OSTEOPATHIC APPROACH TO LUMBO-PELVIC DYSFUNCTIONS IN CANINES

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Description: Osteopathic Approach to Lumbo-Pelvic Dysfunctions in Canines

Objectives:

- History of Osteopathy
- Understanding Basic Canine Lumbo-pelvis anatomy
- Understanding Canine Spinal Mechanics
- Understanding Canine Sacral Mechanics
- The Walking Cycle

Level: Intermediate 2

Content:

HISTORY OF OSTEOPATHY

Osteopathy is a non-pharmacological, “hands-on” approach that encourages the body to heal itself by using the body’s intrinsic forces and corrective mechanism to achieve homeostasis. Osteopathy views the body as a FUNCTIONAL and HOLISTIC unit. Osteopathy – derived from the Greek words osteon (tissue) and pathos (feeling) – is essentially “feeling the motion of the tissues.” Developed in the U.S. in the late 18th century, founder Dr. Andrew Still discovered a direct relationship between the musculo-skeletal system and the function of the rest of the body. His understanding was that FORM/STRUCTURE directs the function of specifics joints, which led to his conclusion that inappropriate alteration in the structure can trigger dysfunctions in other parts of the body.

CANINE SPINAL MECHANICS

The predominant motions in the lumbar spine, directed by the orientation of the facet joints, are flexion/extension with some rotation and side bending during the gait. Facet-joint direction for lumbar vertebra seven is more in a dorsal plane to accommodate more rotation with the sacrum than lumbar five and six. The main direction of the facet joints of lumbar five and six are in the sagittal plane to accommodate the predominant flexion/extension movement component. These same facet-joint directions occur between the third sacral and first caudal joints. Lumbar vertebra five and the sacrum joint are described in osteopathy for humans as universal joints. These universal joints allow for counter rotation during the gait cycle. This concept is adapted for quadrupeds for the lumbar seven and first sacrum, and third sacrum and caudal one joints. These joints support the opposite rotation movement as well counter balance during the gait cycle.

Dr. Fryette, D.O., divided Spinal Mechanics into two categories:
1. Type I Neutral Spinal Mechanics
2. Type II Non-neutral Spinal Mechanics
Type I: NEUTRAL SPINAL MECHANICS
- **Neutral** dysfunction (Neutral, Rotated, Side bend)
- Appearing over 3 or more segments
- Found in **neutral** position
- Compensatory for a Type II dysfunction
- Minimal motion restriction in flexion/extension
- Side bend and rotation to **OPPOSITE** side
- Rotation makes muscle fullness on side of convexity
- Muscle tightness on concave side
- Treat as a **group** and **last**

Type II: NON-NEUTRAL MECHANICS
- **Non-neutral** dysfunctions (Flexed/Extended, Rotated, Side bend [FRS and ERS])
- Single segment
- Side bend and rotation occur in the **SAME** direction
- Found in **flexion** and **extension**
- Rotation occurs towards the produced concavity
- Treat **individually** and before Type I

**CANINE SACRAL MECHANICS**

The sacrum is floating between the two ilia and is able to move over several **FUNCTIONAL axes** during the gait cycle, mainly because of the joint configuration and its ligamentous support with the ilia. The ilio-sacral ligaments support the rotation and side bending motions of the sacrum during the gait. Important muscles groups during the gait cycle are the piriformis, the quadratus lumborum, the psoas major and minor, and the iliacus. Each individual muscle performs/plays its separate role in the complicated lumbo-sacral mechanics.

The sacrum motion during the gait cycle with humans has been described over seven different **FUNCTIONAL axes**. These axes are in the joint surface of the sacral-iliac joint and are related to the upper and lower poles. If we compare the human sacrum with the sacrum of the canine, we can describe the same axes. These axes are complex and can be seen moving as a “gyroscope” idea.

There are seven **FUNCTIONAL AXES**:
1. Superior Transverse Axis (Craniosacral Rhythm + breathing axis)
2. Middle Transverse Axis (Sacrum motion on ilium)
3. Inferior Transverse Axis (Ilium motion on sacrum)
4. Right Oblique Axis (ROA/Sacral motion)
5. Left Oblique Axis (LOA/Sacral motion)
6. Ventral-Dorsal Axis (Side bend motion)
7. Longitudinal Axis (Rotation)

In canines, the piriformis can perform the function of creating the oblique axes from the transverse axis in the stand phase. The piriformis attaches on the lateral sacral crest and the major trochanter. At heel strike, the piriformis creates the oblique axis by sliding the sacrum down simultaneously over the upper (cranial) and lower (caudal) poles, and rotates the sacrum over this axis forward. These movements are **forward sacral torsion** over the oblique axis and are the normal **neutral**
Mechanics of the sacrum during the gait. Torsion refers to the direction the anterior surface of the sacrum is facing towards. **Forward Sacral Torsions (FST)** are the normal neutral sacral mechanics during the walking cycle and happen mainly during heel strike, stand phase, and push off. 

*Left* rotation around a **Left Oblique Axis** (L on LOA)  
*Right* rotation around a **Right Oblique Axis** (R on ROA)

**Backward Sacral Torsions (BST)** are abnormal, non-neutral sacral mechanics in the lumbopelvis area.

**THE WALKING CYCLE**

The walking cycle is a cycle where an abundance of unique motions all happen at once. The lumbar spine does its own, compensating motion during the whole cycle. During the walk and the trot, the lumbar spine moves mainly in **neutral** mechanics of rotation one way combined with side bending the opposite direction. The sacrum and the lumbar spine work together as a team (universal joint), with the ilia rotating in opposition of one another. The tail makes a compensating motion to maintain balance in the spine and pelvis.

**Five** joints in the pelvis all work at the same time:  
1. Lumbar seven and first sacral joint  
2. Left and right sacral-iliac joints  
3. Pubis symphysis  
4. Sacrum three and caudal one  

The movements are divided into a **five-phase cycle**, with all the motions happening at the same time:  
1. Lumbo-sacral junction with flexion, extension, rotation, and side bending  
2. Sacral-iliac movements over the Middle Transverse Axis  
3. Ilio-sacral movements over the Inferior Transverse Axis  
4. Pubis symphysis movements  
5. Caudal-sacral movements

In the gait cycle, the lumbar spine and the sacrum can rotate and side bend in both the same and opposite directions (universal joint) depending on the specific phase. This happens because of the attachments of the iliaceus, the quadratus lumborum, and the psoas muscles from the lumbar spine to the pelvis and hip, and the specific joint configuration.

**THE CANINE WALK**

With the **right heel strike and left push off**, the right piriformis creates the L on LOA, with the sacrum rotating left and side bend right. The left iliaceus, which has attachments on ventral/lateral side lumbar six and seven, combined with the quadratus lumborum on the right, rotate the spine left and side bend right at heel strike. Coming from heel strike to stand phase, the lumbar spine starts counter rotating to the right in the universal joint. At the same time, movement in the lumbar seven and first sacral junction (universal joint) rotates, alternating from the same direction to the opposite depending on the phase of the cycle.
With the **right stand phase and left in swing phase**, the sacrum is in neutral over the middle transverse axis and ready to start rotating to the opposite side. After finishing the counter rotation, the lumbar spine is relatively straight in the stand phase and is preparing for heel strike on the left with rotation right and side bend left. At this moment, the opposite motion happens in the lumbar spine and the sacrum.

With the **right push of phase and left heel strike**, the right piriformis has relaxed and the left has started to fire because of heel strike on the left. The weight gets shifted from push-off leg to weight-bearing leg. This creates the R on ROA, with the sacrum rotating right and side bend left. Lumbar spine is in rotation right and side bend left phase.

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**REFERENCES:**
Selected References for Small Animal Functional Outcome Assessment  
Lin. McGonagle, MSPT, LVT

Texts


Articles


Updated 9/04
# Proposed Stifle Function Scale

(created by Levine DL, Millis D, and Marcellin-Little DJ).

<table>
<thead>
<tr>
<th>Category</th>
<th>Section</th>
<th>Findings</th>
<th>Maximal score</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Stance</strong></td>
<td>Normal</td>
<td>Stands with equal weight on both pelvic limbs</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>Mild asymmetry</td>
<td>Bears less weight on the pelvic limb of interest or affected limb trembles when standing</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Severe asymmetry</td>
<td>Does not bear weight on affected limb while standing</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td><strong>Muscle atrophy</strong></td>
<td>None</td>
<td>Normal muscle mass</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>Mild</td>
<td>If disease is unilateral, thigh girth is 0 to 9% smaller than the opposite limb. Otherwise, a slight atrophy of the biceps femoris or other thigh muscles is noted. The femur is not visible.</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Moderate</td>
<td>If disease is unilateral, thigh girth is 10 to 19% smaller than the opposite limb. Otherwise, a moderate atrophy of the biceps femoris or other thigh muscles is noted. The femur is not visible.</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Severe</td>
<td>If disease is unilateral, thigh girth is more than 20% smaller than the opposite limb. Otherwise, a severe atrophy of the biceps femoris or other thigh muscles is noted. The femur is visible.</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td><strong>Lameness at a walk</strong></td>
<td>None</td>
<td>Normal locomotion</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>Mild</td>
<td>Walks with a slight limp, but strides appear to have normal length</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Moderate</td>
<td>Has a shortened stride length on affected side when walking, but is bearing weight on that limb.</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Severe</td>
<td>Is intermittently or constantly non weight bearing on that limb when walking</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td><strong>Limb use at a walk</strong></td>
<td>Normal</td>
<td>Normal limb use</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>Mild disuse</td>
<td>Mild, moderate, or severe lameness less than 5% of the time of observation</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Moderate disuse</td>
<td>Mild, moderate, or severe lameness less than 5% but less than 50% of the time of observation</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Severe disuse</td>
<td>Mild, moderate, or severe lameness more than 50% but less than 95% of the time of observation</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Very severe disuse</td>
<td>Mild, moderate, or severe lameness more than 95% of the time of observation</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td><strong>Lameness at a trot</strong></td>
<td>None</td>
<td>Normal locomotion</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>Mild</td>
<td>Trots with a slight limp, but strides appear to have normal length</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Moderate</td>
<td>Has a shortened stride length on affected side when trotting But is bearing weight on that limb</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Severe</td>
<td>Is intermittently or constantly non weight bearing on that limb when trotting</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td><strong>Limb use at a trot</strong></td>
<td>Normal</td>
<td>Normal limb use</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>Mild disuse</td>
<td>Mild, moderate, or severe lameness less than 5% of the time of observation</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Moderate disuse</td>
<td>Mild, moderate, or severe lameness more than 5% but less than 50% of the time of observation</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Severe disuse</td>
<td>Mild, moderate, or severe lameness more than 50% but less than 95% of the time of observation</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Very severe disuse</td>
<td>Mild, moderate, or severe lameness more than 95% of the time of observation</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td><strong>Stair climbing</strong></td>
<td>Normal</td>
<td>No difficulty</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>Mild</td>
<td>Has slight difficulty climbing step</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Moderate</td>
<td>Skips steps or bunny hops</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Severe</td>
<td>Cannot climb stairs</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td><strong>Sitting and standing</strong></td>
<td>Normal</td>
<td>Easily goes from a sitting to standing or a standing to sitting position. Sit and rises squarely</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Mild</td>
<td>Sits or stands with some difficulty (slight hesitation or delay of 1 second or less)</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Moderate</td>
<td>Sits or stands with difficulty (hesitation or delay of more than one second)</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Severe</td>
<td>Cannot sit or stand without assistance</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td><strong>Limb weakness</strong></td>
<td>None</td>
<td>The dog bears weight without difficulty on the limb of interest,</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>Mild weakness</td>
<td>The dog bears weight with difficulty on the limb of interest,</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Severe weakness</td>
<td>The dog bears cannot bear weight on the limb of interest,</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td><strong>Dancing</strong></td>
<td>Normal</td>
<td>Moves freely forward and backward</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>Mild anomaly</td>
<td>Resists moving forward and backward</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Severe anomaly</td>
<td>Unable to bear weight on pelvic limbs during forward and backward dancing motion</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td><strong>Pain response</strong></td>
<td>None</td>
<td>No pain response is elicited during palpation of the joint</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>(palpation)</td>
<td>Mild</td>
<td>Mild pain response (i.e., head turning) is elicited during palpation of the joint</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Moderate</td>
<td>Moderate pain response (i.e., slight vocalization, delayed reaction) is elicited during palpation of the joint</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Severe</td>
<td>Severe pain response (i.e., immediate reaction, loud vocalization, attempt to bite) is elicited during palpation of the joint</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td><strong>Joint motion</strong></td>
<td>Normal or decreased</td>
<td>Range of motion of 52° or less</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>(flexion)</td>
<td>Mild loss</td>
<td>Range of motion of 53 to 62°</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Moderate loss</td>
<td>Range of motion of 63 to 72°</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Severe loss of flexion</td>
<td>Range of motion of more than 73°</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td><strong>Joint motion</strong></td>
<td>Normal or increased</td>
<td>Range of motion of 160° or more</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>(extension)</td>
<td>Mild loss</td>
<td>Range of motion of 150 to 159°</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Moderate loss</td>
<td>Range of motion of 140 to 149°</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Severe loss</td>
<td>Range of motion of less than 139°</td>
<td>0</td>
<td></td>
</tr>
</tbody>
</table>

Total score: 100


For correspondence please contact Dr. Levine at David-Levine@utc.edu
I. Functional and objective outcomes for canine cranial cruciate ligament (CCL) rupture patients status post surgical repair.
   a. Introduction.
      i. Retrospective statistical analysis of objective and functional outcomes of canine patients following:
         1. Medial retinacular imbrication or “Flo” extracapsular technique.
            a. A 20-80 pound test monofilament leader line is placed from the fabella to the lateral tibia, thus mimicking the function of the cranial cruciate ligament.
            b. Prior to this line being placed, the joint capsule is incised and the damaged ligament is removed.
         2. Tibial plateau leveling osteotomy (TPLO).
            a. Using trademarked equipment, a carefully measured osteotomy is made in the tibia. This “fracture” is stabilized with a plate and screws following rotation of the plateau to a satisfactory angle.
      ii. Preliminary outcomes presented at the Third International Symposium for Physical Therapy and Rehabilitation in Veterinary Medicine, August 2004, Raleigh, NC.
      iii. Potentially a multi-site and multi-level study.
   b. Hypothesis.
      i. The investigator hypothesizes that there is a statistically significant difference in early post-operative outcomes, which is dependent upon surgical technique.
   c. Materials and methods.
      i. The Mid-Atlantic Animal Specialty Hospital (MASH) is a referral veterinary hospital which specializes in surgery and rehabilitation. All cranial cruciate ligament post-operative cases return at 10-14 days for staple removal and a rehabilitation consultation. At that time, the rehabilitation evaluation is performed with specific attention paid to objective outcomes.
      ii. Included in this retrospective study were canines who underwent surgery at MASH from 9/1/02 to 4/13/04 (N=101, average age 5.93, 26 breeds represented (24.75% Labrador retrievers, 21.78% mixed breed dogs, 7.92% Rottweilers).
         1. Extracapsular CCL stabilization without medial meniscectomy (MM) with medial meniscal release (Group A).
         2. Extracapsular CCL stabilization with medial meniscectomy (Group B).
         3. Tibial plateau leveling osteotomy (TPLO) without MM with medial meniscal release (Group C).
         4. TPLO with meniscectomy (Group D).
### Table 1: Sample Statistics

<table>
<thead>
<tr>
<th>Group</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sample Size</td>
<td>41</td>
<td>42</td>
<td>11</td>
<td>7</td>
</tr>
<tr>
<td>Average Age (years)</td>
<td>5.29</td>
<td>7.00</td>
<td>4.68</td>
<td>5.14</td>
</tr>
<tr>
<td>Average Weight (lbs.)</td>
<td>66.50</td>
<td>64.74</td>
<td>101.07</td>
<td>95.24</td>
</tr>
<tr>
<td>Number (%) of Neutered Males</td>
<td>21 (51.2%)</td>
<td>13 (31.0%)</td>
<td>6 (54.5%)</td>
<td>4 (57.1%)</td>
</tr>
<tr>
<td>Number (%) of Intact Males</td>
<td>2 (4.9%)</td>
<td>1 (2.4%)</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Number (%) of Spayed Females</td>
<td>18 (43.9%)</td>
<td>27 (64.2%)</td>
<td>5 (45.5%)</td>
<td>2 (28.6%)</td>
</tr>
<tr>
<td>Number (%) of Intact Females</td>
<td>0</td>
<td>1 (2.4%)</td>
<td>0</td>
<td>1 (14.3%)</td>
</tr>
</tbody>
</table>

iii. Patients which were excluded from the statistical analysis included those with simultaneous and bilateral cranial cruciate stabilization, and cranial cruciate stabilization with patellar luxation, or lateral meniscus, caudal cruciate ligament, or collateral ligament damage.

iv. Objective data, including stifle flexion and extension passive range of motion (PROM), thigh circumference variation, lameness score (LS) with standing, walking, and trotting, and functional stifle score, were retrospectively collected.

v. Statistical analysis, including mean, range, standard deviation, and analysis of variance (ANOVA), was performed.

d. Objective outcomes.

i. Stifle flexion and extension PROM.  
   1. Method: patient in lateral recumbency, stationary arm of goniometer parallel to femur, in alignment with greater trochanter, axis over stifle joint, mobile arm parallel to fibula, in alignment with lateral malleolus.
   2. End range of motion determined by expression of pain, patient withdrawal, or therapist determination of end feel.
   3. Labrador retriever norms: stifle flexion 42°, extension 162°.

ii. Thigh circumference variation.

4. Muscle mass estimated with limb circumference measurements using a “standard, repeatable method.”  
   a. More accurate technology is unavailable in the clinic: ultrasound, CT, MRI, dual energy X-ray absorptiometry (DEXA).

5. Method described by Millis et al.:  
   a. Patient in lateral recumbency with hip flexed to 90° and stifle extended. Alternate position is in a supported standing weight bearing position.
   b. Measure circumference of the thigh at 50% or 70%* (preferred) of the thigh length from the greater trochanter to distal lateral fabella.
   c. Difference if stifle is flexed or “functional standing angle” or stifle fully extended.
   d. No difference with clipped hair, sedation, different evaluators.
e. Difference between operative and non-operative thigh circumference measurements is recorded (as a percentage\(^*\) (preferred) or numerical difference).

6. What is the effect of edema?

iii. Lameness scores.
1. Stance.
   a. 0 Normal stance.
   b. 1 Slightly abnormal stance, partial weight bearing, favors limb but it remains on the floor.
   c. 2 Moderately abnormal stance, toe-touch weight bearing.
   d. 3 Severely abnormal stance, holds limb off of the floor, non-weight bearing.
   e. 4 Unable to stand.

2. Walk and trot.
   a. 0 No lameness and weight bearing on all strides observed.
   b. 1 Mild subtle lameness with partial weight bearing.
   c. 2 Obvious lameness with partial weight bearing.
   d. 3 Obvious lameness with intermittent weight bearing.
   e. 4 Full non-weight-bearing lameness.

7. Variety of scores.\(^1\)

iv. Functional stifle score.\(^2\)
1. “Old style.”
   a. Describes the degree of functional disability.
   b. Original purpose was to evaluate the limb following cranial cruciate ligament surgery.

2. “New style:” Pelvic limb functional score.\(^4\)

e. Results.
1. Data analysis by ANOVA (TBA).

<table>
<thead>
<tr>
<th></th>
<th>Group A</th>
<th>Group B</th>
<th>Group C</th>
<th>Group D</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stifle flexion PROM</td>
<td>48.02°</td>
<td>47.29°</td>
<td>46.09°</td>
<td>52.71°</td>
</tr>
<tr>
<td>Stifle extension PROM</td>
<td>153.71°</td>
<td>152.93°</td>
<td>160.36°</td>
<td>162.29°</td>
</tr>
<tr>
<td>Thigh circumference variation (cm)</td>
<td>2.89</td>
<td>2.01</td>
<td>2.79</td>
<td>2.81</td>
</tr>
<tr>
<td>Standing LS</td>
<td>1.88</td>
<td>1.69</td>
<td>1.45</td>
<td>1.29</td>
</tr>
<tr>
<td>Walking LS</td>
<td>2.05</td>
<td>2.07</td>
<td>2.00</td>
<td>1.86</td>
</tr>
<tr>
<td>Trotting LS</td>
<td>3.00</td>
<td>3.22</td>
<td>2.40</td>
<td>2.20</td>
</tr>
<tr>
<td>Functional stifle score</td>
<td>51.71</td>
<td>54.73</td>
<td>53.57</td>
<td>65.80</td>
</tr>
</tbody>
</table>

f. Discussion/Conclusion.
   i. Are these outcome measures objective?
      1. Lameness scores.
      2. Functional stifle scores.
   ii. Are these outcome measures reliable?
      1. PROM.
   iii. What if we examine…
1. A larger number of subjects?
2. From a number of sites?
3. After eight-weeks, after six months, after a year?
4. After implementation of rehabilitation? By whom? Will the results differ?

iv. Correlations?
1. Age.
2. Weight.
3. Time from injury to surgery. How do we determine this?
4. Radiographic degenerative joint disease score.
5. Analgesics: pre-operative, intra-operative, post-operative, at evaluation.

References:
Activity Level

Stairs:
10  No difficulty
  6  Slight difficulty
  2  Skips steps or bunny hops
  0  Unable to perform

Sit:
10  Sits and rises squarely with no difficulty
   6  Sits and rises with slight difficulty
   2  Sits and rises with difficulty
   0  Unable to sit or rise independently

Stand:
10  Can stand for periods longer than 1 minute
   8  Can stand between 30 and 60 seconds before sitting
   6  Can stand between 10 and 30 seconds before sitting
   4  Can stand between 1 and 10 seconds before sitting
   2  Prefers to always sit
   0  Cannot stand

Function:
10  Can jump in to car or elevated surfaces (over 3 feet) without problems
   6  Can jump in to car or elevated surfaces (over 3 feet) with assistance
      (Places forelimbs on object first)
   2  Attempts to jump up but cannot keep forelimbs off the ground
   0  Cannot jump

Lameness
  Trot:
10  Trots normally
   8  Slight lameness on both or one hindlimb
   6  Obvious weightbearing lameness on both or one hindlimb
   4  Severe weightbearing lameness on both or one hindlimb
   2  Intermittent weightbearing lameness
   0  Cannot weightbear

  Walk
10  Walks normally
   8  Slight lameness on both or one hindlimb
<table>
<thead>
<tr>
<th>Value</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
<td>Obvious weightbearing lameness on both or one hindlimb</td>
</tr>
<tr>
<td>4</td>
<td>Severe weightbearing lameness on both or one hindlimb</td>
</tr>
<tr>
<td>2</td>
<td>Intermittent weightbearing lameness</td>
</tr>
<tr>
<td>0</td>
<td>Cannot weightbear</td>
</tr>
</tbody>
</table>

**Stance**

<table>
<thead>
<tr>
<th>Value</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>Stands with equal weight on both rear limbs</td>
</tr>
<tr>
<td>6</td>
<td>Favors one or both hindlimbs while standing</td>
</tr>
<tr>
<td>2</td>
<td>Does not weightbear on one hindlimb while standing</td>
</tr>
<tr>
<td>0</td>
<td>Does not weightbear</td>
</tr>
</tbody>
</table>

**Pain:**

<table>
<thead>
<tr>
<th>Value</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>None – performs all activities without pain</td>
</tr>
<tr>
<td>8</td>
<td>Mild pain upon rising</td>
</tr>
<tr>
<td>6</td>
<td>Mild pain throughout the day</td>
</tr>
<tr>
<td>4</td>
<td>Moderate pain that improves with activity</td>
</tr>
<tr>
<td>2</td>
<td>Moderate pain throughout the day</td>
</tr>
<tr>
<td>0</td>
<td>Severe pain throughout the day</td>
</tr>
</tbody>
</table>

**Range of Motion**

<table>
<thead>
<tr>
<th>Hip Extension</th>
<th>Value</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>160 to 150 degrees</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>149 to 140 degrees</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>139 to 130 degrees</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>129 to 120 degrees</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>119 to 110 degrees</td>
<td></td>
</tr>
<tr>
<td>0</td>
<td>109 and below</td>
<td></td>
</tr>
</tbody>
</table>

**Owner’s Perception of Dog’s Quality of Life**

<table>
<thead>
<tr>
<th>Value</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>Great quality of life without limitations</td>
</tr>
<tr>
<td>8</td>
<td>Great quality of life with limitations</td>
</tr>
<tr>
<td>6</td>
<td>Good quality of life without limitations</td>
</tr>
<tr>
<td>4</td>
<td>Good quality of life with limitations</td>
</tr>
<tr>
<td>2</td>
<td>Fair quality of life</td>
</tr>
<tr>
<td>0</td>
<td>Poor quality of life</td>
</tr>
</tbody>
</table>

WHEN PHYSICAL THERAPY GOES TO THE DOGS:
INCORPORATING SAFE, EFFECTIVE ANIMAL-ASSISTED THERAPY PROGRAMS

Presenter: Teoti Anderson, CPDT
Delta Society Instructor, AAT Instructor, Evaluator and Pet Partner

Description: This course will define animal-assisted therapy and how to safely and effectively incorporate it into your physical therapy treatment plans. You’ll learn why it’s important for human/animal teams to be screened and register with a nationally recognized program. Specifically, we will review the Delta Society® Pet Partner® program and its standards for volunteer teams, including exactly what it takes for teams to be suitable for and qualify for the program. By understanding the volunteer standards, you will gain a better understanding of the skills and aptitude it takes to work safely with your patients. We will also review the patient benefits of animal-assisted therapy, as well as liability issues.

Objectives:
1. To learn the difference between animal-assisted activities and animal-assisted therapy.
2. To learn the types of animals suited for animal-assisted therapy.
3. To learn the skills and aptitude necessary for human/animal teams to safely and effectively perform animal-assisted therapy.
4. To understand common obstacles to successful animal-assisted therapy, including liability issues.
5. To learn potential patient benefits.

Level: Basic. This course assumes participants have a general or thorough familiarity with physical therapy treatment protocols, but little to no information about how to incorporate animals into working with patients.

Content: Anyone who has enjoyed the companionship of a pet has experienced the unconditional love they offer. It is this lack of judgment, this blind acceptance, that can have a powerful influence on a patient undergoing physical therapy.

Think about your patients’ perspectives. They often are in pain … can feel embarrassed or humiliated at their conditions … frustrated, angry and resentful … withdrawn or unmotivated. A dog’s happy tail wag or a cat’s warm purr can often reach through negative emotions and draw forth smiles. And a patient’s positive outlook can directly impact his or her health! Animal-assisted therapy is not a replacement for your efforts, but it is a powerful tool you can use to reach and motivate patients.

Not every animal is appropriate for this task. It’s not enough that Fluffy is friendly or Fido “really loves people”! There can be serious repercussions in choosing the wrong animal and asking it to perform beyond its skills and aptitude. What kind of animal is best suited? What types of temperament are ideal? Is it important that a dog, for example, have obedience skills? And what about the handler — how does he or she fit into the picture?
The Delta Society® Pet Partner® program is nationally recognized as a leader in screening and registering volunteer human/animal teams. Each team must pass a rigorous process in order to qualify. This course will explain exactly what it takes, so you have a better understanding of the standards that should be in place before you begin.

Whether your goal is to help a child learn to walk again or ease a victim of stroke back into the workplace, a quality animal-assisted therapy program can supplement your treatment plans. Through a PowerPoint presentation, video and your speaker’s personal stories of success, you’ll learn how to safely and effectively incorporate an animal-assisted therapy program at your facility.

References & Contact Information:
Teoti Anderson, CPDT
- Prescription Paws Web site: www.prescriptionpaws.org
  (Prescription Paws is a Delta Society® Pet Partner® Affiliate)
- E-mail: PrescriptionPaws@aol.com

Delta Society®
- Web site: www.deltasociety.org
- Address: 875 124th Ave NE, Ste 101, Bellevue, WA 98005
- Phone: (425) 226-7357 (8:30 a.m. - 4:30 p.m. PST, Monday - Friday)

The following books are all written and published by the Delta Society:
- Standards of Practice in Animal-Assisted Activities and Therapy
- Pet Partners Team Training Course
- Animals in Institutions
- Animal-Assisted Therapy Therapeutic Interventions