CHANGES IN LOW BACK PAIN IN A LONG DISTANCE RUNNER AFTER STRETCHING THE ILIOTIBIAL BAND

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ABSTRACT

Objective: This case report describes a long distance runner with low-back pain and sacroiliac pain and proposes iliotibial band tightness as a possible causative factor.

Clinical Features: A 38-year-old female amateur runner experienced an exacerbation of right-sided lower back and sacroiliac pain, which she had experienced for several months. The problem became worse as she increased the miles she ran. She had a positive Noble compression test and tightness of the iliotibial band on the right. Gaenslen's, Kemp's, and Patrick's tests were negative on the right, but created her pain of chief complaint. Trigger points were found in the gluteus maximus, gluteus medius, and tensor fascia lata muscles.

Intervention and Outcome: The patient was treated using chiropractic manipulative therapy, trigger point therapy and stretching of the iliotibial band. Her running schedule was also changed; at the beginning of treatment, she stopped running. As she progressed, she ran on flat surfaces, and with further rehabilitation, she resumed her pre-injury schedule and route. She did not demonstrate much improvement until extensive stretching was included in the treatment plan.

Conclusion: A patient had low back and sacroiliac pain that seemed to originate from a dysfunctional iliotibial band. This case illustrates that it is important to consider iliotibial band tightness as a possible cause of low back and sacroiliac pain and that proper management may need to include stretching of the iliotibial band along with trigger point therapy and chiropractic manipulation. (J Chiropr Med 2003:2;37–40)

Key Words: Athletic Injuries; Back Pain; Chiropractic; Iliotibial Band Friction Syndrome; Knee Injuries; Sacroiliac Joint

INTRODUCTION

Iliotibial band friction syndrome (ITBFS), also known as iliotibial band syndrome or iliotibial tendonitis, is a common condition of distance runners and cyclists that involves several structures of the lower extremity. The tensor fascia lata muscle (TFL) originates at the anterior superior iliac spine and the anterior aspect of the external lip of the iliac crest and inserts into the ITB. The ITB is a tendonous sheath that extends from the TFL muscle and inserts into Gerdy's tubercle on the tibia. The gluteus maximus inserts directly into the ITB from its origins on the ilium. Therefore, the musculotendinous ITB spans 2 joints, the hip and knee, respectively (1). The actions of the TFL and ITB are abduction of the leg and medial rotation and flexion of the thigh. The TFL also helps stabilize the knee when it is extended, and stabilizes the trunk on the thigh. (1) Because the ITB crosses 2 joints, disturbances in the kinematic chain in the lower extremity can lead to abnormal pelvic biomechanics. The ITB tightens as it absorbs ground reaction forces (2) and therefore affects those who run long distances. As the involved tissues respond to extreme demand or stress, the ITB, gluteus maximus, gluteus medius and TFL tighten. Shortening or tightening of the ITB affects range of motion of the knee, limiting internal rotation. This decrease in internal rotation can change the biomechanics of the hip, pelvis and lower lumbar spinal region at foot strike. At foot strike, the lower extremity is in a closed kinematic chain position and forces are transmitted from the foot up the body. Commonly, ITBFS presents as lateral knee or hip pain (3); however, this report identifies a patient with sacroiliac (SI) and low back pain (LBP) for which ITBFS appears to be an appropriate diagnosis.

CASE REPORT

History

A 38-year-old female runner requested care for generalized LBP and right SI pain in the month of April. These symptoms began the prior October but were somewhat relieved over the winter months when she decreased her long runs (10–15 miles). Her training schedule consisted of running 5 to 8 miles per day, 3 to 4 times a week, with the addition of a long run once or twice per week. She had done this for years without difficulty and there was no history of traumatic injury.

When she began her long runs again in the spring, the pain returned and gradually worsened. Just prior to the

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April onset of SI pain and LBP, she had experienced occasional lateral knee hip pain, which she rated as 3 out of 10 on a 1 to 10 verbal pain scale (VPS). She took anti-inflammatory medication for this problem; it was relieved in 3 to 4 days. When the right SI pain and LBP began, she again took anti-inflammatory medication but received no relief. The SI pain and LBP became sharp and stabbing and seemed to be most severe in a 3-inch circle with the right posterior superior iliac spine (PSIS) being the center of this distribution. The pain extended out of the circle into the low back, left lumbosacral region, and right hip. The pain was the least intense furthest away from the right PSIS. The patient rated the pain around the PSIS as a 6/10 on the VPS at rest and the right SI and LBP as a 4/10. With weight bearing, intensity increased to 7/10 and 5/10, respectively. Walking increased the pain to 9/10 and 7/10, respectively. She had stopped running because the pain was too intense.

Examination

This patient was 64 inches tall, weighed 110 pounds, had normal vital signs and was in no acute distress. Upon postural examination as viewed from the posterior, the iliac crest was low on the left, there was a mild pelvic shift laterally to the left, and the left shoulder was higher than the right. From a right side view, there was anterior translation of her head, but normal postural alignment from the shoulder to the lateral malleolous.

Palpation revealed tenderness of the right SI joint and L5 spinous process. A right SI fixation in extension was noted upon motion palpation. There was also mild tenderness to palpation over the right greater trochanter, lateral thigh and lateral knee. Trigger points were found in the right gluteus maximus, gluteus medius and TFL, as described by Travell and Simons. (4) Active ranges of motion for the lumbar spine, ankles, knees and hips were normal and non-painful.

Gaenslen's, Kemp's, and Patrick's tests all caused an increase in right SI pain and LBP. Lasegue's test was negative. Posterior iliac compression caused increased right SI pain. The ITB was tight on the right and revealed a positive Ober's test as well as a positive Noble's compression test, as described by Evans. (5)

No neurological deficit was detected when testing deep tendon reflexes, pathological reflexes, sensation, muscle bulk evaluation, manual muscle strength testing, and proprioception. Radiological examination of the lumbar spine and pelvis revealed no gross evidence of osseous or joint pathology. The low iliac crest on the left was noted on the AP pelvis projection. The patient was diagnosed as having tightness of the ITB with subsequent lumbar spine and sacroiliac strains.

Management

Treatment consisted of side-lying, high-velocity low-amplitude manipulation of the right SI joint and lumbar spine mobilization; a cold pack was applied to the right SI joint for 15 minutes following manipulation. This was done 3 times per week for 2 weeks She was prescribed lumbar spine, sacroiliac, and ITB stretching exercises once per day to promote motion in the fixated joints. (6) Specifically, the stretching program consisted of knee chest pulls, pelvic tilts, sitting and stretching in full lumbar flexion, and high knee marching. She was also instructed not to run or take long walks.

Although she felt better, pain returned when she resumed a walking program after the second week. Re-evaluation still revealed tightness of the ITB with trigger points located in the right gluteus maximus, gluteus medius and TFL. At this time, the management plan was modified. Manipulation continued as previously described. Trigger point therapy of the gluteus maximus, gluteus medius and TFL was begun (4) followed by hip extensor stretching. Friction massage was performed along the ITB especially at its insertion on the lateral condyle. Office treatments continued twice a week for 2 weeks. After trigger point therapy, the patient was instructed to stretch the ITB. This was performed in the side-lying position as described by Zachazweski, et al, (7) and is depicted in figures 1 and 2. The patient was asked to stretch the ITB twice per day.

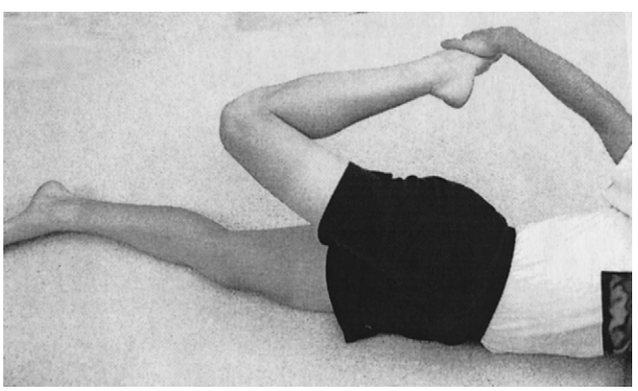

Figure 1. Iliotibial band stretch beginning position. The patient flexes the right hip to 90 degrees and holds the right foot with the right hand. The patient then actively abducts and extends the hip so that the heel of the foot is against the right buttock.

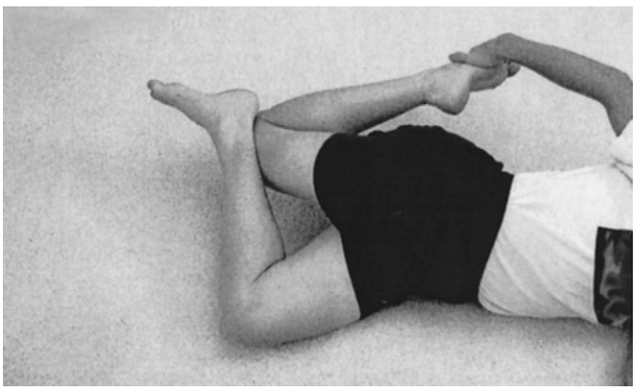

Figure 2. Following the position in Figure 1, the hip is then allowed to fall into adduction, which stretches the TFL and ITB. The opposite heel may then be placed on top of the knee for further stretch on the ITB (7).

The patient seemed to respond favorably to the revised management plan and returned to walks of approximately thirty minutes. She was able to tolerate walking. So, the next week she began running. Her running was restricted to 3 times a week, not exceeding 2 miles each run. She was instructed to run only on flat surfaces and to participate in multidirectional sports, such as tennis and basketball. She was also told to run at a pace that was twice as fast as her usual pace. After training for 3 weeks she returned to short runs and eventually to the long runs once to twice per week, without symptoms.

DISCUSSION

Pathophysiology

ITB friction occurs during foot strike, predominately in the foot contact phase, between the posterior edge of the ITB and the underlying lateral femoral condyle. (3) The literature traditionally describes friction occurring at, or slightly less than, 30 degrees of knee flexion. (8) For this reason, the patient in this case was instructed to run only on flat surfaces. Distance and downhill running predisposes the runner to ITBFS because the knee flexion angle at foot strike is reduced. Sprinting and faster running on level ground are less likely to aggravate the ITB, because at foot strike the knee is flexed beyond the angle where friction occurs.

The patient was also told to run at a faster pace. Orchard and colleagues believe that an impingement zone exists and that there is less pain with faster running because there is less time in the impingement zone. (9) The patient also participated in multidirectional sports such as tennis and basketball. These sports are unlikely to aggravate the ITB. (10)

Commonly implicated causes of ITBFS include downhill running, prolonged sitting, increased mileage without proper conditioning, genu varum, tibial varum, rearfoot and/or forefoot varus, cross over gait, hip abduction contractures, TFL and glutus maximus contractures, loss of flexibility in the hamstrings and quadriceps, weakness of the quadriceps, internal tibial torsion, foot pronation, and leg-length discrepancy. (11–14) Also, cyclists with greater than 20% of external tibial rotation have been shown to have a higher incidence of ITBFS. (15)

Literature describing the ITB, TFL and gluteus maximus as being associated with sacroiliac fixation and subsequent LBP was not found. This, and the results of this case study, prompted me to propose a model of pathogenesis based upon work published by Vleeming and colleagues, which was presented at the World Congress on Low Back Pain in 1995. (16) Their work describes the elaborate connection of bony articulations, muscles, ligaments and fascia as an explanation of how forces are translated from the foot to the lower back. Abnormal contraction and shortening or tightening of muscles can affect the mechanics of the SI joint and, therefore alter the pelvic biomechanics, resulting in LBP. (17)

Related to the case presented here, the model that follows is proposed. The transmission of force passes through bony articulations and fascial continuities of the calcaneus to the tibia and the peroneal and tibialis muscle attachments. There is fascial continuity to the popliteus muscle which in turn has fascial continuity with the semimembranosis. The semimembranosis, working with biceps femoris, represents a continuum from the sacroiliac joint to the fibula and investing fascia of the leg. Contraction of the biceps femoris, along with extension of the thigh, will pull the sacrum against the ilium, tightening the sacroiliac joint. The biceps femoris assists in stabilizing the sacroiliac joint from the lower extremity to the spine during the force transfer.

The TFL at the origin of the ITB, along with the piriformis, stabilizes the head of the femur in the acetabulum. Contraction or tightening of these muscles also places tension on the SI joint capsule, pulling the sacrum against the ilium. Although there are many causes of LBP and SI pain in runners, this dynamic connection should be considered by the clinician as a possible cause of that pain syndrome.

Differential Diagnoses

There are several differential diagnoses to consider when a patient presents with signs and symptoms simi-

lar to the patient described. Trochanteric bursitis may exhibit these symptoms, but the clinician will see an increase in pinpoint tenderness over the inflamed bursa. Secondly, degenerative disease of the hip joint should be considered. In the case presented, hip joint degeneration was ruled out because there wasn't a decrease in hip range of motion and the radiographs failed to indicate hip joint pathology. Also, the hip joint capsule often refers pain to the medial thigh, and in this case, the patient presented with lateral thigh pain. Thirdly, a quadriceps strain, specifically of the vastus lateralis, should be considered. Quadriceps strains usually show weakness and pain when manually tested for strength. This patient had normal strength of the quadriceps and this condition was ruled out. Other less common differential diagnoses could include Reiter's syndrome and rheumatoid arthritis.

Limitations

Although favorable results were achieved with this patient, this case study had some limitations or faults in case management. One such limitation is that after the initial examination, the trigger points should have been treated. Secondly, if stretching exercises were initially performed at home on a twice daily basis, the patient may have had a better response to treatment and relief and improvement could possibly have been attained in a shorter time period. Also, the patient was trusted to do the exercises as prescribed. However, since they were done at home, one can only assume they were done as often and as exactly as directed. Finally, if the patient in this case study had been examined more frequently, exam findings would have revealed information sooner to the clinician so that treatment modifications could have taken place sooner and the patient may have realized a quicker recovery.

CONCLUSION

ITBFS, like many other overuse conditions, should be considered as a possible cause of LBP in runners and cyclists. Through force transmission systems, forces are transmitted from the foot to the lower back. Any abnormal functioning of the lower extremity supporting structures including muscles, ligaments, tendons, and fascia may cause altered pelvic biomechanics and result in SI fixation and LBP.

Other studies could be done to determine if ITB tightness has any affect on other joints, such as those of the ankle or foot, following this reasoning. Also, research should be done to determine if ITB tightness is associated with homolateral sacroiliac fixation in extension. Another study prompted by cases such as this could be 1 to determine how often it is necessary to stretch the ITB to decrease tightness. Controlled studies may demonstrate more clinical information that could be used in the treatment of LBP and SI syndromes.

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