

Traumatic Isolated Myotendinous Rupture of the Teres Minor in a Young Athlete – A Unique Case Report

Adrien Jacquot^{1,2}, Jean Genest¹, Emilien Fronzaroli¹, Guillaume Lux³, Daniel Mole^{1,2}

Learning Point of the Article:

Teres minor myotendinous tears is a rare traumatic lesion and is accessible to surgical repair, when treated early, with good mid-term outcomes.

Abstract

Introduction: Functional role of teres minor (TM) is well known. To date, an isolated myotendinous rupture of the TM, without any lesion of the other cuff tendons, has never been reported in literature.

Case Report: The patient was a 22-year-old soccer player who has presented with a direct shoulder traumatism that is causing persistent pain and impairment. Early appropriate imaging was done (magnetic resonance imaging [MRI] and arthro-computed tomography scan); it revealed an isolated tear of the TM at the myotendinous junction. Open surgical repair was performed through a posterior approach, within the 1st month after the injury. The patient was immobilized for 1 month in neutral rotation and then was allowed to begin the rehabilitation process. At the 2-year follow-up point, the patient had a pain-free and functional shoulder, allowing a return to full activities, including sport at the pre-injury level. MRI confirmed that the muscle had healed, without atrophy or fatty infiltration.

Conclusion: A TM myotendinous tear is very rare but might be under diagnosed. Early appropriate imaging is necessary. Surgical repair may be the preferable option in young and active patients and should be performed at the acute phase before muscular atrophy and fatty infiltration occur.

Keywords: Teres minor, Rotator cuff, Sports injury, Shoulder, Myotendinous tear.

Introduction

Despite the fact that it is considered the “forgotten muscle,” the important role of the teres minor (TM) is now well known [1]. In a healthy shoulder, it is responsible for 20–25% of the external rotation strength including more than 50% when the arm is abducted [2, 3]. Moreover, in case of a massive cuff tear, TM tends to hypertrophy to compensate for the loss of the other tendons (especially the infraspinatus [IS]). It becomes then solely responsible for active external rotation and essential to maintain shoulder balance [4, 5]. If a TM lesion commonly occurs in association with a rotator cuff tear, it remains a rare phenomenon (<1%) [6]. On the other hand, an isolated TM

tear (without any other rotator cuff lesion) is even rarer and has only been described once before. Indeed, Zaman and Syed reported a case of isolated TM avulsion from its humeral insertion that was repaired arthroscopically [7]. To the best of our knowledge, an isolated myotendinous tear of TM has never before been described. Here, we present an original case of an isolated TM lesion at the myotendinous junction in a young athlete, which was treated early by open surgery with a clinical follow-up of 2 years and a post-operative magnetic resonance imaging (MRI). The patient was informed that his case would be submitted for publication as a case report and provided consent.

Access this article online

Website:
www.jocr.co.in

DOI:
2250-0685.1418

Author's Photo Gallery



Dr. Adrien Jacquot



Dr. Jean Genest



Dr. Emilien Fronzaroli



Dr. Guillaume Lux



Dr. Daniel Mole

¹SAS Pasteur, Clinique Louis PASTEUR, 7 rue Parmentier, 54270 Essey-lès-Nancy, France,

²Department of Orthopaedics, Arctic S Center of Joint and Sports Surgery, 24 boulevard du 21ème Régiment¹ Aviation, 54000 Nancy, France,

³Department of Radiology, Radiology Center, 7 rue Parmentier, 54270 Essey-lès-Nancy, France.

Address of Correspondence:

Dr. Adrien Jacquot,

Artics, Center of Joint and Sport Surgery, 24, Boulevard du XXIe Régiment¹ Aviation, 54000 Nancy, France.

E-mail: drjacquot@chirurgie-artics.fr

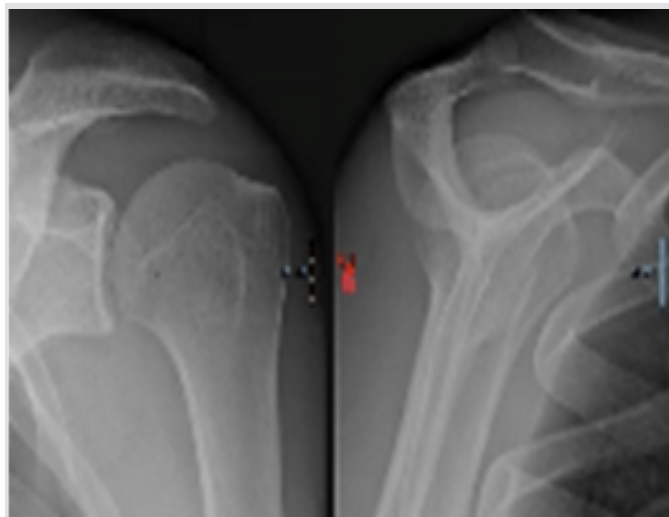


Figure 1: Standard X-rays after the injury.

Case Report

Anamnesis

A 22-year-old, right-handed young man who had been practicing soccer at a competition level sustained a left shoulder injury in September 2015 when playing soccer. He described two successive traumatism: First, he has been hit laterally, with his arm at his side, by another player and immediately experienced intense pain. Then, he fell onto this shoulder, which was injured again. He did not report any sensation of dislocation. This shoulder had never before been injured or painful. Initially, he was conservatively managed by his coach (i.e., he wore a sling and took some medication). However, after a few days, he felt that persistent pain and loss of function were unusual and sought a medical consultation. At that time, 10 days after the trauma, pain was located posteriorly, exacerbated by palpation and in an armed position. Anterior and posterior apprehension tests were both negative. Passive and active shoulder motions were normal. Active external rotation, with the arm at side and in abduction, was painful. There was a slight asymmetry of strength in external rotation compared to the contralateral side, but it was not obvious and could be explained by the pain. There were no hornblower or dropping signs.

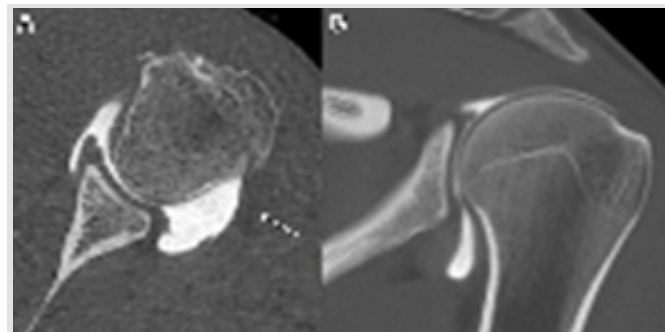


Figure 3: Arthro-computed tomography scan showing no capsular lesion. (a) Axial view: Intact articular capsule (arrow: No contrast dye throughout the joint). (b) Coronal view: Intact inferior articular capsule and supraspinatus.

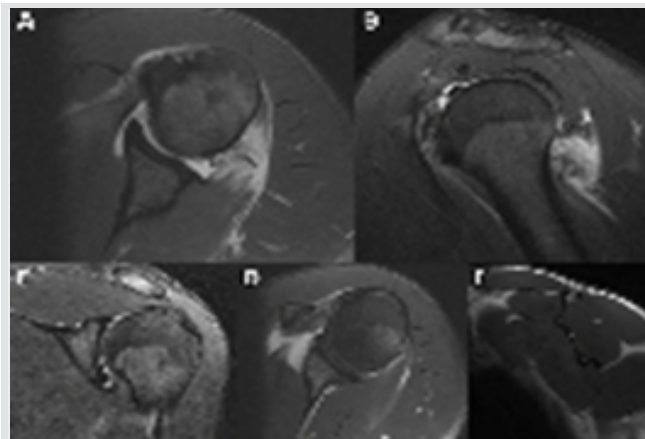


Figure 2: Magnetic resonance imaging showing an isolated teres minor (TM) myotendinous lesion. (a) Axial view, T2 (distal): Myotendinous tear of TM, (b) Sagittal view, T2: Isolated tear of TM. (c) Coronal view T2: No lesion of the supraspinatus. (d) Axial view, T2 (proximal): No lesion of infraspinatus or subscapularis. (e) Sagittal view, T1 (Y view): No atrophy of the muscles, no fatty infiltration.

Passive internal rotation was difficult and painful as well. Radiographs were judged to be normal (Fig. 1). Ultrasound suggested a posterior cuff lesion without concluding in a precise diagnosis. MRI confirmed a very unusual isolated tear of the TM at the myotendinous junction without any other associated lesions (Fig. 2). There was no labral, capsular, or bony lesion in favor of a posterior instability. The other tendons of the rotator cuff all remained inserted. An arthro-computed tomography scan was consecutively performed and did not reveal any contrast dye moving throughout the joint, thus confirming the integrity of the articular capsule and comparable to what has been described in the case of IS myotendinous ruptures (Fig. 3). Knowing the natural evolution of this kind of lesion (based on what we know from IS lesions) [8, 9] and the potential functional consequences for the shoulder in this young patient, we hypothesized that it was preferable to repair this lesion early. We ultimately performed an open surgical repair after a 3-week delay following the initial trauma.

Surgical technique

The procedure was performed under general anesthesia in a lateral position, through a posterior approach and the arm in a

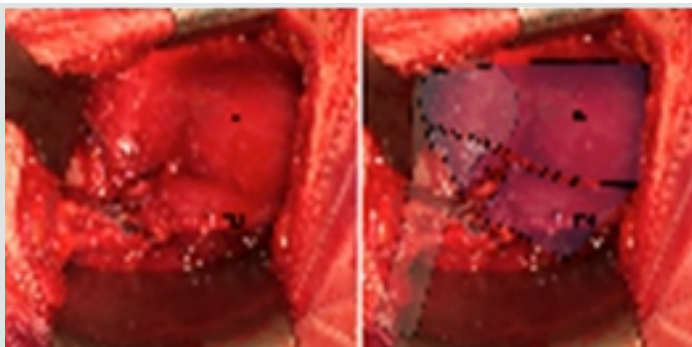


Figure 4: Intraoperative view, before the repair, showing the teres minor (TM) myotendinous tear, and the integrity of the infraspinatus. TM = Teres Minor, IS = Infraspinatus.

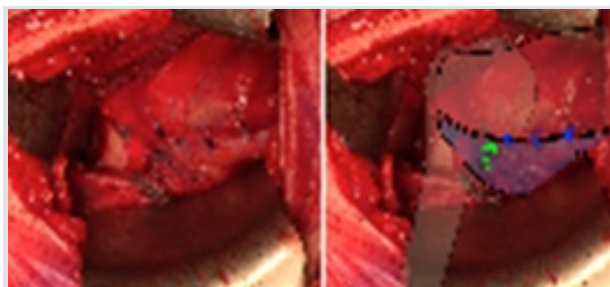


Figure 5: Intraoperative view after the repair. TM = Teres Minor. IS = Infraspinatus. Green sutures = Side-to-side suture of the TM. Blue sutures = Lateral sutures with IS.

70° elevated position. The 8-cm skin incision was done along the posterior border of the deltoid, which was anteriorly reclined. The posterior cuff was easily visualized. The myotendinous tear of the TM was confirmed, as well as the integrity of the IS (Fig. 4). There was no opening of the joint and the articular capsule was not torn. We created a simple side-to-side suture between the medial and lateral parts of the muscle. We completed the repair by placing three lateral sutures between the TM and IS to close the interval between the two muscles (Fig. 5).

Rehabilitation and recovery

The patient was immobilized with a sling in neutral rotation for 4 weeks; after that point in time, he was able to begin the rehabilitation process. Only passive motion was authorized for the 1st month and then active motion commenced. The patient returned to sport after 6 months. At that time, his shoulder was already free of pain and he had achieved complete passive and active motion. His strength was symmetrical in abduction and external rotation. The constant score was 92. An MRI was done at this follow-up and showed a complete healing of the muscle without any atrophy or fatty infiltration (Fig. 6). The patient was clinically evaluated 2 years after the surgery and has still a painless, functional, and “forgotten” shoulder. He returned to playing soccer at the same level of competition that he had enjoyed before the injury.

Discussion

In this article, we described the first reported case of an isolated myotendinous TM tear. At the time when we had to manage this case, we found no data in literature to help us with the decision-making process because it was a very unusual lesion. We then decided to rely on what we already knew about myotendinous lesions of the IS as described by Walch et al. [8, 9]. Isolated IS myotendinous tears more typically occur in middle-aged patients and after a shoulder injury in only 22% of the cases [9]. However, such an injury has been described as a muscle strain lesion characterized by a delamination at the myotendinous junction with an intact articular capsule and tendon insertions.



Figure 6: Magnetic resonance imaging performed 6 months after the surgery. (a) Axial view, T2 (same slice as preoperative imaging): Healing of the Teres minor (TM). (b) Sagittal view, T2: Healing of the TM. (c) Sagittal view, T1 (Y view): No muscle atrophy, no fatty infiltration.

Those conditions were comparable with what we found in our case, except for the fact that it was not the same muscle. These myotendinous lesions of the IS are known to evolve rapidly (<1 year) toward severe atrophy and fatty infiltration of the muscle, with potential chronic pain and functional impairment [9]. The authors recommended arthroscopic repair in the first 3 months after the acute phase. Based on this data, and considering the young age and the functional demand of our patient, repairing this lesion in the acute phase seemed to be justified. As the lesion was uncommon and could lead to some technical difficulties in arthroscopy due to its localization, we decided to repair it in open surgery. Moreover, in 2013, Cain et al. described a case of a traumatic avulsion of the IS and TM [10], and despite their attempt to arthroscopically repair this lesion, they had to convert to open surgery for the TM repair. This outcome was in line with our decision. It is impossible to know what would have been the outcomes with a conservative non-surgical treatment. However, in a young athlete with this kind of traumatic lesion, we could not take any chances. We decided to choose the surgical option, which gave him the maximum chance to recover well and return to his level of pre-injury sport participation. The functional and anatomical results in this patient were excellent at the 6-month follow-up point and were maintained overtime, which was comparable to the results published by Zaman and Syed [7] after treating a TM tendon avulsion. If identified at the acute phase, before muscular atrophy and fatty infiltration occur, and then, isolated traumatic TM lesions should probably be repaired without hesitation. Moreover, isolated atrophy of the TM was reported to occur in 3% of the shoulders, as an incidental finding on shoulder imaging [11]. Sometimes TM atrophy could be responsible for pain and altered function. To date, the exact etiology is not really known, but a neurologic origin has been often suggested (quadrilateral space syndrome, traumatic injury of the TM nerve...) [12, 13, 14]. To us, an occult myotendinous lesion could be also a hypothesis to consider. In their studies, Friend et al. indeed reported two cases of isolated muscular atrophy of the TM and both of these patients had sustained a shoulder injury [12]. Only one case of an isolated tear of the TM has previously been published, but it was an avulsion from the humeral

insertion and not a myotendinous rupture [7]. In addition, another case was reported by Smith et al. [15], but it was also a tendinous avulsion in association with a bony posterior humeral avulsion of the glenohumeral ligament lesion and the authors mainly focused on the instability problem rather than the TM lesion. They did not mention what happened to the TM at the last follow-up. The extremely low frequency of reports in literature highlights the rarity of these lesions, but also perhaps the fact that they might be under diagnosed. This emphasizes the fact that appropriate imaging must be rapidly performed in the case of post-traumatic persistent shoulder pain in a young patient when no obvious cause has been identified, to diagnose this kind of tendinous or muscular lesion – as rare as such a condition can be.

Conclusion

An isolated lesion of the TM is a rare pathology. Here, we reported the first case of a myotendinous rupture of this muscle.

Considering the potential long-term consequences of non-operative treatment, these lesions should be detected at the acute phase, with the assistance of early appropriate imaging and managed with surgical repair performed before muscular atrophy and fatty infiltration occur.

Clinical Message

Myotendinous lesions of the teres minor can occur in young patients after shoulder trauma. Clinical presentation may not be specific. MRI must be considered when a shoulder remains abnormally painful after a recent trauma, without any obvious diagnosis. Early diagnosis allow early surgical treatment, muscle healing, and shoulder function recovery.

References

- Walch G, Nové-Josserand L, Liotard J. The teres minor muscle: The forgotten muscle of the rotator cuff. In: Blum A, Tavernier T, Brasseur J, editors. *Shoulder A Multidisciplinary Approach*. France: Sauramps Medical; 2005. p. 237-44.
- Gerber C, Blumenthal S, Curt A, Werner CM. Effect of selective experimental suprascapular nerve block on abduction and external rotation strength of the shoulder. *J Shoulder Elbow Surg* 2007;16:815-20.
- Kuhlman JR, Iannotti JP, Kelly MJ, Riegler FX, Gevaert ML, Ergin TM, et al. Isokinetic and isometric measurement of strength of external rotation and abduction of the shoulder. *J Bone Joint Surg Am* 1992;74:1320-33.
- Walch G, Edwards TB, Boulahia A, Nové-Josserand L, Neyton L, Szabo I, et al. Arthroscopic tenotomy of the long head of the biceps in the treatment of rotator cuff tears: Clinical and radiographic results of 307 cases. *J Shoulder Elbow Surg* 2005;14:238-46.
- Williams MD, Edwards TB, Walch G. Understanding the Importance of the teres minor for shoulder function: Functional anatomy and pathology. *J Am Academy OrthopSurg* 2018;26:150-61.
- Melis B, DeFranco MJ, Lädermann A, Barthelemy R, Walch G. The teres minor muscle in rotator cuff tendon tears. *Skeletal Radiol* 2011;40:1335-44.
- Zaman SU, Syed HM. Arthroscopic repair of an isolated teres minor tear: A Case report. *JBJS Case Connect* 2016;6:e40.
- Tavernier T, Walch G, Barthelemy R, Nove-Josserand L, Liotard JP. Isolated lesion of the infraspinatus at the myotendinous junction: A new lesion. *J Radiol* 2006;87:1875-82.
- Walch G, Nové-Josserand L, Liotard JP, Noël E. Musculotendinous infraspinatus ruptures: An overview. *OrthopTraumatolSurg Res* 2009;95:463-70.
- Cain EL, Andrachuk J, Wilk KE. Traumatic full-thickness infraspinatus and teres minor tendon tears. *J Orthop Sports Phys Ther* 2013;43:583.
- Sofka CM, Lin J, Feinberg J, Potter HG. Teres minor denervation on routine magnetic resonance imaging of the shoulder. *Skeletal Radiol* 2004;33:514-8.
- Friend J, Francis S, McCulloch J, Ecker J, Bredahl W, McMennamin P, et al. Teres minor innervation in the context of isolated muscle atrophy. *SurgRadiolAnat* 2010;32:243-9.
- Kruse LM, Yamaguchi K, Keener JD, Chamberlain AM. Clinical outcomes after decompression of the nerve to the teres minor in patients with idiopathic isolated teres minor fatty atrophy. *J Shoulder Elbow Surg* 2015;24:628-33.
- Wilson L, Sundaram M, Piraino DW, Ilaslan H, Recht MP. Isolated teres minor atrophy: Manifestation of quadrilateral space syndrome or traction injury to the axillary nerve? *Orthopedics* 2006;29:447-50.

15. Smith PA, Nuelle CW, Bradley JP. Arthroscopic repair of a posterior bony humeral avulsion of the glenohumeral

ligament with associated teres minor avulsion. *Arthrosc Tech* 2014;3:e89-94.

Conflict of Interest: Nil
Source of Support: Nil

Consent: The authors confirm that Informed consent of the patient is taken for publication of this case report

How to Cite this Article

Jacquot A, Genest J, Fronzaroli E, Lux G, Mole D. Traumatic Isolated Myotendinous Rupture of the Teres Minor in a Young Athlete – A Unique Case Report. *Journal of Orthopaedic Case Reports* 2019 May-June; 9(3): 52-56.

