

# Physician Alert

## Case Report

16-year-old female with 2-month history of left knee pain

### Testimonial

“I really didn’t want to go to physical therapy, because I was afraid they were going to tell me I have to stop playing soccer. I was surprised when the therapists at Kinetic were focused on giving me exercises that I could do before and after soccer practices and games. I added the warm-up and cool-down exercises to my routine and have had no knee pain with any sport. They understood what I needed to do for my sport and I feel a lot stronger now. I feel like I can play better and have more endurance than before too.”

### ABSTRACT

HS is a 16-year-old female with a 2-month history of left knee pain that increased during sport. The pain would affect her ability to walk longer distances without increased symptoms and she was unable to run. She also reported having other nagging chronic injuries such as frequent R-ankle (inversion) sprains and R-Achilles tendon pain. Biomechanical assessment revealed pelvic, trunk, and scapular asymmetries. These results indicated a need for 6 Postural Restoration exercise sessions. Following the treatment, the patient reported 100% improvement in symptoms and was able to return to playing soccer without pain during or after. HS’s experience confirmed that physical therapy at Kinetic is a very positive treatment alternative to help referring providers successfully treat patients suffering from unresolved pain.



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## History

HS is a 16-year-old female with a 2-month history of left knee pain and right Achilles tendon pain that developed during her varsity tennis season. The pain has limited her ability to walk longer distances, run, or perform sport without pain. HS also reports having frequent R-ankle inversion sprains in tennis and soccer. She describes using ankle braces, ice, heat, and OTCs to help moderate the pain with limited success. She would like to participate in cross country skiing this season, but is concerned she will cause more damage to her joints and be unable to play soccer and tennis her senior year. X-ray shows no significant findings and her physician has referred her to physical therapy to address postural and strength asymmetries detected.

## Examination

Pelvic-femoral, trunk, and scapular-thoracic objective measures:

	Right	Left
Hip Add (mod. Ober)	-	+
Hip Ext (mod. Thomas)	-	+
Hip ER (seated)	35°	45°
Hip IR (seated)	40°	45°
Trunk Rotation (supine)	Limited	Full
Shoulder IR (supine)	45°	90°

HS's pelvic position is consistent with an anteriorly tilted and forwardly rotated left hemi-pelvis, with associated sacral and spinal orientation to the right.<sup>1</sup> This alteration in pelvic-femoral position will manifest with changes throughout the entire body. Most specifically to this individual, the mechanics of acetabular-femoral (AF) and femoral-acetabular (FA) joint movement during the gait cycle and sport play will be affected. Currently, the left femur is forced to alter its position to a state of *active* ER to return the left LE to a relative neutral state due to the mechanics of the anteriorly tilted innominate placing it into a *passive* position of IR. The patient also demonstrates some "tibial torsion" at the left knee as the tibia attempts to accommodate the remainder of the ER needed to keep the L-LE in a positional state of neutral. This increased tendency of body weight shifted over to the right contributes to increased strain down the R-LE and subsequently muscle overuse patterns. Her right sacral-spinal orientation will require a counter rotation through the thorax (thoracic spine and rib cage) to the left in order to reorient a centric relation of the body to a perceived straight alignment for ADLs and sport. The result is an asymmetrical rib cage with the left half positioned in external rotation and the right half in internal rotation.<sup>2</sup> The individual will develop an increased length of the left internal obliques and consequently decreased left pelvic-trunk stability in the position of mid-stance. The altered rib cage position also results in an improper scapular resting position and the loss of shoulder internal rotation on the right side as seen in the objective measures above.

## Intervention

- 6 Postural Restoration physical therapy sessions

Treatment focused on restoration of proper pelvic-femoral symmetry and mechanics with development of good neuromuscular control and strength to prevent injury. Proper activation of the left hamstrings muscle group was the initial target of the program due to its lengthened and weakened position from the left anterior pelvic tilt. Research shows that a reduced activity of the semitendinosus (medial hamstrings) with elevated activity of the vastus lateralis (lateral quadriceps) during cutting sports increased risk of noncontact ACL rupture.<sup>4</sup> The patient was also recommended to use a motion control shoe for training due to the effects on increased VMO activity with running<sup>3</sup>. The patient required the ability to correctly perform left hip shifting mechanics during functional activity to simulate optimal mid-stance foot position needed for R-footed kicking without increased L-knee torque forces. Another key component of her therapy was to address left pelvic-trunk stabilizer weakness secondary to the faulty patterned position of the thorax. When she was able to increase her activation of L-IO abdominals and L-gluteus medius in mid-stance, there was improved L-LE control and no L-knee valgus stress. This also permitted optimal rib cage mechanics and restoration of R-shoulder IR due to the now correctly positioned R-scapula. HS also ultimately required improved strength and

control of R-gluteus max. for hip extension to prevent compensatory muscle overuse of R-gastrocnemius and soleus for push-off with functional activity that was contributing to R-Achilles tendon strain.

## Outcomes

Following the scheduled Postural Restoration therapy sessions, the patient reported:

- Resolve of all of her pain symptoms (L-knee; R-ankle)
- Return to full participation in school sport with no symptoms during or after activity

Pelvic-femoral and scapular-thoracic objective measures as follows:

	Right	Left
Hip Add (mod. Ober)	-	-
Hip Ext (mod. Thomas)	-	-
Hip ER (seated)	55°	60°
Hip IR (seated)	45°	45°
Trunk Rotation (supine)	Full	Full
Shoulder IR (supine)	90°	90°

## Discussion

HS's objective findings of biomechanical asymmetry of the pelvis and rib cage position indicated a need to begin Kinetic Physical Therapy's specialized biomechanical Postural Restoration program. The patient was provided individualized home exercises based on her objective findings to address these asymmetries. By restoring proper biomechanics of the pelvis, the femur and tibia mechanics improved to decrease L-knee torque forces causing pain and it promoted improved left hip shifting to decrease strain on the R-heel. The asymmetries objectively noted throughout the rib cage, scapulas, and upper extremities were also restored in this process. In sum, the left knee pain was the result of torsion forces across the femoral-tibial joint as a direct result of the L-femur positioned in IR on the acetabulum and compensatory L-tibial ER to achieve a neutral L-LE. Correcting the pelvic-femoral issue and increasing the strength of pelvic-femoral and trunk stabilizers bilaterally has improved her mid-stance position and decrease L-knee torque forces during functional activity and sport.

It is significant to note HS's successful outcome with Postural Restoration. This example demonstrates the multi-factorial causation in a patient's pain pattern that is often related to areas other than the direct location that hurts. Her pain would not have likely resolved by simply addressing the left knee with traditional measures of muscle strengthening and stretching. It required a total body restoration with knowledge of the biomechanical and muscle relationships that were contributing to her L-knee pain and R-heel pain.

This case report confirms that Kinetic Physical Therapy Institute in Woodbury, MN is a successful treatment alternative for patients with multiple overuse pain syndromes.

## References

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3. Cheung R, Ng G. Motion control shoes affects temporal activity of quadriceps in runners. *Br J Sports Med* 2009;43:943-927.
4. Zebis M, et. al. Identification of Athletes at Future Risk of Anterior Cruciate Ligament Ruptures by Neuromuscular Screening. *Am J Sports Med.* 2009;37(10):1967-1973.

