CASE REPORT

Teres major muscle tear in two professional ice hockey players: Cases study and literature review

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Accepted: 13 September 2011

KEYWORDS
Teres major; Ice hockey; Muscle strain; Eccentric contraction

Summary Ice hockey is a sport renowned for its numerous injuries; different studies report between 13.8 and 20 lesions per 1000 athlete exposures. Exactly 65.5% of these injuries occur during games, compared to 34.5% during training sessions. And 35.1% of all injuries involve the lower extremity and 29.7% the upper extremity (results drawn from games and training combined). Determining whether muscle injuries are extrinsic (contusions) or intrinsic (tears) is of utmost importance since the former generally require simple follow-up, whereas the latter necessitates further investigations, appropriate treatment and often prolonged absence from sports for the injured athlete. To our knowledge, no publication to date has reported isolated damage of the teres major muscle in Ice Hockey players. Seven cases were reported amongst baseball pitchers. Two cases presented after a waterskiing traction accident and a further case has been described in a tennis player. In the present study, we report two cases of isolated teres major tear in ice hockey players. These two athletes were both professional players competing at the highest level in the Swiss Ice Hockey League.

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The teres major is part of the posterior shoulder muscles. Rectangular in shape, it originates from the posterior aspect of the inferior-lateral corner of the scapula and inserts into the medial aspect of the intertubercular groove of the humerus.

The teres major acts as an extensor, internal rotator and adductor of the shoulder [1,2] and its action is often in conjunction with the latissimus dorsi. It has been demonstrated that tendons of both converge at their distal insertion point and in addition, electromyography studies showed that they function in synergy, the latissimus dorsi acts first followed by the teres major [3–5]. Together, they also have a role in stabilizing the glenohumeral joint, allowing depression of the humerus and are, therefore, essential in preventing sub-acromial impingement.

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doi:10.1016/j.otrsr.2011.09.014
The nerve supplying teres major is the sub-scapular nerve (C5-C6) and its vascularisation is via the sub-scapular artery.

Case no. 1

A 28-year-old, right-handed player (right hand used at the lower end of the hockey stick). Injury occurred during the windup phase of a slapshot causing immediate pain in the posterior region of the athlete’s right shoulder.

Upon clinical examination, haematoma was noted on the posterior face of the scapula. Mobility of the shoulder was normal, as was the testing of the rotator cuff aside from a strength deficit during the “Belly Press Test”. “Lift-Off” was negative. Sharp pain was experienced upon palpation of the lateral region of the scapula, radiating into the axilla. Resisted extension of the shoulder was painful.

Ultrasound was undertaken the same day and showed laceration of approximately 8 cm within the teres major (Fig. 1a–c). Bone-tendon and myotendinous junctions, as well as muscle fascia, were intact.

Treatment consisted in RICE protocol for the first 48 hours and rest, followed 3 days after by gentle stretching of teres major and sub-maximal eccentric reinforcement dependent on pain threshold. Total time loss encountered for 5 days.

Case no. 2

A 41-year-old, left handed player (left hand used at the lower end of the hockey stick). This patient is known for some previous trauma to his right shoulder, including fibrosis of the sub-scapular muscle following a tear.

The present injury resulted during face-off, following rapid resisted internal rotation of his right shoulder (impact of player’s hockey stick against opponents’ stick). Pain was immediately evident in the posterior region of the shoulder requiring immediate withdrawal from the match.

Upon clinical examination, haematoma was observed on the posterior internal face of the scapula. Active mobility was complete. Testing of the rotator cuff was un-noteworthy aside pain during resisted extension of the affected shoulder and a positive “Belly Press Test”. “Lift Off Test” was negative. Lastly, the athlete presented with elective pain upon palpation of the lateral edge of the scapula, radiating proximally.

Ultrasound was undertaken the following day and showed intramuscular oedema of the teres major, including a haematoma. The latter located in the centre of the muscle and measuring 5 cm long by 4 cm wide.

Immediate treatment also consisted in RICE protocol and immobilization. After 3 days, the athlete started with gentle stretching manoeuvres of teres major combined with a sub-maximal eccentric reinforcement protocol. Return to play was possible after 1 week.

Discussion

During practice, ice hockey players are prone to injury with between 13.8 and 20 lesions per 1000 athlete exposures.

![Figure 1](image_url)  
**Figure 1** a–c: three ultrasound images of Teres Major muscle: localized muscle injury with no aponevrotic tear. Intramuscular swelling and contained haematoma.
During a match, the most common cause of injury is a contact with another player (50%), followed by contact with the ice or the boards (39.6%). The remaining injuries (9.7%) occur without contact [6]. In contrast, Rishira et al. report that the majority of injuries occur without contact, followed by contact with the ice or boards [7].

When all injuries are pooled, results show that forwards are 2.1 times more at risk of injury than defencemen, and 16.3 times more at risk than goal keepers [7]. Injuries occur most frequently in the second and third periods of the game. This may be explained by the level of fatigue of the athletes but also by the fact that the first period is often used as an observation phase to establish team’s strategies [6–8]. A third study by Flick et al. reports somewhat contrary results showing a higher injury rate in the first period due to the higher intensity of play at the outset of the match [9].

Knee is the most affected joint (22%), followed by head, face and neck injuries (19%) and thirdly, shoulder injuries (15%). Contusions account for 19.2% of lesions during matches (14.8% during training sessions), whereas muscular tears make up 19.6% of all injuries occurring during matches and 30.9% during training. First of all, muscle tears concern the pelvic region: hamstrings and adductors. Exactly 16.8% involve the shoulder during matches compared to 4.4% during training [6,8,10].

Despite the fact that the percentage of shoulder tears is relatively low, this class of injury has significant consequences since they result in the second highest participation time loss behind knee lesions (7.5 versus 13.3 sessions lost) [7].

Between 2008 and 2009, we have encountered two indirect isolated tears of the teres major muscle in professional athletes. Both were professional ice hockey players (forwards). The first muscular tear occurred during the wind-up phase, of the slapshot, that is the phase of eccentric contraction of the teres major. Injury happened within the first few minutes of practice. The second injury occurred during a match at the face-off, resulting from a resisted internal rotation of the shoulder.

Initial diagnosis in both cases was via clinical examination. Aside from haematoma, pain upon palpation of the area, pain and weakness during resisted extension of the shoulder and a positive “Belly Press Test”. The deficit is due to muscle tension exerted on the teres major during this movement. There were no other specific symptoms.

In our practice, we perform ultrasonography as a primary imaging tool with a well-trained and experienced staff.

Ultrasonography imaging provides important information to the sports clinic regarding the management of soft tissue diseases [9].

Shoulder ultrasound has the advantage of being relatively inexpensive, widely available and permits dynamic imaging. Iannotti et al. [11] (level I evidence) and Cullen et al. [12] recommend the use of ultrasonography to accurately diagnose the extent of rotator cuff pathology with a good sensibility and specificity compared to MRI.

According to Kelly and Fessell [13], while ultrasonography and MRI are equally useful to diagnose full thickness cuff tears, ultrasonography seems more performant in the evaluation of partial thickness tears. A negative ultrasonography is more likely to exclude a partial tear than MRI (level 2a evidence).

Concerning our players, a dynamic ultrasound was performed in the 24 first hours, enabling us to visualize the muscle tears [14–16]. In both cases, the tear was localized within the muscle body with no evidence of aponevrotic damage. Given that markers for severe damage were absent, MRI scan was not undertaken but we still recommend when ultrasonography is not available and the staff is not well-trained.

Both players were treated with a conservative protocol for re-education: RICE for the 48 hours following the incident followed by rest, gentle stretching and sub-maximal eccentric reinforcement dependent on pain threshold from the 3rd day. Both recovery periods were rapid with a return to sports sessions after 5 days (case no. 1) and 7 days (case no. 2) after the occurrence of injury.

Teres major tears in athletics are, therefore, relatively rare injuries. In the current literature, only 10 cases are reported [17–22], seven of them concern baseball pitchers. The first case presented by Malcam et al. [18], describes a minor league pitcher who sustained an avulsion of the teres major tendon. He was treated with physical therapy and returned to full off-season pitching practice at 6 months after the injury. Schikendantz et al. [19] described in a 10-case series’ professional baseball pitchers with tears to teres major or latissimus dorsi. Only four cases showed isolated injury to teres major muscle and involved tears at the myotendinous or tendon-bone junctions and resulted in an average of 4 months before return to play. Leland et al. described two cases of isolated teres major injuries between the myotendinous junction and the insertion of the tendon on the humerus in professional major league baseball pitchers. A structured and progressive 8 to 10 week rehabilitation program allowed the return to full sports participation. All the pitchers had injured their dominant shoulders and all these injuries occurred during the follow through phase of the pitching motion.

The first waterskiing injury with isolated tear of teres major was reported by Maldjian et al. [21] with a myotendinous junction’s located tear. Lester et al. described a second waterskiing injury with isolated teres major tendon rupture. In these both cases, the mechanism was a traction injury with the arms jerked forward by the accelerating boat.

In the case described by Takase [22], the injury was confined to the body of the teres major muscle of a tennis player and resulted in a 4-month game’s lost.

It is likely that the more rapid recovery period observed in our subjects is due to the fact that the site of trauma was contained within the muscle body. However, our results do appear contrary to those observed by Takase [22], who described a muscle tear similar to ours in location, but not in grading neither on size and that required 4 months recovery before return to competition.

Numerous studies on hamstrings injuries have clearly shown that tears within the body of the muscle have a much better prognostic when compared to myo-aponevrotic tears, tears at the bone-tendon junction and tears at the muscle-tendon junction. In particular, regaining muscular function and return to sports activities are more rapid in the former compared to the latter. Other factors that may affect the prognostic outcome are the size of the injury (> 50% of the surface of the section) and the presence of an intramuscular haematoma [16,23,24]. However, these results observed in
hamstring injuries should be taken with care if extrapolated to shoulder injuries.

Conclusion

In this study, we report two cases of isolated and confined intramuscular tears of the teres major in professional ice-hockey players. In both cases, diagnostic was first clinical (positive "Belly Press Test") and then confirmed by ultrasonography. Clinical outcome was good and recovery rapid, due to the relatively moderate size of the injury and its localization without myo-aponevrotic involvement or damage to the bone-tendon and muscle-tendon junctions. The long-term outcome is good with no sequelae (1 and 2 years’ follow-up).

Disclosure of interest

The authors declare that they have no conflicts of interest concerning this article.

References