Case Report

Quadratus lumborum muscle strain in a youth soccer player: a case report

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A B S T R A C T

Case: We report a case of quadratus lumborum muscle strain that occurred in a 16-year-old soccer player during a game. According to a video recording of the game, the injury occurred when the leg landed just after kicking the ball with the same leg while dribbling. The mechanism was suspected to be right lateral flexion of the trunk while the pelvis was simultaneously forced to tilt backward. The injury healed and he was able to return to competition 3 weeks later.

Conclusion: This is the first report of a sports-related quadratus lumborum muscle strain.

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Introduction

Acute low back pain (LBP) has been estimated to occur in 10%-15% of young athletes, including soccer players [1]. It often becomes chronic and impairs sports performance, so early diagnosis of the injury is essential. LBP can occur as a result of either an acute traumatic event or repetitive microtraumas (overuse injury), with overuse injuries such as pars interarticularis injuries being more common. However, muscle strains in deeper areas of the trunk are very rare. Some studies reported the muscle strain of deeper areas of the trunk, such as iliopsoas muscle, oblique muscles, and erector spinae muscles; however, there has been no report regarding quadratus lumborum (QL) muscle strain. This is the first report of a sports-related QL muscle strain, which occurred in a 16-year-old male soccer player who was treated nonoperatively, fully recovered, and was able to return to competition. The QL muscle is a structural component of the deep area of the trunk, but its precise function is still not known. In this report, we focus on the mechanism of injury based on a video recorded at the time of the injury.

Case report

A 16-year-old male soccer player complained of acute severe LBP on the right side during a game. While dribbling the ball near an opposing player on his left side, he kicked the ball to a teammate with his right foot and landed on the same foot, immediately noticing pain (Fig. 1). He left the field and was
unable to return to the game. He visited our hospital the next day. Physical examination revealed moderate tenderness on the posterolateral aspect of the right iliac crest but there was no finding of swelling or spontaneous pain. Pain on motion was induced by forcing the trunk into left lateral flexion with left rotation.

The range of motion of the hip joint was 120° in flexion, 10° in extension, 30° in internal rotation, and 60° in external rotation, with no side-to-side difference in all directions. However, straight leg raising test was negative, the angles between the leg and floor were 45° bilaterally, which indicated tightness in the hamstrings. FADIR, FABER test, and Trochanteric pain sign were all normal. Plain X-ray images revealed that the epi-
physeal line of the iliac crest was nearly closed (Risser sign: 5) but no obvious abnormality was observed. Fat-saturated T2-weighted images magnetic resonance imaging (MRI) which was performed at one day after injury, showed a high-signal-intensity area in the right QL muscle at the attachment point on the iliac crest that spread upward along the muscle fibers (Fig. 2). Based on the above, a QL muscle strain was diagnosed. We recommended that he suspend daily practice and undergo a rehabilitation program involving muscle stretching and iso-
metric muscle strength training around the hip. Two weeks after the injury, the pain on motion and tenderness around the iliac crest that we had observed at the initial examination had almost disappeared. Follow-up MRI which was performed at 2 weeks after injury, revealed improvement of the high-signal-intensity area (Fig. 3). He was allowed to increase his exercise load and was able to return to competition 3 weeks after the injury. He has had no recurrence 4 years after the injury.

Discussion

The QL muscle is a deep muscle that originates from the posterior iliac crest and inserts on the 12th rib and the transverse processes of the 1st to 4th lumbar spine (L1-L4) [2]. It is divided into 3 portions: the anterior layer, which originates from the iliac crest and inserts on the 12th rib; the middle layer, which originates from the transverse processes of L1-L4 and inserts on the 12th rib, and the posterior layer, which originates from the iliac crest and inserts on the transverse processes of L1-L4. In this case, MRI showed high signal intensity mainly where
the anterior layer attaches on the lateral iliac crest. The precise function of the QL is not known. Several studies have reported that it acts as an agonist muscle during trunk extension and lateral flexion, and it also attaches to the transverse processes of each segment to stabilize the spine, especially during flexion [2–9]. Furthermore, the QL plays a greater stabilizing role compared with the psosas muscle, especially when spinal compression occurs [4]. Another study reported that the QL is less functionally important compared with the multifidus and erector spinae because the QL has a thinner cross-section of muscle [8].

It is well known that abdominal muscle strains are typical sports-related muscle injuries. For example, strains of the rectus abdominis and the oblique muscle are common in tennis players and baseball players, respectively [11,12]. However, to our knowledge, there are no reports of muscle strain in the QL. The only pathological conditions of the QL in the literature are abdominal wall abscess and tuberculous pyomyositis [13,14].

The video recording confirmed that the injury occurred when he landed on the right foot just after kicking the ball with the same foot (Fig. 1). At this moment, we speculate that his trunk was forced into right lateral flexion while the pelvis was forced to tilt backward, causing the QL to extend during active contraction. Tightness in the hamstrings might have partly caused the pelvis to tilt backward at that moment. In addition, we speculated that a disorder of neuromuscular coordination on the affected side of the trunk and foot at this moment might also have played a role in the injury because he concentrated on kicking the ball just before landing on the same foot while attempting to keep the opposing player on his left side away from the ball.

In general, muscle strain is classified by MRI findings as follows: grade I, edematous changes in the muscle; grade II, partial rupture of the muscle tendon; and grade III, complete rupture of the muscle tendon [10]. Conservative treatment is selected for grades I and II, while surgical treatment is recommended for grade III. In this case, the MRI showed grade I injury, so conservative treatment was chosen and he was able to return to play relatively early. The patient was able to return to play 3 weeks after the injury, which is almost the same recovery time for grade I muscle strains of the lower limbs.

**Patient consent**

The patient was informed that data concerning the case would be submitted for publication, and he provided consent when he was 20 years old.

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