obstruction to the channels, with Blood Stasis. Unlike diabetic dogs, diabetic cats rarely form diabetic cataracts. Feline diabetics with Blood Stagnation typically present with more severe clinical symptoms. The tongues of these patients are typically dry, pale to red-purple and pulses are rapid, weak and choppy. Qu-Yu-Jiang-Tang-Fang is a formula useful for Blood Stagnation, with tonification of major acupuncture points (LI-4, ST-26), as well as LIV-3/13/ and SP-21.

**Arthritis/Degenerative Joint Disease**

Only recently have veterinarians become increasingly interested (and alarmed) by the prevalence of arthritis and degenerative joint disease in cats. The stoic nature of feline patients and their resolve to continue jumping on favorite surfaces (even if those jumps are clumsy) has convinced many clinicians and cat clients that cats do not suffer from arthritis. However, recent evidence supports what holistic veterinarians have
known for many years: Cats of all ages, but particularly middle-aged and older cats, can and do suffer from arthritis and degenerative orthopedic issues.

Plain spinal films often do not provide support for a diagnosis of degenerative joint disease, as feline patients do not have the same degenerative changes that dogs with arthritis/DJD do. Common findings in cats, however, often include spondylosis (particularly at L7S1 and T13L1), remodeling of the femoral heads and acetabulae and degenerative changes of the elbows and shoulder joints. Anecdotal evidence suggests that cats who have been declawed often develop gait changes (which may lead to remodeling of joints), but this has not been demonstrated in widespread studies. Arthritic changes may not only lead to cats becoming reclusive, due to pain, but may also lead to the development of inappropriate urination and defecation, due to the cat being unable to assume normal elimination postures. Among interventions that should be recommended for older cats with elimination issues is the use of a large, open cat box with a sufficiently low entrance lip, so that those patients with arthritis can easily utilize the cat box.

Acupuncture can be an excellent treatment for arthritis in cats and is this speaker’s main modality. Other interventions include a glucosamine-chondroitin-avocado nutraceutical (Dasuquin); fatty acid supplements; and an injectable p-GAG (Adequan, dosed at 5 mg/kg of lean body weight sub-cutaneously twice-weekly for four weeks, then once-weekly for four weeks, then every other week for four weeks and then once-monthly, long-term). Chiropractic/spinal manipulation therapy is used in most feline patients in the speaker’s practice and most commonly cats are referred for one or two spinal manipulation treatments before beginning acupuncture therapy. Massage at home can be extremely beneficial to arthritic cats and is typically enjoyed by them. Cats that stop grooming, due to discomfort or lack of normal spinal motion, often begin to groom again and enjoy a high quality of life.

Many elderly cats with arthritis suffer from Kidney Qi/Yang Deficient Bi Syndrome. These cats often have difficulty getting up and/or walking, have soft stool and coldness of the back and extremities, and are heat seeking. Massage is typically well tolerated by these cats. The tongues of these patients are pale and wet, with pulses that are deep and weak. Acupuncture points for these patients include GV-3/4, Bai-hui, Shen-shu/peng/jiao, BL-28 and local points. A smaller subset of feline patients with arthritis have Fixed (Damp) BI and have more stiffness than pain. These are cats who benefit from heat and whose arthritic symptoms are exacerbated by cold, damp weather. The tongues of these cats are greasy with pale coating and their pulses are soft and slow. Acupuncture at BL-20/21/22, SP-6/9, ST-40/36 and local points are typical treatments.

Geriatric cats with renal disease commonly have Kidney Yin and Qi Deficiency Bi Syndrome. These cats have dry skin, are thirsty and cool seeking. Lameness is exacerbated by heat. It is not uncommon for clients to find their cats lying on the bathroom tiles, even in the winter. These cats are also lethargic and have difficulty rising from a resting position. The tongues of these cats are pale or red with pulses thread/weak. Acupuncture points include BL-23, SP-6, KID-3/6/7/10, CV-4/6 and ST-36.
The speaker finds dermatome examination to be helpful in assessing cervical pain in cats of all ages, particularly geriatric ones. Cats will often over-groom focal areas on the forelimbs that correspond with cervical spinal segments. Cats with neck pain at C7-8 will often over-groom the digits and distal metacarpals; those with issues at C6 will over-groom the carpus and distal radius and ulna; and cats with problems involving C2-4 will over-groom the distal (typically, lateral) forelimb proximal to or at the elbow.

Other local points include: Neck area, GB-20 and SI-16; shoulder area, LI-1; LI-15; LI-16; SI-9; TH-14/15; elbow area, SI-8; LI-4; LI-10/11; and LU-5; and carpus area, LI-4; SI-3; and TH-5.

Cats who do not tolerate dry needling can often be treated successful with the use of therapeutic laser at acupuncture points. The speaker has had clients use acupressure in the home, as well as small, hand-held lasers successfully, too. Given the rapid response to treatment for degenerative disease in most cats, the use of acupuncture in the support of these patients is most rewarding.

**Kidney Disease/ Urolithiasis**

We will start our discussion of urinary tract disorders of cats with an examination of the increased prevalence of hypercalcemia in feline patients and the concurrent increased incidence of calcium oxalate urolithiasis. Since the early 1980s, clinicians have found increasing numbers of cats with hypercalcemia. Before ionized calciums were readily available through reference laboratories and some in-hospital, “cage side” units, veterinarians were unable to demonstrate whether total hypercalcemia reflected true hypercalcemia or not.

Calcium in plasma or serum exists in three fractions: Protein-bound, ionized or free, and complexed or chelated calcium. It is physiologically active ionized or free calcium that accounts for 50-60 percent of total calcium concentration. In cats, idiopathic hypercalcemia appears to be the most prominent cause of a high total calcium concentration followed by renal failure and malignancy. The most common tumor types associated with hypercalcemia in cats are lymphoma and squamous cell carcinoma. Primary hyperparathyroidism is an uncommon cause of hypercalcemia in cats. Idiopathic hypercalcemia is diagnosed when the ionized calcium is increased above reference range and the parathyroid hormone (PTH) is decreased. This combined test is available through Michigan State University, as well as most larger veterinary reference labs.

Hypercalcemia is problematic in cats because approximately 30 percent of cats with increased serum calciums will develop calcium oxalate urolithiasis. Unlike other types of urinary tract uroliths, calcium oxalate uroliths can be found not only in the bladder, but in the kidneys and ureters as well. Multiple small nephroliths and ureteroliths can be obstructive and rapidly advance renal disease. Unlike struvite uroliths, calcium oxalate uroliths are not amenable to dissolution by diet. Cats can present with acute renal failure, due to ureterolith obstruction and or these patients, surgery and stenting are often attempted, with different degrees of success.
At this point in time, no definitive cause has been identified for the increased incidence of hypercalcemia and the development of calcium oxalate urolithiasis in cats. It is thought that magnesium restriction that took place in the late 1970s/early 1980s in North America, due to concerns regarding struvite formation may be a contributing cause. At this time, magnesium supplementation cannot be recommended for cats with idiopathic hypercalcemia.

Treatment for hypercalcemia has included the use of higher fiber diets, although these diets are often calcium repleted, to compensate for poor absorption of calcium in a fiber-rich diet. Glucocorticoids have been used to reduce hypercalcemia in many cats, although cats with idiopathic hypercalcemia often require very high doses of prednisolone (up to 20 mg/cat/day), with significant systemic effects, including the development of diabetes. Bisphosphonates, such as alendronate (Fosamax) have replaced glucocorticoids in the treatment of idiopathic hypercalcemia in cats, to good effect. However, cats who receive alendronate typically must be kept in an upright position for approximately 30 minutes after receiving the medication, as esophageal irritation and erosion has been reported (as is the case in humans who take this class of medications). Alendronate must be given on an empty stomach and it is suggested that cats be given a small amount of butter along with the medication, to encourage licking and swallowing of saliva to buffer the medication. Alendronate is dosed at 10 mg/cat once-weekly, with ionized calciums measured every 30 days. Some cats require up to 30 mg/week in order to control their idiopathic hypercalcemia.

From a TCM perspective, urolithiasis in cats, including the formation of nephroliths, ureteroliths and cystoliths is consistent with Lin Syndrome, specifically Shi Lin. The tongues of these patients are typically red, with strong pulses. Acupuncture points that are commonly suggested for uroliths in cats include: GV-14; Wei-jian; CV-3; BL-22/28/39/65; SP-6/9; and LIV-3. Because urolithiasis in cats is associated with acute renal failure and urethral obstruction, the speaker rarely utilizes acupuncture in these cats. Instead, she recommends that the patient be evaluated by one of the regional VMTH’s with experience in the removing of these ‘liths (as possible) and possible stenting. Clients need to understand that while many nephroliths are non-obstructive, ultrasound examination should be part of the evaluation of these patients, for diagnostic and prognostic purposes. It is estimated that plain radiographs fail to identify up to 30 percent of small ‘liths (those less than 3 mm); ultrasound, approximately 10 percent.

The kidneys of cats in general can be considered to be the “Achilles heel” of the species. The cat’s high demand for dietary protein, combined with the species high urinary concentration means that the feline kidney is in “over drive” throughout life. There are few cats whose kidneys are not impacted by late middle age. Geriatric cats frequently present with some degree of renal insufficiency and holistic practice, primarily acupuncture, is very useful in the support of these patients.

Increasingly, this speaker is seeing evidence of renal disease in young cats, where renal dysplasia can lead to loss of urinary concentration and azotemia early in life. It should be noted that the normal cat typically concentrates his or her urine to a specific
While cats on raw and canned diets can have more dilute urines without renal insufficiency, the finding of a dilute urine in a cat should be corroborated with additional samples (first morning specimens, ideally). If the finding is repeatable, the urine should be cultured. While the normally highly concentrated feline urine is typically an inhospitable environment for bacteria, dilute urine makes the likelihood of urinary bacterial infections high. In cats, a urinalysis (preferably collected via cystocentesis) should accompany blood work. A dilute urine is typically the first sign of renal disease in cats and precedes the development of azotemia. Cats who are found to have a bacterial UTI should be appropriately treated with antibiotics, cultured (to ensure negative in vivo status one week after beginning antibiotics and then re-cultured (a growth/no-growth culture offered by most larger reference labs is sufficient) one month after cessation of antibiotics. Cats, unlike dogs, do not have uncomplicated urinary tract infections. Cats with repeatable positive urine cultures should be further evaluated for the presence of uroliths, tumors, bladder pathology, etc.

Young cats especially who present with renal insufficiency should be evaluated further with plain radiographs and advanced imaging (ultrasound). Treatment for renal insufficiency, regardless of the age of the cat, typically involves the maintenance of normal hydration status, control of phosphorus, control of proteinuria and hypertension, maintenance of normokalemia, and, as possible the blunting of parathyroid hormone (PTH) via the use of calcitriol. There is increasing interest as to whether renal diets are optimal in cats and this speaker prefers not to use these diets in patients with mild/moderate renal disease (IRIS Stages 1-early Stage 3 renal insufficiency), due to the aforementioned concerns for the cat’s high dietary protein requirement and the fact that most renal diets are significantly protein restricted. Many older cats do not readily eat the renal diets and if a decision is to be made regarding diet, it is generally better to have the cat eat whatever diet they will eagerly and readily and control phosphorus (optimally to a level less than 5-6 mg/dl) with aluminum hydroxide. To achieve adequate phosphorus control, the speaker uses aluminum hydroxide from www.thrivingpets.com, at a dose of 100 mg/kg/day, divided with food. Aluminum toxicity, which is common in humans on chronic aluminum hydroxide, is not recognized in cats. Doses of up to 300 mg/kg/day can be used, as necessary, to achieve an acceptable phosphorus value, although constipation can occur with very high doses of aluminum hydroxide. Similarly, the speaker only uses sub-cutaneous fluids to maintain hydration, as necessary. As in all treatments, fluid therapy needs to be specifically tailored to the individual cat’s needs.

Calcitriol, a Vitamin D3 analogue, has been recognized as an excellent adjunctive to the control of renal disease through the blunting of PTH. Anecdotally, calcitriol is reported to increase the quality and quantity of the lives of feline patients who are placed on this medication. The speaker uses calcitriol as early as possible in patients with renal insufficiency and will start it in patients with no evidence of azotemia, but having dilute urines. Calcitriol is generally given as a liquid of capsules at a dose of 2.5 – 3.5 ng/kg PO q 24 hours. Due to the small dose necessary in cats, calcitriol needs to be compounded by a pharmacy with experience in working with it. In the speaker’s experience, calcitriol has multiple benefits to cats with renal disease, including increased appetite, less gastrointestinal upset and less lethargy.
Kidney Jing Deficiency is the TCM diagnosis for those young cats with dilute urines where other causes have been ruled out and/or azotemia. With supportive care as above and acupuncture, the speaker has had good success in maintaining these patients with excellent quality of life for years. Acupuncture points for these patients include KID-3, BL-20/21/23/26/39, SP-3, ST-36 and CV-4/6. Epimedium powder, provided in capsules or tea pills at a dose of 0.5 g per 10 pounds of body weight BID can be added in as well.

Older cats with renal disease also can receive significant improvement with the use of acupuncture treatment and these groups of patients represents the largest single group of feline acupuncture patients in the speaker’s clinical experience. Cats with renal disease can have either cold or heat signs and it is important that an accurate TCM diagnosis be made, as herbals can be used successfully in cats with renal disease, if the appropriate diagnosis is made. In the speaker’s clinical experience, most cats with renal disease present with cold signs and are warm seeking, consistent with Kidney Yang Deficiency. Rehmannia 8 (tea pills or powder, dosed at 0.5 g per 10 pounds of body weight BID) is an excellent adjunctive for these patients, along with acupuncture points GV-3/4, Bai-hui, Shen-shu, BL-26, KID-7, KID-10, CV-4/6 and BL 22/29. Uncommonly, cats with renal disease present with Yin and Qi Deficiency. These cats are cool seeking, are urinary incontinent and present with pale/wet tongues and deep and weak pulses. Rehmannia 11 (dosed as for Rehmannia 8) is useful in these cats, with acupuncture at BL-22/23/24/26/39, Shen-shu, CV-4/6, ST-36, SP-6/9 and KID 3/7/10. Those cats with only Yin Deficiency can receive benefit from Rehmannia 6 (dosed as for Rehmannia 8) and acupuncture points KID-3/7/10, BL-22/23/29/52. GB-26 and SP-6/9/10.

In conclusion, although feline patients present specific and real challenges for treatment, many common syndromes in cats can be ameliorated and helped considerably through a thorough understanding of Western pathophysiology and a firm grounding in TCM. Those clinicians interested in pursuing a feline focus to their practice will generally find a clientele willing to commit to appropriate treatments and derive satisfaction in knowing that the patients’ health and welfare has been enhanced through appropriate use of multiple modalities.
References


3. Falkowski, LB. Oxidative stress and neutrophil function in cats with diabetes mellitus compared to controls: Assessing the impact of nutrition. American College of Veterinary Internal Medicine, 2008.


Pathophysiology of Chronic Pain and Neurophysiologic Effects of Acupuncture the Treatment of Chronic Pain
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Introduction and Definition
The term “Chronic pain” refers to the time course of pain rather than to the pathophysiologic process behind it. Different definitions of chronic pain exist. These include pain persisting for longer than one month (veterinary literature), three to six months (medical literature) or pain lasting longer than the expected period of tissue healing. Whilst pain can be a symptom of disease it can also progress to a disease itself. The use of the terms “adaptive and maladaptive” have been suggested to describe pain, which serves a “physiologic” purpose vs. pathological pain. Additionally, a mechanism based classification has been suggested for animals dividing chronic pain into inflammatory pain, neuropathic pain or both.

Prevalence
In companion animals presenting as outpatients to a veterinary hospital, the prevalence of pain lasting between 1 month and 1 year was reported to be approximately 2% in dogs and cats, while for pain lasting longer than one year the prevalence was 1.2% for dogs and 0.1% for cats. Similar data for other species does not exist to date.

Pathophysiology and effects of acupuncture
The same pathophysiologic phenomena described for acute pain will also occur during chronic pain. However, with chronicity plastic changes can occur (plasticity: inherent capacity to change). These changes may be responsible for the persistence of pain and additionally, these changes make chronic pain often more challenging to treat. More than 30 neurotransmitters acting on more than 50 receptors have been associated with pain-related phenomena. The pathways and mechanisms involved in generation and transmission of acute pain signals are also involved in chronic pain. However, often one or more aspects of physiologic transmission or the balance between excitatory and inhibitory mechanisms is abnormal during chronic pain states. The pain pathway* can be separated in different areas where changes occur in chronic pain and where acupuncture may have an effect. Briefly, in the periphery a noxious stimulus is detected by nociceptors (free nerve endings) and an electronic stimulus in a nerve fibre ensues. Different types of nerve fibres mediating different aspects of pain transmit the stimulus towards the central nervous system: 1. A delta fibres mediate mostly fast, sharp pain and 2. C fibres mostly mediate slow, dull pain. In the spinal cord this is relayed onto a secondary neuron. The secondary neuron is located in different laminae depending on the fibre type (overlap occurs, one or several segments). The secondary neurons project to the brain often with one or more relays/stations. Important centres include the brain stem (N. raphe magnus, locus coerulescus, periaqueductal grey matter, thalamus) and then are relayed to the cortex.

*the author will continue to use the word pathway, even though the term pain matrix is probably more appropriate to reflect the complexity/divergence and convergence of the system
Periphery

Nociceptors are free nerve endings, which are triggered by noxious chemical, mechanical or thermal stimulation. Chemicals stimulating nociceptors include substances released from damaged cells and the process is enhanced by inflammatory mediators (“inflammatory soup”). Important receptors involved in the initial generation of action potentials in nerve fibres signalling nociception are the TRPV (transient receptor potential vanilloid) receptor family.

Inflammatory mediators

The most common chronic pain conditions in animals are initially of inflammatory origin. Examples are osteoarthritis and laminitis, but as the disease progresses, on-going stimulation and plastic changes may result in neuropathic components to this pain. Other conditions, like tumours have different mechanisms responsible for pain. Secretion of different factors by tumour cells, mechanical tissue disruption and osteoclastic activity, immune response to tumour cells or pain related to tumour treatment can be present. Besides intracellular substances, some inflammatory mediators can directly excite nociceptors (free nerve endings), for example interleukins. Substances like prostaglandins or bradykinin will facilitate the generation of an action potential in nociceptive nerve fibres causing peripheral sensitization and hyperalgesia.

Effects of acupuncture on Inflammation:

Insertion of an acupuncture needle may induce microtrauma and a pro-inflammatory response. However, reduction of pro-inflammatory cytokines in inflamed skin as well as reduction of inflammatory pain has been documented in animals (Su et al. 2012, Huang et al. 2007). In human clinical patients the same has been demonstrated for OA and pelvic pain (Xu et al. 2009, Yuan et al. 2011).

Nociceptors/TRPV1

The TRPV1, TRPV2, TRPV3 and TRPV4 are expressed in afferent nociceptors (A delta and C fibres). Natural substances activating the TRPV1 receptor are capsaicin and camphor (Szallasi et al 2007). The most researched receptor and currently a target for new drug development is the TRPV1 receptor. Cancer pain upregulates the TRPV1 receptor expression in the dorsal root ganglion of rats, this correlates with a decrease in clinically observed hyperalgesia (Zhang Z. et al. 2012).

Effects of acupuncture on the TRPV1 receptor:

Upregulation of the TRPV1 receptor and corresponding increase in pain threshold could be attenuated with electroacupuncture (2 Hz) in a rat and mouse model of inflammatory pain (Zhang Z. et al. 2012, Chen WH et al 2012). Using immune-staining techniques a significantly higher number of TRPV1 positive nerve fibres were found in “acupoints” compared to “non-acupoints”. Additionally, the expression of TRPV1 in the subepidermal nerve fibres is increased by electroacupuncture in non-painful rats (Abraham et al 2011)

The action potentials generated by nociceptors are transmitted through A delta and C fibres to the dorsal root of the spinal cord where they are relayed onto secondary
(projecting) neurons. Non-noxius stimulation is transmitted by A beta fibres and follows the same path to the spinal cord. There is some evidence that A beta fibres may be recruited or even undergo a phenotypic change to express receptor similar to nociceptors in chronic pain. This may result in hyperalgesia and possibly allodynia (touch causing a painful sensation), paroxysmal pain and abnormal sensations, which is a common feature of chronic neuropathic pain (Truini et al 2009).

**Dorsal Root of the Spinal Cord**

**Synaptic transmission**

At the level of the spinal cord synaptic transmission on to a secondary (projecting) neuron is mediated primarily by the excitatory neurotransmitter glutamate. Other substances, which may modulate transmission, are also present at this level (i.e. substance P, vasoactive intestinal polypeptide, cholecystokinin and calcitonin gene related protein). At this first step in transmission sensory inputs begin to interact, as has been documented since ancient times: rubbing (A beta fibre input) produces an inhibitory effect on A delta and C fibre input. In the seventies this has been detailed as the “gate control theory”, where the lamina II of the dorsal horn (= gate) modulates the transmission of sensory information. It was proposed that large fibre activity inhibits (closes) the gate, whereas small fibre activity facilitate (opens) the gate. Even though there were oversimplifications and flaws in the presentation of the neural architecture, the inhibition of small fibres through a combination of presynaptic inhibition and inhibitory interneurons in Lamina II is still used to explain these observations (Moayedi & Davis, 2013).

**Effects of acupuncture on spinal cord transmission:**

Numerous electrophysiological studies of projecting neurons have shown, that electrical stimulation of nerves/ tissues located at the same segmental level produces and inhibitory effect (which is mediated by GABA or Glycin) not involving higher centres. Low frequency/low intensity electroacupuncture can stimulate A beta fibres resulting in a decreased input to the secondary neuron. A delta stimulation through acupuncture and high intensity/frequency electroacupuncture may also suppress C fibre transmission which may be more involved in chronic pain A beta, A delta and C fibres mediate the analgesic effects in acute pain, it has also been suggested that electroacupuncture is preferentially mediated by A beta and A delta afferents (the preference also being dependent on the stimulation frequency), while manual acupuncture uses all types and particularly C type fibre afferents (Leung 2011).

**N-methyl-D-Aspartat (NMDA)**

Glutamate is the main neurotransmitter involved in transmission of the signal to the secondary neuron. Glutamate acts on metabotropic receptor as well as AMPA receptors on the secondary neurons. N-Methyl-D-Aspartate (NMDA) receptors are also located post synaptically on the secondary neuron. These receptors are normally blocked by a magnesium ion. Prolonged or intense stimulation may displace the magnesium block and open the NMDA receptor. Through this ion channel also calcium ions can enter the
secondary neuron. Calcium acts as a second messenger and through different modulatory systems will a) increase the sensitivity of the AMPA receptors and b) induce the formation of more AMPA receptor resulting in an amplification of the signal from the first neuron. This process is part of the phenomenon described as “central sensitization” and is similar to the concept of long term potentiation (LTP). This cascade can also enhance the release of substance P which in turn induces NMDA receptors to become more sensitive to glutamate and additionally can extend long distances within the spinal cord and sensitize neurons which are in different segments. This all will contribute to the maintenance of central sensitisation.

Effects of acupuncture on NMDA receptors:

In rats with neuropathic and inflammatory pain, electroacupuncture with 2 Hz reduces the expression of NMDA receptor (subtype NR1 and NR2A) in the spinal cord as well as pain behaviour (Sun 66, Choi 67).

Effects of acupuncture on LTP:

Electroacupuncture at 100 Hz it induced long term potentiation in rats with neuropathic pain but caused the opposite effect in rats without pain. While electroacupuncture with 2 Hz inhibited LTP of C fibre evoked potentials in rats with neuropathic pain (Leung, 2012). Also it is interesting to note that, when electroacupuncture is given at 100 Hz it induced long term potentiation (derived from extracellular recordings) in rats with neuropathic pain (model) while in the control rats it caused long term depression (the effects probably being mediated by GABA and Ser) (REF 90) this could explain some of the long term effects and also shows the importance of using an appropriate model when testing.

Glia cells

Glia cells were, until recently, considered to be the phagocytic and structural cells of the CNS. Their contribution to continued dysfunction in persistent activation in chronic pain has been postulated. Substances which are known causing neuronal hyperexcitability and neuropathic pain are produced by activated glia cells (Hulsebosch CE, 2012)

Acupuncture and Glia cells:

In a model of neuropathic pain in rats spinal glial activation was suppressed by electroacupuncture (2 Hz) the clinical signs of central sensitisation were also reduced (Gim GT et al. 2011). Aquapuncture with diluted bee venom reduces spinal astrocyte activation and pain behaviours in mice (Kang Sy et al 2011).

Propriospinal modulation

Heterosegmental modulatory systems are intraspinal networks serving as multisynaptic systems which may, but do not have to, be extended to brain stem neurons. The most commonly studied is diffuse noxious inhibitory control (DNIC), which has an
effect on wide dynamic range secondary neurons in the spinal cord. DNIC is likely to be activated by C fibres ascending in the anterolateral tract and possibly A delta fibres.

**Acupuncture and DNIC:**
Electroacupuncture has been shown to trigger DNIC in several studies in animals (Leung 2011).

**Brain**
The secondary neurons relay the nociceptive input to the brain, often giving many collateral branches off and commonly reach the thalamus. From there they project to the somatosensory cortex (sensory –discriminative aspect of pain) and the limbic system (emotional-affective aspect of pain).

**Acupuncture and the Brain:**
Studies using functional MRI have shown significant activation of areas related to pain perception as well as pain modulation in the brainstem and the limbic system (Anterior cingulate cortex, Insula) suggesting that acupuncture may modulate the “pain experience” at this level (Zhou 2008).

**Descending systems/Pathways**

**Descending Inhibitory Control (Noradrenaline/Serotonin)**
Ascending (noxious) sensory input can modulate pain transmission in the spinal cord through brainstem mediated descending inhibitory control. Several centres in the brainstem are the origin of the descending nerve fibres, but the periaqueductal grey matter and the nucleus raphe magnus are the most prominent ones. The main neurotransmitters involved in this control mechanism are noradrenaline and Serotonin.

**Acupuncture and noradrenaline and serotonin:**
Electroacupuncture induced analgesia involves serotonin as a neurotransmitter in a model of inflammatory pain in rats (Chang 2004). Studies in rodents show that electroacupuncture reduces the level of noradrenaline in the brain, however the clinical response to acupuncture may be related to the receptor subtype activated (alpha 2 vs. alpha 1) (Kim et al. 2005).

**Endogenous opioids**
The action of endogenous opioids extends from the spinal cord to the brain to substances released into the blood stream. And may contribute to analgesic effects in many locations. The distribution of opioid receptors shows significant species differences.

**Acupuncture and endogenous opioids:**
The effects of acupuncture through the opioidergic system, both peripherally and centrally, have been widely described in the literature and has been summarized nicely in reviews by Leung (2011) and Zhao (2008). For electroacupuncture the frequency of stimulation seems to be important and determining the substance released.
Electroacupuncture with 2Hz accelerates the release of encephalin, beta endorphin and endomorphin, while electroacupuncture with 100 Hz increases the release of dynorphine. The endorphin release may be in in the spinal cord as well as systemically and in the periphery. Additionally opioid receptor binding is increased centrally in the amygdala and the nucleus caudatus by acupuncture.

Involved in the opioid system is cholecystokinin octapeptide (CCK8), which is the most potent neuropeptide involved in “antiopioid” activity and seems to work antagonistically to electroacupuncture. The presence or absence of CCK8 has been postulated to explain the presence of non-responders to acupuncture.

References:


Designing Acupuncture Trials
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Introduction
Veterinarians trained in Western (aka. conventional, traditional) medicine who also practice Traditional Chinese Veterinary Medicine (TCVM, aka complementary, integrative, Eastern, etc.) including acupuncture confront a dilemma. In clinical veterinary practice, acupuncture treatment is typically highly-individualized and based on a philosophical framework, and subjective and intuitive impressions. Results are based on veterinarian and owner observations. Good evidence is based on well designed and rigorous research and must be available and useful to veterinary practitioners and policy makers.

Evidence Based (Veterinary) Medicine
The practice of Western or traditional veterinary medicine is different because it is based on reproducible scientific investigations into the relevant anatomy, physiology, and pathology of a disease process, combined with pharmacological data and objective statistical analysis of quantifiable data obtained under experimental conditions, showing measurable differences between distinguishable groups. Veterinarian’s clinical principles are based on evidence-based medicine (EBM) using clinical pathways. It can be accepted to respect the different schools of thought, holding separate the standards used to determine the best practice for acupuncture (integrative/alternative/complementary) and traditional or conventional medicine. However, there is strong pressure from the scientific and academic communities to apply the principles and methodology of EBM with statistical analysis of quantified data to evaluate alternative / complementary / integrative veterinary medical treatments, including acupuncture. In EBM, the most convincing data are obtained through large-scale double-blind, randomized controlled trials (RCT) designed to determine efficacy and disease management strategies. Discussion of the contrasting philosophical versus scientific foundation of veterinary medical acupuncture and EBM is important so that comparison of standards of evidence for efficacy and potential investigative methods can provide sufficient evidence to satisfy criteria for proving or disproving claims of efficacy under both standards.

The foundation of TCVM acupuncture is based on the concept of Yin and Yang and an understanding that animal health and illness are related to the social and natural environment. Treatment decisions depend on the veterinarian’s interpretation of the patient's history and physical findings, response to prior treatments, and diagnosis according to the Eight Principles Patterns. Patient’s owner’s experiences combined with the TCVM diagnostic evaluations are the most valued determinant of outcome. The human medical literature on acupuncture includes the ancient texts data from small animal experiments, and human clinical experience. Added to this library of information is more recent and specific veterinary research adding to collective acupuncture data. Although information from all the above sources is taken into account when formulating a treatment plan, the patient's individual physical examination, pattern of illness, and
response to prior treatment carry special significance. The patient's treatment is unique within the context of TCVM. Individual presentation and clinician experience carry the highest value and are the most heavily-weighted evidence for determining specific treatment in TCVM. The hierarchy of Veterinary Clinical Evidence for Traditional Chinese Veterinary Medicine is:

1. Individual experience
2. Case reports and case series—Consensus
3. Single-case experimental design
4. Randomized controlled trials
5. Meta-analysis of randomized controlled trials

In addition to being individualized, treatment in TCVM is also multimodal, i.e., recommendations are made with respect to diet, exercise, activity level and behavioral responses and interactions with others (human and animal). Treatment may include acupuncture, massage, food therapy, and/or herbal medicine. Randomized controlled trials designed to measure acupuncture effect out of context from usual clinical practice are often of limited use to practitioners treating patients comprehensively. Recognition of the importance of objective data to guide clinical veterinary practice in Western or traditional techniques has led to academic and editorial endorsement of EBM. This approach is based on systematic analysis of objective and quantified data, with less or no emphasis on intuition, unsystematic clinical experience, and pathophysiologic rationale as sufficient grounds for clinical decision-making.

Larger randomized controlled studies have been generally accepted as the "gold standard" since the 1940’s for the unbiased evaluation of clinical efficacy for an intervention. Medical randomized controlled trials are designed to eliminate distinguishing characteristics among study patients and make other factors and variables equal; so, there is opportunity to measure effects of a uniformly applied intervention. Randomization is ideally combined with increasing degrees of blindness to eliminate bias. Statistical analysis of the data measures and facilitates interpretation of differences, providing a scientific basis for determining effect and efficacy.

Current consensus in EBM includes the desirability of basing clinical decisions on large-scale randomized controlled studies. Several roadblocks exist including 1) gold standard RCT data may not exist for the question posed 2) substantial resources are required to design and carry out large-scale RCTs 3) extensive numbers of patients and data are required to determine significance, and 4) clinically relevant differences between groups, especially for interventions with subtle or time-sensitive effects is almost impossible to accomplish and 5) evaluating a narrowly-defined question may reveal different conclusions. Lastly, publication bias may limit access to data, especially for RCTs with negative or non-significant results.

Since it may be that large-scale RCT data are unavailable, veterinary clinicians may rely on meta-analysis of pooled data from multiple small RCTs. Ideally, meta-analysis involves combining raw data from studies of similar design, in collaboration
with original authors, in an effort to create sufficient sample size and power to determine likelihood (odds) of treatment benefit, adjusted for underlying risk in otherwise comparable groups.

Some studies are typically not similar and contain highly-variable subjects, randomization, control, and treatment strategies, outcome measures, and length of follow-up. Pooling data under these circumstances may exaggerate bias and imprecision. In addition, the results of meta-analyses and subsequent large RCTs on the same subject may not agree. It is also not uncommon for 2 meta-analyses of the same subject to reach opposite conclusions. Despite these difficulties, all available published information may be considered in EBM; however, RCT data (with or without meta-analysis) carry the most weight with respect to recommended practice and disease management. Data from controlled studies without randomization, cohort or case-control analytic studies, multiple time series, uncontrolled experiments with dramatic results, respected opinions, and descriptive epidemiology are taken into account in descending order. The hierarchy of Clinical Evidence for Scientific Based Studies is:

1. Large-scale randomized controlled trials
2. Meta-analysis of randomized controlled trials
3. Single-case experimental design ("n-of-1")
4. Case series
5. Single case reports
6. Anecdotal observations
7. Individual experience and observations

**Study designs for the determination of acupuncture efficacy**

Accepting the importance of rigorous clinical investigation to inform and guide clinical practice, the question remains as to the most appropriate study design for acupuncture. Is there an investigative method available, consistent with the philosophical foundations and actual practice of clinical acupuncture that would also satisfy EBM standards of randomization, control, and quantitative analysis? Are there examples of studies that would meet these requirements in the acupuncture literature? Many authors have addressed the first question. While acknowledging the importance of hypothesis to generate qualitative data, most have emphasized the need for quantitative data gathered under randomized and controlled conditions. There is no obvious consensus regarding how to address the problems of blinding, placebo control, uniform treatment, and crossover. Most call for large-scale RCTs consistent with EBM standards, despite difficulties, logistical and funding challenges, and the likelihood that even large studies may be inconclusive. Few have specifically urged consideration of alternative methods, specifically single-case reports and/or single-case series and their experimental designs, despite the potential to satisfy standards of evidence for both TCVM and EBM.

The STRICTA (Standards for Reporting Interventions in Clinical Trials of Acupuncture) reporting guidelines, first published in 2001, were designed to improve the completeness and transparency of reporting of interventions in controlled trials of acupuncture, in order that such trials may be more accurately interpreted and readily
replicated. STRICTA comprises a checklist which relates to the reporting of the intervention. Recent updates were made in 2010.

1. Acupuncture rationale  
   a. Style of acupuncture  
   b. Reasoning for treatment provided, based on historical context, literature sources, and/or consensus methods, with references  
   c. Extent to which treatment was varied  
2. Details of needling  
   a. Number of needle insertions per subject per session (mean and range where relevant)  
   b. Names (or location if no standard name) of points used (uni/bilateral)  
   c. Depth of insertion, based on a specified unit of measurement, or on a particular tissue level  
   d. Response sought  
   e. Needle stimulation (e.g. manual, electrical)  
   f. Needle retention time  
   g. Needle type (diameter, length, and manufacturer or material)  
3. Treatment regimen  
   a. Number of treatment sessions  
   b. Frequency and duration of treatment sessions  
4. Other components of treatment  
   a. Details of other interventions administered to the acupuncture group (e.g. dietary changes, herbs, activity level)  
   b. Setting and context of treatment  
5. Practitioner background  
   a. Description of participating acupuncturists (qualification or professional affiliation, years in acupuncture practice, other relevant experience)  
6. Control interventions  

Despite the different foundations and weighing of information, TCVM and EBM are not mutually exclusive. Both share a commitment to providing the best possible treatment for patients based on individual experience and the best available external evidence. Single-case experimental design studies, expanded into large-scale RCTs if they merit allocation of substantial resources using STRICA guidelines, may be a valuable tool for clinical investigation as well as a source of credible evidence supporting the practice of conscientious acupuncture veterinary practitioners.
References


This lecture is intended as an introductory lecture on the use of Chinese food therapy in veterinary medicine. According to Chinese Medicine and the four pillars of health (diet, exercise, emotional balance and lifestyle), diet is thought to be the most important because food is considered the primary cause of sickness as well as the primary reason for long life and health. Chinese food therapy views food as having special properties in addition to the energy it provides unlike the Western perspective on nutrition. It was considered important that every person should have basic knowledge of what constitutes a proper diet or it would be difficult for them to enjoy or maintain good health. When a person first becomes ill, a good doctor should first try to adjust and balance the patient’s diet and lifestyle. Typically, changes in diet are enough to restore health. It is only when changes in diet are not successful that a doctor should give other medical treatments. The famous Chinese physician Sun Si Miao of the Tang dynasty (AD 618-907) advised “dietary therapy should be the first step when one treats a disease. Only when this is unsuccessful should one try medicines”. Clinically it has been shown that unless appropriate changes are made in a patient’s diet no amount of drugs, herbs, acupuncture or other therapies will result in a complete or lasting cure. The founding father of Western medicine, Hippocrates also espoused this view on the importance of diet when he said, “Let medicine be your food and your food be your medicine!”

So what is Chinese Food Therapy? Chinese Food Therapy is one of the 5 branches of Traditional Chinese Medicine and has a recorded history of over 3000 years. It is the study and use of food as medicine. Herbs and food follow the same medical prescribing principles and are often from the same sources. According to the Yellow Emperor’s Inner Classic "medicine and food are the same”. Diet is the single most common concern of pet owners. The veterinarian is frequently asked what type of food is best to feed their companion animal in both health and illness. Traditional Chinese Veterinary Medicine (TCVM) Food Therapy is practiced using the tenets of Chinese medical theory and is based on the unique individual. TCVM Food Therapy programs are formulated to treat the whole animal. They can be used as an adjunct to treat acute and chronic disease and can function as a preventative medicine system. TCVM Food Therapy programs are designed to bring the body back into balance and work synergistically with other Chinese medicine modalities such as acupuncture, herbal medicine and TuiNa. TCVM Food Therapy is still undergoing development and fine-tuning as veterinarians nationally and internationally acquire more information on what types and combinations of foods work best for each species.

Chinese nutrition differs from the Western concept of nutrition in that it does not analyze the biochemical constituents of each food (carbohydrates, fats and proteins) and quantify its energy density (calories). The number of calories is the single most important factor to determine how much food to feed an animal on a daily basis. The source and bioavailability of dietary constituents is often not taken into consideration using this
construct of nutrition. In contrast, Chinese food therapy focuses on the properties or energies of each food and their observable effects on the body. The diet is balanced over time and seasonally, not on a daily basis. Different foods are fed depending on the temperature and season. Wholesome, healthy, species appropriate foods are crucial to the production of high quality Gu Qi (Food Qi) by the Spleen-Stomach. Gu Qi is the foundation for the production of all Qi and Blood in the body after birth. It is the precursor for the production of Zong Qi, Wei Qi and Ying Qi and replenishes Yuan Qi and slows the loss of Pre-Natal Jing. Proper digestion begins in the middle Jiao and is important to transform food and drink into high quality Gu Qi. The analogy of the Stomach as a cooking pot is fundamental to understanding digestion according to Chinese medicine. The Stomach is the “cooking pot” of the middle Jiao that receives, ripens and rots the food after it is consumed. The Spleen/Pancreas is the flame (fire of digestion) under the pot and also the distillation mechanism to which the pot is connected.

Digestion is dependent on making a “body-temperature soup”. Anything that aids the production of this body temperature soup promotes digestion and anything that hinders it prevents normal digestion and can potentially injure the Stomach and Spleen. For example from a western perspective, eating or drinking cold food and drink can decrease digestion and absorption as it inactivates digestive enzymes which have temperature specificity. The Spleen is responsible for sending Gu Qi upwards to the chest to be transformed into Qi and Blood. If the Spleen is weak it fails to ascend Gu Qi to nourish the Lungs and Heart to produce Zong Qi, Blood, Body Fluids and adequate Qi to meet the needs of the body. Qi is required to produce Blood and replenish Kidney Jing. Many dogs and cats develop chronic Spleen-Stomach excess and deficiency syndromes from regular consumption of species inappropriate diets (dry pet food high in refined carbohydrates). Overtime this leads to a compromised ability to digest and absorb food. Species appropriate foods are required for the production of high quality food essence to nourish the whole body. Food is important!

TCVM Food Therapy is based on two fundamental principles. The first principle is that of food energetics. This is the effect food has on digestive, metabolic and physiologic processes of the body. Different foods have cooling or Yin tonifying properties and others have warming or Yang tonifying properties after ingestion. The second principle is pattern differentiation (Bian Zheng) or pattern identification. Accurate diagnosis of the existing pattern of illness or imbalance is fundamental to the development of an appropriate food therapy program. Pets with hot diseases such as damp heat otitis would require cooling foods, conversely geriatric pets with signs of cold would require warming foods. TCVM Food Therapy is especially important in the application of food therapy as a preventive health care measure to strengthen constitutional weakness and prevent disease from developing. Evaluation of constitutional type allows the veterinary practitioner to tailor a food therapy program that supports the individual and helps avoid feeding foods that exacerbate existing weaknesses. Eating foods that are in contrast to the body’s constitution (the inherited mental and physical characteristics of an animal and the tendency to run hot, cold, dry, damp) is beneficial because it augments the body’s natural inclination towards predisposed excesses. Animals that are constitutionally more Yin (cold type) require
more Yang foods and those that are more Yang (warm type) require more Yin foods to remain in balance.1,2,4

TCVM Food Therapy treatment plans and the selection of foods are also based on species and breed, age, activity level or use (breeding animals, herding dogs, police dogs, racing greyhounds), seasonal changes and the geographical region the animal resides in. Geographical and seasonal changes can directly affect the health of our companion animals as different climatic extremes can predispose the individuals to different pathogenic influences. A diet made up of cooling Yin nourishing foods can help to counteract these environmental influences on the body. Pets that live in cold climates or during cold seasons need more warming foods; and animals that live in warm climates or during warm seasons need more cooling foods. For example, in Sacramento California it is often over 90 degrees Fahrenheit for 3 months or longer, many animals develop damp heat dermatitis. These pets would then require a diet made up of cooling, damp draining foods to counteract this climatic extreme.

Food energetics: Food energetics refers to the effect food has on the body post ingestion and depends on four basic parameters. The thermal nature (Xīng) composed of the Five Energies (cool, cold, neutral, warm, hot), the Five Tastes (sweet, sour, bitter, salty and pungent/acrid), the directional nature of food (outward, inward, upward, downward) and channel-organ affinity. Foods are divided into five energetic temperature categories on a continuum from cold to hot. The thermal properties of foods have a warming or cooling effect on the body in general. Energetically “hot” or Yang foods have a heating, warming effect on the body to treat cold diseases, and “cold” or Yin foods have a cooling effect to treat hot diseases. Warm and cool foods have milder effects on the body and neutral foods have no thermal effect on the body. For example ginger, a Yang food has a warming effect on the body and watermelon a Yin food has a cooling effect. The thermal nature of food can be modified depending on how it is cooked or processed. Blanching, salting, steaming, boiling all increase the cooling or Yin potential of foods while grilling, frying, roasting, smoking, baking, simmering and cooking with alcohol all increase the warming effects or Yang potential of foods. The addition of growth hormones and other stimulants can increase the thermal nature of food. Foods with high water content such as fruits and raw veggies are more cooling in nature. Dried foods are warmer than fresh raw foods.

The Five Tastes: Each of the Five Tastes acts on or has a direct influence on specific vital organs and are linked to the phase influenced by that flavor. Sweet flavor is associated with the organs of the Spleen-Stomach and the Earth phase and has warming, harmonizing, tonifying, relaxing and moistening effects. Pungent or acrid flavor is associated with Lung-Large Intestine and the Metal phase and has Qi invigorating, dispersing and stagnation resolving effects. Salty flavor is associated with the Kidney-Urinary Bladder and the Water phase and promotes urination and defecation and dissolves hardness and nodules. Sour flavor is associated with the Liver-Gallbladder and the Wood phase, and has astringent effects to stop the loss of fluids and vital substances. Bitter is associated with the Heart-Small Intestine and the Fire phase and has drying, hardening and down bearing effects (supports the body’s digestive and excretion
functions); bitter can also have calming effects as it supplements Heart Yin. The Yellow Emperors Inner classic of Medicine states: “Sourness enters the liver, bitterness enters the Heart, sweetness enters the Spleen, acrid enters the Lungs, saltiness enters the Kidneys”. It then goes on to say: “sourness enters the sinews, bitterness enters the Blood, pungent enters Qi, sweetness enters the flesh and saltiness enters the bones.”

Directional Properties of Food: Foods have upward, downward, outward, and inward directions in terms of their ability to influence the physiologic activities of the body, very similar to herbs just milder in effects. This quality is what allows them to target specific locations/regions of the body or organs. Ascending or upward foods direct the Qi upwards. Foods with a lifting energy are used for diseases associated with weak or collapsed Qi, prolapse of organs, coldness, depression, low energy, and fatigue. Examples include beef, chicken, egg, sugar, carrot, asparagus, rice, corn, garlic and alcohol. Descending foods have the ability to purge or promote circulation in the lower part of the body, and direct Qi downward. They are used to treat diseases whose clinical signs are expressed in an upward direction including vomiting and coughing. In this way, foods can be chosen whose direction is in opposition to that of the disease being treated to correct the imbalance. Examples include chicken egg white, duck, pork, barley, sweet potato and vinegar. Floating (upward and outward) foods move Qi upwards and outwards and tend to be Yang. They warm from the inside out and help speed up metabolism. They are used for exterior conditions such as the cold or flu, arthritis blood and Qi Stagnation. Examples include outward foods such cinnamon, garlic, ginger, mustard, nutmeg and upward foods such asparagus, beef, sugar, carrot, chicken egg, corn and honey. Down bearing and inward foods tend to be Yin and are cooling. Sinking or inward foods sedate or penetrate into the body. They cool the upper and outer parts of body first, and tastes include sour, bitter and salty. These foods tend to slow down metabolism. Examples include clam, crab, kelp, seaweed, salt, lemon, chicken egg white, duck, pork and sweet potato. The directional properties of foods can be modified depending on what technique is used to cook the food. For instance, frying herbs with vinegar, wine, ginger juice, salt or honey can change their directional properties, increase their therapeutic effects and reduce side effects.

Channel Effects: Foods have an affinity and a clear effect on a specific channel and thus its associated organ and little to no effect on others. Walnuts, almonds and bananas moisten dryness and stop coughing and promote defecation. As these clinical signs are associated with the Lungs and Large Intestine these foods have a clear effect on the Lung and Large Intestine channels. It is important to note that all parameters (thermal nature, taste, direction and channel affinity) must be taken into consideration to get a clear picture of how individual foods affect the body.

Once the properties of food are understood and an accurate Chinese medicine diagnosis made, only then is possible to formulate a diet that is tailored to the individual animal. The animal’s disease, constitution, breed, age, life stage and geographic area must all be considered. TCVM Food Therapy plans can be formulated as an adjunct or primary treatment modality for disease, to strengthen constitutional weaknesses, to optimize performance in sporting animals, to tonify and nourish geriatric pets and to
provide support for pregnant and nursing mothers. The greatest benefit and application of Chinese food therapy in veterinary medicine is in the prevention of disease and the maintenance of health of our companion animals.

References


5. Ferguson, B. Introduction to Food Therapy in Traditional Chinese Medicine, 38th IVAS congress Galway, Ireland, 2012
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Effect of Acupuncture on Generalized Peripheral Edema in Two Intensive Care Patients with a History of a Liver Lobectomy
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Generalized peripheral edema may result from a multitude of causes. Generalized edema implies the presence of edema in all external tissues including paws, limbs, face and trunk. Edema is the swelling of tissues due to excess fluid in the body outside of the cardiovascular system. It is most commonly seen in the peripheral aspects of the body but may be seen in any body part. If the swelling is seen in the limbs it is called peripheral edema. Generalized edema implies the presence of edema in all external tissues including paws, limbs, face and trunk (1).

Edema occurs when the capillaries of the vascular system leak fluid. One common cause of edema seen in veterinary medicine is hypoalbuminemia. Low albumin leads to a decrease in the oncotic pressure within the blood vessels which allows for the leakage of fluid into the peripheral tissues (1).

In Traditional Chinese Medicine pattern that best describes this imbalance of Yin and Yang is Yin Edema, due to a Spleen Yang Deficiency and/or Kidney Yang Deficiency (2). A pale, swollen tongue is noted if only Kidney Yang deficiency is present. A tongue with teeth marks and a white coating if they are also Spleen Yang Deficient. In both deficiency patterns their pulses tend to be deep and weak. The principle of treatment is to tonify the kidneys and spleen and to resolve dampness. In Western Medicine generalized peripheral edema is treated by dietary changes, diuretics, compression wraps and hyperosmolic solutions.

Traditional Chinese Medicine Treatment plans for Yang deficiency might include Moxibustion and acupuncture. In our Intensive Care Unit (ICU) Moxibustion in a smoke form is not an option. The classical point prescriptions include BL 20 (transform & dispel damp), ST 36 (general Qi Tonic) and if Kidney Yang deficient add BL 23 (Kidney back shu point), KI 7 (tonification point), CV 4 (meeting point of Ren, Liver, Kidney and Spleen), with Spleen Yang Deficiency we add ST 28 (edema), CV 6 (all Qi Deficiency patterns) & CV 9 (edema) (3). The treatment of the 2 cases I present used different points that were chosen on the basis of the excess or deficiency of those points chosen.

The purpose of this talk is to discuss two ICU patients that had the removal of one or more liver lobes. Both patients developed pitting edema that had not responded to western therapy. My intentions are to demonstrate the value of acupuncture in the ICU as part of an integrated approach to the treatment of critical care patients with generalized peripheral edema. Acupuncture can provide an excellent modality to treat critical patients without the risk of adverse pharmacological reactions.
The first case is Joka a 12 ½ year old FS Basenji who had presented to our hospital for anxious behavior and restlessness. Historically she was hot and restless especially at night. She also appeared more pruritic than usual. Physical exam revealed an abdominal mass. An abdominal ultrasound revealed a hepatic mass. A dermatological diagnosis of urticarial was made along with the diagnosis of a mass in the abdomen. She was treated with Cetirizine (Zyrtec, an antihistamine) for the urticaria and scheduled for abdominal surgery and liver lobectomy. The left medial, right medial and quadrate lobes of the liver and the gall bladder were removed at surgery due to abnormal enlargement and irregularity of the margins of these lobes. Post-operatively she was sent to ICU for stabilization. While in ICU Joka developed a significant drop in protein levels and became anorexic. She also developed increased clotting times PTT 135, edema, bruising and peripheral vascular clots. Joka had an elevated, ALT 317, ALP 338, TP 2.7 Alb 0.5, & PCV 27%. She was being treated with Denamarin 90 mg PO every 24 hour for 14 days, Enoxaparin 10 mg SC every 24 hours postoperatively for 24 hours, Metoclopramide CRI @ 1 mg/kg/day, Famotidine 10 mg PO every 24 hours, Cerenia 24 mg PO every 24 hours for 5 days & Ceftiofur 22 mg IV every 12 hours for 24 hours post operatively. She was maintained on Normosol R at 15 ml/ hour and Hetastarch at 10 ml/hour. Her pain control included Buprenorphone 0.01mg/kg IV every 24 hours, increased to 0.05 mg/kg IV every 6 hours. A histopathological diagnosis of hepatoma with narrow margins was made.

Day 3 after surgery Joka had begun to eat small amounts of chicken baby food. She had developed profound generalized peripheral edema likely secondary to increased vascular permeability and a decrease in oncotic pressure given her hypoalbuminemia postoperatively. The patient had developed swelling and edema around the head and face, in the inguinal area and down both pelvic limbs. The left pelvic limb was more edematous than the right. There was a marked ecchymosis in her inguinal area due to a decrease in clotting factors.

On TCVM exam Joka’s pulses were slippery, thin and weak. Her tongue was pale, thick and had a thin white coat. Her TCVM diagnosis was spleen Qi Deficiency, Ki Yang Deficiency, Liver Qi Deficiency and Blood Deficiency. Dry-needle technique was used at BL 17 (influential point for blood), BL 18 (Back Shu Point of the Liver), BL 20 (transform & dispel damp), BL 23(Kidney Yin & Qi Deficiency), BL 26 (Abdominal Distention – active point), BL 40 (remove damp heat and clean blood) and BL 62 (communicates with the Yang qiao channel, improve circulation in lower extremities), for 15 minutes (3). Electroacupuncture at 10 hz for 15 minutes was done ST 40–ST 40 (dispel and disperse damp).

Pretreatment her left thigh measured 7 7/8 inches one inch distal to the tibial tuberosity while her right thigh measured 7 inches at the same location. After 15 minutes
the needles were removed. Post treatment the left thigh measured 7 inches, one inch distal to the tibial tuberosity and the right thigh measured 6 ½ inches at the same location. The facial edema was dramatically reduced and the lips were much less turgid. Over the next few days the peripheral edema continued to diminish and did not recur. The ecchymosis also diminished quickly over the next three days. The day following her acupuncture treatment there was a significant reduction in peripheral edema and the ecchymosis was significantly diminished. She started to eat much better on her own. The ICU doctors added Metaclopramide, CRI @ 1 mg/kg/day, Denamarin 90 mg/day and Enoxaparin 10 mg SC every 24 hours. Her pain management Oxymorphone and a Fentanyl patch as the Fentanyl CRI was no longer needed. She was released 48 hours after her acupuncture treatment. She did not return for further acupuncture. She is still living a happy life with her family of humans and Basenjis.

The second patient was a 13 year old female spayed Labrador Retriever named Buffy. She was currently receiving Eucommia/Rehmannia (Kan Herbal, Scott’s Valley, CA) 3 tablets BID to tonify Kidney Yang and Jing Deficiency. She was also on Stasis Breaker (Jing Tang Herbals, Reddick, FL) 1 ½ gms on her food twice daily to address an abdominal mass (substantial phlegm) found on a previous TCVM exam at a previous appointment. She was currently receiving acupuncture and herbs for her Bi & Wei Syndromes, Qi Stagnation, Liver Qi Imbalance, Spleen Qi Stagnation and Kidney Yang Deficiency.

Buffy presented to the Emergency service for a hypoglycemic seizure episode with Karo Syrup by mouth several times a day. She had an insulinoma and a historic liver mass for 1 year. She was told by her general practioner that the liver mass was not resectable. Buffy also had historic severe osteoarthritis of her radiocarpal and metacarpal-phalangeal joints, moderate arthritis of both elbows. She had a history of liver enzyme elevations and was receiving SAMe and Silymarin. She was currently treated for her arthritis with 75 mg Tramadol every 12 hours, and 1 large dog Dasuquin every 24 hours. She was found to have an abdominal mass on physical examination. On abdominal ultrasound she had a large liver mass. Thoracic radiographs revealed diffuse benign osteomas throughout the lung fields and probable remodeling of the osteochondral region of the right 2nd rib, metasttic disease could not be ruled out. One year earlier she had thoracic radiographs taken that showed an increased interstitial pattern.

The client elected surgery to explore the abdomen and resect the liver mass. The left medial and the right lateral liver lobes were removed. The pancreas was diffusely edematous and firm. It was not biopsied per the owner’s request. Postoperatively Buffy was moved to ICU for stabilization. Post operatively his renal parameters were stable but he had a progressive decrease in total protein to 2.8 and PCV to 19% over 48 hrs. She was not eating and very lethargic. She was maintained on Hetastarch, blood products and Normosol R. She was put on Acetylcysteine 70 mg/kg IV every 6 hours for liver inflammation/oxidation, Glucagon 5 mg/kg.min, Mannitol 0.25 g/kg diluted with D5W to increase urine output to match fluid input, Hetastarch 1ml/kg/hr and a Fentanyl CRI. A more thorough list of the medications and doses she received is available upon request. On day 3 postoperatively she developed a generalized peripheral edema secondary to
increased vascular permeability and decreased oncotic pressure that was not responding to western medicine that was not responding to western therapy. Buffy had swelling of her face as well as her limbs. The ICU doctors requested acupuncture to attempt to control and to resolve the peripheral edema.

The TCVM examination showed Buffy to have a very depressed Shen. Her tongue was pale, swollen and had a thin white coat. Her pulses were strong, choppy and slippery. A TCVM diagnosis of Kidney Jing Deficiency, Kidney Yang Deficiency, Spleen Qi Deficiency, Liver Qi Deficiency, Qi and Blood Stagnation and Blood Deficiency was made. She was treated with dry needles at GV 20 (permission point), BL 17 (Influential Point for blood), BL 18 (Shu Point of the liver, replenish blood when used with ST 36), BL 20 (transform & dispel damp), BL 23 (Kidney Yin & Qi Deficiency), BL 40 (remove damp heat and cleans blood), BL 62 (communicates with the Yang Qiao channel, improve circulation in lower extremities), KI 3 (Kidney Deficiency patterns), LI 4 & LIV 3 (clear stagnation), ST 36 (general Qi Tonic), GB 34 (weakness, stops bleeding). She was given aquapuncture with 1ml Vitamin B 12 at BL 17 (Influential Point for blood) and 0.5 ml at ST 41 (head & face edema). The needles were left in for 15 minutes. (3)

Prior to the acupuncture treatment a measurement was made at the right thigh 1 inch distal to the distal tibial plateau. The initial measurement was 11 inches. Immediately post treatment the measurement decreased to 10 inches. There was a marked decrease in the thickness and turgidity of the lips and muzzle. Her liver enzymes were not checked until 4 days postoperatively to conserve finances. Two days after the acupuncture her chemistries were checked. The ALT was more than 1000, her alp Phos was 1691 and her GGT was normal at 7.0. Her glucose was stable at 101. These values were improved over presurgical levels. The histopathological diagnosis was a hepatoma with inflammation of the surrounding liver tissue. Over the next 3 days the edema totally resolved and Buffy went home. Unfortunately, Buffy’s appetite never came back. Two days after her release form the hospital she did receive Vitamin B 12 aquapuncture at BL 18 and 23 for Kidney and Liver Deficiency, the owner did not have time for a full treatment so just active points were chosen. She went home, became severely lethargic, her mentation was obtunded, and she would not eat. The owners elected euthanasia. The edema never recurred or increased after the initial treatment.

While it is difficult to separate out exactly which treatments were responsible for the reduction in swelling, edema and ecchymosis that occurred in both of these patients, conventional medical management had been unsuccessful prior to the addition of acupuncture treatment. The measurable reduction in limb circumference immediately after acupuncture and the continued reduction over the next 24-48 hours is strong support for using acupuncture post-operatively in similar patients.

I am hopeful that acupuncture will become more common as a treatment modality in the veterinary ICU. As noted in the two cases presented, the integration of acupuncture into the ICU allows doctors to address complications that arise during the treatment of complex diseases such as post hepatic lobectomy. The treatment strategy in
these two cases was to provide tonification of Ki Yang and Spleen Qi mainly. Each of the treatments was individualized to the patients and their excesses & deficiencies found on examination. If practical the addition of Moxibustion, applying heat in the form of burning Mugwort to the acupuncture points would have been of benefit in these patients due to its profound warming effects, however it was not practical in my work setting. In the two patients presented, neither one had a recurrence of the edema despite only one acupuncture treatment being requested for each patient. In the future I am striving for acupuncture to be provided as a regular part of the treatment regime in our ICU setting. It can provide effective treatment of many problems seen in ICU patients without the risk of adverse pharmacological reactions. Acupuncture facilitates the smooth flow of Qi and blood (pain relief) and the tonification of Spleen and other organs. It would improve our patients Shen and decrease their pain/stagnation. The integration of acupuncture with western medicine will enhance these patient’s response to treatment resulting in better pain control, more effective and quicker response to treatment and shorter period of stay in the ICU.

I hope that these cases stimulate others to use acupuncture in the ICU and that many of you will now publish case reports and/or research projects using acupuncture in conjunction with western medicine to minimize complications and offer primary treatment in complicated cases such as these.

References:

1) Schroth B.E. Evaluation and Management of Peripheral Edema. JAAPA 2005; Nov 18: 29-34


As practitioners of what is considered Complementary and Alternative Medicine (CAM), we all have been hearing and reading lately about Evidence Based Medicine (EBM) and the gold standard of research, Randomized Double Blind Controlled Trials (RCT), that acupuncture must provide as proof that it is a valid scientifically proven treatment modality. To understand correctly (vs. some distortion out there in the press) and fully what EBM advocates are talking about, and to also be able to be better informed when communicating to clients who may ask, this paper will strive to define EBM, various types of research, external and internal validity in research studies, and the levels of evidence research pyramid. Also discussed will be how various types of research each have their own validity strengths and weaknesses, thus showing that each can offer something to the overall proof of validity for a treatment modality such as acupuncture. Finally, a more relevant and superior Research Pyramid will be proposed than what is commonly referred to in articles and media.

Validity

What is validity in relation to research? Validity is how well a research study or experiment actually measures or relates to what it is supposed to be looking at, and how well that actually corresponds and applies to the real world outside of the research situation. Thus are two types of validity. Most experiments consist of observing the effect of the independent variable(s) on the dependent variable(s), which is the item being measured. Internal validity is often about being able to say that the independent variable (like a treatment) actually caused the effect on the dependent variable (such as a specific disease). This type of validity is where patient or researcher bias plays a factor, thus a RCT is done as a “double blind” to prevent this bias with neither the patient nor the researcher knowing if they are having the real treatment or the placebo/sham acupuncture. Placebo effect on a patient is involved here. As veterinary acupuncturists we all shake our heads saying there is no placebo effect on an animal patient, except maybe in the observation of the effect when it is subtle. But if a dog that could not get up and walk for one week does get up within a few hours after an acupuncture treatment, that dog is not having a placebo effect nor is the observer at that point.

External validity, or generalizability, is whether a study is applicable to a larger population of different people in different conditions. The most common issue that studies have with external validity is that they were done on a small sample group of very specific qualities in order to reduce the variables down to that one independent variable being studied for internal validity. But in the real world, rarely is the variable item being studied existing in such a vacuum lacking interaction. Many other things are influencing results such as environmental, other drugs, relationships, other health issues, etc. Thus as one increases internal validity in experimental and outcome studies, one can potentially
decrease its external validity, and vice versa. “The attempt to achieve methodological purity can result in clinically meaningless results, while attempting to achieve full generalizability can result in invalid and unreliable results.” Is a non-RCT experiment less relevant to consider in the overall body of evidence than one that has great internal validity (for example, an experiment using only PC 6 used to treat any and all nausea)? RCT have great internal validity but definitely can have issues concluding the results’ applicability to real world situations in a clinical setting (reduced external validity) and those factors are often poorly considered in published papers. It has been noted that “lack of external validity is the most frequent criticism by clinicians of RCTs and systematic reviews…The results of RCTs or systematic reviews will never be relevant to all patients and all settings.”

Others note that “taking internal validity as a sufficient condition for generalizability is to assume that contextual factors of clinical settings and life circumstances do not matter – in direct contradiction to assumptions of the classical experimental method, in which all such contextual factors must be strictly controlled because they can indeed affect the outcome of the study.” We, as acupuncturists, have read over RCTs on acupuncture and note often a very select set of points used by on any patient with a certain disease. No regard is made to the various other conditions the patient may be suffering that may influence results, being the experiment cannot be carried out holistically (consideration of the whole) in the pursuit of internal validity (only one factor is variable). This loses external validity to our practice since the experiment’s points used are not necessarily what we as practitioners would use, or how they’d react in our own hands if training is taken into consideration. The doctor’s ability to impart intent or energies into a needle, or the Traditional Chinese Medicine differentials of that medical condition studied are factors that may improve acupuncture results in real world settings over what was seen in a RCT. These are relevant external validity factors that will influence the relevance and applicability in clinical practice of the information being concluded in a RCT.

**Evidence Based Medicine**

Evidence Based Medicine (EBM) was formally defined by Sackett et al. in 1996 as “the conscientious, explicit, and judicious use of current best evidence in making decisions about the care of individual patients. The practice of evidence based medicine means integrating individual clinical expertise with the best available external clinical evidence from systematic research.” Thus there are EBM advocates out there that do acknowledge that clinical experience plays a role in EBM, that RCT and systematic studies are combined with other evidence to give an overall assessment by practitioners on how and which patients to use acupuncture and other treatment modalities. Even drugs, the item most researched via RCT for evidence of efficacy and effectiveness, have been found to have problems with validity if their evidence is just based on RCTs. Differing statistical methods of evaluating data can influence the conclusion of the research, and studies with small populations are held up as “proof” without consideration that the best research has to be repeatable in large populations for a RCT to be truly considered valid, externally or internally. And sometimes, in the pursuit of moneys for research, unfavorable data is not reported or published, as noted in the recent article
“Misconduct, not error, accounts for most scientific paper retractions: 10-fold increase in fraud-related retractions found.”

Consider Smith & Pell’s “Parachute use to prevent death and major trauma related to gravitational challenge: systematic review of randomised controlled trials” published in British Medical Journal, Dec 2003. This is a well and properly written, amusing systematic review (having all aspects that a review should contain even including disclosure of conflicts of interest) on how parachutes have never been proven scientifically to prevent death by randomized double blind studies. If you look at no other reference of my article, you need to read this one and keep in mind all that we are discussing here:

Objectives: To determine whether parachutes are effective in preventing major trauma related to gravitational challenge.

Design: Systematic review of randomised controlled trials.

Results: We were unable to identify any randomised controlled trials of parachute intervention.

Conclusions: As with many interventions intended to prevent ill health, the effectiveness of parachutes has not been subjected to rigorous evaluation by using randomised controlled trials. Advocates of evidence based medicine have criticized the adoption of interventions evaluated by using only observational data. We think that everyone might benefit if the most radical protagonists of evidence based medicine organized and participated in a double blind, randomised, placebo controlled, crossover trial of the parachute. Parachutes reduce the risk of injury after gravitational challenge, but their effectiveness has not been proved with randomized controlled trials.

Types of Research in Levels of Evidence Pyramid

With the mention of systematic review study in the above article, let us consider common study designs that include:

<table>
<thead>
<tr>
<th>Secondary Sources of Evidence</th>
<th>Meta-analysis:</th>
<th>A systematic review that uses quantitative methods to synthesize and summarize the results.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Systematic Review:</td>
<td></td>
<td>A summary of the medical literature that uses explicit methods to perform a comprehensive literature search and critical appraisal of individual studies and that uses appropriate statistical techniques to combine these valid studies</td>
</tr>
</tbody>
</table>
### Primary Sources of Evidence

<table>
<thead>
<tr>
<th>Study Design</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Randomized, Controlled Clinical Trials (RCT):</td>
<td>Participants are randomly allocated into an experimental group or a control group and followed over time for the variables/outcomes of interest.</td>
</tr>
<tr>
<td>Prospective, blind comparison to a gold standard study:</td>
<td>A controlled trial that looks at patients with varying degrees of an illness and administers both diagnostic tests -- the test under investigation and the &quot;gold standard&quot; test -- to all of the patients in the study group.</td>
</tr>
<tr>
<td>Cohort Study:</td>
<td>Involves identification of two groups (cohorts) of patients, one which received the exposure of interest, and one which did not, and following these cohorts forward for the outcome of interest.</td>
</tr>
<tr>
<td>Case Control Study:</td>
<td>A study which involves identifying patients who have the outcome of interest (cases) and patients without the same outcome (controls), and looking back to see if they had the exposure of interest.</td>
</tr>
<tr>
<td>Case Series:</td>
<td>A report on a series of patients with an outcome of interest. No control group is involved.</td>
</tr>
</tbody>
</table>

These study designs are then often organized into a Research Pyramid that often looks like Figure 1. The base of the pyramid is wider than the top because as you move up the amount of published papers decreases compared to the category below, but as you move up the quality of the research design and relevance of the research to the clinical setting increases.

![Figure 1: Types of Study/ Levels of Evidence Pyramid](image)

The type of question being studied is also important and can help lead one to the best study design for what is being studied, beyond that type of study’s place in the Research Pyramid.
<table>
<thead>
<tr>
<th>Type of Question</th>
<th>Suggested Best Type of Study</th>
</tr>
</thead>
<tbody>
<tr>
<td>Therapy</td>
<td>RCT &gt; cohort &gt; case control &gt; case series</td>
</tr>
<tr>
<td>Diagnosis</td>
<td>prospective, blind comparison to a gold standard</td>
</tr>
<tr>
<td>Etiology/Harm</td>
<td>RCT &gt; cohort &gt; case control &gt; case series</td>
</tr>
<tr>
<td>Prognosis</td>
<td>cohort study &gt; case control &gt; case series</td>
</tr>
<tr>
<td>Prevention</td>
<td>RCT &gt; cohort study &gt; case control &gt; case series</td>
</tr>
<tr>
<td>Clinical Exam</td>
<td>prospective, blind comparison to gold standard</td>
</tr>
<tr>
<td>Cost</td>
<td>economic analysis</td>
</tr>
</tbody>
</table>

Witt et al in “How Well Do Randomized Trials Inform Decision Making: Systematic Review Using Comparative Effectiveness Research Measures on Acupuncture for Back Pain” noted that most systematic or Cochrane reviews provide information about possible bias within each study, but do not provide systemic information about the relevance of the study results for clinical and health policy decision-making. Most clinical trials are about assessing the efficacy of medical interventions rather than their real world effectiveness. Witt article encourages Comparative Effectiveness Research (CER), defined by the Institute of Medicine as “the generation and synthesis of evidence that compares the benefits and harms of alternative methods to prevent, diagnose, treat, and monitor a clinical condition or to improve delivery of care.”

Efficacy is defined as the extent to which a specific intervention is beneficial under ideal conditions. RCTs aim to produce an expected result for an intervention under carefully controlled conditions chosen to maximize the likelihood of observing an effect if it exists. These conditions can differ importantly from the clinical setting where the intervention is likely to be used. In comparison, effectiveness is the extent an intervention, when used in a routine clinical setting, does what it was intended to do for a specific population. Witt’s systematic review used pragmatic-explanatory indicator summary (PRECIS) and CER characteristics to evaluate RCTs of acupuncture for treatment of low back pain. Overall, they found that when evaluating acupuncture as an adjunctive treatment that allowed more flexible treatment protocols, trials had higher effectiveness scores than trials that evaluated acupuncture as a treatment alternative and used a more standardized treatment protocol.

**Qualitative and Observational Studies**

Concato et al in “Randomized, Controlled Trials, Observational Studies, and the Hierarchy of Research Designs” used published meta-analyses to identify randomized clinical trials and observational studies that examined the same clinical topics. They concluded “the results of well-designed observational studies (with either a cohort or a case–control design) do not systematically overestimate the magnitude of the effects of treatment as compared with those in randomized, controlled trials on the same topic.” Concato noted that physicians do not use therapeutic agents in a uniform way, and an
observational study would usually include patients with coexisting illnesses and a wide spectrum of disease severity, thus treatment would be tailored to the individual patient. In contrast, each randomized, controlled trial may have a distinct group of patients as a result of specific inclusion and exclusion criteria regarding coexisting illnesses and severity of disease, and thus the experimental protocol for therapy may not be representative of clinical practice.

Norris et al in “Observational studies in systemic reviews of comparative effectiveness: AHRQ and the Effective Health Care Program” developed via their study a conceptual model and recommendation using a consensus process by members of the methods workgroup of the Effective Health Care Program of the Agency for Healthcare Research and Quality. They concluded that “because it is unusual to find sufficient evidence from RCTs to answer all key questions concerning benefit or the balance of benefits and harms, comparative effectiveness reviewers should routinely assess the appropriateness of inclusion of observational studies for questions of benefit.”

Non-experimental studies such as retrospective and prospective observational studies do not assign interventions but leave the choice of treatments up to patients and their health providers. High-quality, large-scale observational studies can contribute to comparative effectiveness research. Observational studies are more prone to bias and confounding (mixing different effects together), but have advantages over clinical trials, such as larger number of subjects at a more affordable cost, the ability to examine meaningful subgroups for comparison, and longer follow-up periods to examine long-term risks and benefits. They are also more useful for examining multiple treatment paradigms simultaneously. For observational study to succeed, Dreyer et al noted that treatment variability is needed and the characteristics of groups being compared should have “reasonable” amounts of overlap.

In a similar type of article, Fleurence et al in “The critical role of observational evidence in comparative effectiveness research” conclude that RCTs and observational studies “should not be viewed as alternatives but as complementary approaches.” They also note that RCTs often don’t represent real-world patient populations, while observational studies look at diverse large populations at lower costs, often sooner than a pragmatic RCT would. They give the example that observational evidence of a case-control study contributed to showing that sigmoidoscopy can reduce mortality from cancer of the rectum and colon. RCTs did not lead to doctors recommending that dreaded procedure to anymore over 50 nowadays.

**A Better Research Evidence Pyramid for Acupuncture (and other TCM Modalities)**

In a discussion similar to acupuncture’s about RCT and the conventional Research Pyramid, Tomlin and Bargello found the relevance of and need to incorporate other types of research into EBM consideration for the practice of occupational therapy. They created a new pyramidal evidence model for clinical practice decisions that separates the evidence-level criteria of internal and external validity, incorporates explicitly the evidence provided by qualitative studies, and retains the critical notion of
rigor. Occupational therapy had found that EBM had not yet “evolved” enough to meet the needs of its practitioners in treatment decision making. The argument with the traditional pyramid is not that experimental RCTs are not important, but “instead to assert that trustworthy evidence of different types can be discovered through disciplined inquiry, and all are important … the point is not to overthrow the ‘gold’ standard for evaluating evidence and the notion of rigor along with it but rather to replace that quest with one for the best-balanced ‘alloy’. If any component of the alloy is missing, its strength will be deficient.” Thus the most powerful evidence for EBM would consist of a “meta-meta-analysis or mega-synthesis,” a study at the top where the three sides converge that analyses the evidence from studies of experimental, qualitative and outcome research up from the bases of the three connected pyramids. This would be the best proof of evidence and not just the meta-analysis of RCTs.

![Research Pyramid](image)

**Figure 2: Research Pyramid**

Note. Meta- = meta-analyses.

**Conclusion**

Thus proof of validity of acupuncture as a viable treatment modality goes beyond just Randomized Double Blind Controlled Trials providing scientific evidence that is so heavily pushed by certain EBM advocates. The proposed Research Pyramid, in the article from the occupational therapists, is a better and more relevant research evidence model in providing proof of acupuncture effectiveness, giving more mention and power to the other types of research and their levels of evidence and validity.

Not all medical treatment modalities in conventional medicine can meet, or are expected to prove, effectiveness and efficacy via RCT, at least not exclusively. Most surgical techniques don’t and certainly the use of certain equipment like parachutes to
save lives is not questioned without RCTs having been done. As the authors of peer-reviewed parachute research article said “Individuals who insist that all interventions need to be validated by a randomised controlled trial need to come down to earth with a bump…That those who advocate evidence based medicine and criticize use of interventions that lack an evidence base will not hesitate to demonstrate their commitment by volunteering for a double blind, randomised, placebo controlled, crossover trial [on the effectiveness of parachutes].”7

References


4. Information Services Department of the Library of the Health Sciences-Chicago, University of Illinois at Chicago. Evidence-Based Practice in the Health Sciences: Evidence-Based Nursing Tutorial. http://ebp.lib.uic.edu/nursing/node/1


Pulse Diagnosis Made Easier
Steve Marsden
DVM, ND MSOM Lac, Dipl.CH, CVA

Pulse diagnosis is often considered unique to Chinese medicine, and both highly esoteric and subjective. Most traditional medical systems utilized pulse diagnosis, however, and made the same interpretations, indicating there must be a practical and underlying logic to it.

The Nei Jing Su Wen also stated it was malpractice to not utilize pulse diagnosis, so it must somehow be very germane to getting real results and avoiding harm. Modern medical research has turned a substantial amount of its focus in the last two decades to the role of circulation in the creation of pathology. Disruptions to circulation occur locally, but are maintained by systemic perturbations. Palpation of a small peripheral artery turns out to be the most rapid and accessible method of assessing those perturbations, ensuring we have not aggravated them, and identifying when we have corrected them.

There can really be only two types of disruption to the blood supply of a tissue – either there is too much or too little. Further, there are really only two types of systemic disruption of circulation to support local pathology. Either the blood supply is located too centrally or too much in the periphery. From all this, then, we realize there is one pulse trait paramount over all the others in assessing a patient’s circulation and whether we have improved – is there vascular tone or isn’t there?

Is there tone or isn’t there?

If vessel wall tone is present, the blood supply thus more internalized, and a finger lift from each pulse wave will be noted on touching the vessel wall lightly. Sometimes, if the pulse is very thin or narrow in diameter, the amount of finger lift will be small, but nevertheless still be present, indicating an internalization of the blood supply. If the pulse is larger in diameter with obvious vasotone, Chinese medicine termed it as ‘wiry’.

If vessel wall tone is absent, then the fingertip will not lift with each pulse wave. Instead, a slapping sensation is often felt against the finger tip. Chinese medicine termed this a ‘slippery’ pulse, and claimed it indicated ease of flow. Similarly, from a conventional medical perspective, it indicates a blood supply that is more externalized. In small animals, the most common reason for a ‘slippery’ pulse that results in inflammation of peripheral structures is Damp Heat.

When palpating the pulse, use only one fingertip and begin with only light pressure, to ensure subtle variances in tone are apparent. Using two or three fingers at once will artificially increase tone, and make subtle distinctions between pulses more difficult.
The goal of treatment in acupuncture is very simple – whatever the traits are of the pulse, make them less so. If a pulse is highly toned, for example, then a successful treatment will reduce that tone. A really successful treatment will reduce it on an enduring basis, for several days or more. In contrast, if the pulse is ‘slippery’ the goal is to introduce some vasotone, undermining any tendencies to inflammation of peripheral structures in the process.

Where to Check the Pulse

The Nei Jing describes the pulse as being taken at nine different locations, including the radial artery of the wrist. Eventually, the radial artery alone was used, perhaps in realization that any disruption of circulation was not just local, but also systemic, with the same basic pulse thus being manifest everywhere.

Thus, any pulse will do, as long as it is small enough for the practitioner to detect subtle variances in tone. The chief consideration is detection of peripheral blood flow, and a systemic tendency towards internalization or externalization of the circulation will manifest virtually everywhere as an increase or decrease in vasoconstriction.

Naturally, then, the only arteries that are of more questionable value in making digital determinations of vessel wall tone are the major trunks like the carotid artery of the horse, or the femoral artery right at the body wall of dogs. Vessels with more supple and thin walls should be sought for pulse diagnosis. The femoral artery at a mid-thigh level is preferable for dogs and cats, and palpation of the temporomandibular artery or perhaps even the coronary band above the hoof more preferable in horses. In cattle, the coccygeal artery serves well.

In this most basic yet utile approach to pulse diagnosis, no distinction is made between the left and right pulse. Each is considered to be as likely to reflect the body’s general circulatory status.

Correlating the Pulse with the Pathology

Almost invariably, the pulse clarifies the nature of the patient’s pathology.

Induction of vessel wall tone, whether it is slight or substantial, marks an effort by the body to shunt blood centrally, away from the periphery. The periphery of the body includes not just the extremities and head, but also all epithelial surfaces, including the skin, digestive and respiratory tracts. This systemic tendency highlights and aggravates pre-existing circulatory disturbances in various organs.

Specifically, reduced peripheral circulation underpins and aggravates:

- Chronic inflammation of epithelial surfaces and joints
- Degenerative joint disease
- Chronic infection of epithelial surfaces
• Cognitive dysfunction
• Anxiety and fear aggression
• Slow-growing tumors of epithelial surfaces and the extremities

At the same time, it also aggravates congestion of more central organs, including:

• Rapidly growing abdominal and thoracic tumors
• Pulmonary congestion
• Congestive heart failure
• Acute inflammation of the viscera, including especially the liver and kidneys

When there is no vessel wall tone, circulation to the periphery is unobstructed. Blood rushes past the finger tip, creating a rolling or slapping sensation. This is most commonly seen in:

• Acute inflammatory conditions of the limbs or epithelial surfaces
• Rapidly growing and inflamed malignancies of the limbs or epithelia
• Hyper-excitability and dominance aggression

At the same time, hypo-perfusion tendencies of the internal organs are also aggravated, including:

• Chronic renal failure and renal hypoperfusion
• Microvascular porto-systemic shunts and chronic active hepatitis
• Slow growing abdominal tumors

Pulse assessment is a rapid physical examination technique that at once both confirms the likely nature of the pathology the patient is experiencing, and indicates what treatment effects are necessary to reverse it.

More Detailed Pulse Analysis

Other pulse traits can be palpated that will give further information on the status of the patient’s circulation, and allow you to speculate on the cause of any perturbations. For example, if a toned pulse was also found to be weak in force and narrow in diameter, you might naturally speculate that the reason the blood supply is internalized is because the patient is anemic. Other patients may not be anemic, but simply have a low overall blood volume.
Table 1 lists the traits of the pulse that can help you speculate the reason behind a patient’s macrocirculatory pattern. We’ve discussed tone already.

<table>
<thead>
<tr>
<th>Trait</th>
<th>Sensation</th>
<th>Interpretation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Force</td>
<td>Palpability</td>
<td>Strength (Heart Yang)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Blood volume (Blood or Yin)</td>
</tr>
<tr>
<td>Diameter</td>
<td>Diameter</td>
<td>Fluid Level (Ying Qi, Blood or Yin)</td>
</tr>
<tr>
<td>Tone</td>
<td>Compressibility, finger</td>
<td>Ease of Circulation</td>
</tr>
<tr>
<td></td>
<td>lift</td>
<td></td>
</tr>
<tr>
<td>Depth</td>
<td>Location of strongest</td>
<td>Location and mobilization of Yang</td>
</tr>
<tr>
<td></td>
<td>sensation</td>
<td></td>
</tr>
</tbody>
</table>

*Figure 1 - Pulse traits, what they mean, and how to detect them*

**Depth** is how much you depress your finger tip before you feel the pulse’s maximum beat intensity. If the pulse is relatively deep, then Yang energy, which drives Blood before it, may not be very mobilized. This may be, for example, because the patient doesn’t have enough of it, or because Yang energy is effectively trapped. The rest of the clinical findings can help determine which is which.

In a dog with hip dysplasia with a strong, normal diameter, wiry pulse, the patient is more likely to simply need their Yang (i.e. circulation) released to the periphery. Gall Bladder channel points serve that function, both systemically, and locally into the hip joint.

A Yang deficient patient may have a weaker pulse, per the comments on Force below, and may appear more fragile and chilly. They might be more apt to have problems in areas that Yang energy supports, such as the digestive tract or urine concentration.

**Vessel diameter** is a measure of the volume of blood in the peripheral vasculature. Blood is composed of plasma (which corresponds to Ying Qi) and Blood (which corresponds to the cellular elements). As a fluid, blood is also reflective of the body’s overall Yin or moisture content. This is particularly true for Essence, which constitutes the viscous life-giving fluids of the body, of which Blood is an example.

Returning again to the hip dysplastic dog, if the diameter of the pulse is normal, then Blood and Yin tonifying points or strategies are not called for to begin treatment. The circulation simply needs to be unleashed.

On the other hand, a thin slightly toned pulse in a dog with superficial pyoderma will benefit from diets and herbs that support the patient’s blood volume, in addition to those points and strategies that impel blood reserves to the body periphery.

The **Force** of a pulse is the overall ease with which the pulse can be located and assessed. In a word, the force of a pulse is its “obviousness”. The force (and diameter) of the pulse should match the body size of the patient, with smaller animals exhibiting
weaker thinner pulses, and larger animals displaying relatively larger diameter and stronger pulses.

A thin or narrow, weak, and toneless pulse in a dog with fatigue indicates the dog is ‘spread too thin’ for its resources. Despite the deficiencies in fluids (thinness) and Yang energy (weakness), the dog’s blood supply is peripherally distributed anyway, rather than centrally as we would expect. An ‘astringing’ treatment that reintroduces normal vasotone, such that blood moves toward the center, will result in a reintegration of the body’s low Yang energy with its meagre Yin reserves, leading to the regeneration of more Qi and vigor. From a western perspective, the blood supply will once more be directed towards the vital organs first, and the periphery secondarily, resulting in the animal being more clinically stable and strong.

How about a thin, weak, toneless pulse in a dog with lameness that improves with motion? Peripheral circulation that helps resolve chronic inflammation within the joint is still required, so the strategy to help this dog would be to continue mobilizing blood peripherally, but also to increase the blood supply itself, through tonifying herbs, diets and treatments.

In essence, then, whatever the pulse is in an acupuncture patient, the goal is to make it less so, and more non-descript in the process. We would like a pulse that is neither too deep nor too shallow; vessel walls that are neither too toned nor too flaccid; vessel diameters that are proportionate to the body size and not too large or too small; and pulses that are moderate in their force, by being both tangible yet resilient. Any point prescription that creates this pulse will be effective for the patient.

**Tongue Diagnosis**

The pulse reflects the circulatory dynamic currently pervading the patient. As a piece of the patient’s flesh, the tongue reflects the net sum impact of all previous circulatory dynamics on the patient’s body. These impacts are reflected in changes in the tongue’s color, moisture, size, and physical features. Fortunately, the interpretation of all these changes is logical (Figures 2 and 3).

<table>
<thead>
<tr>
<th>Colour</th>
<th>Interpretation</th>
</tr>
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<tbody>
<tr>
<td>Pale</td>
<td>Qi, Blood, or Yang Deficiency</td>
</tr>
<tr>
<td>Red</td>
<td>Heat</td>
</tr>
<tr>
<td>Pale Lavender</td>
<td>Mild Stasis (e.g. Qi Stagnation from Blood Deficiency)</td>
</tr>
<tr>
<td>Purple</td>
<td>Blood Stasis</td>
</tr>
<tr>
<td>Dark Red or Purple Red</td>
<td>Stasis producing Heat</td>
</tr>
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</table>

*Figure 2 Interpretation of tongue color*
Pallor reflects Blood Deficiency, whether due to anemia or reduced circulating blood volume. In Chinese medicine, the Spleen manufactures Blood, but requires adequate Qi in the middle burner, which is in turn contingent upon adequate Yang. Pallor can reflect a deficiency at any or all of these three levels. As blood levels decline, peripheral resistance increases, resulting in increasing purpling of the tongue. Mild congestion or resistance to circulation is termed Qi Stagnation. More severe circulatory impairment causes purpling, and correlates with Blood Stasis. When the body is hot, the patient will cool themselves by increasing blood flow to the oral mucous membranes and panting. This will show as a red tongue. Much of the Heat observed in small animal medicine is Damp Heat, produced by Dampness crowding out the normal circulation of Qi and, later, Blood. This manifests as a tongue that is both red and purple.

Tongue moisture and physical feature correlations are as self-evident as tongue color. A small or dry tongue indicates a lack of moisture and body substance (Yin Deficiency), a denuded tongue even more so. A wet swollen tongue indicates an accumulation of Damp. Where this Damp has congealed slightly into Phlegm, the saliva becomes stringy. Viscous frothy saliva indicates Phlegm as well. Protrusion of purple vessels from the tongue surface indicates a tendency to Blood Stasis. The presence ulceration indicates severe inflammation, or Heat.

<table>
<thead>
<tr>
<th>Feature</th>
<th>Interpretation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Small size</td>
<td>Tissue wasting (Yin deficiency)</td>
</tr>
<tr>
<td>Large size</td>
<td>Damp accumulation</td>
</tr>
<tr>
<td>Vessels</td>
<td>Blood stasis</td>
</tr>
<tr>
<td>Ulcers</td>
<td>Heat</td>
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</tbody>
</table>

The association of different areas of the tongue with different organs (Figure 4) is also logical and based, like the pulse, on simple hemodynamics. Figure 5 is a cross section of the tongue of an anemic patient. Note how the blood is sequestered in the center of the tongue and lacking in the white spaces nearer the tongue edge. Pallor is produced at the edges, resulting in Chinese medicine making the correlation between the tongue edge and the organ that stores Blood and oversees circulation, namely the Liver. This patient would thus be undoubtedly diagnosed with Liver Blood deficiency.

When blood is squeezed from the periphery of the tongue towards its center, it creates a purpling in the middle of the tongue, which is interpreted as stasis. The association of the middle of the tongue with the digestive organs reflects accurately the splanchnic congestion that typically results from peripheral vasoconstriction. In a patient that has ample blood and is hot, we would expect circulation all the way out to the tongue tip. Such a heated state is only possible with adequate Yang energy, which is stored in the
Heart in the upper body. Not surprisingly, then, the tongue tip is correlated with the Heart and upper burner.

Once the hemodynamic logic of the pulse and tongue is appreciated, correlation of their features can provide a rapidly incisive tool for determining the overall Yin Yang dynamic pervading a patient and for correctly interpreting their symptoms and signs. Together with these symptoms, they provide a useful barometer for monitoring the progress of a patient. These symptoms and signs should be listed together with the pulse and tongue findings where they can be referred to easily upon re-examination. A patient registering an improvement in the majority of these findings has experienced a genuine improvement in their condition.
Introduction

Acupuncture research demonstrates that keys to rapid efficacy include:

- Utilizing ‘active’ points that can be detected through infrared imaging, or which palpate as warm or swollen
- Having the normalization of the patient’s circulation as the goal of acupuncture, as evidenced by a normalization of their pulse

These two steps alone will yield gratifying results, but they may be improved upon even further by the way the needles in the points are stimulated. Different electrical frequencies and different hand movements exert radically different results on the circulation of the patient that can be immediately detected as changes in the pulse. Before we discuss those techniques, it is worth contemplating how it is possible for needles to create radically different patient responses simply by how they are moved. Without an appreciation for this ability of acupuncture points, and due care in the handling of needles, it can be easy to render a treatment ineffective or even harmful, instead of making it more efficacious.

Acupuncture Point Structure and Behavior

While not possessing any anatomically distinct sensory receptors or structures, the most clinically important acupuncture points nonetheless tend to have a typical histological structure. They are almost invariably aggregations of afferent and efferent nerve fibers, blood vessels, a mucopolysaccharide matrix, and collagen (Ifrim and Ifrim, 2005).

In addition, acupuncture points are commonly known to possess significant numbers of mast cells. The role of the mast cells is crucial; they provide an integral link between the point and the body region it influences.

When pathology occurs in a body structure, nerve impulses are sent to the acupuncture point(s) reflexively linked to the disease site. These sympathetic efferents cause mast cell degranulation (Facoetti, 2006). Histamine and nitric oxide then act on the capillary in the point, leading to vasodilation and the formation of edema. Edema swells the mucopolysaccharide matrix of the point, causing tensile forces to be exerted on collagen fibers in and around the point. The point is now visible using infrared imaging.

Acupuncture points themselves are located where accumulations of connective tissue are more prominent and are themselves essentially nexi at intersections of multiple fascial planes (Langevin and Yandow, 2002). Collagen fiber stretch and deformation in response to swelling and distension of the point is thus propagated a certain distance of the point. It is these tensile forces that generate the effect of the point.
The means by which physical movement in collagen fibers leads to changes in cellular activity is known as mechanotransduction. Ample research has accumulated to suggest that acupuncture points work through the process of mechanotransduction. When collagenase is injected into an acupuncture point that is then stimulated normally, no effect is seen of the acupuncture needle (Yu et al, 2009). Displacement of tissues by acupuncture needles is substantial (Langevin et al, 2004), and includes the winding of collagen fibers around needle. These tensile forces are then channelled and amplified, because of the anatomical locations and spatial constraints of the points (Julias, 2011).

The specific cellular change of greatest interest as a result of this transduction is an alteration in nitric oxide levels. Nitric oxide then mediates any vascular changes both locally and systemically in the patient. The exact mechanism by which this final shift in nitric oxide levels occurs is still unclear. Nitric oxide is produced by fibroblasts, and fibroblast activity does shift markedly following acupuncture stimulation (Langevin et al, 2007; Jiang et al, 2009). Alternatively, perhaps the shift in tensile forces within the point alters how or which nerve fibers are depolarized, resulting in a shift in nitric oxide in the efferent arm of the nerve impulse. It may even be that multiple mechanisms are involved in the activity of each point.

Regardless of the exact mechanism by which nitric oxide levels change and then alter vasotone, these changes are rapidly propagated through the vasculature through endothelium and smooth muscle gap junctions between cells (Schmidt et al, 2008). This spread of the vascular response is not restricted to the direction of blood flow, and probably marks an important mechanism by which both normal and aberrant blood flow patterns are maintained by the body.

Implications of Acupuncture Point Structure and Behavior

It is clear from research into point structure and behavior that movement is important in eliciting the effects of acupuncture points. It is likely the main way they are stimulated on a day-to-day and minute-to-minute basis. We can thus easily see how Chinese medicine stumbled upon the utility of forms of point stimulation that did not utilize needles, but instead relied upon physical movement or the application of external pressure. The current understanding of how acupuncture points work easily provides a western explanation for the purported health benefits of Tai Chi or Qi Gong, as well as those of massage, Tui-na, acupressure, and shiatsu.

Such an elaborate network and feedback mechanism must surely confer an evolutionary edge to an organism. A clear survival advantage must exist in being able to modulate potentially debilitating pain and inflammation with physical movement. Such a system allows the prioritizing of the immediate safety of the organism in its external environment over the completion of any internal inflammatory process. If survival dictates a wounded animal must take immediate evasive action to avoid predation, this system of mechanotransduction allows that escape to potentially happen through induction of analgesia and modulation of the inflammatory response. Indeed, the adaptation appears of such fundamental value that we can understand how such a
development would have appeared early in the evolutionary tree, providing the foundation for the utility of acupuncture in a vast array of species.

Mechanotransduction also provides the ability for the most useful points to control an inflammatory process to be rapidly identified, and thus for acupuncture to be easily discovered. We can even see how it would inspire the development of Chinese medical and meridian theory. Any patient that is chronically ill will have the same points persistently distended and visible or detectable on the patient’s surface. As such, they constitute the acupuncture point prescription for the patient. Points that always crop up for certain problems and symptoms would eventually guide the development of and be reconciled with the Chinese medical theory of the patient’s condition, by being assigned to particular channels, functions and meridians. Conversely, when the system is working well, and there are no chronic disease processes occurring, the points that are swollen and visible on infrared imaging seem random and unrelated.

**Needle Stimulation: putting mechanotransduction to work**

The two basic needling techniques that take advantage of this mechanotransduction mechanism to manipulate blood flow are simple and easy to learn. Tonification involves exerting a compressive force on the point and its collagen fibers. Sedation involves creating a stretching or distracting force on the point and its fibers.

These effects can be achieved easily with hand movements. Even a steady gentle insertion pressure on the needle is sufficient to create a tonifying stimulus. Likewise, creating a steady gentle withdrawing force on the needle tip is enough to create a sedating stimulus.

Needle movements can also be moved more overtly to achieve tonification or sedation, using rotation and thrusting techniques. In general, to tonify, the in-thrust phase is slowed down and emphasized. Needle movements are small. To sedate, the out-thrust phase is slowed down and emphasized. Needle movements are large. As far as needle rotation is concerned, small slow gentle turns with a clockwise emphasis are tonifying. Rapid forceful larger degree turns with a counter clockwise emphasis are sedating.

Acupressure can also be deliberately tonifying or sedating. To tonify, massage from distal to proximal on the limbs, and caudal to cranial on the torso. To sedate, massage from proximal to distal on the limbs, and cranial to caudal on the torso.

For purists, some additional techniques can be used to effect tonification or sedation. To tonify, angle the needle as it is inserted slightly proximally. To sedate, angle the needle slightly distally on insertion. Lastly, Chinese medicine advocates withdrawing the needle at the end of inspiration to tonify, and at the end of expiration to sedate. Push the hole closed once the needle has been removed if you are tonifying. Leave the hole open and allow any capillary bleeding to stop on its own if you are sedating.
Needle retention times also influences whether a treatment is tonifying or sedating. For tonification, retain needles for 15 minutes or less. For sedation, retain needles for 15 minutes or longer. That being said, once the pulse is improved, treatment can be concluded at any time.

Tonification and sedation can also be achieved with electroacupuncture, utilizing different frequencies. They are listed in Table 1.

Basic procedure for setting up an electroacupuncture unit:

- Connect two or more points that need the same form of stimulation, as determined by the type of manual stimulation that improved the pulse through them.
- Set the current level (i.e. the intensity) just below what is palpable by the patient.
- Start with a frequency appropriate to the type of stimulation needed (see Table 1).
- While simultaneously feeling the pulse for improvements, adjust the frequency up or down until the pulse feels optimal.
- Select the waveform and/or amplitude that produces an optimal pulse.

Table 1. Comparison of the two basic methods of needle stimulation - tonification and sedation

<table>
<thead>
<tr>
<th></th>
<th>Tonification</th>
<th>Sedation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rotational emphasis</td>
<td>Clockwise</td>
<td>Counter-clockwise</td>
</tr>
<tr>
<td>Thrust emphasis</td>
<td>Insertion</td>
<td>Withdrawal</td>
</tr>
<tr>
<td>Needle retention</td>
<td>&lt; 15 min.</td>
<td>&gt; 15 min.</td>
</tr>
<tr>
<td>Force</td>
<td>Gentler</td>
<td>Vigorous</td>
</tr>
<tr>
<td>Frequencies</td>
<td>10 to 20 Hz</td>
<td>60 to 100 Hz</td>
</tr>
</tbody>
</table>

How do you know for sure whether to tonify or sedate the points in your prescription? To ensure a maximal pulse improvement, try first one, then the other, at each point. Any points that don’t yield improvements with either tonification or sedation can be removed. If the pulse improvements are not enduring, additional points are sought until a healthy pulse is attained. Points can be selected through detection of infrared emissions, or based on theory. Bilateral needling of each point is not necessary as long as pulse improvements are attained.
References


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Why Do We Have Acupuncture Points?
Steve Marsden
DVM ND MSOM Lac Dipl.CH CVA AHG

Introduction

Acupuncture is performed with beneficial effect in a wide array of species, including mammals, birds, reptiles and even fish. As veterinarians, we accept this as true without missing a beat, without pausing for even a moment to examine its implications.

We might not even be aware there are any implications to the vast utility of acupuncture, until we re-frame the question. Consider for a moment a fasting animal or human. Within just two days of fasting the gastrointestinal brush border of many if not most species atrophies, and with it its digestive enzyme complement. The rule the digestive and other organ systems seems to operate by, regardless of species, is “use it or lose it”.

Now consider the average dolphin (or rabbit, or parrot, or elephant, or dog) and its elaborate network of afferent and efferent nerves leading to several hundred distinct and identifiable acupuncture points. Why do these animals possess this elaborate network? Why do we have acupuncture points? Clearly if we start dismantling our digestive tract after 48 hours of inactivity, we can’t assume the incredibly complex neuro-immunological network that makes acupuncture possible to be some happy little accident. And if it was an accident, why did it occur in so many species? In other words, why was this accidental network preserved in this distant progenitor and not lost again somewhere along the way?

In short, if a dolphin’s body operates on a principle of ‘use it or lose it’, who exactly has been treating these points all these millions of years before veterinary acupuncturists came along? The answer is: the dolphin.

To understand how they are doing it and why, we have to take a tour of the most cutting edge research in acupuncture.

Pain Relief, Shmane Relief: acupuncture is about blood flow

In the last 20 years, a growing tide of medical research has established that chronic disease is propagated in large part by persistent abnormalities in tissue blood flow. These disruptions in blood flow are inherently simple. There is either too much blood or too little to resolve the pathology in process. In degenerative and chronic inflammatory processes there is too little circulation, and in acute unresolved inflammation there is too much.

The notion that chronic inflammation requires an increase in blood flow may seem counter-intuitive. This is due to the fact that, until recently, medicine believed that inflammatory processes simply burned themselves out, resolving once all antigens that
sparked the fire were eliminated. Sending more blood to the region would seem like sending more oxygen, resulting in a fanning of flames and a reactivation of inflammation.

Recent research has confirmed, however, that inflammation does not naturally just fizzle, but must be ‘actively resolved’. Interestingly, the agents of active resolution, known as resolvins, protectins, and lipoxins, are produced by the same inflammatory cascades that produce pro-inflammatory cytokines, and work simultaneously to end the same inflammatory process that the cytokines start. If these compounds are not produced, perhaps because of chronic use of anti-inflammatory drugs, then the inflammatory process ironically continues to smoulder.

Resolvins and lipoxins don’t throw water on the fire of inflammation themselves, but act through another compound called nitric oxide. As discussed further below, nitric oxide turns out to be the body’s key regulator of tissue blood flow and is happily directly influenced by acupuncture.

Endothelial production of nitric oxide (NO) is critical to the regulation of vascular responses (Atochin and Huang, 2010). Once NO is produced, it fulfills a number of different roles crucial in regulation of circulation and the inflammatory response. Specifically, it regulates:

- Vascular tone
- Regional blood flow
- Leukocyte-endothelial interactions
- Platelet adhesion and aggregation
- Vascular smooth muscle cell proliferation

A relative deficiency in the amount of bio-available vascular NO results in endothelial dysfunction, leading to:

- Thrombosis
- Inflammation
- Neointimal proliferation
- Vasoconstriction

NO levels most often become low due to reduced synthesis or because of breakdown by reactive oxygen species liberated during the inflammatory process. Fortunately, acupuncture has been shown repeatedly to be able to directly influence nitric oxide levels. Although thought of as an analgesic, it is this circulation- and inflammation-regulating ability of acupuncture through the intermediary of nitric oxide that is responsible for most of its benefits in chronic disease, and thus most of the gratification it brings as a therapeutic tool. By acting at the final mediator of inflammation and vasotone, acupuncture treatments can bypass whatever breakdown exists in the regulation of inflammation within a patient, allowing the process to finally come to a conclusion. By increasing nitric oxide in chronically inflamed tissues, acupuncture can thus:
• Limit further chemotaxis of neutrophils into the inflamed region
• Promote neutrophil clearance from the area via the lymphatic system
• Increase macrophage activity in clearing inflammatory debris
• Reduce excessive vascular permeability
• Promote development of new vasculature
• Vasodilate existing vasculature
• Heighten mucosal antimicrobial defenses

These actions of nitric oxide and acupuncture extend not just to a handful of diseases, but as it turns out, practically all the disorders veterinarians are called upon to treat with acupuncture.

**Systemic Disruption of Blood Supply**

Disordered circulation doesn’t just occur locally in particular joints or organs. It appears to be supported by a generalized and sustained tendency to aberrant flow that affects the entire organism. These abnormal macrocirculation patterns coexist with chronic inflammatory states arising from abnormal microcirculation patterns and are also manifestations of endothelial dysfunction (Ghiadoni et al, 2008). The goal of the acupuncturist is thus to improve circulation both locally and systemically. Hence the frequent strategy within acupuncture point prescriptions of combining locally acting points with those that work regionally and systemically.

Sustained systemic aberrations in blood flow are of two main types: too much blood on the inside and too much blood on the outside. Too much blood on the inside results in a relative excess of blood in the splanchnic circulation. This can create a problem if the viscera are already too acutely inflamed and congested. Meanwhile, there is simultaneously too little at the periphery of the body, allowing degenerative and chronic inflammatory conditions there to continue smouldering. These patients are often diagnosed with Blood Stasis in Chinese medicine.

The opposite problem also occurs, with a relative excess of circulation occurring in the peripheral structures and epithelia. A ready tendency to acute inflammation results, often at multiple locations within the gastrointestinal, respiratory and urinary tracts, joints, and skin. Meanwhile, too little circulation is located internally, under-serving parenchymatous abdominal organs. Chinese medicine often terms these patients as having Damp Heat.

Of the two conditions, internalization of circulation is the most common in humans. Too much blood on the inside is tied to hypertension in humans, a common problem that is a major risk factor for stroke and heart disease, two of the most frequent causes of death in humans in North America. Because of its medical importance, it is by far the more researched of the two conditions. The ability of a therapy to counter this circulatory tendency is measured through flow-mediated dilation (FMD) testing of the brachial artery in humans. Acupuncture (e.g. at Stomach 36) has been shown to improve FMD readings (Park et al, 2010) and thus can have a systemic vasodilatory effect.
The tendency toward hyperemia of multiple mucosal surfaces and peripheral tissues is less well researched but still has been confirmed to exist. These tissues sometimes just share a heightened responsiveness to systemic inflammatory mediators like histamine (Tur et al, 1998). Other researchers have observed, however, a cause and effect link between oral mucosal and skin circulation that is so significant as to constitute “an emergent coordination phenomenon” when it manifests clinically (Schmid-Schonbein et al, 1997).

One example of a coordinated circulatory phenomenon at epithelial surfaces is menopausal hot flashes. These appear to be mediated by a systemic increase in CGRP (calcitonin gene-related peptide) levels which, in turn, often raise nitric oxide levels to create peripheral vasodilation (Hay and Poyner, 2009).

CGRP is released by primary afferent neurons originating in the dorsal root ganglia. Primary afferent neurons, originating from the dorsal root ganglia, create a perivascular network of fibres around the arterial system throughout the body. When stimulated, these fibres cause a nonadrenergic noncholinergic (NANC) vasodilatation by release of calcitonin gene-related peptide (CGRP). This peptide is a potent vasodilator and, in this action, cooperates with nitric oxide (NO) in a tissue-specific manner (Holzer et al, 1995).

The palpable spread of a hot flash in a wave through the body underscores the ability of the dorsal root ganglia and the CGRP levels they control to increase epithelial circulation at multiple sites in a coordinated fashion.

Now that we understand the all-important influence of acupuncture on blood flow, the next question that comes to mind is how acupuncture points work to influence it. That is the subject of the next section.

The Balloon in the Car

To understand how acupuncture points work, consider for a moment the analogy of a balloon in a car. Imagine a child coming out of a store on a hot summer day, having just been given a balloon. Once back in the car, because it’s hot inside, his mother opens the windows a bit. Then she puts the car in motion. Immediately, the rush of air through the window starts bouncing the balloon around, causing the string to yank and tug on the child’s fist that is holding it.

We’ve all been that child, yet this model, so simple a child can understand and relate to it, appears to describe accurately how acupuncture points work to effect change in physiological and pathological processes.

Let’s start relating the analogy to acupuncture. Who’s the balloon? The answer is, the point itself. Acupuncture points are almost invariably aggregations of afferent and efferent nerve fibers, blood vessels, a mucopolysaccharide matrix, and collagen (Ifrim and Ifrim, 2005).
In addition, acupuncture points are commonly known to possess significant numbers of mast cells. It is their degranulation that starts the inflating of the balloon. Histamine released from mast cell granules leads to vasodilation and the formation of edema. The rush of blood and fluid into an acupuncture point swells the mucopolysaccharide matrix and collagen fibers that surround it. In so doing, it becomes the air in our balloon. Movement of the surrounding muscles then begins to move the point, the way the air moves our balloon as it streams into the car.

Who’s the string? Either fibroblasts or nerves. Acupuncture points are located where accumulations of connective tissue are more prominent. In effect they are nexi at intersections of multiple fascial planes (Langevin and Yandow, 2002). Collagen fiber stretch and deformation in response to the movement of our balloon is channelled by these fascial planes. It’s bouncing off adjacent muscle groups and fascia accentuates the signal even further (Julias, 2011).until the balloon is tugging hard on its string

What happens next is still being determined. All this yanking and pulling may stimulate fibroblasts in the connective tissue (Langevin et al, 2007; Jiang et al, 2009), possibly causing them to release nitric oxide. Circulation patterns then begin to change, first locally, and then more distantly as they are propagated in both directions along the vascular tree (Schmidt et al, 2008).

Alternatively, fibroblasts may not be involved at all. Instead, the tensile forces created by the bouncing balloon may simply depolarize adjacent nerve endings. The resultant nerve impulse leads to some shift in nitric oxide levels at a distant site, the target tissue associated with the point. Perhaps even both mechanisms, nerve endings and fibroblasts, are invoked as the balloon begins to bounce. Regardless, once nitric oxide levels change, so does blood flow, and with it pathology.

Patients Choose Their Own Points

Let’s summarize the mechanism we’ve discussed thus far. When pathology occurs in a body structure, nerve impulses are sent to the acupuncture point(s) reflexively linked to the disease site. These sympathetic efferents cause mast cell degranulation (Facoetti, 2006). Air then enters the point, or balloon, in the form of an increased blood supply and edema. Only some points become inflated, however, and these correlate very highly with their pathology and the points that would be expected to help.

Interestingly, with increased circulation the point becomes warmer than the surrounding area, such that it can even be visualized with infrared imaging. The practitioner can thus see on a patient using thermography which acupuncture points are ‘inflated’. From this they can make an educated guess about the nature of the pathology, but more importantly are provided with a list of points most likely to impact it. In effect, using tools like infrared imaging or even just the tremendous tactile abilities of the human hand, allows the acupuncturist to take advantage of a startling fact: patients ‘choose their own points’.
Proof of this concept has been demonstrated by a growing number of authors. A Russian study identified a strong correlation between the relative temperature of Yin Tang, as measured by infrared imaging, and the severity of intracranial hypertension (Ovechkin, 2003). The study based its conclusions on 3000 images collected from 1256 patients. In a related study, acupuncture points were pinpointed on the skin using thermal imaging, and observed to vary significantly in response to various disease states (Ovechkin et al, 2001).

Another study demonstrated points selected by infrared imaging produce superior treatment outcomes relative to points selected by traditional means. The study looked at Bell’s palsy, a facial paralysis condition arising from facial nerve inflammation. Since the damage is usually unilateral, we can reason that points most helpful in treating the condition will also be unilateral and on the affected side.

Using this logic, one group of sixty patients had their acupuncture points chosen using infra-red imaging. Points showing a one half Celsius degree difference between one side of the face and the other were needled on the affected side, with re-evaluation at each treatment. Efficacy of the acupuncture treatment was then compared to outcomes in 120 control patients where points were chosen according to the Chinese medical diagnosis rendered by practitioners. Patients with points chosen using thermography showed a significantly higher cure rate (68%) compared to the control group (46%) over the study duration (Zhang et al, 1991).

A dramatic difference was also seen in the speed of recovery for those cured cases, and the potential benefit of acupuncture thus made more clear, in a follow up study. Per the NIH fact sheet on the condition (http://www.ninds.nih.gov/disorders/bells/detail_bells.htm#109673050), Bell’s palsy typically requires three to six months to resolve, regardless of treatment. The average treatment duration for acupuncture to affect a cure when points were selected using thermography was 6 weeks (requiring 25 sessions). The control group required an average 79 sessions over 24 weeks (six months) (Zhang, 2007). One may thus argue that selecting points on the basis of the presumed Chinese medical diagnosis had no benefit at all, whereas using infrared imaging to select points markedly increased efficacy.

How Dolphins Treat Their Points

Summarizing all of the above information, we can now understand how dolphins have been treating their acupuncture points all these millions of years, before veterinary acupuncturists came along to help out. Imagine a dolphin with an unresolved pathological complaint. The associated acupuncture points become effectively inflated, such that normal bodily movements produce an amplified yanking and tugging on the point and its fascial and neural connections. In response to this motion, nitric oxide levels in the target tissue are altered, and with it its circulation. The pathology thus begins to resolve.

In the Bell’s palsy study, however, bodily movements were not enough to resolve the pathology of the patient. Perhaps they were too sedentary. Or perhaps there is not
enough facial movement to tug on the balloon, particularly if the facial nerve itself is paralyzed. Whatever the reason, the points stayed inflated and the pathology persisted, until the acupuncturist came along and needled the points.

Needling just amplified the yanking and tugging, such that a strong enough afferent signal was finally created that altered the circulation in the chronically inflamed facial nerve root. Displacement of tissues by acupuncture needles is, indeed, substantial (Langevin et al, 2004), and includes the winding of collagen fibers around needle.

In contrast, when all is working well, the points inflate and deflate as various conditions come and go, and no one is the wiser. We all thus treat ourselves using acupuncture points many times each day, and thousands of times a year, using nothing but our bodily movements.

Having elucidated this mechanism of acupuncture, we can immediately appreciate why it appeared and remained in so many phyla. A clear survival advantage must exist in being able to modulate potentially debilitating pain and inflammation with physical movement. Such a system allows the prioritizing of the immediate safety of the organism in its external environment over the completion of any internal inflammatory process. If survival dictates a wounded animal must take immediate evasive action to avoid predation, this system of mechanotransduction allows that escape to happen, through induction of analgesia and modulation of the inflammatory response. Such an adaptation appears of such fundamental value that we can easily understand how it appeared early and remained within all the branches of the evolutionary tree.

Similarly, we can easily see how Chinese medicine stumbled upon the use of physical movement or the application of external pressure to stimulate points, as an alternative to acupuncture. The current understanding of how acupuncture points work easily provides a western explanation for the purported health benefits of Tai Chi or Qi Gong, as well as those of massage, Tui-na, acupressure, and shiatsu.

References

1. Atochin DN, Huang PL. Endothelial nitric oxide synthase transgenic models of endothelial dysfunction. Pflugers Arch. 2010 Nov;460(6):965-74


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Rehab Techniques for the TCVM Practitioner Wet Lab Notes
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Introduction

TCVM practitioners are frequently presented with orthopedic and neurological cases and asked to provide acupuncture for these patients in order to relieve pain and return the patient to optimal health. Many of these patients require more than acupuncture to return them to full range of movement and full strength. Rehabilitation therapy integrates well with TCVM practice to help these patients return to peak performance.

Participants in this lab will learn:

1. Training available in rehab therapy.
2. Indications for rehabilitation therapy and its benefits.
3. Introduction to a rehabilitation assessment and lameness evaluation.
4. Introduction to modalities and equipment.
6. Protocols used for common rehabilitation problems.
7. Where to obtain various pieces of equipment and supplies and other rehab resources.

It is not my intent in this 3 hour lab to make you into rehabilitation therapists but to give you an idea of what is available in this new field and how you can use what you already know to help your patients.

Training in Rehabilitation Therapy

According to the American Association of Rehabilitation Veterinarians (AARV), a “rehabilitation-trained veterinarian is trained to evaluate the whole patient and not just focus on the perceived injury or illness. The rehabilitation-trained veterinarian has the ability to perform in-depth examinations, order diagnostic testing, and prescribe appropriate therapy to address the many different problems seen. Following evaluation the rehabilitation-trained veterinarian can perfect a treatment plan, monitor patient progress and adjust therapeutic recommendations to achieve success.” Veterinarians who hold a general license can be trained in rehabilitation and receive a Certification as a Rehabilitation Practitioner or Therapist depending on which program is taken. These certificate courses are offered by the Canine Rehabilitation Institute (in Florida and Colorado) website is: www.caninerehabinstitute.com and North East Seminars/University of Tennessee, website is: www.utvetce.com and the Healing Oasis Wellness Center, website is: http://www.healingoasis.edu.
Veterinary Sports Medicine and Rehabilitation is now a board certified specialty. The college has divided the specialty into a Canine and an Equine Specialty certification. Currently there are 47 diplomates of the college and residencies are available at various locations. For more information the website is here: http://www.vsmr.org.

Benefits of Rehabilitation Therapy

Rehabilitation has many benefits. Reduction in pain, swelling and post-operative complications and increased speed of recovery are important post surgery or post trauma. Rehabilitation therapy can improve strength, and build muscle for areas that are atrophied. It can improve range of motion for stiff joints and improve endurance and performance. Rehabilitation therapy can improve quality of life for patients and helps the owner feel involved in the recovery of his or her pet.

Indications for Rehabilitation Therapy

Many patients can benefit from rehabilitation therapy but these are the ones we commonly see:

1. Post-surgical or post trauma either orthopedic or neurological cases
2. Non-surgical intervertebral disc disease cases with pain or paresis, fibrocartilagenous embolism cases, or other dogs with spinal cord disease.
3. Osteoarthritis cases.
4. Geriatric dogs with neurological deficits, or degenerative joint disease
5. Vestibular disease.
7. Wound or pain management
8. Gait abnormalities --traumatic or congenital musculoskeletal problems

Introduction to Rehabilitation Assessment and Lameness Evaluation

This topic could encompass an entire lab or series of lectures but I have condensed it here. As a TCVM practitioner, you should be taking a thorough history and doing a complete physical examination in order to determine the pattern of the patient. In addition to your TCVM examination you should add the following questions to help with a rehabilitation assessment.

What is the intended use of the dog?
What is the trainer’s opinion of the injury?
What forms of treatment have already been used?
Is there anything (activity, exercise, sport) that makes the lameness better or worse?
Is the dog worse or better after exercise?
Have you added any new exercises, training or work activity?
Does the dog lay with the affected side down?
At which gait is the lameness most evident?
Any difficulty with stairs or jumping?
Any difficulty in getting in or out of the vehicle?

Remember your assessment starts when the dog walks in the door. Especially for dogs presenting for lameness, this may be the first time a veterinarian has actually watched them move. I am surprised at the number of animals that are referred to me for lameness where the referring veterinarian did not watch the animal move. Success in rehabilitation depends on an accurate physical diagnosis.

From a diagnostic perspective the rehabilitation therapist is making a PATHO-ANATOMICAL diagnosis as well as a PATHO-FUNCTIONAL diagnosis. This means that we seek the anatomical origin of the problem or in other words, “name the lesion” so we can figure out the functional impairment and its relationship with other structures and figure out “how to reduce the lesion” and improve function.

There are a few very simple test that I perform on each patient I am evaluating in order to pin point the lesion. Videotaping these sessions is very helpful, so you can go back and look at the patterns of movement at a later date. These videos then become part of the patient’s record.

**Sit to Stand:** Generally using a treat, I ask the dog to sit and then stand back up again. To name the lesion look for the following clues:

1. **Stifle pain**—These dogs do not fully flex the affected joint and may “kick out” the affected leg.

2. **Unable to stand squarely**—the dog may place the unaffected limb more towards the midline shifting the center of gravity and bearing less weight on the affected limb. The affected limb is usually abducted in order to decrease amount of weight on it.

3. **Hind Limb pain**—when standing the head is lowered and the back is arched in order to transfer weight to the forelimbs.

4. **Elbow pain**—elbows are abducted.

5. **Hock or carpal problems**—look for cow hocked stance or palmigrade or plantigrade stance.

**Side bending:** Place a treat at the dog’s shoulders, over his head, at his toes and by his hips. This is evaluating flexibility and neck or back pain. Dogs with neck or back pain will be unable to bend their spine in order to get the treat but will have to move their whole bodies.
Gait Analysis

It is important to evaluate the animal’s gait at a walk, trot, and canter or gallop. Lameness evaluation takes practice and time spent watching normal animals move. If you are a canine practitioner and want to learn more about gait evaluation, spend some time with an equine practitioner who does lameness evaluation. Many things cross over from species to species. It is easier in many cases to evaluate equine lameness as the animal is larger and the gait is slower. If this is not an option, try videotaping the gait so you can look at it frame by frame later to help with your evaluation.

Watching the animal at all gaits enables the practitioner to determine if the lameness is orthopedic or neurologic in origin. When evaluating lameness, it is advisable to do so in an area with good footing and few distractions. If weather permits, evaluating outside is helpful. Off leash evaluation is ideal but not always advisable. It is important to look at the patient from all angles and on different surfaces. Inclines and declines are also important.

A few tips for gait analysis:

1. Listen as well as watch—frequently you can hear scuffing or clicking of nails which may indicate neurological involvement.

2. Head bob are useful when determining front limb lameness. Remember the rule “Down is sound”. When the unaffected limb hits the ground, the head is down. When the affected limb hits the ground the head is up, transferring weight off the sore limb.

3. Short choppy gaits with front legs are indicative of cervical spinal disease.

4. With hind limb lameness, the pelvis is frequently inclined and the “good” leg tends to strike the ground with more force.

5. In the hind end the affected limb may have a shorter stride.

6. Be sure you understand how a dog normally moves through all its gaits so you can more easily identify the abnormal.

After the gait analysis is finished, the therapist has an idea of which limb is affected or if it is more than one limb. At this point a neurological exam as well as palpation of all the limbs, joints, spine and muscles should occur. It is best to start with the animal standing and palpate both front legs or both back legs simultaneously. It is at this point that thigh circumference is measured using a Gullick and conscious proprioception is evaluated in each limb. When you are palpating the legs appreciate...
swelling, pain, atrophy or joint effusion and note this. Do not forget to do your acupuncture point scan at this time to find active points as this may help with the diagnosis.

The next step involves placing the dog in lateral recumbency and moving and measuring each joint with a Goniometer. Individual muscles are evaluated at this time and a spinal/chiropractic examination is done as well. It is best to start with the unaffected limb and leave the affected limb for last. Be gentle and systematic. Work from the paw up towards the body. Don’t forget to check the pads. I was once asked to evaluate a dog for lameness that a thorn stuck in his pad!

Joint range of motion can be easily compared against a range of normals, so each joint can be objectively quantified. It is important to evaluate the muscles at this point. Most veterinarians are not well trained in muscle evaluation for weak, shortened, tight muscles or for myofascial trigger points. Muscle problems can result in lameness even though the bones are joints are normal.

Spend time evaluating both stifles for cruciate or meniscal injuries. Check the joint in extension. A normal dog will not resist this. Check for medial and lateral instability as well as medial buttress (a firm swelling on the medial aspect of the stifle which is indicative of chronic injuries to the anterior cruciate ligament (ACL)). There are several tests for insufficient cruciate injuries. Cranial draw test and tibial thrust are the most common. I will demonstrate in lab a new technique for checking for drawer that involves pinching the patellar tendon and moving the tibia forward.

An important test for the integrity of the meniscus is the McMurray test. This is a test that used by human physiotherapists in their patients to for meniscal tears but it does translate well into the canine patient. To perform this test the stifle is first flexed to 90 degrees or is fully flexed. The stifle is then rotated in and then extended into full extension. If there is a problem with the meniscus, this will result in pain and you will feel a clunk, click or catch. The test is repeated to check the opposite meniscus by flexing the stifle to 90 degrees or full flexion and then rotating the stifle out and extending the leg to full flexion. Another human test is the Inner Quadrant test where you put the stifle in full flexion and twist and grind in and out by rotating the tibia. This is not painful in a normal dog, but in a dog with a deficient meniscus it will cause pain and clicking.

The last thing to check in the stifle is the laxity of the patella in extension and flexion. It is important to check for both medial and laterally instability by exerting pressure on the patella from both sides.

Hips can be assessed by flexion and extension as well as direct palpation coxofemoral joint and some pelvic structures. Thumb pressure at the ischiatic notch caudal to the greater trochanter and external rotation of the limb will allow evaluation of the hip luxation. If the thumb is displaced by the greater trochanter then the femoral head is in place. Direct pressure on the ilium allows for evaluation of the SI joint as does palpation and motion of the sacrum.
A note about hind end lameness—be sure to check the iliopsoas muscles on both sides as this is an under diagnosed cause of hind limb lameness. To check this lay the dog on his back and extend both back legs. To test the iliopsoas internally rotate the hip. This places the muscle in tension and is painful if there is an iliopsoas injury.

**Modalities and Equipment Used in Rehab**

At the end of these notes is a list of equipment discussed and sources for the equipment and supplies. Following is a brief overview of what equipment is used in rehabilitation therapy. Massage, chiropractic and Tui-na will be discussed with manual therapy.

**Thermal Therapy**

This can be either hot or cold therapy. Hot thermal therapies are used to relieve pain, decrease muscle spasm, increase circulation and prepare a stiff joint for exercise. It should never be used over a large area that might cause temperature to increase, or in areas of infection, heat sensitive skin or in actively bleeding infections. It should not be used over reproductive organs or in cardiac cases or in areas of decreased sensation or when the animal is unable to move away from the heat source. They may be alternated with cold. Bean bags or oat bags such as are used in humans can work well. Do not use heating pads as can burn patients. Cover hot pack with a towel so no direct contact with patient.

Cryotherapy or cold packs are used to decrease pain and inflammation, reduce swelling, hemorrhage and for muscle spasms. Cold packs can be as simple as a bag of frozen peas or physiotherapy icers can be used. The Canine Icer is an example. Contraindications would be impaired circulation, regenerating nerves, chronic wounds and over the anterior neck and carotid artery. Do not apply directly to skin without a towel as can cause frostbite! Cold packs tend to be applied within the first 48 hours of injury or surgery and typically are left on for 10 to 20 minutes every 2 to hours. Game ready is an icer used by the agility community.

**Electrical Stimulation**

There are 2 types of electrical stimulation that are commonly used in rehabilitation therapy and these are Neuromuscular Electrical Stimulation (NMES) and Transcutaneous Electrical Neuromuscular Stimulation (TENS).

NMES is used for muscle atrophy either from disuse or neurological atrophy, joint effusion and for tendon and fracture healing. In general the NMES unit creates a low level electrical current muscle contraction. The electrodes are placed over specific muscle groups, with one electrode on a motor point and the pulse generator stimulates the muscles. The skin must be shaved first. The unit does not continuously stimulate the muscle but rather ramps up causes the contraction and ramps down.
TENS machines utilize higher or lower frequencies than NMES and are used for pain relief. TENS stimulates the descending inhibitory pathways and facilitates the release of endorphins. For acute pain the TENS is set for higher frequency and lower pulse, whereas for chronic pain it is lower frequency and higher pulse.

Higher frequency TENS selectively stimulates larger diameter peripheral nerve fibers that block nociceptive activity in the smaller afferents at the segmental levels. This causes an increase in endorphins in the blood and CSF and more enkephalins in the CSF. It also causes a decrease in substance P and glutamate in the spinal cord dorsal horn.

Low frequency TENS acts like acupuncture and stimulates a release of endogenous opiates. It activates the opioid, GABA, serotonin and muscarinic receptors to reduce the activity of the nociceptors in the dorsal horn. Peripheral opioid receptors are responsible for low frequency TENS analgesia (but not high frequency).

Contraindications for E-Stim are areas that are unstable due to fractures—you can use pain control but not muscle contractions, should not be used around the heart or in areas of impaired circulation. It is safe over implants.

Magnetic Field

Pulsed Electromagnetic Field Therapy (PEMF) is used to stimulate chondrocytes and facilitate cartilage repair. It also causes an increase in osteogenesis. As such it is indicated for bone healing, muscle spasm pain, degenerative diseases (arthritis) tendon healing, post op, neurological problems and infection. It cannot be used in the presence of a pace maker or hemorrhage and should not be used in cancer patients.

Ultrasound and Laser Therapy

Therapeutic ultrasound uses sound waves as pressure waves. It has heating and mechanical effects. It is indicated for muscle spasms, contractures, trigger points, tendonitis, soft tissue healing, bursitis, contusions, fracture healing and joint swelling. Contraindications are over a malignancy, over electronic devices, over the eyes, over areas of reduced circulation, over the carotid sinus. Biggest problem with ultrasound is the hair. Hair absorbs a lot of the energy and ultrasound requires gel.

Laser therapy could be an entire course unto itself. Many classes of lasers but basic principle is that 1 J = 1 Watt per second. The depth of penetration is determined by the Wavelength not the time. Higher power lasers give you a shorter treatment time but do not increase the penetration (depth). Pulse frequencies (Hz) are over rated. Lasers are used to treat pain, superficial wounds, ligament and tendon injuries, contractures and scars, bursitis, arthritis, hematomas and can be used on acupuncture points. Research shows that pain relief is due to anti-inflammatory mechanisms similar to NSAIDs. Laser has the ability to reduce oxidative stress and improve angiogenesis, augment collagen synthesis and skeletal repair and reduce nerve firing. Research comparing laser and ultrasound shows very similar results at increasing fibroblastic activity, increasing
collagen synthesis and increasing tendon healing. Big advantage with laser is no shaving is needed; no messy gel and treatment time is less.

Aquatic Therapy

Hydrotherapy or aquatic therapy is used by many rehabilitation practitioners. It has many advantages although it is not a magical treatment. Aquatic therapy allows the patient to exercise and move his joints in a warm, environment while bearing only 10 to 30% of normal weight. Pool therapy or Underwater treadmill therapy are the 2 most common aquatic therapies used. These therapies are great for strengthening, gait retraining and neurological rehabilitation.

Manual therapies

Manual therapies are very important in rehabilitation medicine. Passive Range of Motion (PROM), massage, stretching, joint mobilization and chiropractic techniques all have their place in rehabilitation therapy.

PROM-moving every joint in the way it was meant to go. This involves moving the joint through its physiological range and at the end of the range holding it for up to 30 seconds. After all the joints on one limb have been moved the entire limb should be moved.

Massage

Massage has many benefits particularly for the painful or paralyzed patient. Massage increases circulation and lymph flow. It is used to break down adhesions, relieve muscle spasms, provide relaxation and analgesia. Massage can be used as ‘homework’ for the owner and involves them in their pet’s therapy. Massages have an opening, a middle and an ending.

Opening--use Passive Touch to lay hands on the dog, soothes nervous animals, there is no movement or pressure. Stroking with fingertips, and palms from front to back of dog-soothing motion. Effleurage a sliding stroke with whole hand to get patient ready for deeper work.

Middle--Circles--circles with your hands and digits. Compression starting at the paw and working up. Cross friction Thumb glide

Closing --Stroking, and Effleurage

Stretching--recommend after exercise or work. Put all joints in flexion or extension.
Joint Mobilizations

Entire courses are taught to human physiotherapists on joint mobilization or Maitland techniques. Graded 1 to 5 depending on amount of movement and speed. Grade 1 and 2 are for pain relief and are small motions. Grade 3 and 4 are larger movements and mobilize or move joints. Grade 5 is actually a chiropractic adjustment.

Chiropractic

Chiropractic techniques have a definite place in animal rehabilitation. When the spine is not aligned, then the muscles and joints are not firing at the correct frequency. This leads to pain and musculoskeletal compensation. Chiropractic adjustments restore proper neurologic and biomechanical function. Training in chiropractic is available at Options for Animals (www.animalchiro.com) or Healing Oasis Wellness Center (http://www.healingoasis.edu).

Therapeutic Exercises

These are done to improve strength, endurance, proprioception, and co-ordination. Many focus on increasing range of motion, strengthening muscles, and reducing muscle atrophy. Warm ups can be done by rubbing patient down or with hot packs. Cooling down can end with relaxing massage. We will practice these exercises in the lab

Exercises for Proprioception

Theraball
Weight shifting
Balance on Ball with feet on Treadmill
Wobble Board

Weight Bearing

Loving on the Stairs
Superdog
Wobble board against the wall
Sit to stand
Resisted Standing

Techniques for the Immobile and Recovering Neurological Patient

As acupuncturists you are already seeing a number of neurological patients. Other than acupuncture, you need to be able to do something to help these patients. Here is a list of things to think about and that I will do with many of these patients.

1. Pain management--assess pain and use whatever methods are necessary to relieve it. This can include TENs, acupuncture, herbals, hot and cold packs, massage or pharmaceuticals. Do not let them hurt!
2. Set up a rolling schedule for the owners to avoid pressure sores. Pay attention to soft bedding. Reposition the patient every 1 to 2 hours if they are not able to do it themselves.

3. Hygiene is extremely important. Pay attention to the bladder. Use diapers, express the bladder and watch for UTIs as these are very common in paralyzed patients. The bladder should be expressed multiple times per day.

4. Neurological stimulation techniques should be done minimally 3 times per day. These exercise include but are not limited to PNF patterns, vibration (a small electric vibrator can be used to help muscle stimulation), tapping over the muscle belly, placing the patient in a standing position (can use a cart or sling if necessary, but assisted standing is very important) and joint compressions. Petting and grooming work for tactile stimulation.

5. Tellington Touch or Tellington wraps help to connect the front and back of the body

6. Ball exercise with or without the NMES. Ball rocking is great to elicit Paraspinal contractions.

7. Use carts or assistive devices to help with lifting.

8. Hydrotherapy if available.

9. Don’t forget booties as they recover.

10. Be cautious with unstable patients i.e. those dogs that have had disc prolapses but not surgery.

Physiotherapy Treatments for the DM Patient (after Laurie Edge Hughes)

This protocol was taken from Kathmann et al (2006) J Vet Intern Med.

**Active Exercise**--5 to 10 minutes at least 5 times per day  
*Sit to stand, slow walking, weight shifting, uphill walking*  
*Correction of paw placement may be needed*

**Passive Exercise**- 3 times daily, 10 times each  
ROM

**Massage:** 3 times per day  
*Start and finish with stroking, kneading massage distal to proximal*

**Hydrotherapy:** 1 or more times/ week for 5 to 20 minutes  
*Swimming or UWTM, assist as needed*  
*Weight shifting in the water*
This regime yielded a mean survival time of more than 4X that of dogs that did not receive treatment and twice as long as dogs that received UWTM once weekly and 3 times per day walking.

Post-Op Protocol for Cranial Cruciates

**Day 1 to 7 Post Surgery:**

Anti-Inflammatory Drugs and Pain Killers: Give the medication as instructed. This will help reduce pain and encourage early usage of the leg.

Massage: Reduces pain, muscle spasm, swelling and helps your dog to relax. Using a kneading circular motion, work on the muscles starting from the toes up to the hip. Work for 5-10 minutes 3 times per day prior to starting exercises.

Passive Range of Motion (PROM): 2 to 3 times daily. Movement of the knee is important immediately after surgery to increase healing and reduce swelling and pain. Place your dog on its side with the affected leg up. Start with flexing and extending the joints above and below the knee joint. Only flex the knee to the point where discomfort is shown. Then move the entire leg to simulate a normal stride. Do 10 repetitions of each joint 2 to 3 times daily.

Icing: 2 to 3 times daily after the exercises for 15 minute sessions. If your dog is sensitive to the cold, you can wrap the gel pack in a thin towel. Preferably ice after each exercise session or walk.

Walks: Your dog should not be outside off leash for at least 3 months. Depending on your dog, you can start light exercise the day after surgery. Short walks (5 to 10 minutes) on leash ONLY, on even terrain, a few times per day will increase circulation, encourage early weight bearing and discourage boredom. If your dog is unable to fully weight-bear, it should be supported with a towel or sling around the abdomen held from above.

Laser Therapy: Laser therapy has been used in humans for many years. Laser therapy works by applying light energy at the cellular level to stimulate the cells and promote healing, increasing blood flow and reducing pain. It is non-painful and is applied several times over the 3 week post-operative period.
**Days 7 to 21: 2 visits per week**

Cartrophen Injections: Cartrophen VetR (pentosan polysulphate) can mimic the cartilage-nurturing effect of glucosamine. This product provides pain relief because it helps repair cartilage damage, it boosts the synthesis of hyaluronic acid (the main component of joint fluid), and it inhibits the enzymes which contribute to inflammation. There are no significant side effects from Cartrophen. Injections are given once weekly for 4 weeks then every 6-8 weeks for life if necessary. For more information: [www.arthritis.au.com/DMOAD.2006.FINAL.pdf](http://www.arthritis.au.com/DMOAD.2006.FINAL.pdf)

Neuromuscular Electrical Stimulation: Your dog may receive muscle stimulation sessions starting one to two weeks after the surgery. This involves placing electrodes on the thigh muscles and creating contractions to strengthen and help prevent muscle loss. We are able to show you how to use this device and send you home with one so treatments can be done daily for more benefit.

Suture/Staples Removal: About 10 to 14 days after surgery, we will remove the staples/sutures and recheck the incision for any infection, swelling or fluid build-up.

PROM and Massage: Continue range of motion and massage 2 times daily. If your dog is using the leg well the range of motion exercises can be decreased.

Weight Shifting: On a floor with good footing, with your dog in a standing position, rock the pelvis back and forth so that weight is forced on the affected leg. Start lightly first and increase force as your dog becomes more comfortable. You can also apply rhythmic downward compressions on the pelvis to stimulate weight bearing. Do 10 repetitions 3 times daily.

Underwater Treadmill Walking: This will be started soon after the stitches have been removed (about 3 weeks post op). This encourages early weight bearing due to the buoyancy in water and also it allows early strengthening due to the resistance of water. This should be done 2-3 times per week. Actual swimming should not start until after 4-6 weeks in an Extra Capsular Repair and 8 weeks in a Tibial Plateau Leveling Osteotomy (TPLO).

Walks: Increase by 2 to 5 minutes each week if your dog is doing well. If your dog shows any signs of soreness, reduce amount of time.

Ice/Heat any time after exercise that your dog seems to be more stiff or sore go back to icing for 15-20min. If the increased lameness continues then cut back on exercise and call us.

If your dog seems stiffer after rest then heat can be used before exercise. Soak a towel in hot water that will be tolerable and wrap it around the knee for 10 minutes. Reheat it if it gets cool.
Day 21 to 4 weeks: 2 visits per week

PROM and Massage: Continue range of motion and massage 2 times daily. If your dog is using its leg well the range of motion exercises can be stopped.

Walks: Increase by 5 minutes each week if your dog is doing well. If your dog shows any signs of soreness, reduce amount of time.

Sit to Stand: On a floor with good footing, ask your dog to sit and tuck the knee as close as possible to the body. Then ask your dog to stand as slowly as possible thus causing it to put weight on the affected leg. Do 5 repetitions 3 times daily.

Weight Shifting: On a floor with good footing, with your dog in a standing position, rock the pelvis so that weight is forced on the affected leg. Start lightly first and increase force as your dog becomes more comfortable. You can actually apply enough force so that your dog takes small sideways steps to each side. Do 10 repetitions 3 times daily.

Unilateral Weight Bearing: Lift the unaffected limb off the ground. Hold for 10 to 15 seconds. Move the foot around and put your dog off balance if he/she tries to lean on your hand. Another way to do it is to tape an object (like a pen or syringe cap) under the uninvolved foot to force full weight on involved side – only do with supervision.

Circles and Figure of Eights: While on a leash, get your dog on your left side and then walk in tight circles and figure of 8’s. This encourages weight bearing on both legs and increases strength and balance.

Weeks 4 to 6: 2 Visits per week

Introduce Slopes and Uneven Terrain: Increases weight bearing and rebuilds muscles. Walking up hills in a straight line really accentuates back and thigh muscle development. Zigzagging up hills increases balance and strengthening as well. Walking across hills forces weight on to the downhill leg.

Stairs: Starting after week 4, encourage your dog to go upstairs slowly. This encourages weight bearing. Use a leash if necessary to ensure your dog does not go up too fast. Slower is better. Start with 5 repetitions 3 times daily and increase by 5 reps every week.

Underwater Treadmill/Swimming: 4 to 6 weeks after an Extra Capsular Repair and 8 weeks after a Tibial Plateau Leveling Osteotomy (TPLO) deep water swimming can be added. This enhances cardiovascular strength and allows the use of more muscle groups then when walking on the treadmill. Many dogs find it more stimulating to swim for toys then just walking. We combine treadmill and deep water swimming to maximize the benefits.
Weeks 6 to 12: 2 visits per week

Dancing: Pick up your dog’s front feet and have him/her walk several steps forward and backwards. The higher that you lift the front legs the more weight is placed on the back legs.

Tug-of-War or Harness Pulling: This is one time that a dog that pulls on the leash can be useful. If your dog likes to play tug-of-war then use it. When he is pulling backwards that is a great balance and strengthening exercise. Or if she pulls on the leash resistance while pulling is a hind leg strengthener. Using a harness would be best to prevent pulling on the neck.

Land Treadmill: We can introduce the land treadmill at this time for greater intensity of work out. It can be inclined and have the speed increased. After your pet becomes comfortable on the treadmill, you can run it yourself at the SPAW or at home if you have your own treadmill.

8 Weeks after a TPLO repair we will take x-rays to bone healing. After 8 weeks and with healing well on its way we can really increase the exercise in intensity and duration.

Continue to increase exercises. Increase repetitions and length of walks. At this time the surgery should be mostly healed and stable and so strength exercise can be increased. After week 12, you can let your dog off leash for short periods of time. If any limping or soreness becomes evident, ice the knee for 10 to 15 minutes and reduce exercises. After 4 – 5, months full exercise can be resumed.

Resources and Equipment List

This is my list of suppliers for rehab equipment and related supplies. This is not an exhaustive list.

Electrotherapeutic Modalities and General Supplies

* Able Pet--a comprehensive resource of products and services [www.ablepet.com](http://www.ablepet.com)
* Health -Med Servi System ( B. C.) 1-800-248-1661
* Sissel Gymballs--[http://www.sisselshop.ca](http://www.sisselshop.ca)
* Respond Systems--PEMF beds and wraps, Class III and IV Lasers. [www.respondsystems.com](http://www.respondsystems.com)
* GNR--Ocala, FL-[www.rehabshopper.com](http://www.rehabshopper.com)
Orthotics, Prosthetics, Wraps and Custom Support

* Ace Ortho solutions and Balanced Canine Products
  www.aceorthosolutions.com
  www.balancedcanineproducts.com
* K9 Orthotics and Prosthetics--custom orthoses and prostheses and wheelchairs
  www.k-9orthotics.com
* Orthopets--www.orthopets.com
* Thera-Paw- standard and custom assistive and rehab devices
  www.therapaw.com
* Doglegs--custom assistive wraps, supports and devices
  www.doglegs.com
* OrthoVet Splints--www.orthovet.com

Wheelchairs

* Eddie’s Wheels www.eddieswheels.com
* Doggon’ Wheels www.doggon.com
* K9 Carts www.K9carts.com
* Deweys Wheelchairs for Dogs www.wheelchairsfordogs.com
* K9 Orthotics and Prosthetics--custom orthoses and prostheses and wheelchairs
  www.k-9orthotics.com

Slings, Booties, Harnesses, Life jackets and Diapers

* Walkabout --www.walkaboutharnesses.com
* Help em up Harnesses--helpemup.com
* Ruff wear--booties, float coats and Webmaster Harnesses www.ruffwear.com
* Sam’s Dog Hut--diapers and incontinence bands www.samsdoghut.com

Treadmills

Land treadmills- *Jog A Dog-www.jogadog.com
  *PetZen/ Dog Tread--www.pwtzenproducts.com

Underwater Treadmills

* Hudson Aquatics--www.hudsonaquatic.com
* Oasis Underwater Treadmill--http://www.h2oforfitness.com

Lasers

* Respond Systems--www.respondsystems.com
* Cutting Edge--http://www.celasers.com/veterinary
* Spectravet--www.spectravet.com
REFERENCES


Can Myofascial Kinetic Lines be an Anatomical Foundation for Acupuncture Meridians?
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Introduction
This is an introduction to the concept of myofascial kinetic lines that are believed to be deeply involved in the functional part of the locomotion system. The lines have been verified by dissection of over 20 horses at University of Copenhagen. To provide a holistic biomechanical understanding that can be compared to the philosophy of TCM, theory of connective tissue in general, fascia, the concept of tensegrity and normal spinal biomechanics will be viewed. It will also be shown how myofascial lines lies very close to acupuncture meridians in horses, the eight extra meridians will be viewed in relationship to the lines and finally different treatment approaches will be discussed.

Connective tissue
Myofascia is for many the “forgotten” or even unknown tissue. When I followed the anatomy course at the veterinary school we dissected the entire fascia away so we could expose the muscles, vessels and nerves – “the real stuff”. We were not taught that fascia had much biomechanical function.

Fascia is part of the connective tissue that arises from the mesoderm in the embryo. At 17th day after gestation the mesodermal cells starts to develop and divides in the paraxial mesoderm which later shapes the axial somatic structures and the intermediate mesoderm that builds the visceral and parietal layers covering the viscera and the body cavities. Intermediate mesoderm can be viewed as a double back. From the mesoderm the mesenchymal cells develops and specializes into many types of cells such as blood stem cells, myoblasts, fibrocytes, osteocytes, chondrocytes, masts cells, fat cells, reticulum cells and endothelial cells. They form different connective tissue types like adipose tissue, soft interstitial tissue and muscles as well as dense connective tissue like fascia, tendons, ligaments, aponeurosis, bone and cartilage. Connective tissue consists of fibrocytes and fibroblasts in an extracellular matrix containing collagen, elastin and reticulin fibres (in variable amounts) as well as interfibrillar proteins such as glycosaminoglycans and proteoglycans. Collagen itself shows up in many molecular and architectural variations. In fascia interwoven collagen fibres are the major component. In general the different types of connective tissue are woven into all the tissues of the body as a large continuous web (1).

In the muscle the single muscle cell is covered with a layer of connective tissue, the endomysium. Around bundles of muscles fibres perimysium forms a fascicle and
At muscle/tendon attachments and intersections such as at the coxal tuber or calcaneus it is possible to release the connective tissue from the bone by blunt dissection and still maintain the myofascial connections. This shows that a bony attachment is not a final “station” for the muscle/tendons but function as an anchoring point and a connection point to other structures from where the forces can continue. The fascia sheets surrounding the muscles also continue into fascia sheets from other muscles and distributing strain and forces in several directions - and seen in a larger perspective- keep the whole body together. Myers (2) refers to the muscles as “one big muscle in 600 bags” describing the interstitial connective tissue as a big web-like bag. From this point of view the anatomical reductionist way of describing a muscle and its function with origin, insertion and specific single function is outdated. It is convenient for explaining single structures but not for describing body locomotion.

The myofascia which surrounds the muscles and the body acts as sleeves and can become tight due to the fact that fascia has a contractile property. Fascia has long been thought to show some plasticity but still to be inelastic and non-contractile. Myofibroblast cells – a “middle ground” between smooth muscle cells and fibroblast cells can provide contractile forces in fascia. They can provide long-duration, low-energy consuming contraction without nervous stimulation but induced by a) mechanical tension in the tissue b) pharmacological components such as histamine, mepyramin and oxytocin (contraction) and nitric oxide (relaxation) together with cytokines. Also the pH of the tissue influences the contractility where a low pH induces contraction. The contraction happens very slowly over 20–30 minutes and lasts for more than one hour and the fascia get stiff and tense due to the myofibroblasts pull on the matrix components (2).

Tensegrity

To further understand this continuous connective web the concept of tensegrity is important. It is described by the designer R. Buckminster Fuller. The word is a composition of “tension integrity” meaning a construction or structure that can hold its shape (integrity) by a combination of tension and compression forces in balance. In Fullers own words: “tensegrity describes a structural relationship principle in which structural shape is guaranteed by the finitely closed, comprehensively continuous, tensional behaviors of the system and not by the discontinuous and exclusively local compressional member behaviors”. “Finitely closed” meaning that the structure is not anchored to anything like a trampoline or a spider web is, but balances itself. Fuller also says: “continuous tension around localized compression” (2, 3). A tensegrity model can be built of pins (compression structures) and elastic band (tensional structures). The compressed members are not touching each other and the tensioned members delineate...
the space. The structure collapses if the compression members do not push out and holds up and it falls apart if the tensioned members fail to pull inward and hold together. When force is applied to one area of a tensegrity structure the forces are distributed to the whole structure and in that way the structure adapts to different changes in context and pressure of the surroundings.

A lot of natural structures such as cells, water molecules, carbon atom and even living beings have tensegrity architecture. It is described by Ingber (4) and Levine uses the word biotensegrity (5). When we look at the body as a tensegrity structure with the connective tissue as the tensional members, it is easy to understand that injury or overstrain in one area can cause symptoms in another. An injury which may happen to one area spreads due to the tensional forces through the whole body and symptoms can show up at the body’s weakest link. Put into a TCM concept the injury is an external excess and the weak link is an area of deficiency. Pain (excess) can arise in one area but the cause of it comes from another place (the deficient area).

Figure 1a: Simple tensegrity model, children’s toy.

Figure 1b: Same model with compression applied to it.
Biomechanics of the spine

To understand the function of the kinetic lines, basic knowledge of normal spinal biomechanics are essential. It is common knowledge that movement of the spine and the single vertebrae’s happens in several planes at the same time. A neutral position of the spine is according to Freyette when the facet joints are not engaged. In a non-neutral position the facet joints are engaged as in flexion or extension. These two motions can occur independently in a standing position, but lateral flexion and rotation cannot be separated, they are always coupled. Flexion, extension, lateral flexion and rotation alter continuously in balanced movement but if there are restrictions in areas of the spine some of the movements can be absent. As an example if a horse is hyperextended in the neck and back it cannot flex the spine or if it is static lateral bend to the left it cannot lateral bend to the right.

Kinetic lines

Different writers have described myofascial kinetic chains or lines as rows of interconnected anatomical structures in the locomotion system that describes motion. Thomas Myers, the author of “Anatomy Trains”, is to my knowledge the first who has dissected human bodies to show these lines. His results are not published in previewed scientific papers but the DVD following the book shows the dissections very well. He describes 10 lines, 5 from head to toe (or the other way around meaning that there is no definition of beginning or end) Superficial Back Line (SBL), Superficial Front Line (SFL), Lateral Line (LL), Spiral Line (SL) and Deep Front Line (DFL), 4 on the arms: Superficial Back Arm Line (SBAL), Superficial Front Arm Line (SFAL), Deep Back Arm Line (DBAL) and Deep Front Arm Line (DFAL) and one from forelimb to hind end: Functional Line (FL).

Different motions can be described by activity of single lines but it is important to remember that no line works on its own; the lines are still interconnected according to the description above. It will also be shown by the fact that several lines share the same myofascial structures and/or bony anchoring points.

When dissecting the lines certain rules are followed: The fibres need to have the same functional direction, they have to be at the same depth and the function has to be similar. Most of the connections are purely connective tissue and fascia but in some places they are mechanical connections passing over bone.

Research project

Dr. Vibeke S. Elbroend and undersigned has conducted a dissection study in equines in order to verify related lines. We have dissected 20 horses where we have followed the lines.

Superficial Back Line (SBL) in humans includes the plantar fascia and short toe flexors following the posterior leg muscles to the sacrotuberous ligament over the erector
spinae muscles and ending at the epicranial fascia over the eyes. Contraction of the line flexes the toes, stretches the foot, flexes the legs and extends the hips and whole spine. The antagonistic line to SBL is the Superficial Front Line (SFL) that includes the dorsal toe tendons and muscles following the anterior leg muscles over the patella along the quadriceps muscles over the pelvis to the straight abdominal muscles continuing through the sternochondral fascia to the sternocleidomastoid muscle and to the scalp fascia. Contraction of this line extends the toes, flexes the ankle, extend the legs, flex the hips and the whole spine.

We have named the lines differently to Thomas Myers due to the differences between bipeds and quadrupeds. The SBL is the Superficial Dorsal Line (SDL) and the SFL is the Superficial Ventral Line (SVL). These two lines have similar courses in horses as in humans. The SDL consist of the flexor tendons and suspension ligament on the hind limbs and runs proximal over the Achilles tendon to the biceps of the thigh and into the sacrotuberous ligament of the pelvis. It continues along the erector spinae muscles and the neck muscles to the temporal fascia and muscles of the head. The SDL is the line that extends the spine and hips and flex the hind legs. SVL consist of the extensor tendons and muscles continues through the patella and its ligaments along the straight quadriceps to the pelvis and to the hip joint. It goes into the straight abdominal muscles to the straight thoracic muscles, pass through the sternomandibular muscles and end at the head. The SVL act as an antagonist to SDL and flexes the spine and hips and extends the hind legs. They describe the motion around the horizontal axis. The two lines show a big part of the Bow and String theory as described first time by Sleijper in 1946 (8) and by later authors (9). The bow and string lines in this study are more extended than the description by Sleijper because the two antagonistic lines fuse at each end. It makes it even clearer why the correct balance between them is so important for optimal posture and function. Hypertension in the SDL (spinal hyperextension) can force the horse to position the hind limb camped out and the opposite happens if the SVL is hypertonic and the spine hyperflexed – the hind limbs will be standing under.

The movement around the vertical axis is the lateral flexion of the body and it is described with the Lateral Line (LL). It has to work with the spine both in extension and flexion so it has two courses at the neck and lumbar area depending of the horizontal position of the spine. It follows the third fibular muscle from the hock proximally to the collateral lateral ligament of the stifle into the tensor muscle of the fascia lata and the superficial gluteal muscle to the coxal tuber where it changes direction from vertical to horizontal following the external abdominal muscles to the ribs continuing through the intercostal muscles to the splenius muscle and the sternocleidomastoidoeus muscles. It ends at the mastoid process and mandible. Together with the SDL and the SVL the LL outlines and supports the body balance.
The movement around the sagittal axis is the rotation of the spine. It is described by two helical lines in Anatomy Trains; the Spiral Line (SL) and the Functional Line (FL). Both lines have points where they cross over at the midline and thereby can initiate rotational movement. From the splenius the SL crosses over the midline proximal to C6 – 7 into the rhomboid muscle and continues into the thoracic ventral serrate muscle on the medial side of scapula. From there it continues into the external abdominal muscle and crosses the white line to weave into the internal abdominal muscle on the opposite side, then continuing to the coxal tuber joining the fascia lata and goes on distal to the lateral extensor muscles and into the tendons. Here it turns to the plantar surface just above the hoof proximal to the Achilles tendon, onto the caudal head of the biceps muscle of the thigh and into the sacrotuberous ligament to the sacral tuber. Here we suggest unlike Myers (in humans) that a third crossover takes places before the line follows the SDL to the head.

The FL starts with the latissimus dorsi muscle continuing into the thoracolumbar fascia crossing over the lumbar vertebrae and continues into the gluteal fascia, to the superficial gluteal muscle and fascia lata to the collateral lateral ligament of the stifle. Here it crosses over distal to the joint into the medial collateral ligament and crural fascia proceeding proximal to the adductor and gracilis muscles. The gracillis muscle crosses over at the pubic bone at an aponeurosis, the line continuing into the straight abdominal muscle and ends in the deep pectoral muscle.
If the helical lines are unbalanced it might compel both front and hind limbs in external/internal rotation and/or in abduction/adduction.

![Figure 3: Spiral Line](image1)

![Figure 4: Functional Line](image2)

Arm Lines in humans and Front Limb Lines (FLL) in horses describes the movements of the front extremities. In humans T. Myers have two superficial and two profound lines, we have described a Front Limb Protraction Line (FLPL) and a Front Limb Retraction Line (FLRL). The Protraction Line consist of the muscles rotating the proximal part of scapula caudally – brachiocephalic and trapezius muscles, continuing in the muscles cranial to the scapular spine onto the cranio-lateral part of radius into the extensor tendons and ending on the dorsal surface of the toe. The Retraction Line includes the muscles pulling the proximal part of scapula cranially – rhomboid, deep pectoral and latissimus dorsi, continuing over the elbow to the flexor muscles and tendons and ending at the palmar surface of the toe.

The two lines act antagonistic to each other so when they are both in balance, they keep the front limbs straight vertical under the body. A hypertension in the retraction line
forces the horse to stand under with the fore limbs and a hypertension in the protraction line forces it to campe the limbs. We suggest that if the tensegrity concept is applied to these postures it can be said, that at the standing under position the compression forces are predominant and in the camped posture the tensional forces are predominant. Motion of these two lines is closely linked to the other lines.

Figure 5: Front Limb Protraction Line (blue) and Front Limb Retraction Line (green)

This was a description of the exterior body locomotion. The Deep Front Line in humans and the Deep Ventral Line (DVL) in horses connect the exterior and interior. DVL contains the deep flexor tendon into the inner thigh with the gracilis and sartorius muscles to the pubis bone. Here it split up in three pathways. One follows the abdominal wall, another following the inner structures of the abdominal and thoracic cavities and the last one running along the ventral structures of the vertebras. They all end at the cranium.

The most ventral paths follow the inside of the ventral part of the abdominal wall to sternum and continue through the sternothyroid muscles to the hyoid bone and ending on the mandible. The middle path follows the fascia of the Sartorius muscle meeting the iliopectoas muscle, continuing in the crus of the diaphragm and the diaphragm itself. From here it passes through the mediastinum and pericardium, out of the thoracic outlet, following the scalene muscles and along trachea and oesophagus to pharynx/larynx. From here it is ending at the base of the occipital bone. The dorsal paths follow the ventral spinal longitudinal ligament on the ventral surface of the vertebrae to the longus colli muscle and attaches at the base of the skull. We assume that this path may be another way to the cranio-sacral system, from the ventral part of the sacrum to the ventral part of atlas and to the base of the cranium.

Contraction of the DVL may possibly occur, secondary to visceral pathology: According to the anatomical course of the line it can affect the whole spine and limb
posture and possibly also the cranio-sacral system. Also the diaphragm can be affected
and can create both respiratory dysfunction and back/rib pain and hypomobility. As the
iliopsoas muscles are involved in the line contraction of DVL can influence lumbar,
sacral, pelvic and hip mobility. Jean-Paul Barral (11) describes visceral mobility and
motility as important for optimal visceral function which may also be disturbed. It means
that motion dysfunction in one organ can affect other organs just as TCVM philosophy
claims.

Can myofascial kinetic lines be an anatomical foundation for acupuncture
meridians?

Langevin and Yandow (12) investigated the hypothesis that acupuncture points
are situated over fascial planes. They marked locations of acupuncture points and
meridians on a human upper arm and made serial cross sections, each section measuring
1 cun and then they described the underlying tissue. More than 80% of the points and
50% of the meridian intersections appeared to coincide with intermuscular or
intramuscular connective tissue planes. They write: ”These findings suggest that the
location of acupuncture point, determined empirically by the ancient Chinese, was based
on palpation of discrete locations or “holes” where the needle can access greater
amount of connective tissue.” And: “On the basis of these findings and our previous
experimental results (Langevin et al. 2001b.2002) we propose that acupuncture charts
may serve as a guide to insert the needle into interstitial connective tissue planes where
manipulation of the needle can result in a greater mechanical stimulus”.

Darsher (13) has made a computerized visualization comparing Anatomy Trains
with the 12 Principal Meridians and find that 8 out of 9 (89%) lines has a substantial
overlap and he concludes:” The strong correspondence of the distribution of the
acupuncture and myofascial meridians provides an independent, anatomic line of
evidences that acupuncture Principal Meridians likely exist in the myofascial layer of the
human body”. It must be remembered that the myofascial lines are not thin lines but
wider surfaces.

According to this way of thinking the superficial lines correspond to the Yang
meridians and the deep line to the Yin meridians. We find that the SDL correspond very
good to the Bladder Meridian and the SVL to the Stomach Meridian. The starting point
around the eye lies on fascia of the face. The ST meridian follows the SVL nicely along
the sternomandibular muscles and the abdominal wall according to van den Bosch (14)
and it ends over the insertion of the extensor tendon on the hind limb in the stomach ting
point ST 45. The SDL follows the BL meridian over the semispinal and longissimus
muscles of the neck and head to the erector spinae muscles: longissimus dorsi, iliocostalis
and spinal muscles. The two branches of the BL meridian lie in the interstitial space
between these muscle groups. Over the croup the bladder points lies on the gluteal
muscle but the SDL follows the sacrotuberous ligament of the pelvis below that muscle
so here is a slight deviation. The meridian continues in the space between the caudal head
of the biceps of the thigh and semitendinosus muscles. Both of these muscles are part of
SDL. From BL 39 the meridian deviate lateral between the lateral gastrocnemius and the
Achilles tendon both structures of the SDL which continues over the calcaneus to the flexor tendons onto the plantar surface of the toe so here is also a slight deviation.

The Gallbladder meridian follows the LL very well although it starts at the 3rd fibular muscle and not above the hoof. The different branches of the 3rd fibular muscle enclose the hock. GB 40 lies on the lateral branch which inserts on the 4th metatarsal bone. Its muscle belly lies under the interstitial space between the two lateral extensor muscles where the meridian passes over. Both LL and the GB meridian run over the lateral part of the stifle, which the fascia lata of the tensor muscle covers. At this point the GB seems to continue more caudal than the LL but it is still over the same fascia. At the coxal tuber they are taking the same path following the abdominal muscles along the side and over the ribs to the neck. Here LL has two pathways over the brachiocephalicus and splenius muscles and the meridian follows the interstitial space between them. The myofascial line ends at the mastoid process just caudo-ventral to the ear which is very close to GB 2.

The meridian system has no helical lines that cross the midline, the only transverse meridian is the girdle vessel or Dai Mai and it cannot be compared to the helical lines in course or in function. Darsher (14) finds that the SL is a combination of the ST and BL meridians which we partly agree on but they do not explain the crossing over the Governing Vessel and the Conception Vessel.

The name and the course of DVL points to the Foot Yin meridians; Kidney, Liver and Spleen which all passes over the medial aspect of the hind limb and enter the pelvis. The descriptions of the internal branches of these meridians are not so precise and can be a little hard to compare with the three pathways of DVL. Here it is necessary to remember the embryological origin of the serous membranes already mentioned. With one continuous net covering the inside of the thorax and abdominal cavities and the surface of the viscera, so maybe they are hard to distinguish. The internal branches of the SP meridian reach the oesophagus and end in the centre of the tongue which put it closes to the middle DVL pathway. The KI meridian also seems to follow the middle pathway but curves ventrally and end at the root of the tongue, which is closer to the ventral pathway. The LIV meridian ends in the eye and continues to the GV so here it is closest to the dorsal branch. It is also possible to look at the Eight Extra Meridians to explain the abdominal/thoracic part of the DVL. The Governing Vessel (Du Mai), Conception Vessel (Ren Mai) and the Penetrating Vessel (Chong Mai) is according to Maciocia (15) considered as three branches of the same vessel. The vessel originating from the space between the kidneys from where it flow down to the perineum before they separates. They are thought to affect the energy on a deep constitutional level. The CV follows the abdominal midline, GV the midline of the back and the Penetrating Vessel the KI meridian, but it is only correct if the GV follows the ventral part of the spine.

We have not found it possible to identify superficial (Yang) and deep (Yin) front limb lines but we find that the retraction line placed on the palmar aspect of the limb includes the Yin meridians as the Yin Ting Points are on the more palmar surface of the toe and the meridians are continuing into the chest. It is also possible to argue that the
Yin function is being more withdrawal. Opposite to that we find that the protraction line represent the Yang meridians as it is situated on the dorsal part of the toe, just as the Yang Ting Points are and it continues to the neck and head as the Hand Yang meridians. Also it can be argued the Yang function is outreaching.

**Treatment**

The empiric experience we have had until now using the knowledge of these lines has provided a possible method to trace the primary cause of somatic pain and dysfunction and also to relate it to the viscera. In combination with TCVM knowledge it seem to be a strong diagnostic tool and also usable for treatment. e.g. I have over a longer period found a consistent pattern by my osteopathic examination of horses with longer standing (deeper) problems. I find that they have dysfunction and/or pain at the cranium, hyoid bone, the thoraco-lumbar junction, diaphragm and the sacroiliac joints. These are all structures related to the DVL.

When looking at the myofascial layers as sleeves that cover, protects and holds together it is understandable that if the sleeves are too tight they needs to be addressed by treatment. Normal function might not be regained if only the joints and muscle tissue within it are treated and released. Due to the different mechanisms of contractile action in muscles and fascia it is likely that the same manual therapy methods cannot bring release to both types of tissue, saying that traditional muscle massage techniques releasing muscles may not work on the fasciae’s. Facing the fact that many of the human manual fascia techniques are quite pain full, they are not very usable in animals.

Seen in the light of Langvin and Yandow’s results acupuncture therefore seems to be a good choice. It is obvious to treat the meridians that correspond to the kinetic lines as described but finding specific acupuncture points that can influence the lines is an attractive option. In collaboration with my colleague Tove Due, DVM we have found points, which seem to relax tension in the lines. They are not described acupuncture points but in some places very close to. We are still working on testing them.

For the DVL the Eight Extra meridians offers treatment of several inner organs and the diaphragm through the Conception Vessel and Yin Steeping Vessel (Yin Qiao Mai) with LU 7 and KI 6 and through the Penetrating Vessel and Yin Linking Vessel (Yin Wei Mai) with SP 4 and P 6 (15).

The osteopathic functional indirect technique (earlier lectured on at the IVAS congresses by Patricia Kortekaas, PT) is a technique that addresses all the tension in soft tissue around the joints, and also seem to have good effect on fascia. According to Myers (2) the bones rebalances if the soft tissue regain a tensional balance which is the same line of thinking.

The circular TTtouch® from Linda Tellington-Jones might be known to some of the audience as a very effective treatment approach. If the effect is due to the myofascial
tissue release it efficiency might be explained. It is a technique that can be recommended to let the owner use at the patient between treatments.

**Summary**

Background knowledge of the embryology of connective tissue and the concept of tensegrity provides an understanding of connective tissue as a continuous web through the whole body. Myofascial lines, a part of the connective tissue, are interconnected kinetic lines that describe different movements of the whole body such as flexion, extension, lateral flexion and rotation. By dissecting 20 horses, eight kinetic lines have been verified for equines such as described in humans by Thomas Myers (2). When they are compared to acupuncture meridians by following the anatomic structures, six of them have good correlation. This might indicate that kinetic lines of connective tissue play a role as the anatomical foundation of acupuncture meridians in horses. Two helical lines though, cannot be compared with any meridians. Understanding the overall locomotion of the body through the lines provides a foundation for finding the cause of somatic dysfunction and connections to the visceral system just as TCM proposes. For treatment of the lines acupuncture is an interesting option, both by treating the 12 meridian system and the eight extra meridians. Kinetic line specific points are under development.

**Literature list**


14) Bosch, van den, E. Acupuncture points and Meridians in the Horse, Van Wilderode, Zaventem, 1995.

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