

## Acromioclavicular Joint Dislocation Type 3 Managed Using the Tightrope System in Open Procedure: A Case Report

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### Abstract

### Case Report

The acromioclavicular joint dislocation type 3 and higher represents a real therapeutic challenge due to the multitude of operating techniques described in the literature and controversial results. We present our first case of a prospective series: it was a 28 year old female patient who presented type 3 injury which we treated with open procedure using Tightrope system taking into account its reliability and its technical and biomechanics advantages.

**Keywords:** Acromioclavicular joint; dislocation; TightRope; open procedure.

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## INTRODUCTION

Acromioclavicular (AC) joint disruption is not an uncommon injury among sports person involved in contact sports. It accounts for 3–5% of all shoulder injuries [1]. Acromioclavicular dislocations are typically classified according to Rockwood, a classification based on degree of soft-tissue injury and clavicle displacement. In the literature, the multitude of techniques reflects the absence of a universal consensus concerning the surgical management of these injuries. Generally, the treatment must be established according to the patient's request, his functional impairment, his level of activity and his response to conservative treatment [2, 3]. Recently, the TightRope system is convincing more and more surgeons for the surgical reconstruction of acute AC dislocation [3, 4]. Through this article, we share the case of an AC disjunction in a 28-year-old patient treated using the TightRope system in open procedure.

## OBSERVATION

We report the case of 28 years old female active Patient suffering of traumatic AC joint dislocation type 3 that underwent surgical treatment using the TightRope fixation systems. AC joint dislocation diagnostic was based on both clinical and

radiographic (figure 1) assessment within a 2 week period following the original injury. Mechanism was a direct blow to the acromion with the shoulder in the adducted position

### Surgical Technique

The procedure was done in beach chair position under general anaesthesia and regional block. After full preparation and draping of the entire clavicle and upper extremities, the head was tilted away from the operative side. The incision is made between the distal angle of the clavicle and the coracoid process (figure 2). The upper side of the clavicle and the base of the coracoid process were exposed. The reduction of the AC joint reduction is made upper limb in supination and evaluated by fluoroscopy. First, conoid clavicular, trapezoid clavicular and coracoid tunnels were created independently (figure 3). Then the TightRope system was inserted (figure 4). The wound was then closed and the arm was immobilized in an arm support. Postoperative radiographs were taken to confirm adequate reduction (figure 5). Patient was immobilized completely for 2 weeks, and then physiotherapy was started after the third week. After 8 weeks, patient was allowed normal shoulder mobilization and his Constant score was 100.



**Fig-1:** Comparative preoperative X-ray of both shoulders which illustrates on the left side type III AC joint dislocation



**Fig-2:** Pre-operative anterior view of the left shoulder specifying the AC joint and the coracoid process



**Fig-3:** Intraoperative anterior view after tunneling clavicle and coracoid process



**Fig-4:** intraoperative view of the TightRope system in place



**Fig-5:** Post-operative X-ray of the left shoulder at the final follow-up 3 months after surgery demonstrating an acceptable reduction of the AC joint

## DISCUSSION

Acromioclavicular dislocation still poses a treatment problem. If types I and II always profit from a conservative treatment [5], the authors diverge, in types III, IV, V and VI as for the choice of the surgical technique offering the optimal stability [6]. Literature review identifies many successful surgical techniques including open and arthroscopic procedures, in this context comes the TightRope technique practiced to our knowledge for the first time by Hernegger *et al.* [7], who published a case report in 2006.

Many biomechanical studies have shown that TightRope system provides excellent superoinferior stability and allows for the healing of the coracoclavicular ligament complex without any graft supplementation. These findings translate clinically, as several authors point out, by a quasi-complete functional recovery relating to shoulder mobility, daily activities and muscular strength [8, 9]. In this regard, Abdelkader *et al.* [10] report in a series of 13 cases, a satisfaction rate of 76.9% with a constant score of 94.8 on average and this at 6 months of surgery. Unlike the other methods, the TightRope system, in addition to its simplicity, dispenses with graft removal, ligaments transfer and the use of material such as screws and hook plates which may require secondary ablation.

The procedure is associated with a low rate of complications and failures [3]. In this regard, the different publications focus on loss of reduction due on the one hand to osteolysis around the button which is especially important in case of osteoporosis [11], and the other hand to the location of clavicle tunnel. In this context, Cook JB *et al.* [12] recommend through a series of 130 patients the positioning of the conoid tunnel at 25% and trapezoid tunnel at 17% of the total clavicular length from its lateral border. Eisenstein ED *et al.* [13] considered that the optimal ratio of the conoid tunnel should be between 0.20 and 0.25 and the ratio of trapezoid tunnel should be less than 0.16. In addition, anteroposterior stability remains poorly controlled with this procedure, as reported by several authors [14,15] who describe a partial loss of reduction which is accompanied by a decrease in the functional score. In this regard, Zhang *et al.* [11] lists 25% of cases in a series of 24 patients. In order to compensate for this loss of anteroposterior stability, some authors perform the technique with two implants, whose long-term results are still not available [14-17].

Recently, many authors [18] report the fracture of the coracoid process weakened by tunneling. In this sense, few studies have addressed the risk of coracoids sided failure after transcoracoid drilling like the publication of Rylander *et al.* [19] in 2014. The authors conclude through a cadaveric study of Sixty-two cadaveric scapulae, that a 4 mm coracoid tunnel is significantly more resistant than a 6 mm tunnel. Other authors have been interested in the positioning of the

coracoid tunnel and its effect on the occurrence of coracoid process fracture. Biomechanical literature review results showed a higher peak load to failure with a center-center or medial-center tunnel orientation, which may lessen the risk of coracoid fracture during drilling [20].

At the last follow-up which is 6 months, our patient was allowed normal shoulder mobilization and his Constant score was 100. Radiologically, no loss of reduction has been detected.

## CONCLUSION

The TightRope system in open procedure represents a simple, reliable and reproducible surgical technique for the management of acute acromioclavicular disjunction type 3. With great conviction, and in the expectation of developing our practice of shoulder arthroscopy, we intend to adopt it in all our patients with a view to a prospective study with hindsight and a greater number of patients.

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