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Technical note

All arthroscopic augmented Vargas procedure: An option after failed acromioclavicular joint dislocation reconstruction. A technical note

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ABSTRACT

Few salvage procedures have been described after a failed Weaver-Dunn procedure. We hypothesized that it was possible to perform an all-arthroscopic revision with a reflected vascularized conjoint tendon into the distal resected clavicle (Vargas procedure) augmented by an artificial coraco-clavicular ligament. Two patients were enrolled. A minimum of 3-cm proximal conjoint tendon was dissected under arthroscopic control. The half-longitudinal conjoint tendon split, leaving its proximal end attached to the coracoid process, was made and incised transversely near the muscles fibers. While being still vascularized with the tip of the coracoid process, the tendon was tubularized, reflected proximally and transferred into the distal part of the clavicle. An artificial coraco-clavicular ligament augmented the transfer. No complication was described. After a minimum of two-year follow-up, there was no recurrence of AC instability and there was normal ROM; two patients returned to sport.
Level of evidence: Level IV-a, case series.

1. Introduction

A total of 20 to 40% of the patients treated conservatively after acute AC joint dislocations have unsatisfactory results [1–3]. More than 60 techniques have been described since the first open procedure, credited to Samuel Cooper in 1861 by Cadenat [4], including arthroscopic techniques since 2001 [5]. These techniques are supposed to pull the scapula up toward its physiological anatomic position under the clavicle. The Weaver-Dunn (WD) procedure [6] is the coraco-acromial (CA) ligament transfer into the distal part of the clavicle and was widely proposed. Nevertheless, few salvage procedures have been described in cases of failure. In 1942, Vargas [7] published an open technique with a half-longitudinal split of the short head of the biceps (conjoined tendon, CT), leaving its proximal end attached to the coracoid process. The distal half of the tendon was incised transversely near the muscle fibers and reflected proximally through the distal clavicle. We proposed an all-arthroscopic augmented Vargas procedure.

2. Materials and methods

Inclusion criteria for the study were persistent symptoms and recurrence of AC joint dislocation for at least a 6-month period after a failed primary operative technique. There was a minimum 24-month clinical and radiological follow-up.

An exclusion criterion was a previous Latarjet procedure as harvesting the lateral part of the CT is not possible in such cases.

2.1. Patient selection

Two men were enrolled. These patients complained about their right AC joint after a previous failed-open Dunn-Weaver procedure. Plain X-rays showed a fixed and dislocated AC joint, a distal resected clavicle and an increased distance between the coracoid process and the clavicle in comparison with the other side (Fig. 1).

2.2. Surgical technique

In the beach chair position, the arm was placed on an arm support with 30° of forward flexion and neutral rotation of the shoulder without any traction. A portal was made directly over the distal clavicle 2 to 3 cm medial to the AC joint. A 2.4-mm drill-tipped penetrated both clavicle corticals perpendicularly and was left in situ. A standard arthroscopic posterior portal was created just inferior and medial to the postero-lateral corner of the acromion. The 30°-arthroscope (Vims, Toulouse, France) was placed into the joint. Medial resection of the rotator interval was made using an outside-in technique to control the inferior surface of the coracoid process and the posterior surface of the conjoint tendon. Then, the arthroscope was placed into the sub-acromial space. A

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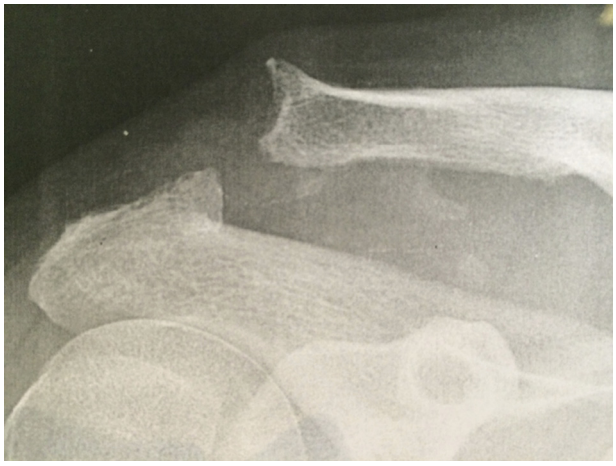

Fig. 1. Plain X-ray after a 6-week failed open WD procedure. See increased CC distance and distal resected clavicle.

lateral sub-acromial portal was made 1 cm distal to the lateral acromial edge in line with the posterior aspect of the AC joint. A 5.5-mm shaver (Smith & Nephew Endoscopy) was used to perform a bursectomy to enable adequate visualization. The arthroscope was transferred to the lateral portal. A 90°-tipped electro cautery device (Depuy Mitek, Raynham, MA) was used through a lateral portal to release the undersurface of the anterior deltoid from the CA ligament. Distal clavicle resection was performed. Anterior deltoid clavicle insertion was released to obtain a large view on the distal third of the clavicle and the K-wire through area. A 4.5-mm drill-cannula was made along the 2.4-mm drill-tipped for guidance and a shuttle relay (No. 2 looped polyester suture) was introduced through this tunnel (Fig. 2a). A socket was shaped into the distal resected clavicle with a motorized bur (StoneCutter; Smith & Nephew Endoscopy) and a second shuttle relay was introduced from the superior clavicle tunnel (Fig. 2b). The base of the coracoid, the conjoint tendon and the Pectoralis Minor (PM) were identified. Axillary and musculo-cutaneous (MC) nerves were visualized and the surrounding fatty atmosphere was preserved. Perfect visualization of all the coracoid processes was the key to prevent any fracture. An arthroscopic deltoid muscle elevator (switching stick) facilitated this step. A 2.4-mm drill-tipped was introduced through the coracoid process in a supero-medial to infero-lateral direction [8,9]. A 4.5-mm drill-cannulated was made along this drill-tipped and a third shuttle relay was introduced into this coracoid tunnel (Fig. 2c). Once the tip of the suture lasso was visualized in the inferior recess to the coracoid, the Twin-Bridge ligament (Smith & Nephew Endoscopy) was pulled from the anterior portal underneath and through to the coracoid process and through the clavicle as described by Boileau et al. [10]. A probe was placed through the anterior portal to assist in graft passage.

A clever hook was used to pass a No. 2 nonabsorbable suture through the 3-cm-lateral conjoint tendon (Fig. 3a). A half-longitudinal split of the short head of the biceps leaving its proximal end attached to the coracoid process was made. The distal one-half of the tendon was incised transversely near the muscle fibers. This tendon slip was reflected proximally and shuttled from the anterior portal into the distal resected clavicle (Fig. 3b). It was still vascularized with its proximal part to the tip of the coracoid process. A suture grasper was then used to capture the No. 2 nonabsorbable suture and fixed into the superior titanium endobutton.

Pushing the arm from inferior to superior reduced the AC joint dislocation and the Twin Bridge was locked before the hemi-CT was attached. Arthroscopic control was mandatory to control a less than 5-mm coraco-clavicular distance (Fig. 4).

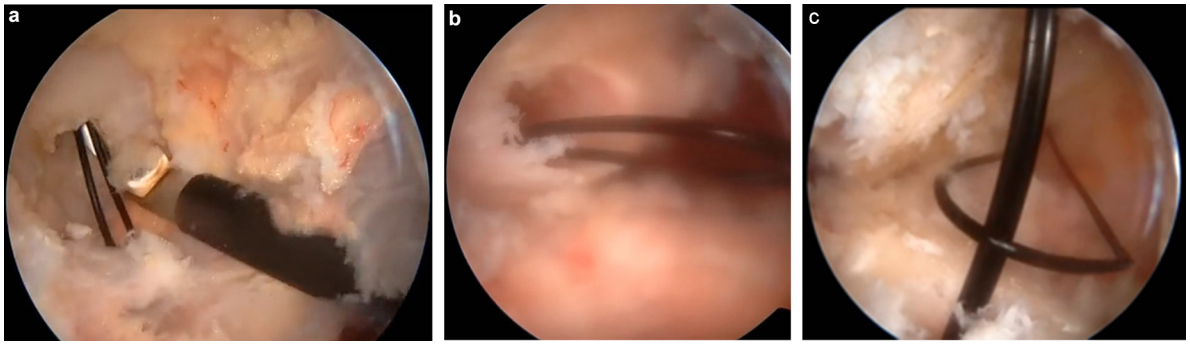

Fig. 2. a–c: arthroscopic views: a: distal clavicle tunnel with shuttle relay; b: distal clavicle socket with shuttle relay; c: coracoid process tunnel with shuttle relay.

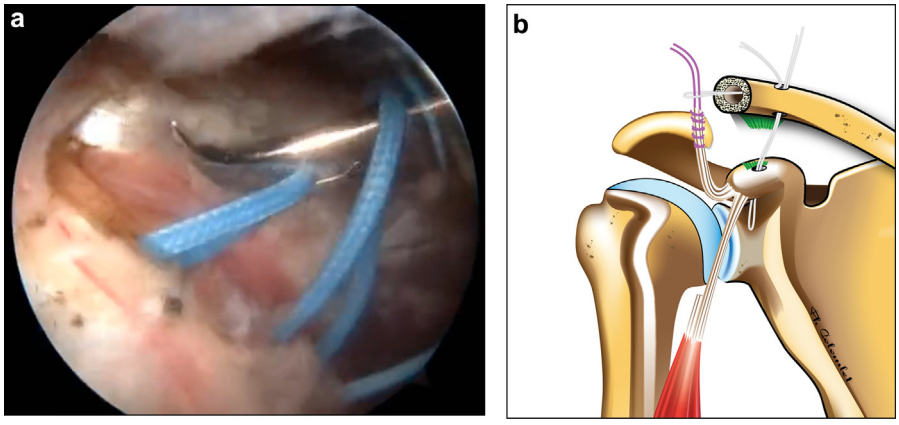

Fig. 3. a and b: arthroscopic views; a: harvesting of the hemi-lateral CT; b: reflected CT (draw).