



Addressing Arthroscopic-Assisted Acromioclavicular Joint Reconstruction in the Beach Chair Position With Concomitant Labral Pathology in the Lateral Decubitus Position

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Abstract: High-grade Acromioclavicular (AC) injuries are complete dislocations, involving ruptures of the AC and coracoclavicular ligaments. They occur following trauma after a fall, direct-blow to an adducted arm, or indirectly by falling onto an abducted, outstretched extremity. Given this traumatic etiology, additional intra-articular pathologies can arise and may go unnoticed because of the painful and prominent AC joint (ACJ). Previous studies have evaluated patients with high-grade ACJ injuries with diagnostic arthroscopy at the time of an ACJ reconstruction. They found associated injuries to the labrum/biceps, rotator cuff, and articular cartilage. The arthroscopic-assisted ACJ reconstruction (AA-ACJR) technique has made it possible to identify the associated injuries and treat them concurrently. The previous studies have performed this reconstruction in the beach chair position (BCP) and have addressed the concomitant pathology in the same position. As opposed to the BCP, the lateral decubitus position (LDP) allows for easier application of traction to the arm and, thus, improves visualization of the glenoid, especially the inferior and posteroinferior portions. It is imperative to gain appropriate access to the inferior glenoid for anchor placement to address this component of traumatic instability. We present the technique for addressing high-grade ACJ injuries with AA-ACJR in the BCP preceded by labral repair in the LDP.

Introduction

Acromioclavicular joint (ACJ) injuries are classified by the Rockwood classification. Rockwood I and II injuries are incomplete dislocations and have intact or

sprained coracoclavicular (CC) ligaments. Rockwood III-VI injuries are complete dislocations with ruptured acromioclavicular and CC ligaments.¹ ACJ injuries occur following trauma as a result of a fall or direct blow to an adducted arm.² Indirect injury patterns also occur by falling onto an abducted, outstretched extremity resulting in the humerus translating superiorly and driving into the acromion.² Given this traumatic etiology, additional intra-articular pathologies can arise and may go unnoticed because of the painful and prominent ACJ.^{2,3} Clinicians must be diligent in evaluating the patient for concomitant injuries. Several articles have previously evaluated patients with high-grade ACJ injuries that underwent arthroscopic-assisted ACJ reconstruction (AA-ACJR) and found associated biceps/labral pathology, cuff tears, and articular cartilage damage.²⁻⁶ The AA-ACJR technique has made it possible to identify the associated injuries and treat them concurrently. The previous studies have performed this reconstruction in the beach chair position (BCP) and have addressed the associated pathology in the same position. As opposed to the BCP, the lateral decubitus position (LDP) allows for easier application of traction to the arm and, thus, improves visualization of

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the glenoid, especially the inferior and posteroinferior portions.^{7,8} It is imperative to gain appropriate access to the inferior glenoid; anchor placement here is important for addressing this component of traumatic instability.⁹ We present the technique for addressing high-grade ACJ injuries with AA-ACJR in the BCP preceded by labral repair in the LDP to allow for easier access to the inferior and posterior glenoid especially.

Surgical Technique (With Video Illustration)

Labral Repair-Bankart-Lateral Decubitus Position

The patient is placed in the LDP using a bean bag. Bony prominences are padded and an axillary roll is placed. The patient's arm is placed in an arm positioner with 10 pounds of traction; additionally, the Arthrex star sleeve (Arthrex, Naples, FL) is placed under the axilla for better traction and visualization. A high posterolateral portal is established, and diagnostic arthroscopy is performed. An anterior portal is established, and the

location within the interval is determined on the basis of the pathology encountered. A cannula is placed in the anterior portal for easier instrument and suture passage. This portal allows for reliable access to the 5:30 position, especially for an anterior-inferior labral tear. A Bankart elevator is used to mobilize the torn labrum appropriately. A shaver or Burr is used to prepare the glenoid bone bed. An additional anterior portal is established percutaneously through the subscapularis using the percutaneous kit from Arthrex. Anchors are inserted through a cannula from this portal. A 2.4-mm single-loaded Suture Tak anchor (Arthrex) is placed after drilling, starting at the 5:30 position for a Bankart repair. A simple suture is passed through the labrum just inferior to the anchor in retrograde fashion using a PDS suture that is passed through the labrum with a Spectrum suture passer (ConMed Linvatec, Largo, FL) through the anterior portal. For a right shoulder, a 45° curved-right suture passer is used to penetrate the anterior labrum. The suture is tied using the REVO knot followed by

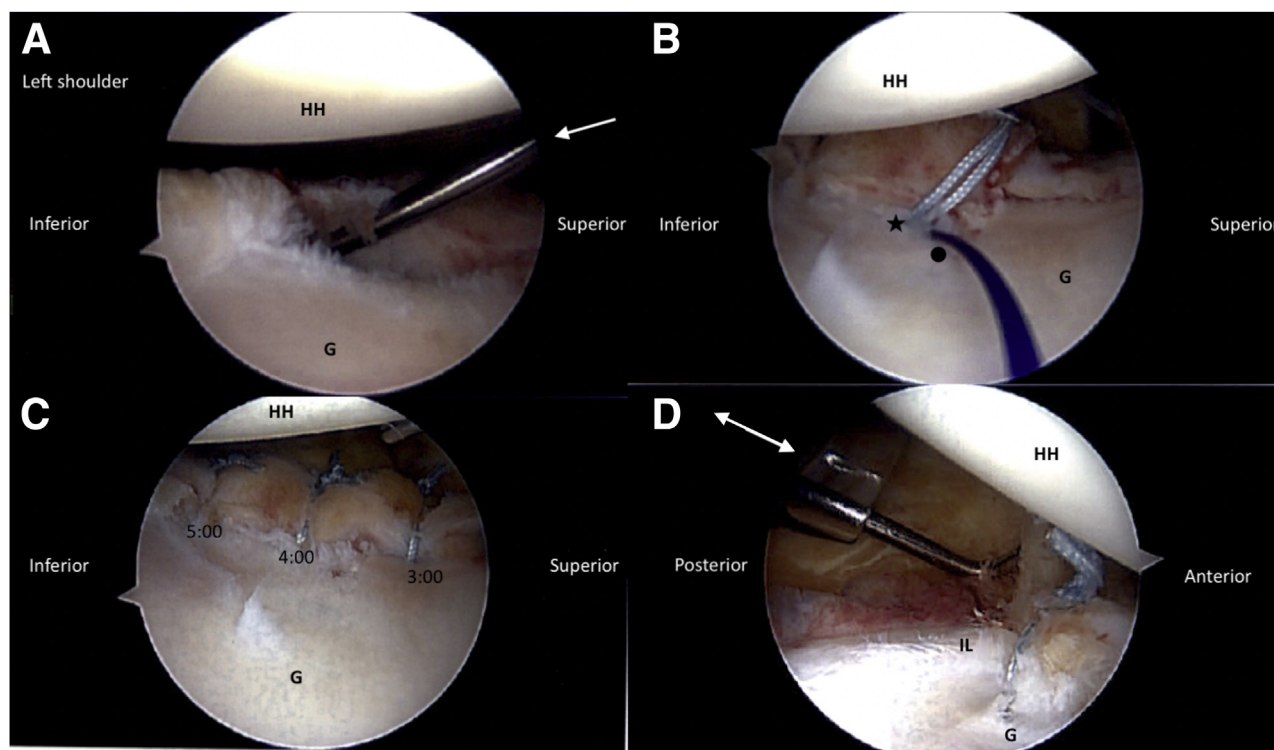


Fig 1. (A-C) Demonstration of the left shoulder of an 18-year-old male snowboarder with an ipsilateral type III acromioclavicular (AC) joint injury and Bankart lesion that is viewed from the posterolateral portal in the lateral decubitus position. Before proceeding with the arthroscopic-assisted acromioclavicular joint reconstruction (Fig 5) the Bankart tear (A) being probed (arrow) is repaired. Single-loaded 2.4-mm BioComposite SutureTak anchors (star) (Arthrex, Naples, FL) are used for the labral repair. One of the suture limbs from the anchor are passed through the labrum in retrograde fashion with a PDS suture (circle) (B). Three anchors are placed through a percutaneous anterior working portal in the 3:00, 4:00, and 5:00 positions (C). After anterior labral fixation the inferior labrum is addressed which is better accessed through the posterior portals. The camera is switched to the anterior portal, a cannula is placed in the posterolateral portal which becomes a working portal (double arrow), and a final anchor is placed at the 6:30 position through an accessory portal of Wilmington (D). The lateral decubitus position allows for reliable access of the labrum circumferentially. Inferior access is usually required even for Bankart tears. G, glenoid; HH, humeral head.

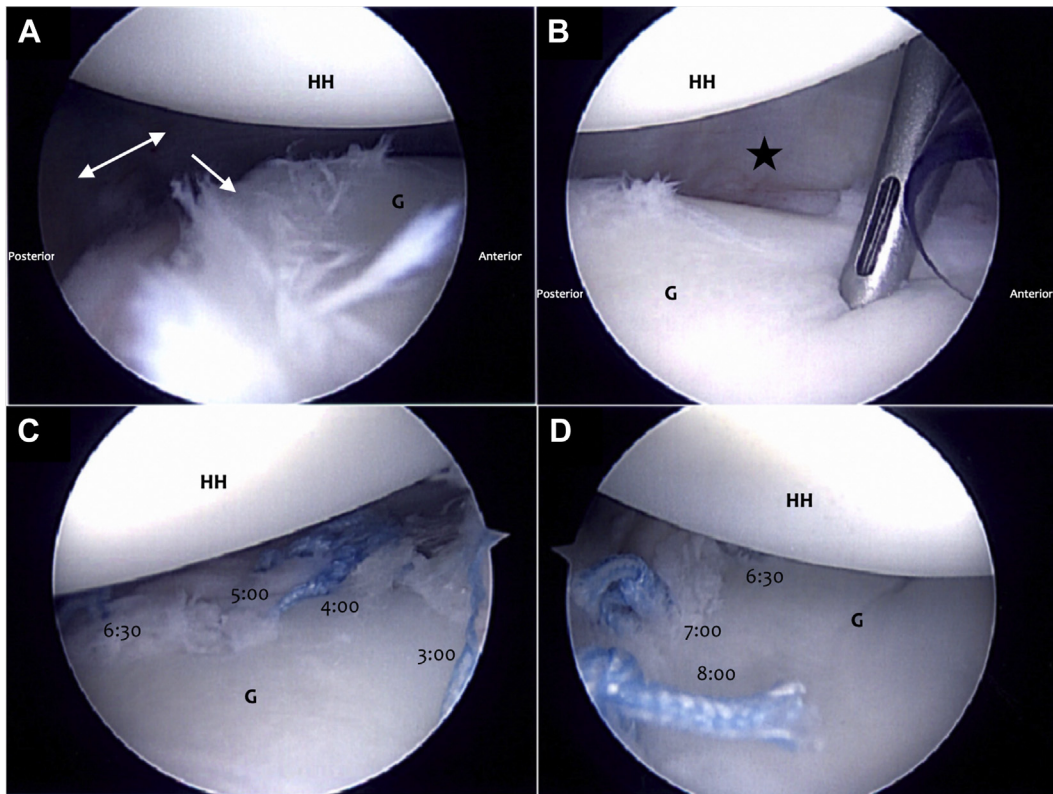


Fig 2. Demonstration of the right shoulder of a 15-year-old female with a type III B acromioclavicular (AC) joint injury after mechanical fall. She also had symptomatic multidirectional instability and a posterior labral tear. Her right shoulder is visualized in the lateral decubitus position, viewing from the posterolateral portal. The lateral decubitus position allows for appropriate circumferential access of the labrum. She has a patulous capsule posteriorly (double arrow) with associated labral tear (arrow) (A) and a patulous anterior capsule (B) (star) in line with multidirectional instability. Single-loaded 2.4-mm Biocomposite SutureTak Anchors (Arthrex, Naples, FL) are used for a posterior labral repair and capsular plication. Suture anchors are placed at the 3:00, 4:00, 5:00, and 6:30 positions (C) and in the 7:00 and 8:00 positions (D). The lateral decubitus position allows for appropriate circumferential access of the labrum and is ideal in cases in which the posterior and inferior labrum must be accessed especially. G, glenoid; HH, humeral head. (The arthroscopic-assisted acromioclavicular joint reconstruction part of her case is presented in the attached video and in [Figs 3, 4, and 6.](#))

alternating half hitches. Attempts are made to keep the knot on the capsular side ([Fig 1](#)). This process is repeated until at least 3 anchors are placed for Bankart lesions.¹⁰

Labral Repair—Inferior and Posterior

The cannula is removed, and the camera is switched to the anterior portal. The posterolateral portal is maintained with a switching stick, and an accessory portal of Wilmington is used for anchor placement. From this accessory portal, the 6:00 position can be accessed appropriately along with the posterior glenoid ([Fig 2](#)). The labrum is prepared as described above. The suture passer is passed through the posterolateral portal through a cannula, and the anchors are placed through the portal of Wilmington.

Beach Chair Position

After the intra-articular work is completed, the subacromial space is established to complete a full

diagnostic arthroscopy. After confirming the absence of additional pathology, the portal sites are closed provisionally using 3-0 nylon suture and dressed. The patient is then transferred to another table with the Tenet beach chair attachment (Smith & Nephew, Andover, MA) and placed in the standard BCP with the arm in a Spider arm-positioner (Smith & Nephew). The patient is repped. Fluoroscopy is available and helps confirm appropriate reduction of the ACJ.

Arthroscopic-Assisted Acromioclavicular-Joint Reconstruction

The AA-ACJR portion of the case then begins. [Table 1](#) discusses the indications for this procedure. This is completed in a similar fashion as described by Millet et al.¹¹ The same posterolateral and anterior portals that were established for the labral repair are used to access the joint. The coracoid undersurface is prepared using



Fig 3. Demonstration of a right shoulder in the beach chair position. The arrow indicates the incision made to expose the clavicle for the arthroscopic-assisted acromioclavicular joint reconstruction, approximately 3.5 cm medial to the acromioclavicular joint and 3 cm in length. The circle indicates the posterolateral viewing portal. The star indicates the anterior working portal. The triangles indicate the percutaneous accessory portals used for anchor placement in the labral repair/capsular plication, anteriorly through the subscapularis muscle belly and the more posterior portal of Wilmington through the infraspinatus muscle belly.

the shaver and radiofrequency ablation through the anterior portal. A 70° scope allows for better visualization in preparing the coracoid.

Exposure/Dog-Bone Construct Passage

A 3-cm longitudinal incision is made ~3.5 cm medial to the ACJ (Fig 3).¹² Dissection is carried down to the deltotracheal fascia. The fascia is then elevated perpendicular to the skin incision subperiosteally in full-thickness flaps, centered along the clavicle. The deltoid and trapezium are known to have intimate attachments with the ACJ capsule as demonstrated in cadaveric studies. When any exposure of the ACJ is performed, subperiosteal dissection needs to be performed to preserve these attachment sites.¹³ Enough clavicle should be exposed for placement of the guide for drilling described below; and the ACJ itself should be visualized. It should be ensured that the ACJ capsule is not interposed within the joint and preventing reduction.¹⁴ The remaining capsular tissue should be preserved; the allograft will be imbricated with this tissue at the end of the procedure. Additionally, the anterior and posterior edges of the clavicle need to be appropriately exposed for graft passage also described below. Hohmann retractors are placed anterior and posterior to the clavicle. The Arthrex anterior cruciate

ligament (ACL) guide (Arthrex) is then placed through the anterior incision, the flat portion abuts against the base of the coracoid, and this is verified with the arthroscope. The drill sleeve is positioned centrally along the clavicle in an anterior to posterior direction, while an assistant holds the ACJ reduced. Fluoroscopy can confirm the drill trajectory before proceeding. Four cortices are drilled using a 3-mm cannulated drill, two through the clavicle and two through the coracoid. The drill is left in place, and the ACL guide is removed. Through the cannulated drill, a looped nitinol wire is passed and the looped-end is retrieved from the anterior portal. This looped wire is used to shuttle the four-strand Dog-Bone construct (Arthrex). The button is guided into appropriate position against the coracoid with a Kingfisher grasper, under direct visualization with the arthroscope. The second button is fitted through the four suture strands and placed against the clavicle (Fig 4). The ACJ is reduced and the four strands of suture are tied, two at a time. Radiographs are taken to ensure appropriate reduction (Fig 5).

Tibialis Anterior Allograft Passage

The allograft is then prepared; we use an 8-mm tibialis anterior allograft. The total length of the graft can be trimmed according to the patient's anatomy after final passage. We use a 20-cm graft and have plenty of length to spare. The ends of the graft are tubularized with a no. 2 FiberLoop sutures (Arthrex); the central 5 cm of the graft remain without suture. The nonsutured portion abuts against the base of the coracoid. A pathway for graft passage is then created (Fig 6). A switching stick is placed posterior to the clavicle and medial to the coracoid. A soft tissue dilator matching the diameter of the graft is passed over this. The switching stick is removed and a FiberStick with FiberWire suture (Arthrex) is passed through the dilator. The suture is retrieved through the anterior portal and used to pass one end of the graft through the established pathway medial to the coracoid and posterior to the clavicle. In a similar fashion, a pathway is created anterior to the clavicle and lateral to the coracoid, and the other end of the graft is shuttled. This completes the graft passage posterior to the clavicle, looping around the coracoid, and anterior to the clavicle. To secure the ligament and to prevent a windshield-wiper effect of the allograft on the bone, the

Table 1. Indications and Contraindications

• Indications
○ Rockwood IIIA injuries that remain symptomatic and have failed conservative treatment
○ Rockwood IIIB injuries that remain horizontally unstable
○ Rockwood type IV and VI injuries, acute and chronic
• Contraindications
○ Skin problems over surgical site
○ Patients unwilling to comply with postoperative rehab/restrictions

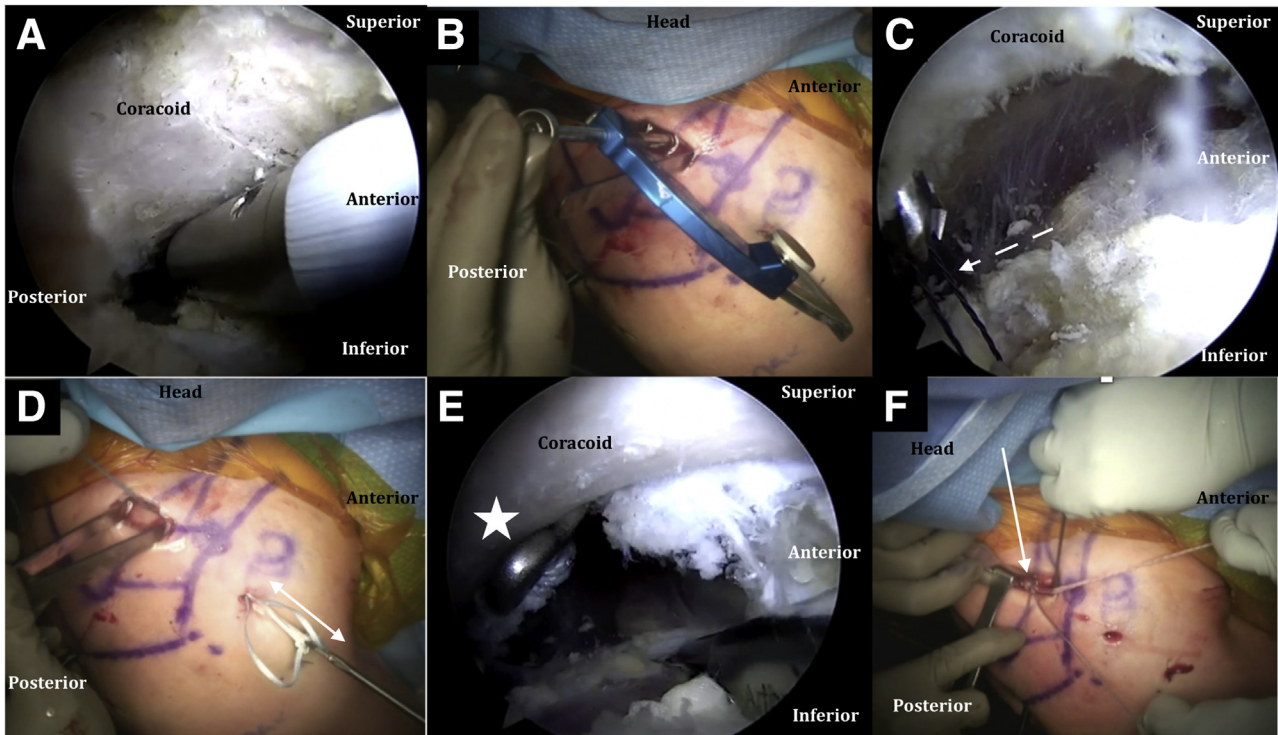


Fig 4. Demonstration of the right shoulder of a 15-year-old female with a type III B acromioclavicular joint injury after mechanical fall, who also has symptomatic multidirectional instability and a posterior labral tear. She is undergoing the arthroscopic-assisted acromioclavicular joint reconstruction in the beach chair position after her labral pathology was addressed in the lateral decubitus position. Using a 70° scope, viewing from a posterior portal, the undersurface of the coracoid is prepared with radiofrequency ablation (A). The anterior cruciate ligament guide is hooked around the undersurface of the coracoid and centered over the clavicle; and a cannulated drill is then passed through the clavicle and coracoid (B). A looped nitinol wire (dashed arrow) is passed through the cannulated drill (C). The wire aids in passage of the Arthrex suture/dog-bone construct (Arthrex, Naples, FL) (double arrow) into the shoulder and through the coracoid/clavicle (D). The dog bone (star) sits flush underneath the coracoid after all the slack is removed from the sutures (E). After appropriate reduction of the AC joint, the second dog-bone (arrow) is placed and sutures are tied (F). This reconstruction construct is then reinforced with an allograft.

sutures passing through the dog bone are passed through both limbs of the graft using a free needle. Additionally, no. 2 FiberWire (Arthrex, Naples, FL) sutures in figure-of-eight fashion are used to link the anterior and posterior limbs of the graft. Approximately 3 cm of redundant graft from the more lateral limb of the allograft is left in place, and the excess graft is trimmed.

Closure

The 3-cm limb of redundant graft is imbricated into the remaining superior ACJ capsule in figure-of-eight fashion with nonabsorbable suture. The imbricated graft is then incorporated/tucked under the delto-trapezial fascia. A nonabsorbable suture is used to pass through the posterior leaflet of fascia, through the graft, and then through the anterior leaflet of fascia; the second pass of the figure-of-eight suture is passed through the fascia only and tied. This is repeated for a second stitch and tied. Mazzoca et al. stresses the importance of repairing this fascia in regard to adding to ACJ stability in addition to the reconstruction

procedure.¹² The deltoid and trapezium are known to have intimate attachments with the ACJ capsule.¹³ The skin is closed appropriately along with the portal sites followed by dressings. Table 2 discusses the pearls and pitfalls of the technique.

Postoperative Rehabilitation

Postoperatively, the patient is placed in an abduction brace at all times for 4 weeks and then transitioned to wearing the sling portion only when out of the house for an additional 2 weeks. Active-assisted motion begins at 4 weeks postoperatively to 90° forward elevation and progresses from there. Active range of motion begins at 6 weeks and strengthening at 8 weeks.

Discussion

When treating high-grade ACJ injuries surgically, it is necessary to perform associated arthroscopy to evaluate for and treat concomitant injuries.²⁻⁶ When capsulolabral pathology is expected on the basis of preoperative imaging, the senior author prefers to start in the LDP.

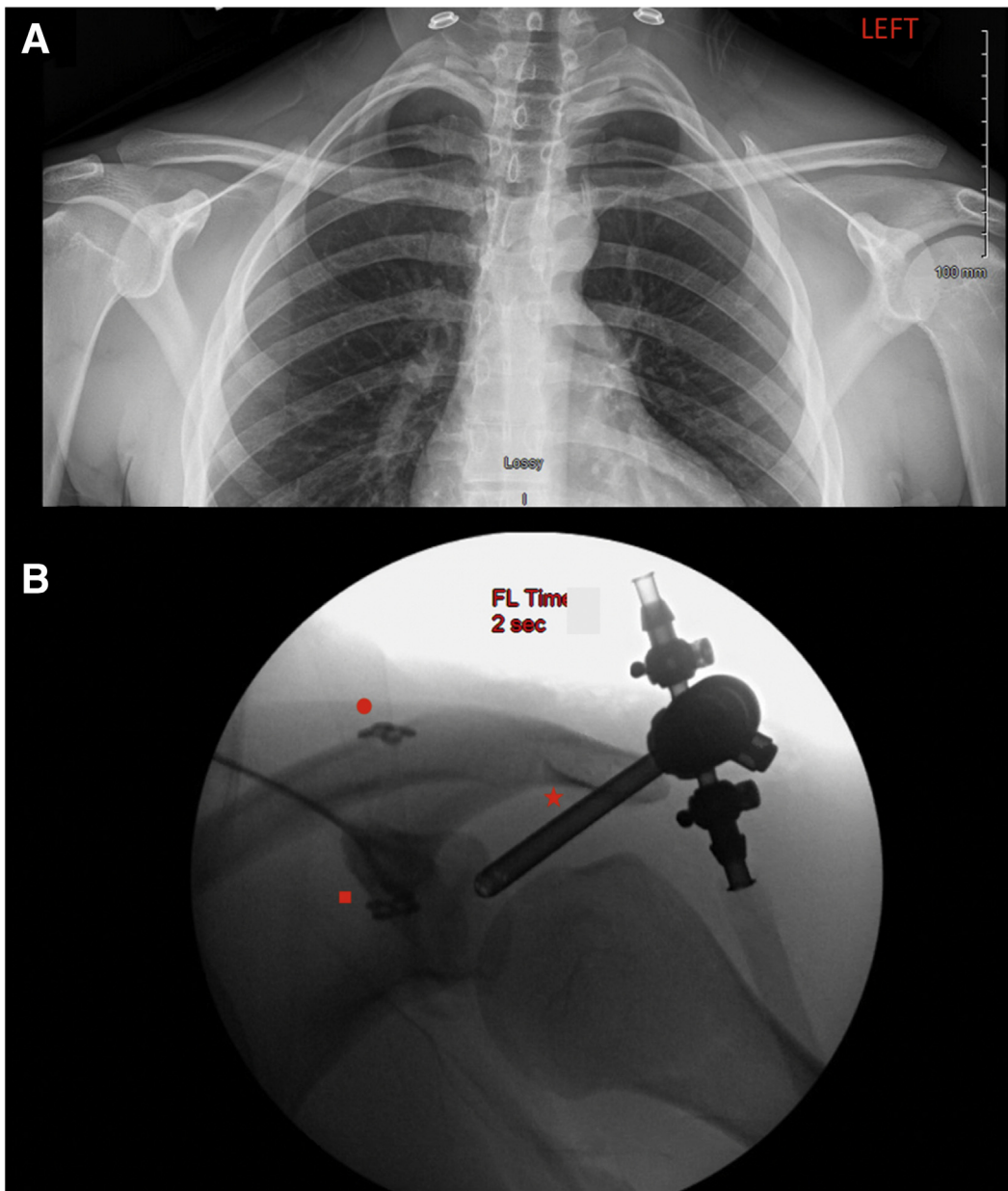


Fig 5. Demonstration of 18-year-old male with a snowboarding injury who sustained a left type III AC-joint injury (A) and Bankart tear. The Bankart tear was fixed first in the lateral decubitus position (Fig 1) followed by arthroscopic-assisted acromioclavicular joint reconstruction in the beach chair position. Intraoperative fluoroscopy is necessary in confirming achievement of appropriate acromioclavicular joint reduction with the procedure. (B) The same left shoulder with the final Arthrex Dog-Bone construct (Arthrex, Naples, FL) with cortical buttons abutting the clavicle (circle) and coracoid (square) holding the acromioclavicular joint reduced in an appropriate position. An arthroscope (star) remains in the shoulder for viewing intra-articularly.

It allows for easier access to the inferior and posterior labrum, ensuring a comprehensive repair can be performed.^{7-9,15} After completion of this portion of the case, the patient is transitioned to the BCP to address the ACJ injury. We feel that although switching positions can be cumbersome, it can be done in an efficient fashion and allows for the best execution of both procedures.

Several articles have previously documented associated injuries found on diagnostic arthroscopy in patients with high-grade ACJ injuries treated with AA-ACJR.²⁻⁶

Tischer et al. evaluated 76 patients with Grade III-VI ACJ injuries and found the following associated injuries: 14.3% with SLAP tears, 1 complete supraspinatus tear, 2 partial articular-sided tears, and 4 fractures (radial head, distal radius, distal clavicle, scapula).² Pauly et al. treated 40 patients with type III-type V ACJ injuries with ACJR and diagnostic arthroscopies. Fifteen percent of patients had associated traumatic intra-articular lesions: partial tears involving the rotator cuff or SLAP tears.³ Markel et al. treated 163 patients arthroscopically with

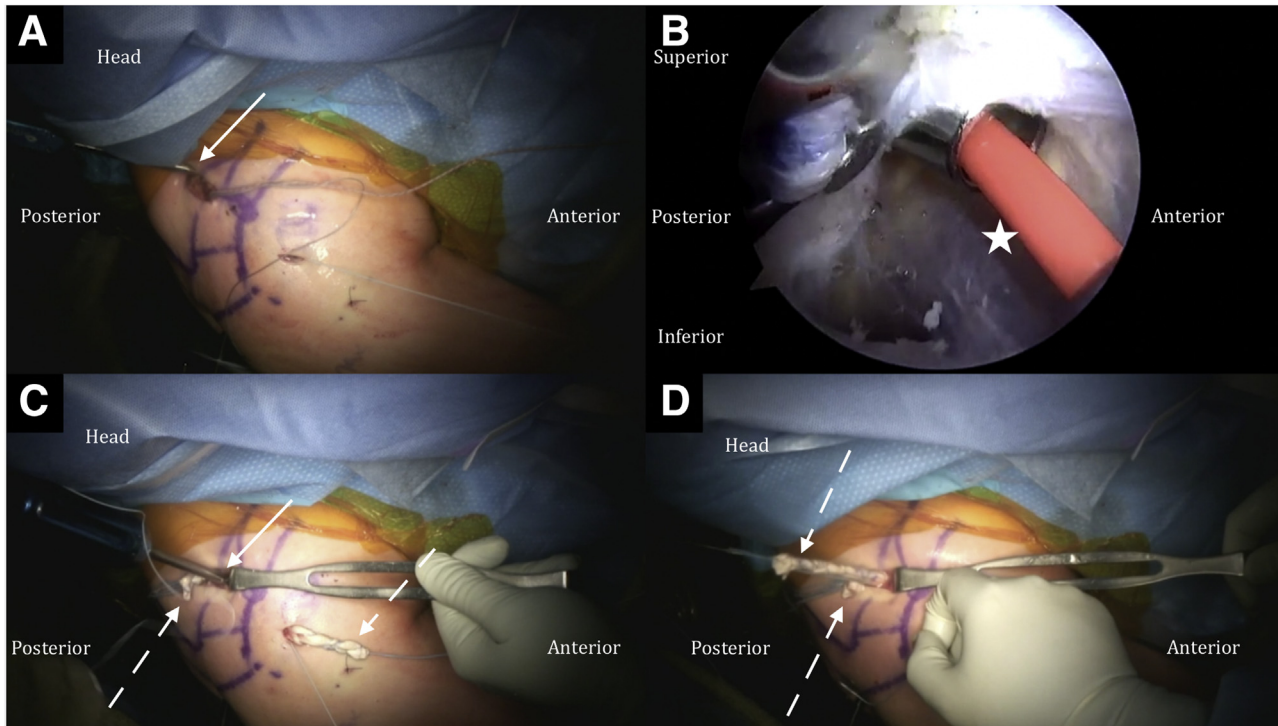


Fig 6. Demonstration of the right shoulder of a 15-year-old female with a type III B acromioclavicular (AC) joint injury after mechanical fall who also has symptomatic multidirectional instability and a posterior labral tear. She is undergoing the arthroscopic-assisted acromioclavicular joint reconstruction in the beach chair position after her labral pathology was addressed in the lateral decubitus position. In addition to the Arthrex Dog-Bone (Arthrex, Naples, FL) construct, a tibialis anterior allograft (dashed arrows) provides reinforcement for an AC joint reconstruction. Using suture constructs alone have been associated with higher failure rates.¹⁸ The passage of the graft is demonstrated here. A soft tissue dilator (arrow) is placed overlying the switching stick posterior to the clavicle and medial to the coracoid to create a pathway for the graft (A). A Fiberstick (star) with Fiberwire (Arthrex, Naples, FL) is passed through the dilator to aid in graft passage (B). This is repeated to pass the other limb of the graft. A dilator (arrow) is now placed anterior to the clavicle and lateral to the coracoid to complete graft passage around the coracoid (C). After both limbs of the graft have been passed, they can be secured to the sutures from the dog bone, and then both limbs of the graft can be tied to each other. One limb of the graft is left redundant to reinforce the AC-joint capsule (D).

type III-type V ACJ injuries. 39.3% of patients sustained concomitant injuries: 32.3% cuff injuries, 30.6% chondral injuries involving the humerus and/or glenoid, and 22.6% sustained SLAP injuries. This was an older population cohort, with the mean age averaging 36.8. Older patients experienced a higher rate of concomitant injuries with their high-grade ACJ injuries. 57% of patients >35 years old had associated intra-articular injuries compared to 28% of patients <35 years old.⁴ Jensen et al. evaluated 376 patients with type III and type V injuries who underwent AA-ACJR and found that 53% of patients had concomitant glenohumeral pathologies most commonly involving the biceps or rotator cuff. Twelve percent of patients had pathology significant enough to require repair, and 45% of patients required debridement of their pathology.⁵ Most recently, Nolte et al. evaluated 102 patients that underwent AA-ACJR for type III-V ACJ injuries with 2-year follow-up. They found the following concomitant lesions requiring treatment at the time of initial surgery: 44.1% of patients with SLAP lesions, 36.3% with other labral lesions, 13.7% with long head biceps lesions, and 25.5%

with rotator cuff lesions. They reported complications in 12.7% of patients over 2 years of follow up. Patients reported a statistically significant improvement in all patient-reported outcome scores compared to the preoperative values. For the American Shoulder and Elbow Surgeons score (ASES), 79.6% reached the minimal clinically important difference when comparing preoperative to the most recent postoperative scores.⁶ Additionally, the coracoacromial distance correction was improved from preoperative to postoperative values and maintained at 2 years. This distance was higher, however, in patients with chronic ACJ injuries compared to acute ACJ injuries.⁶

In terms of ACJR surgeries, open and arthroscopic-assisted techniques are employed in the BCP. Mazzoca et al. and Carofino et al. were among the first to describe an open, anatomic reconstruction technique for high-grade ACJ injuries using tendon allograft looped around the coracoid with interference screw fixation in the clavicle.^{6,12,14,16} Mazzoca additionally stressed the importance of the ACJ capsule in regard to stability and recreating this with one of the limbs of the

Table 2. Pearls/Pitfalls

-
- Perform the lateral decubitus position (LDP) of the case first before proceeding with the beach chair position as traction is required in the LDP and may unnecessarily stress the arthroscopic-assisted acromioclavicular joint reconstruction construct.
 - Appropriate exposure of the clavicle is key. Skin flaps are created down to the deltotrachezial fascia. The deltotrachezial fascia is elevated in line with the clavicle in full-thickness flaps, so that meticulous repair can be performed after the acromioclavicular joint reconstruction (ACJR)—this fascia contributes to acromioclavicular joint (ACJ) stability.^{12,13} Additionally the posterior and anterior borders of the clavicle need to be clearly visualized to aid in easier graft passage.
 - The ACJ should be routinely exposed with the dissection, again making sure that subperiosteal dissection is performed as not to disrupt the deltotrachezial attachments to the capsule.²⁰ This exposure ensures that no soft tissue interposition is blocking the reduction of the ACJ.¹⁴ Additionally it provides an opportunity to imbricate one limb of the excess graft into the remaining capsule and incorporate the capsule/graft in the deltotrachezial repair.
 - In addition to the coracoclavicular reconstruction portion of the procedure, the ACJ should be independently addressed. Some authors recommend reconstruction with dermal allograft or configurations with suture/suture anchors to address horizontal stability of the ACJ.^{21,22}
 - Using the 70° scope provides better visualization of the subcoracoid space and aids in clearing the soft tissue from the undersurface of the coracoid for the AA-ACJR portion of the procedure.
 - Use fluoroscopy to ensure appropriate orientation for drilling and reduction of the ACJ.
 - Ensure that when drilling, the anterior cruciate ligament guide is centered over the clavicle, so as not to disrupt the anterior or posterior cortices of the clavicle.¹¹
 - Creating tunnels with the appropriately sized tissue dilator, according to graft diameter allows for easier graft passage.¹¹
-

allograft used for the ACJR and meticulous deltotrachezial fascia closure.^{12,14} Fracture is a concern with drilling into the clavicle and coracoid—clavicular bone tunnels ≥ 5 mm, and coracoid bone tunnels ≥ 4 mm were associated with increased risk of developing fracture.¹⁷ The technique described by Millet et al. is similar to the method described above except for the cortical button used for the clavicular fixation. His technique uses a top-hat cortical button that requires a 5.1-mm reamer that is drilled unicortically allowing for a low-profile construct.^{5,6} The technique described above uses two dog-bone buttons (Arthrex) for both the clavicular and coracoid fixation. This technique avoids larger tunnels, as only the 3 mm cannulated drill is used. Techniques have been employed that use either suture/cortical button fixation or tendon graft fixation exclusively. Using suture/cortical button fixation alone results in higher failure rates with the most prevalent complication being loss of reduction which most commonly occurred secondary to suture breakage.¹⁸ In terms of graft choices that have been used, options include tibialis anterior allograft as in the case presented above, hamstring autograft or allografts, and peroneus longus allografts.^{6,14}

In the 2-year outcome data supplied by Nolte et al. for the AA-ACJR procedure, one-fourth of patients did not reach the threshold of patient acceptable symptomatic state in regard to their outcome scores.^{6,19} Part of this discontent may stem from the threshold values not being validated and specific to the ACJ.¹⁹ An additional explanation of this dissatisfaction is the ACJR procedure's ability to restore horizontal stability. Many of the described procedures restore vertical stability of the AC joint reliably but not necessarily horizontal stability.^{19,20} In their biomechanical study, Celick et al. discussed horizontal stability of the ACJ along the lines of rotational stability as opposed to solely anterior/posterior

translation. The clavicle experiences rotational forces with movement of the shoulder—both anterior and posterior rotation along its long axis. With shoulder motion, the movement of the scapula is transmitted through the ACJ complex and induces rotation of the clavicle.²⁰ This study used 12 cadavers and evaluated 3 techniques: The coracoid loop reconstruction technique with a single strand of no. 2 nonabsorbable suture looped around the clavicle and secured into the clavicle through two 2.4-mm tunnels, single-bundle trans-CC reconstruction technique (as described in the Dog-Bone Construct passage section of this article), and finally a double bundle trans-CC reconstruction technique that recreates the anatomy of both the conoid and trapezoid using two no. 2 nonabsorbable sutures with a total of 4 cortical buttons.²⁰ This biomechanical study demonstrated that all the techniques restored the vertical stability of the ACJ, but none of the techniques recreated the rotational stability of a native ACJ. The double-bundle technique most closely mimicked the native ACJ by restoring posterior rotational stability, but not anterior stability.²⁰

Morikawa et al. discuss that many of the procedures described above reconstruct the CC ligaments and, thus, restore vertical stability but don't address the ACJ capsule itself, which plays an important role in horizontal stability. They evaluated several techniques to stabilize the ACJ in a biomechanical, cadaveric study and found that a dermal allograft best restored posterior rotational stability and horizontal translational stability of the ACJ. The other methods that used sutures/suture anchors restored horizontal translational stability, but not the rotational component.²¹

A limitation of our technique is that it does not independently address the ACJ. Attempts to restore horizontal stability are made with the allograft configuration looping around the clavicle, soft tissue

imbrication of the remaining superior ACJ capsule with the allograft, and a meticulous deltotrpezial fascia closure. However, a formal reconstruction/augmentation procedure is not done, which ultimately may be needed to fully recreate native horizontal stability, as described by some authors.^{19,22} The most optimal method to achieve this has yet to be determined, but the dermal allograft shows promise.^{19,21}

Transferring from the LDP to the BCP allows for optimal treatment of the intra-articular and ACJ pathologies. Regardless of position, employing an arthroscopic-assisted technique for ACJR ensures that the expected concomitant pathology can be addressed at the same time. Additionally, the arthroscopic-assisted approach provides a cosmetic, low-profile construct with smaller bone tunnels and lower risk of developing associated fracture.¹¹ The soft tissue graft reinforcement also provides added stability in both the vertical and horizontal planes. This technique also offers beneficial radiographic and patient-reported outcomes with mid-term results.^{6,11} Additionally, the ACJ and its capsule are important stabilizers that should not be overlooked.^{12,14,19-22}

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