Distal Clavicle Fracture Dislocations

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Neer classified fractures of the distal clavicle into two types depending upon whether the coracoclavicular ligaments were torn. The type I distal clavicle fracture did not have ligamentous injury and presented few problems long term. The type II distal clavicle fracture demonstrates displacement because of the detachment of the coracoclavicular ligaments. This fracture is lateral to the coracoid tubercle and it is the medial fragment that presents the problems. This fragment rides high, which leads to delayed union or nonunion and prolonged disability. A type III distal clavicle fracture was later described, consisting of an intraarticular fragment at the inferior joint surface of the clavicle.

Indications
Neer type II fracture of the distal clavicle with displacement indicating tearing of the coracoclavicular ligaments (Fig. 5–1).

Contraindications
1. Nonacute skin disruptions (abrasions)
2. Associated clavicle shaft fractures
3. Fracture of the coracoid

Mechanism of Injury
The injury is produced by a direct blow to the point of the shoulder, which drives the humerus and scapula downward, disrupting the ligaments while breaking the clavicle.

Physical Examination
1. Tenderness and swelling at distal clavicle
2. Prominent, high-riding distal clavicle
3. Bruising and soft tissue damage

Diagnostic Tests
1. Standard radiographic shoulder views may demonstrate the lesion.
2. Posterior-anterior “stress” view of both shoulders with the patient holding 10 pounds in each hand can better demonstrate the degree of displacement.
3. Anterior 45 degree oblique view.
4. Posterior 45 degree oblique view.

Special Considerations
The unopposed sternocleidomastoid muscle pulls the proximal clavicle fragment upward and backward into the substance of the trapezius muscle (Fig. 5–1). The distal fragment is still attached to the acromion and pulled downward and is rotated by movement of the scapula. Trapezius muscle interposition and displacement of the two fragments can result in delayed union or nonunion.

Preoperative Planning and Timing of Surgery
Early intervention is desirable although a postponement of several days will not compromise the ultimate outcome if fracture healing can be achieved.

Special Instruments
1. PeBA-C 6.5 suture anchor (Orthopedic Biosystems, Scottsdale, AZ)
2. PeBA-C suture anchor insertion equipment (drill, countersink, driver, threader)
3. Power drill
4. 5-mm Mersiline tape (Johnson and Johnson)

Anesthetic Options
1. General anesthesia
2. Scalene block

Patient and Equipment Position
1. Beach chair position
2. Semifowlers position
3. Arm prepped and draped free

Surgical Approach
1. Make a transverse incision anterior to the clavicle between the coracoid and acromioclavicular (AC) joint. Expose the leading edge of the clavicle and dissect downward to clear the top of the coracoid (Fig. 5–1).

2. With the PeBA equipment, drill a hole into the top of the coracoid and countersink the hole for later placement of the 6.5 PeBA-C suture anchor (Fig. 5–2).
3. With a 3.2 mm drill bit, drill a hole through the clavicle, starting in the middle of the superior surface and angling downward and anterior to the inferior surface (Fig. 5–3).
4. Insert the 6.5 PeBA-C suture anchor (already threaded with the 5 mm Mersiline tape) into the prepared site in the coracoid. Leave the needles attached to the tape (Fig. 5–4).
5. Pass one arm of the Mersiline tape, using the attached blunt needle, through the tunnel in the clavicle, passing the Mersiline tape in an upward and posterior direction (Fig. 5–5).
6. With the Mersiline tape woven through the clavicle and secured to the coracoid by the suture anchor, tie a series of square knots in the tape while an assistant puts downward and anterior pressure on the medial clavicle fragment (Fig. 5–6).
7. The tape holds the reduction achieved, and the knot is rotated inferiorly so it is not in a subcutaneous position.

Dressings, Braces, Splints, and Casts
1. A simple absorptive sterile dressing is applied to the skin.
2. The arm is maintained in a sling for comfort until pain permits motion.

Tips and Pearls
1. The incision should be off the clavicle anteriorly to avoid a scar in a potentially painful location. Straps from clothing or backpacks will rub and irritate the scar if it lies over the clavicle.
2. Use the 6.5 PeBA-C suture anchor. This anchor has the advantages of a large enough eyelet to accommodate the 5-mm tape, excellent load-to-failure strength, and a smooth eyelet, which will not cut the tape.
3. The dissection of the clavicle should continue to the posterior edge to expose enough for placement of the drill hole. However, it is not necessary to dissect completely around the clavicle.
4. The importance of the assistant placing a reduction pressure anteriorly and inferiorly on the distal clavicle while the Mersiline tape is tied cannot be overemphasized.
5. Multiple square knots are needed to secure the tape.
Figure 5−2
Drill into the top of the coracoid and countersink the hole for later placement of the suture anchor.

Figure 5−3
Drill through the clavicle, in the middle superior surface, angling downward and anterior to the inferior surface.

Figure 5−4
Insert the suture anchor threaded with 5-mm Mersilene tape into the prepared site in the coracoid.
6. After the knots are tied and the excess tape cut away, grasp the knot with a hemostat and pull it until the bulk of the knot is under the clavicle and away from the skin. This will eliminate the potential of a prominent subcutaneous knot.

Postoperative Care and Rehabilitation
1. This procedure is an open reduction of a fracture, and as the fracture healing proceeds the repair becomes increasingly secure. As with most clavicle fractures, bone fragment movement stops at about 2 to 3 weeks. The stress on the Mersiline tape will decrease over this time frame too.
2. A sling is used for 1 to 2 weeks, after which motion is allowed as tolerated.
3. Overhead motion is allowed at 4 weeks.
4. Resistance exercises begin at 8 weeks.

Suggested Readings