

ORTHOPAEDIC Physical Therapy Practice



The Importance of Core Strengthening (and Manual Therapy of the Spine and Pelvis) for the Long Term Benefit of the Canine Athlete Following Tibial Plateau Leveling Osteotomy: A Case Study

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PAST MEDICAL HISTORY

Skye is a 7-year-old male neutered Golden Retriever and a well-accomplished obedience, rally, agility, and flyball athlete. He originally presented to rehabilitation in May 2012 after undergoing a tibial plateau leveling osteotomy (TPLO) for surgical stabilization of a torn cranial cruciate ligament. After undergoing significant therapeutic interventions that included cold laser therapy, underwater treadmill, land-based exercises focusing on limb and core strengthening, and manual therapy, Skye returned to function, but continued to demonstrate unloading of the affected limb and palpable tenderness at the pes anserine. In October 2012, the TPLO hardware was removed as the surgeon suspected plate irritation as the cause for the continued unloading of the affected limb. After plate removal and additional rehabilitation, the lameness subsided and Skye returned to competition.

In February 2014, Skye came up lame on the same limb after an agility trial. Though no significant findings were identified by the referring veterinarian, it was recommended that Skye rest for 2 weeks and began a round of anti-inflammato-

ries. Skye's lameness persisted, so he was referred to the board certified surgeon who diagnosed bilateral sciatic nerve pain or cauda equina syndrome and was placed on gabapentin and further activity restriction. He was also referred back to a physical therapist certified in canine rehabilitation.

PT PHYSICAL EVALUATION

In late March 2014, an evaluation was performed by the canine rehab-trained physical therapist and the following significant findings were observed: (1) gait at a walk: 2/4 lameness in left pelvic limb (LPL off loaded and slightly externally rotated), (2) palpable tenderness in the following areas: left pes anserine, bilateral iliopsoas (left greater than right), bilateral sacrotuberous ligament, lumbosacral junction, and multilevel zygapophyseal and costovertebral joints of the thoracic spine, (3) pelvic asymmetry was noted with a dorsal and caudally positioned ilium on the left, as compared to the right, and moderately restricted mobility of the sacroiliac joints bilaterally (left worse than right), and (4) positive modified left straight leg raise indicating sciatic involvement.

INTERVENTION

Skye received a variety of treatments to meet his specific needs to initially reduce pain and inflammation including manual therapy techniques (to spine and pelvis, ie, grade II and III zygapophyseal and costovertebral joint mobilization, tail traction, sciatic nerve dural mobilizations, and soft tissue mobilizations including trigger point release to the iliopsoas and epaxial muscles), cold laser therapy (class 3b), and ultrasound to the pes anserine and distal hamstring tendons. He was kept conditioned in a low impact environment using the underwater treadmill.

FOLLOW-UP VISITS

Once Skye's acute pain was successfully managed with the above interventions, his treatment plan was modified to better meet his long-term needs of improved postural alignment and more intense core strengthening to enable him to safely return to sport. Employing grade III and IV joint mobilizations, the sacroiliac joints were effectively mobilized to correct Skye's pelvic alignment. Achieving a properly balanced pelvis and adequately mobilized zygapophyseal and costovertebral joints were critical to Skye's recovery since he had been compensating for the left-sided TPLO for so long.

The specific manual techniques implemented to achieve improved postural alignment were as follows: (1) unilateral dorso-ventral pressures of the affected zygapophyseal joints, (2) transverse pressures using the spinous process for the restricted zygapophyseal joints, (3) distraction and rotational mobilization techniques for the costovertebral joints, (4) cranial/caudal translations for the SI joints, (5) dorsal/ventral rotations SI joints.

The above techniques were employed as described by Laurie Edge-Hughes, PT, in the Basic and Advanced Manual Therapy for the canine spine book and continuing education course, respectively.

Exercises were advanced to work both on static and dynamic core strength. Static strengthening exercises included thoracic limbs on a BOSU ball with pelvic limbs first on solid ground with head perturbations (cookie to hip to facilitate weight shift-

ing), then progressing to the pelvic limbs on an air disc, and finally to a 3 legged stand with the affected limb on the air disc and thoracic limbs on a more challenging air-filled donut (Figure 1).

To incorporate more dynamic core strength, Skye worked on a land treadmill with his thoracic limbs balancing on a BOSU ball. Once he mastered that, he was challenged more with simultaneous rhythmic stabilization techniques to the hind end (Figure 2).

With the above core strengthening exercises, an ace-wrap was used around Skye's trunk to provide proprioceptive input to his lumbar spine and abdominals. Concurrent manual tapping to the abdominals was done to elicit greater awareness to contract those muscles specifically. Following a successful comprehensive rehabilitation program, Skye fully returned to sport without limitation (Figure 3).



Figure 1. Skye working on static core strengthening exercises. Incorporating manual tapping to the abdominals further facilitates muscle contractions.



Figure 2. Skye working on dynamic balance on the land treadmill. He is required to balance on the BOSU ball with his thoracic limbs while walking on the treadmill. The proprioceptive band along with manual tapping of the abdominals helps to facilitate core strength.

CLINICAL SIGNIFICANCE

As physical therapists, we are accustomed to treating the body as a whole. A stifle injury does not just require stifle rehab. Treatment goals not only need to address short-term functional use of the affected limb, but the long term functional use of the

entire body. For athletes, the desire to return to sport runs deep, and your rehab program needs to highlight exercises that take into account the repetitive stresses on the whole body which requires and relies on a strong core.



Figure 3. Skye successfully returns to competition.

CONCLUSION

Pelvic and spinal alignment and core motor control are important aspects to consider during the rehabilitation of the postoperative TPLO. Even small compensations at the stifle can lead to significant problems in the spine that can severely affect performance and long term postural health in a canine athlete.

RESOURCES

1. Edge-Hughes L. *Basic Manual Assessment and Treatment of the Canine Axial Skeleton*. Published by Four Leg Rehab Inc. Copyright 2012.
2. Edge-Hughes L. *Advanced Manual Therapy for the Canine Spine (Course Manual)*. Copyright 2014.



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