

Sternoclavicular dislocation—reconstruction with semitendinosus tendon autograft: a case report

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Abstract Traumatic sternoclavicular dislocation is a rare injury corresponding to less than 5% of all injuries of the scapular belt. It is preferentially treated through reduction of the sternoclavicular joint, symptom relief, a brief period of immobilization and rehabilitation, with the aim of gaining strength and range of motion. In some patients, however, this type of injury may progress with instability and pain, thus causing discomfort and pain. On such occasions, surgical treatment is chosen. The objective of this study was to report the clinical case of a sports player who progressed with chronic traumatic anterior instability of the sternoclavicular joint and underwent reconstruction using the ipsilateral semitendinosus tendon. This was a 16-year-old male patient who was a state-level judo player. Following a fall during a fight, he presented pain, slight deformity and edema in the right sternoclavicular joint, and he underwent conservative treatment for 12 months, without success. In the end, reconstruction of the

sternoclavicular joint was carried out using the ipsilateral autologous semitendinosus, with resection of the intra-articular disc and suturing of the costoclavicular ligaments. We have presented a case of dislocation of the sternoclavicular joint in a high-performance judo player who underwent reconstruction using the semitendinosus, with excellent functional results after 1 year of follow-up.

Keywords Orthopedics · Trauma in sports players · Sternoclavicular joint · Autologous transplantation · Treatment results

Introduction

Traumatic sternoclavicular dislocation is a rare injury corresponding to less than 5% of all injuries of the scapular belt [4, 8, 10]. It usually results from direct high-energy trauma or indirect trauma following a fall. The culmination is dislocation or subdislocation of the sternoclavicular joint, or epiphyseal lesion of the medial clavicle in immature skeletons [10, 11, 16].

Although rare, such injuries deserve rapid diagnosis and effective treatment to avoid future complications. Anterior dislocation is three to twenty times more common than posterior dislocation [10, 12], and normally it presents few complications.

Posterior dislocation, which is rare, may cause serious complications due to compression of prime central structures by the medial clavicle. Respiratory discomfort, lesions of the brachial plexus and arterial insufficiency are some of the harmful consequences of this type of dislocation [3, 6, 7, 9].

Acute or chronic anterior dislocation of the sternoclavicular joint is mostly treated by means of symptom relief, a

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short period of immobilization and rehabilitation, with the aim of gaining strength and range of motion. There are cases in which reduction of the sternoclavicular joint becomes necessary and, even if it remains unstable, the deformity is accepted because of the low risk of sequelae [5].

Surgical treatment is chosen when this type of injury progresses with recurrent instability and pain, thereby causing great discomfort and incapacity [1, 5, 13]. A variety of surgical techniques have been used to keep the medial clavicle and the sternum together. Some examples include intramedullary suture, medial resection of the clavicle, use of a plate, reinforcement with the subclavian tendon and reinforcement with the semitendinosus tendon [1, 13].

The objective of this study was to demonstrate the clinical case of a high-performance sports player who progressed with chronic traumatic anterior instability of the sternoclavicular joint and underwent reconstruction using the ipsilateral semitendinosus tendon. What stimulated our group to publish this report was that it was an unusual type of case in our daily practice, with a precise surgical indication that was also unusual, and with a result from the present case that was very good, in line with what we have found in the literature.

Case report

This was a 16-year-old male patient who was a state-level judo player. Following a fall during a fight, he presented pain, slight deformity and edema in the right sternoclavicular joint. Following an initial evaluation, anterior dislocation of the sternoclavicular joint was diagnosed.

It was initially decided to administer conservative treatment consisting of immobilization for 10 days, followed by physiotherapy for rehabilitation. After 4 months of muscle strengthening, the patient returned to his high-performance sport, while maintaining the symptomatology. The rehabilitation process was continued, with muscle strengthening and analgesia.

After 12 months, the symptoms presented by the patient at a physical examination were pain, slight anterior deformity of the sternoclavicular joint and muscle weakness. In training sessions, he was complaining of joint instability.

Dynamic computed tomography was performed. This showed that the sternoclavicular joint was stable at rest (Fig. 1), but that dynamic maneuvers provoked anterior dislocation (Fig. 2). Chronic degeneration of the intra-articular disc was also found. We decided to carry out reconstruction surgery with reinforcement using the semitendinosus tendon, since this is a biological technique with good functional results, according to the literature.



Fig. 1 Computed tomography image at rest, showing stable sternoclavicular joint



Fig. 2 Computed tomography image with dynamic maneuver, showing anterior dislocation of the clavicle

Surgical technique

The patient underwent general anesthesia, positioned in horizontal dorsal decubitus with the dorsum inclined at around 30°. The surgical fields were laid out so as to expose the right sternoclavicular joint, and a transversal incision was made above the joint.

After accessing the joint, subperiosteal dissection was performed laterally to medially, while protecting the deep vascular structures. This was followed by debridement and local scraping until bleeding, excision of the degenerated intra-articular disc and partial resection of the medial clavicle, which showed signals of degenerative cartilage and bone spurs.

The graft removed was from the semitendinosus tendon of the patient's ipsilateral knee. The surgeon who did this was the same surgeon operating on the sternoclavicular joint, who was already qualified to carry out knee surgery. Krakow-type sutures were performed at the extremities of the graft, thus enabling good attachment to the sternoclavicular joint.

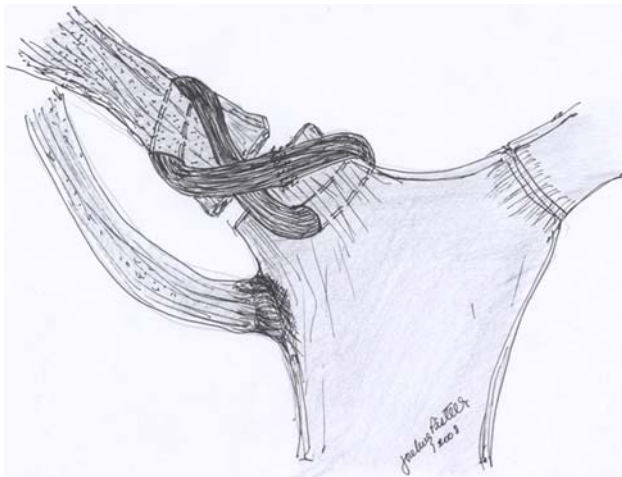


Fig. 3 Surgical technique—autologous graft from the semitendinosus through in a figure-of-eight

Holes were drilled 1.5 cm from the sternum and from the medial clavicle, to pass the autologous graft from the semitendinosus through in a figure-of-eight, and the reduction was reinforced with nonabsorbable thread (Ethibond 5) through the tendon (Fig. 3). After observing that stability had been achieved, by means of an adduction maneuver, we closed the remainder of the periosteum and repaired the costoclavicular ligaments.

Postoperative period

During the postoperative period, the patient continued to be immobilized using an arm sling for 3 weeks. After this period, he was sent for physiotherapeutic treatment, starting with passive movement to gain range of motion.

The immobilization was withdrawn in the fifth week, and the patient was allowed to start performing active aerobic exercises with restriction on shoulder extension. Thereafter, he progressed to strengthening exercises and sports action training. In the fourth month, the patient returned for assessment, and was found to present stability of the sternoclavicular joint and absence of pain at the site of the surgery, on physical examination. The patient reported that he was not suffering any pain during training sessions, and he was given clearance to return to practicing judo.

After 1 year of evolution, the patient presented normal range of motion, absence of pain, muscle strength without deficit, as proven by an isokinetic test, both in the shoulder and in the knee. An imaging examination showed reduction of the sternoclavicular joint (Figs. 4, 5). The patient went back to competing at the same level as before the injury, and has even won a state competition recently.



Fig. 4 Elevation without pain



Fig. 5 Computed tomography image following surgery, showing the sternoclavicular joint together

Discussion

The recommendations for treating anterior sternoclavicular dislocation range from pain relief and immobilization to closed reduction and surgical reconstruction [1, 5, 13, 17]. Few studies in the literature show objective data for precise indications of surgery in cases of acute or chronic traumatic anterior dislocation, or show which would be the best method [1].

The objective of this study was to demonstrate the case report on a sports player with the sequela of traumatic anterior dislocation that progressed with pain and instability. In most cases, anterior dislocation receives conservative treatment, with a good response from most patients. Even, cases in which deformity continues, with slight instability, do not end up having repercussions on these patients' ways of life. However, because our patient was a high-performance judo player who constantly needed to use adduction force and elevation of the arm, his chronic instability was leading to pain and weakness, thereby causing decreased performance.

These cases of chronic traumatic anterior instability that respond poorly to conservative treatment and give rise to clinical repercussions are indicated for surgery [1, 2]. Our patient underwent 12 months of conservative treatment without success, which led us to indicate surgery.

Studies in the literature have shown good functional results from the use of autologous grafts from the semitendinosus for reinforcing the sternoclavicular joint [1]. This is a biological reconstruction and therefore has fewer complications than that with the use of plates or other implants. Even though plates bring good results, they may cause the complications that are inherent to all nonbiological implants, as well as needing to be removed later on [15].

A study on cadavers comparing reinforcement using the semitendinosus tendon in a figure-of-eight, reinforcement using the subclavian tendon and reconstruction of the intramedullary ligament showed that the first of these techniques is more resistant and confers greater biomechanical stability to the sternoclavicular joint than what the other two do [14].

One criticism of the use of the autologous semitendinosus is the possible damage to the flexion strength of the knee. However, this tendon is constantly used in ligament reconstructions in the knee. Another option would be the use of a graft from a tissue bank, for biological reconstruction without harming a donor area.

Rockwood and Wirth [13] showed that the continuing presence of the costoclavicular ligaments is fundamental for stability of the sternoclavicular joint. Therefore, their reconstruction in open surgery has high priority, and this was done in our technique.

In the present case, all our steps were based on data in the literature, from the best time for indicating surgery and the reconstruction technique to the care taken during the operation, such as repair of the costoclavicular ligaments. Today, our patient is satisfied, asymptomatic and pursuing his competitive sports activities at a high level.

Conclusion

We have presented a case of dislocation of the sternoclavicular joint in a high-performance judo player who

underwent reconstruction using the semitendinosus, with excellent functional results after 1 year of follow-up.

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