CASE REPORT

Complex shoulder injuries in sports

Eduardo Antônio de Figueiredo, Paulo Santoro Belangero, Benno Ejnisman, Alberto de Castro Pochini

CETE—Centro de Traumatologia do Esporte, Universidade Federal de São Paulo, São Paulo, Brazil

Correspondence to
Dr Benno Ejnisman,
bennoale@uol.com.br

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SUMMARY

A 26-year-old Olympic wrestling athlete presented with a pectoralis major muscle injury, glenohumeral instability and acromioclavicular joint dislocation separately. The patient underwent surgical treatment to repair these injuries. The pectoralis major muscle was reconstructed with a semitendinosus tendon graft using the endobutton technique, as described by Pochini *et al.* Treatment of the traumatic anterior instability was performed using the technique described by Bristow-Latarjet, and the acromioclavicular joint dislocation was repaired using the modified technique of Weaver-Dunn with the aid of an anchor. The athlete exhibited a rapid recovery and could return to normal activities 6 months after surgery. At present, 18 months postoperatively, the patient is asymptomatic.

BACKGROUND

By the end of the 1970s, only 45 cases of complete lesion of the pectoralis major muscle were described in the literature,¹ and at present, approximately 200 cases have been described.²

However, the occurrence of muscle lesions has not been associated with rupture of the pectoralis major muscle until now.

The present study aimed to describe the treatment provided to a competitive Olympic wrestling athlete presented with two injuries associated with pectoralis major muscle lesions, namely glenohumeral instability and acromioclavicular joint dislocation.

CASE PRESENTATION

A 26-year-old Olympic wrestling athlete presented with a sudden pain in the area of the pectoralis major muscle of the right shoulder after abduction and external rotation 6 months prior to the first consultation. Two years prior to that, the patient fell and suffered a trauma of the right shoulder. Since then, the trauma evolved to acromioclavicular joint dislocation grade III. Four years prior to that, the patient suffered the first episode of traumatic glenohumeral joint dislocation during training, which was followed by four episodes of dislocation of the same shoulder. These diagnoses were later confirmed by imaging (figures 1–9; videos 1 and 2).

TREATMENT

The patient immediately underwent surgical treatment to treat the aforementioned injuries. The reconstruction of the pectoralis major muscle was performed with a semitendinosus tendon graft using the endobutton technique, as described by Pochini *et al*³ (figures 10 and 11; videos 3–5).

Figure 1 Physical examination of patient, showing chronic rupture of the pectoralis major tendon.

The treatment of the traumatic anterior instability was performed using the technique described by Bristow-Latarjet, which is performed with grafts that are removed from the coracoid process and fixed in the anterior margin of the glenoid with two screws (figures 12 and 13). The acromioclavicular joint dislocation was treated using the modified technique of Weaver-Dunn, with the aid of an anchor and a Kirschner wire (figures 14–16). The athlete showed a rapid recovery and returned to normal activities 6 months after the surgery. At present, 18 months postoperatively, the patient is asymptomatic (figures 17 and 18).

OUTCOME AND FOLLOW-UP

After the procedure, the patient remained immobilised for 6 weeks, and the Kirschner wire used for treating the acromioclavicular joint dislocation was removed at this time. Following the 6-week period,

Figure 2 X-ray showing acromioclavicular dislocation in the right shoulder.

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Figure 3 X-ray showing acromioclavicular dislocation in the right

Figure 4 X-ray showing acromioclavicular dislocation in the right shoulder.

Figure 5 MRI revealing the Bankart lesion, resulting from glenohumeral instability.

Figure 6 MRI revealing the Bankart lesion, resulting from glenohumeral instability.

Figure 7 MRI revealing the Bankart lesion, resulting from glenohumeral instability.

rehabilitation work was performed for the patient to gain range of motion and muscle strength. The patient exhibited a good recovery and continued sports activities at the competition level 6 months after the surgery.

Figure 8 MRI of the chest showing a lesion of the tendon of the pectoralis major with about 3 cm of retraction.

At present, 18 months postoperatively, the patient is asymptomatic.

DISCUSSION

According to a recent systematic review,⁴ in chronic injury periods comprising a 6-week time span, the exact location of the insertional muscle fibres is lost, and this detachment may hinder anatomic repairs.⁵

Figueiredo *et al*⁶ described important anatomical parameters to be considered during the reconstruction of pectoralis major muscle lesions. The authors have reported that the tendon of the pectoralis major muscle has a single laminar insertion in the

Figure 9 MRI of the chest showing a lesion of the tendon of the pectoralis major with about 3 cm of retraction.

Video 1 Physical examination of patient, showing chronic rupture of pectoralis major tendon.

Video 2 Physical examination under anesthesia revealing the diagnosis of glenohumeral instability and acromioclavicular dislocation.

Figure 10 Osteotomy of the coracoid process was performed and the graft was fixed in the anterior margin of the glenoid with two screws.

humerus in the cranial–caudal direction, with an average length of 80.8 mm and an average width of 6.1 mm (ranging from 5 to 7 mm). Moreover, the height of the footprint of the pectoralis major is 1.36 times larger (36%) than the distance from the top margin to the apex of the humeral head.

Figure 11 Osteotomy of the coracoid process was performed and the graft was fixed in the anterior margin of the glenoid with two screws.

Video 3 The reconstruction of the pectoralis major muscle was performed with a semitendinosus tendon graft using the endobutton technique.

Video 4 The reconstruction of the pectoralis major muscle was performed with a semitendinosus tendon graft using the endobutton technique.

Video 5 The humerus bone tunnels were performed and a semitendinosus tendon graft used with endobuttons.

Figure 12 Humerus bone tunnels were performed and a semitendinosus tendon graft used with endobuttons.

Figure 13 Humerus bone tunnels were performed and a semitendinosus tendon graft used with endobuttons.

Figure 14 Postoperative radiographics.

With regard to the traumatic anterior instability, surgical treatment is required since the first traumatic episode in athletes. McMahon *et al*⁷ reported that two successive episodes of anterior dislocation may increase the propensity for recurrent posterior dislocations.

Figure 15 Postoperative radiographics.

Figure 16 Postoperative radiographics.

Boileau *et al*⁸ recommend surgical treatments with the use of bone locking, taking into account some parameters, including age, level and type of sport, ligament laxity, and the presence of bone defects in the humeral head and the glenoid. Terra *et al*⁹ defined a safety margin for osteotomy of the coracoid process that would not compromise the coracoclavicular ligaments and that could be used in the coracoid transfer procedures. The authors established a safety margin of 2.64 cm for osteotomy of

Figure 17 Patient 6 months after procedure.

Figure 18 Patient 6 months after procedure.

the coracoid process and its relation with the posterior margin of the pectoralis minor.

However, the technique that employs bone grafts has a complication rate of approximately 30% and a significant loss of external rotation in comparison with the arthroscopic treatment.¹⁰

The treatment of acromioclavicular joint dislocation has been controversial since the time of Hippocrates.¹¹

Non-surgical treatment is recommended in dislocation grades I and II, whereas surgical treatment is admittedly better in grades IV, V, and VI. However, the treatment of acute acromioclavicular joint dislocation grade III remains controversial.^{11–15} Thus, outcomes were satisfactory with conservative treatment^{16 17} and surgery.

We chose to perform surgical treatment of all three lesions in a single surgical procedure because of the functional demand and the competitive level of the patient.

Learning points

- Pectoralis major muscle injuries are rare in daily practice.
- The occurrence of injuries associated with rupture of the pectoralis major tendon has not been described.
- Simultaneous surgical treatment of all three lesions yielded satisfactory results for this patient.

Competing interests None.

Patient consent Obtained.

Provenance and peer review Not commissioned; externally peer reviewed.

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