Shoulder Acromioclavicular and Coracoclavicular Ligament Injuries

Common Problems and Solutions

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• Coracoclavicular ligaments • Reconstruction • Repair • Weaver-Dunn
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KEY POINTS

- Acromioclavicular and coracoclavicular repair and/or reconstructions have high complication rates, even in expert hands.
- Anatomic placement of repair or reconstruction grafts or devices may help to prevent many of the common problems encountered.
- Most common problems and complications have revision or salvage treatment options.

INTRODUCTION

Acromioclavicular (AC) joint and coracoclavicular (CC) ligament injuries are common in active individuals and commonly occur with a fall on the affected acromion with the shoulder in an adducted position.[1] AC joint injuries are most commonly graded based on the Rockwood classification.[2] Treatment of grade I and II injuries involves nonoperative management and progressive return to activities.[3] Most orthopedists agree that treatment of grade IV, V, and VI injuries generally require surgical intervention, either in the acute setting or after continued pain and dysfunction after attempted nonoperative management.[3] The treatment of grade III injuries is

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more controversial, with some providers advocating for operative and some for nonoperative management.[3]

In the higher grade injuries, the goals of surgical treatment include anatomic reduction of the clavicle in relation to the scapula and recreation of proper scapulothoracic biomechanics.[4] This procedure can be performed in either the acute or the chronic setting. More commonly, reconstructions with tendon grafts are performed in the chronic setting, whereas repairs are performed acutely.[4] Historical and contemporary surgical options fall into 4 different groups:

- Primary AC and CC repair and fixation;
- The Weaver-Dunn procedure;
- Anatomic CC reconstruction; and
- Arthroscopic reconstruction techniques.

PROBLEMS ENCOUNTERED IN ACROMIOCLAVICULAR JOINT AND CORACOCLAVICULAR LIGAMENTS REPAIR AND RECONSTRUCTION TECHNIQUES

A recent database study showed an 11% reoperation rate in the first 6 months after undergoing AC joint reconstruction.[5] This study investigated reoperations after AC joint surgery by Current Procedural Terminology codes and, therefore, was unable to discern the technique used. The investigators reported the following revision surgery rates in 2106 patients: 2.8% irrigation and debridement, 1.3% manipulation under anesthesia, 4.2% revision reconstruction, 2.8% distal clavicle excision, and 6.2% removal of hardware.[5] Common problems and complications included clavicle and coracoid fractures, loss of fixation or graft failure, hardware irritation, wound healing problems and infection, adhesive capsulitis of the shoulder, and subacromial impingement.[5–7] The specific complications encountered are related to the technique and fixation construct chosen.

First-Generation Fixation and Reconstruction Options

Older fixation and repair constructs included cerclage wire around the clavicle and the coracoid, a lag screw (Bosworth screw) from the clavicle to the coracoid, and screws, or pins across the AC joint from the acromial side. Initial reports on these procedures demonstrated good clinical outcomes.[8] More recently, the biomechanical fixation properties of these constructs have been questioned,[9] and the potential for pin migration into the thoracic cavity or spinal canal has made pin fixation less popular in clinical use.[10,11] Problems encountered with these fixation methods included fracture, hardware breakage, loss of reduction, and, in the setting of pins, could lead to pin migration in the chest with potentially devastating complications. We do not currently perform these procedures; however, if these fixation techniques are attempted, then frequent radiographic follow-up and hardware removal is encouraged to prevent hardware breakage and/or migration.

The Weaver-Dunn procedure involved detachment of the coracoacromial ligament from the acromion and fixation to the clavicle with a distal clavicle resection.[12] Similar to the older repair constructs, initial reports portrayed good clinical outcomes.[12] However, further follow-up was fraught with loss of reduction and continued patient pain and shoulder dysfunction.[13] Both clinical comparative studies[13–15] and biomechanical studies revealed inferiority in comparison with the anatomic CC reconstruction.[16] Failure of the Weaver-Dunn procedure can be rectified with revision using an anatomic CC reconstruction technique (**Fig. 1**).