

- J Shoulder Elbow Surg (2011) 20, 955-960

CALCIFIC TENDINITIS

- Codman Tendon degeneration

- Uhtoff Proposed a nondegenerative, cell-mediated mechanism of calcification that induces metaplasia of normal tendon

- Hurt Stated that approximately 90% of patients can expect resolution with nonoperative treatment.

- This study documented 2 major findings: (1) patients undergoing debridement alone of a calcific deposit of the supraspinatus tendon had earlier relief of pain and return to activity than patients undergoing combined debridement and arthroscopic subacromial decompression, and (2) no long-term differences between the 2 groups were measured.
- Subacromial decompression, especially for cases associated with mechanical impingement as
- evidenced by type II and III acromial morphology

Pathology

- Uhtoff showed that the supraspinatus tendon is normal at the start of the process of calcific tendonitis
- Then the transformation or metaplasia of tenocytes into chondrocytes.
- Calcification proceeds with the formative phase in which calcium crystals are deposited.
- At this point, the calcium is chalk-like or firm, and at the end of this phase, calcium crystals are surrounded by a border of fibrocartilaginous tissue.
- During the resorptive phase, multinucleated giant cells remove the calcium, and the deposit assumes the consistency of toothpaste.
- As the disorder resolves, often with spontaneous resorption of the calcium deposit, a normal tendon is reconstituted.

A prospective MRI study of calcific tendonitis

- The supraspinatus tendon consistent with degeneration in only 10% of patients, with only
- 1 patient having a partial-thickness tear and no patient
- having a full-thickness tear.
- Only 16% of these patients had a type III acromion.
- The authors concluded that there was no correlation between “calcifying tendonitis and osseous subacromial impingement” and that subacromial decompression was not indicated in the treatment of patients with calcific deposits.
- J Shoulder Elbow Surg 1996; 5:314-9.
- 18% POST OP FROZEN SHOULDER

A-CI arthritis

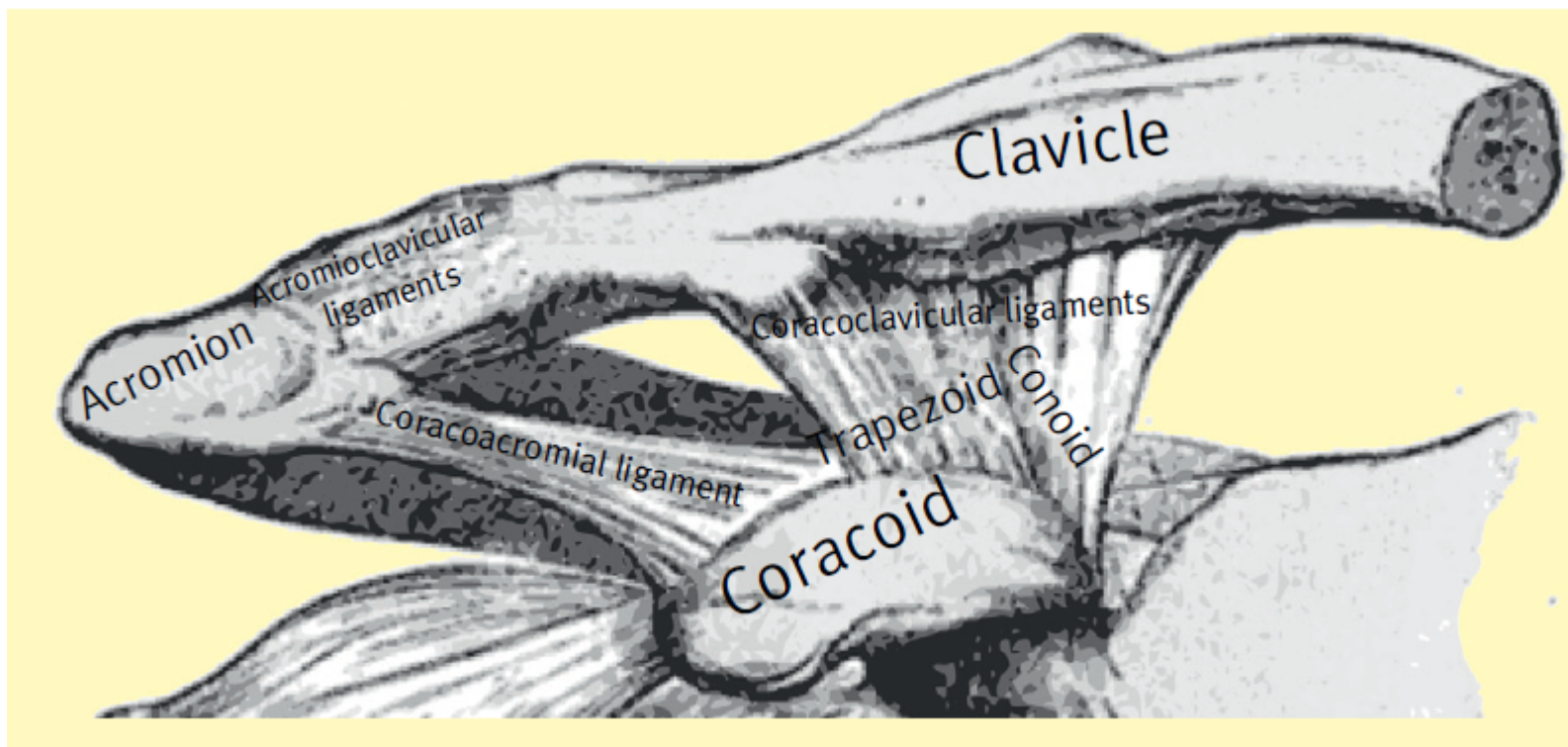
- Degeneration of the acromioclavicular joint is common, with deterioration of the meniscus commencing as early as the second decade of life. This leads to progressive degeneration within the joint, with up to 57% of elderly patients exhibiting radiographic evidence of arthritic change.
- Pain worse with heavy lifting or abduction at the glenohumeral joint.
- Typically, abduction beyond 100° at the glenohumeral joint will exacerbate the pain. The cross-arm adduction test involves the affected arm being placed on the opposite shoulder and the examiner applying pressure across the shoulders.
- The O'Brien test was developed to detect labral pathology but has also been used to assess the ACJ.
- Simple analgesics and activity modification may be all that is required. Injection of corticosteroid into the ACJ is often employed as a precursor to surgical intervention, either as a diagnostic or therapeutic manoeuvre.
- The mainstay of surgical treatment for ACJ osteoarthritis is joint excision. The lateral 15 mm of the clavicle is excised
- Failure to remove residual osteophytes may also give rise to ongoing symptoms.
- Arthroscopic distal clavicle excision is an alternative to open surgery.
- **Freedman et al. undertook a small prospective,** randomized controlled trial comparing open excision with arthroscopic excision.²¹ There was
 - a non-significant trend towards better pain relief and function in patients treated with arthroscopic surgery. Intra-articular pathology
 - was seen and treated in 50% of patients in the arthroscopic group.

A-Cl Dislocation Orth Trauma 25:1

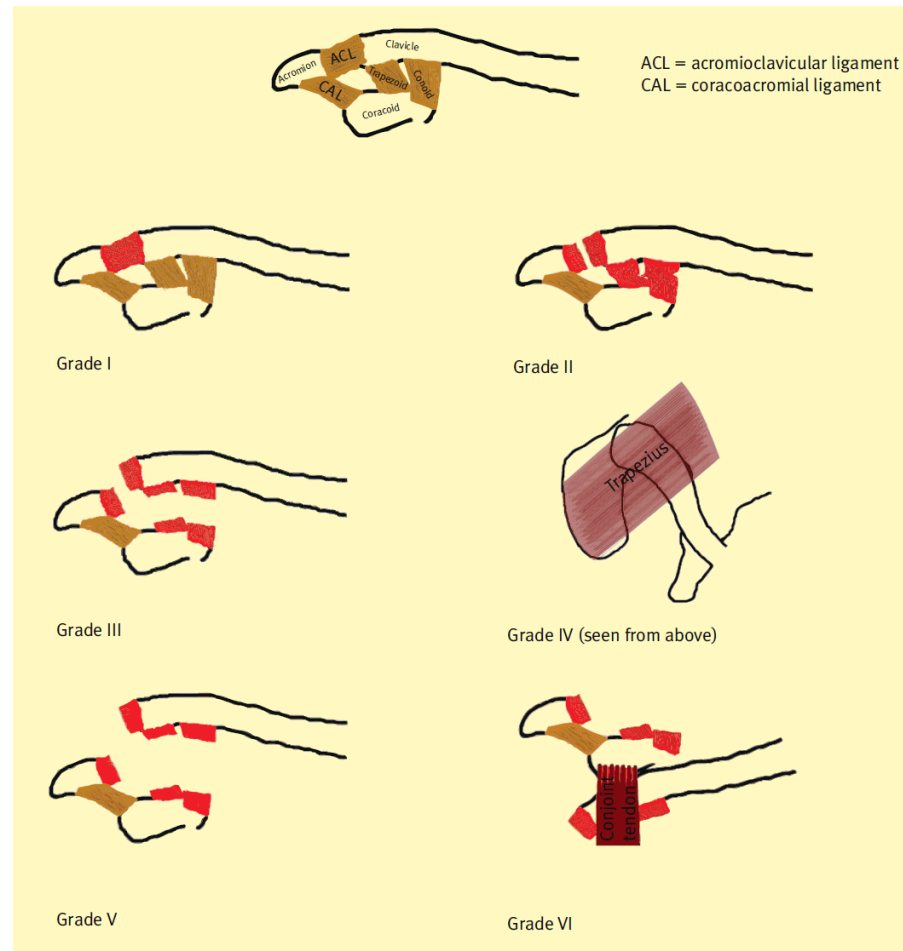
- Injuries to the ACJ represent 12% of all shoulder girdle injuries.
- There is a strong male preponderance and injuries are most common in the first III decades of life.
- Weight-bearing views are sometimes helpful to determine the degree of instability.
- The most widely accepted is that developed by Rockwood
- Treatment of acromio-clavicular injuries depends on whether they are incomplete or complete.
- The vast majority of Type I and Type II injuries require no surgical intervention, however, there remains huge controversy regarding which complete injuries

- **Bannister** et al. randomized 60 patients to either non-operative treatment or open reduction and fixation with a coracoclavicular screw.³ Fifty-eight patients were followed for 4 years.
- **They found that patients treated non-surgically** returned to work and sport significantly earlier, and at both 1-year and 4-year follow-up outcomes as determined using the same non-validated scoring system employed by Imatani were better in the conservatively treated group.
- Chronic: WeavereDunn reconstruction, described in 1972,⁶ is perhaps the most well known method for the treatment of long-standing instability of the ACJ. The joint is approached in the same manner as for acute injuries. The lateral 2 cm of the clavicle is resected obliquely, such that the inferior part of the osteotomy overlies the coracoid. The coracoacromial ligament is identified and detached at the acromial end with a thin wafer also taken from the acromion.
- A heavy non-absorbable suture is placed in the ligament and two drill holes are made in the superior cortex of the lateral end of the

- **ACJ disruption**



Rockwood



Treatment of A-C dislocation

Non-operative

- A broad arm sling is used to resist the tendency of the shoulder girdle to sag. This is discontinued as pain settles, which typically takes 7 -10 days.

Surgical treatment of acute dislocations

- Not required for the majority of surgeons; however, an understanding of the principles is useful. The patient is positioned in a beach chair position
- The joint is approached via an incision starting just medial to the ACJ and extending inferiorly to the coracoid process.
- Full thickness skin flaps are raised and the deltopectoral fascia is incised and the deltoid is elevated, exposing the ACJ.
- Often the coracoclavicular ligaments have failed by peeling off their clavicular attachment complete with a periosteal sleeve, which may be repaired.
- Once reduced, the ACJ may be held directly with K-wires or a hook plate or indirectly with a coracoclavicular (Bosworth) screw, by passing suture or tape beneath the coracoid and through the clavicle, by securing a suture anchor in the coracoids and tying it around the clavicle or a synthetic ligament secured with an endobutton through the clavicle and coracoid at either end

Osteolysis of the distal clavicle

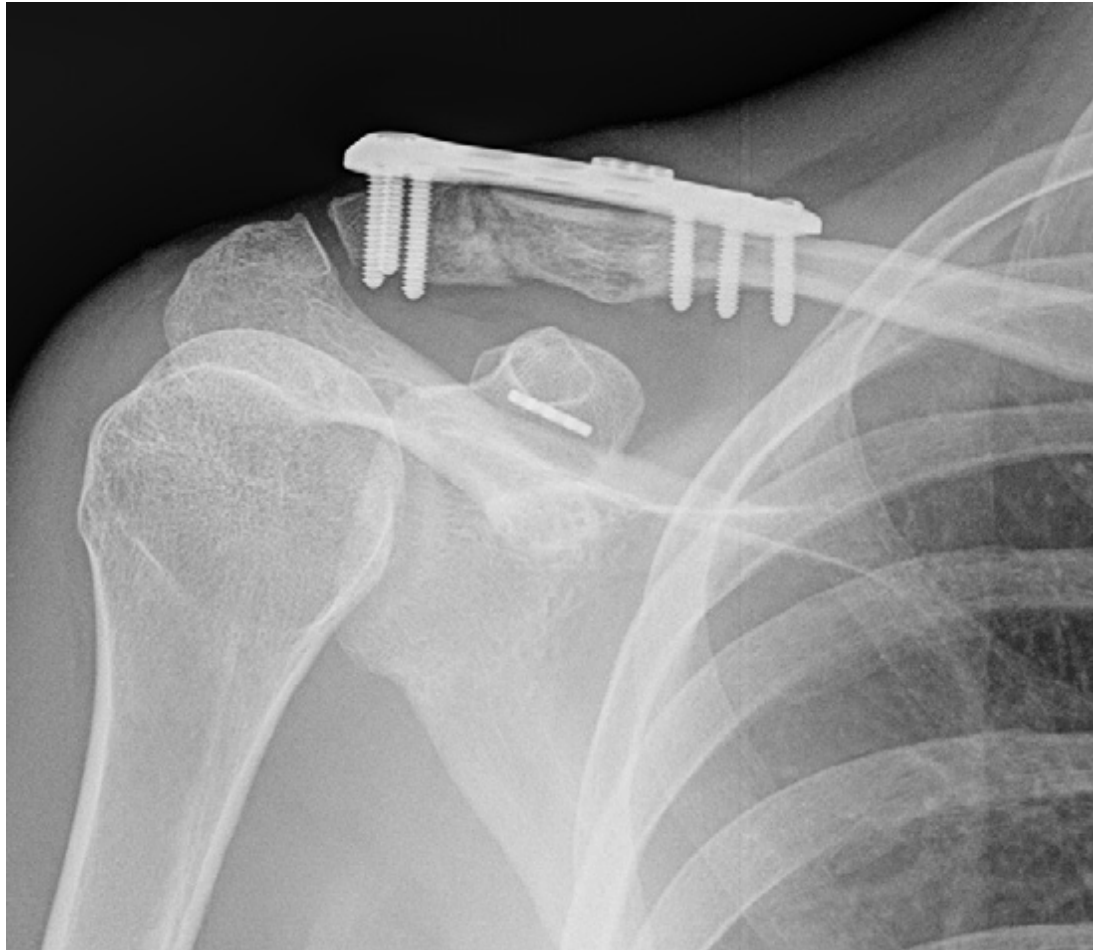
- First described in 1950,9 this is a phenomenon that most commonly results from trauma to the shoulder or as a stress reaction to intolerable levels of exercise, usually in weightlifters.
- It is characterized by dull ache, weakness and pain in flexion and abduction. In some individuals the ACJ is the weakest point in the shoulder girdle and microfractures or a subchondral fracture can be sustained.
- Radiography may demonstrate localized osteoporosis, tapering, loss of subchondral bone detail, osteophyte formation and cystic changes in varying degrees in the distal clavicle with no bone changes in the acromion
- If unilateral osteolysis is observed a differential diagnosis should include gout, neoplasia and Gorham's massive osteolysis. When bilateral osteolysis is noted systemic disorders must be considered such as rheumatoid arthritis, hyperparathyroidism and scleroderma.
- If activity modification fails to bring about relief, surgical treatment takes the form of excision of the distal clavicle.

Distal fractures Clavicle

- Type I The C-C L are intact and there is sufficient soft tissue stability
These fractures do not displace and heal uneventfully without surgical intervention.
- Type II There is disruption of the C-CL
Complete displacement at the fracture site is the norm.
The non-union rate has been estimated at 21e25%
- Type III The fracture extends into the ACJ.
- Robinson's prospective study of patients with a displaced fracture of the lateral end of the clavicle
- who had a minimum of 6 months non-operative treatment, only 14% went on to require surgery.
- Several options exist for fixation of a lateral clavicle fracture.
 1. A coracoclavicular screw, PDS loop/nylon tape around the clavicle and coracoid or a tightrope fixation device.
 2. The clavicular hook plate is an option.

- As a result, the plate limits movement across the ACJ and **removal is mandatory before elevation or abduction of the shoulder beyond 90 is permitted.** With excessive movement in these planes there is a risk that the hook may erode into the acromion. The hook portion poses additional risks by the nature of its proximity to the subacromial space and rotator cuff.
- A retrospective clinical study of 18 patients who had undergone hook plate fixation demonstrated a non-union rate of 22%, and a 28% incidence of acromial osteolysis.¹⁵

Post-operative radiograph of locking plate fixation of a lateral clavicle fracture supplemented with an endobutton coracoclavicular device.



Atraumatic S-Cl dislocation

J Am Acad Orthop Surg 2005;13:138

Spontaneous atraumatic anterior subluxation of the SCl joint may occur during overhead elevation

Affected patients are generally in their teens, and demonstrate signs of generalized ligamentous laxity

Patients report a sudden subluxation of the medial end of the clavicle, and many remember feeling an associated pop. The majority of cases are not painful, and the subluxation usually reduces with lowering the arm.

In a review of 37 patients with spontaneous anterior subluxation of the sternoclavicular joint, subluxations were reproducible.

80% of the patients demonstrated evidence of generalized ligamentous laxity. Twenty-nine patients were treated nonsurgically with strengthening exercises and advancement to unrestricted activity as tolerated. Although many patients subsequently reported intermittent episodes, few reported discomfort, and most were able to participate successfully in athletics.

The most common reason for surgery was the failure of a previous attempt at reconstruction. Surgery is rarely indicated. Nonsurgical management, including patient education of the benign nature of the condition, is recommended.

- **OA ACJ**

O.A of the acromioclavicular joint

- May commence as early as the second decade of life. Up to 57% of elderly patients exhibiting radiographic evidence of arthritic change.
- Clinically, it can be difficult to distinguish ACJ pain
- The authors suggest that a positive radioisotope scan and a positive Paxinos test, in which the application of direct pressure between the thumb and index finger across the ACJ in an anteroposterior direction produces pain, has the greatest positive predictive value for ACJ pathology.
- As with other degenerative musculoskeletal conditions, nonoperative management is appropriate. Injection of corticosteroid into the ACJ is often either as a diagnostic or therapeutic manoeuvre. 81% of patients failing to benefit from long-term pain relief.
- The mainstay of surgical treatment for ACJ osteoarthritis is joint excision. The approach for open surgery is the same as previously described for open fixation of the dislocated ACJ. The lateral 15 mm of the clavicle is excised
- It is essential to identify the orientation of the articular surface of the lateral end of the clavicle as the plane of the osteotomy must be parallel to this to avoid incomplete excision.

A-CI steroid injection

J Shoulder Elbow Surg (2012) 21, 376-379

- The diagnostic value of the injection of a local anaesthetic in the AC joint is immediate.
- Only 28% have a clear positive result at 1 month; but, this result is sustained at long-term follow-up. There were no complications.
- Weakness: we did not use imaging to assess the location of the injection;

ACJA, J Am Acad Orthop Surg 1999;7:176-188

- D/D Most commonly osteoarthritis,
Posttraumatic arthritis,
Distal clavicle osteolysis.
- Asymptomatic AC joint degeneration is frequent and does not always correlate
- with the presence of symptoms. Selective lidocaine injection enhances diagnostic
- accuracy and may correlate with surgical outcome.
- Nonoperative treatment is helpful for most patients.
- Some times open or arthroscopic distal clavicle resection is necessary
- Recent biomechanical study emphasize the importance of capsular preservation and minimization
- of bone resection
- Patients with AC joint instability have poor results after distal clavicle resection.

Basics

- The AC joint is a diarthrodial joint
- Between the hyaline-cartilage articular surfaces there is a fibrocartilaginous meniscal disk of variable integrity.
- Degeneration of the AC joint is a natural consequence of the aging process, with disk degeneration occurring as early as the second decade.
- By early adulthood, most intra-articular disks are little more than fibrocartilaginous remnants.
- The AC ligament complex reinforcing the joint capsule plays an important role in stability
- maintaining joint stability. The AC capsular ligaments are predominantly responsible for maintaining stability in the AP and also provide most (68%) of the restraint to superior translation of the clavicle
- The AC joint complex is further supported by the conoid and trapezoid ligaments

- Despite the fact that the clavicle rotates as much as 45 degrees about its axis, almost all clavicular motion takes place at the sternoclavicular articulation.
- Motion at the AC joint is **limited to 5 to 8 degrees**, predominantly because of synchronous scapuloclavicular motion, in which the clavicle and scapula move as a unit.
- **The proximity of the AC joint to the subacromial space may lead to clinical overlap in the**
- **symptom complex.**

? Arthritis

- **I Synovial joint:** is vulnerable
- 2.Its superficial location and its relationship to the shoulder girdle predispose it to traumatic injury.
- 3.The biomechanics: The AC joint to transmit large loads across a very small surface area, which can result in failure with repetitive activity or overuse.
- **Primary Osteoarthritis**
- Primary involvement of the AC joint is much more common than primary involvement of the glenohumeral joint and is, in fact, the most common cause of pain in the AC joint.
- In one study, 54% to 57% of elderly patients demonstrated radiographic evidence of degenerative arthritis. In another study, 13 magnetic resonance (MR) imaging
- demonstrated evidence of arthritic changes in 48% of the AC joints in over 300 older asymptomatic patients.
- Despite its seeming prevalence by radiologic criteria, symptomatic primary osteoarthritis is a relatively uncommon clinical entity.

Posttraumatic Arthritis

- Acromioclavicular arthritis following trauma is even more common than primary osteoarthritis, due to the frequency of injury to this vulnerable joint.
- The incidence of posttraumatic arthritis symptoms after injury or surgery is highly variable and depends on the degree of injury and the type of operative procedure.
- Studies of the natural history of grade I and II sprains of the AC joint have demonstrated the development of symptoms in 8% to 42% of patients.^{15,16} Arthritis also occurs, although less commonly, after distal clavicle fractures, particularly those with intra-articular extension.¹⁷

Distal Clavicle Osteolysis

- An increasingly recognized
- Osteolysis related to repetitive microtrauma has recently been receiving more attention, particularly among weight-lifting
- Due to the popularity of weight-training and its incorporation into fitness programs and training regimens for other sports.
- The proposed mechanism of this form of osteolysis is that repetitive stresses to the subchondral bone of the distal clavicle lead to fatigue failure, which initiates resorption.
- The histologic features of microscopic fractures, demineralization, subchondral cysts, and distal clavicle erosion have been described

Presentation

- Acromioclavicular joint problems can present either in isolation or in conjunction with associated rotator cuff impingement.
- - The pain occasionally radiates into the base of the neck, the trapezius, and the deltoid and
- down the arm. Hypertonic saline injections in normal volunteers have elicited the sometimes vague and occasionally radicular pain pattern typical of AC joint involvement.
- Pain is often brought on by activities of daily living, such as washing the opposite axilla, reaching back to retrieve a wallet, or fastening or unhooking a brassiere.
- Symptoms are often exacerbated by more demanding activities, such as pushing or overhead work in the case of laborers and weight lifting, golfing, swimming, or throwing in athletes.
- Among athletes involved in weight training, pain is typically brought on by specific exercises,
- such as bench presses, dips, and push-ups. Patients may note pain at night, with nocturnal awakening when rolling onto the affected shoulder.
- There may be associated symptoms of popping, catching, or grinding.

Treatment

- Local corticosteroids: works in 25-40%
- Operative treatment by distal clavicle resection, through open or arthroscopic methods,
 - achieves good results in most cases. The amount of resection remains controversial.
- The direct arthroscopic approach avoids compromise of the deltoid-trapezial fascia and AC joint capsule.
- Troublesome bleeding with this approach can make it a frustrating endeavor, however, and this technique usually takes longer than an open procedure.
- The open method is appropriate for most patients because it is easy and quick and offers predictably good results.

- **CLAVICLE**

Distal 1/3 clavicle

J Am Acad Orthop Surg 2011;19:

392-401

- 1. However, these nonunions are often asymptomatic, and their clinical relevance has been questioned.
- 2. We recommend primary nonsurgical management of type I, type III, and nondisplaced type II distal clavicle fractures
- 3. For patients with displacement, we offer surgical treatment but counsel them that the current evidence suggests equivalent outcomes between surgical and nonsurgical treatment.
- 4. Our preferred surgical management technique is internal fixation of the distal clavicle fracture with supplementary CC fixation
- 5. NU is 44% and high risk with a displaced fracture

Management of distal clavicle fractures

- 2010, N° 2 (Vol. 76/2) p.145-149 Ilias Bisbinas, Petros Mikalef, Ioannis Gigis, Theodoros Beslikas, Nikolaos Panou, Ioannis Christoforidis From Aristotle University of Thessaloniki, Greece
Abstract: Management of type II distal clavicle fractures has always been a challenge. Non-operative treatment has a high risk of complications and should be considered only for elderly and frail patients. For younger and active patients there is a wide variety of operative options, each with advantages and disadvantages. According to our unit's experience the first choice could be hook plate fixation, with very good and reproducible results. Another option could be Kirschner-wire fixation with or without tension band wiring ; however, because of potential wire complications or difficulties in rehabilitation, the method should be reserved for reliable patients and used with a meticulous technique.

Malunited Clavicle

Acta Orthopaedica 2010; 81 (3): 273–279

- Neer (1960) and Rowe (1968) : formed the basis of the idea that few problems are to be expected after closed treatment of clavicular fractures regarding nonunion and functional problems.
- Rowe stated: “Fortunately for man, nature has endowed the clavicle with excellent reparative powers”. This applies to fracture union and unfortunately does not apply to the restoration of length and rotational deformities of the clavicle after a fracture.
- Nordqvist et al. 1997: In the last decade, however, a number of studies using patient-based outcome scores have been published stating that malunion with shortening after a midshaft clavicle fracture may lead to symptoms such as pain, loss of strength, rapid fatigability, paraesthesiae of the arm and hand, and problems with sleeping on the back as well as cosmetic complaints
- Ledger et al. (2005) showed that there was loss of strength of the arm in patients with a shortening of the clavicle. He also noticed a reduced peak shoulder abduction velocity. Patients identified recreational activity as the area in which the functional loss was most evident.
- The reported incidence of unsatisfactory outcome after closed treatment of a displaced midshaft clavicular fracture has varied from 4.4% to 31% (Hill et al. 1997, Nowak et al. 2005, Lazarides and Zafiropoulos 2006), but the definition of unsatisfactory outcome has also varied between studies.

- Most authors have reported residual pain during activity or even at rest and loss of strength as main issues for an unsatisfactory outcome.
- *Glenoid orientation/scapular winging.* Because of the shortened lever arm of the shoulder girdle, there is a change in orientation of the glenoid with winging of the scapula, which leads to functional problems of the shoulder in overhead movements.
- The change in orientation of the glenoid might also result in increased shear forces across the shoulder joint (Chan et al. 1999)
- *Neurovascular problems/thoracic outlet syndrome* has been described after clavicular malunion, often associated with large callus formation. P
- *AC/SC joint problems.* The change in resting angle of the SC joint after malunion (Ledger et al. 2005) results in a changed load of the AC and SC joint.
- Due to the ellipsoid shape of the thorax, changes in clavicular length result in nonlinear changes in scapula position: each additional millimeter of shortening results in an exponential increase in scapula malposition. This can lead to all of the above-mentioned problems.

Summary

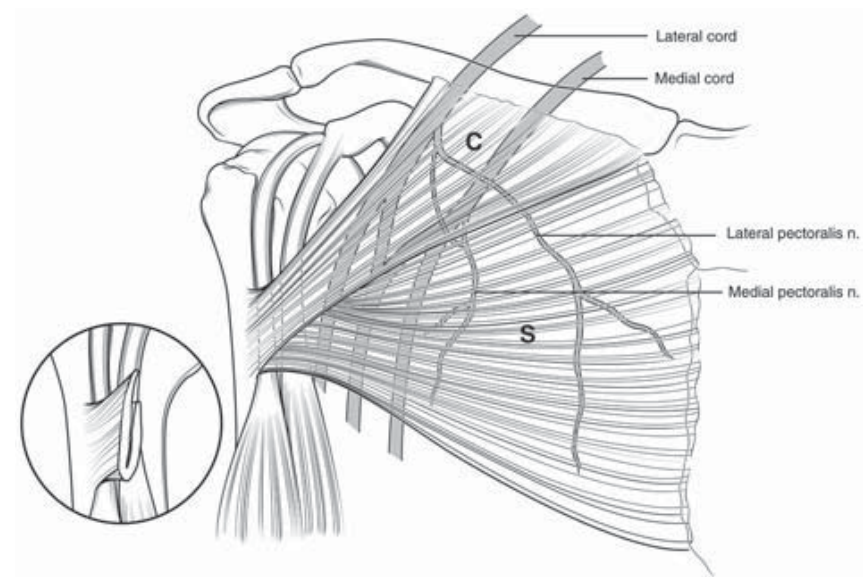
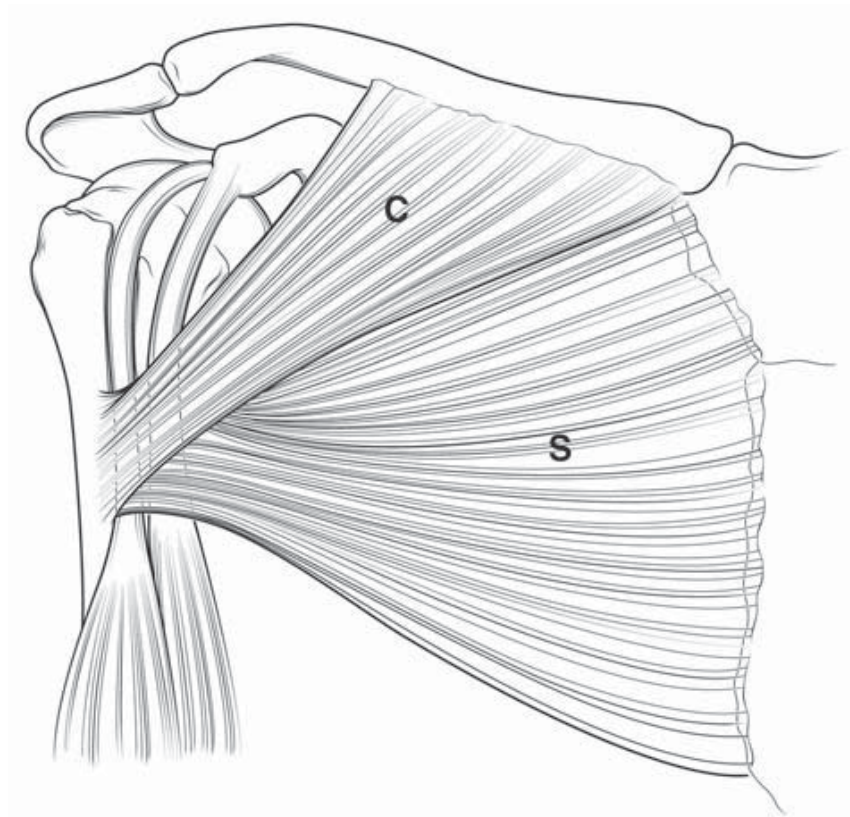
- The view on midshaft clavicle fractures has changed in the last 15 years.
- Adult patients with a displaced fracture have a higher number of nonunions than previously expected.
- Secondly, the outcome after union is now measured with patient based outcome scores, which detect subtle loss of function in daily activities.
- Displaced fractures heal with some degree of shortening and they therefore result in malunion (or nonunion) unless treated operatively.
- Malunion can become symptomatic with pain, loss of strength, rapid fatigue, numbness or parasthesiae of the arm and hand, and problems with sleeping on the back, as well as cosmetic complaints.
- Treatment can either be prevention in the acute phase, by means of primary osteosynthesis—or later when the symptomatic malunion is established, a correction osteotomy can be performed.

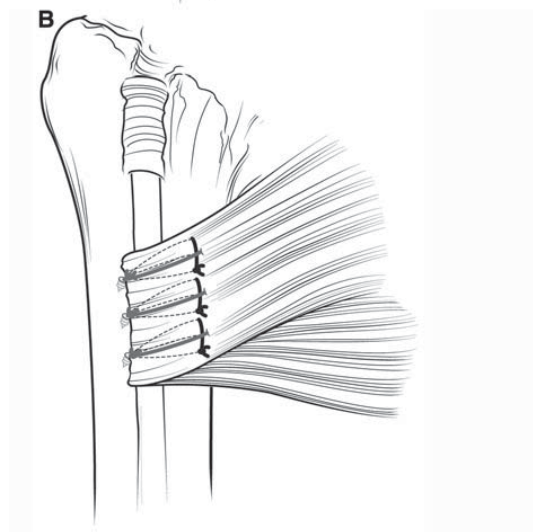
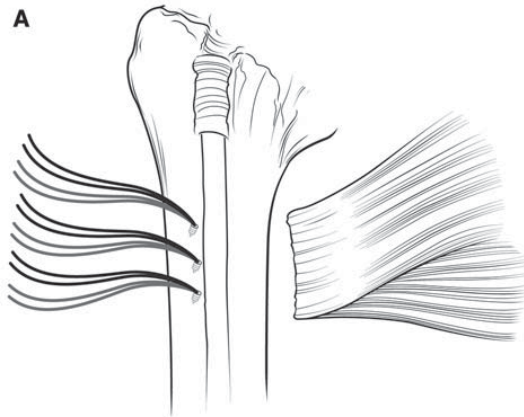
- **PECTORALIS MAJOR**

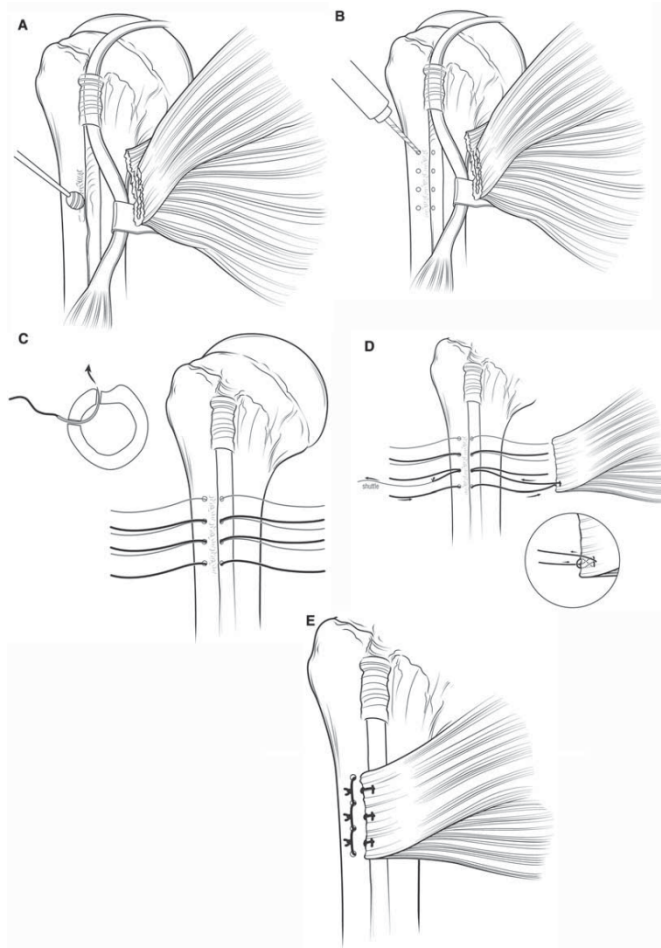
Pectoralis Major injury.

A J Sports Med Vol. 38, No. 8, 2010

- Injuries to the pectoralis major muscle are relatively infrequent but result in pain, weakness, and deformity of the upper extremity.
- The usual injury mechanism is during eccentric shortening of the pectoralis major under heavy load, such as when performing a bench press exercise.
- The ability to detect and treat a pectoralis major rupture is important for both the clinician and the patient and is aided with knowledge of the anatomy, the clinical findings, and results of nonoperative and operative care.
- It is important to understand the physical demands and desires of the patient as well as to understand the outcomes of both nonoperative and operative care to make an informed decision regarding optimal treatment.







- The most frequent activity in which pectoralis major injury occurs is during the bench press maneuver, but the muscle is at risk to become injured during any activity in which the arm is extended and externally rotated while under maximal contraction. Immediate pain and weakness, especially in internal rotation, are common.
- In an acute clinical presentation, ecchymosis, swelling, loss of axillary fold, medial bulge, and weakness with adduction and internal rotation are good diagnostic clues that a rupture of the pectoralis major muscle has occurred.
- Presentation of a chronic injury is similar, with swelling and ecchymosis less likely beyond 3 to 6 weeks after injury. The best imaging modality to determine extent and location of a rupture is the MRI, but ultrasound is an adequate, less expensive alternative.
- The most common type of rupture is a distal avulsion of the tendon from its insertion at the humerus. Less common rupture sites are at the musculotendinous junction, the tendon substance itself, and the muscle belly.
- Nonoperative treatment consisting of immobilization, analgesics, ice, and physiotherapy is generally reserved for the elderly or inactive patient.
- Surgical treatment is generally recommended for pectoralis major ruptures in the young, active patient population, especially if strength in internal rotation is a concern.

SUPRASCAPULAR NEUROPATHY

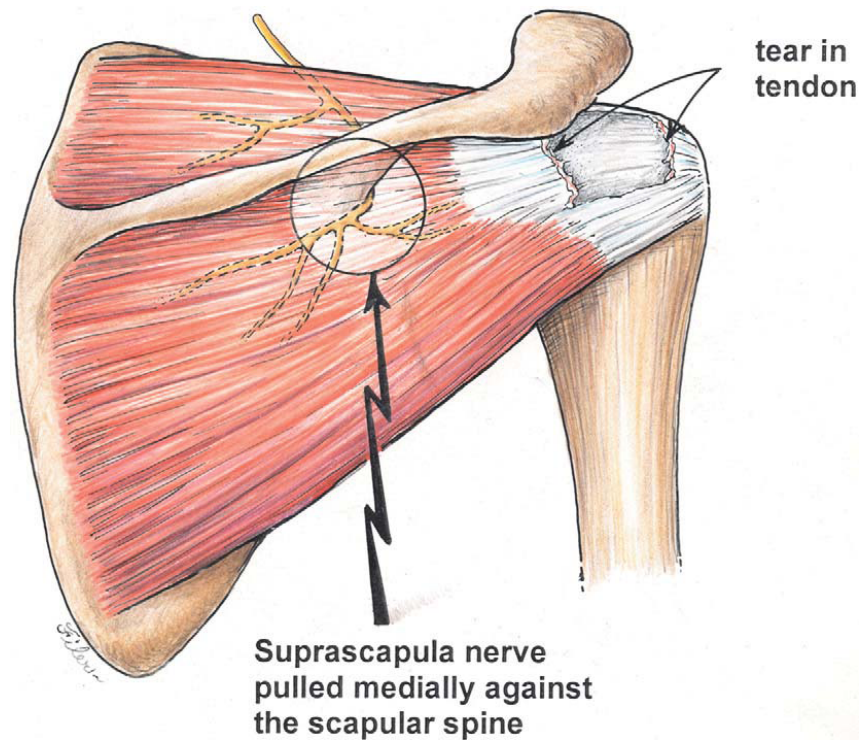
Suprascapular neuropathy

J Bone Joint Surg Am.

2010;92:2348-2364.

- Suprascapular neuropathy has often been overlooked as a source of shoulder pain. The condition may be more common than once thought as it is being diagnosed more frequently.
- Etiologies for suprascapular neuropathy may include repetitive overhead activities, traction from a rotator cuff tear, and compression from a space-occupying lesion at the suprascapular or spinoglenoid notch.
- MRI is useful for visualizing space-occupying lesions, other pathological entities of the shoulder, and fatty infiltration of the rotator cuff.
- NCN remain the standard for diagnosis of suprascapular neuropathy
- Initial treatment of isolated suprascapular neuropathy is typically nonoperative, consisting of physical therapy, nonsteroidal anti-inflammatory drugs, and activity modification;
- However, open or arthroscopic operative intervention is warranted when there is extrinsic nerve compression or progressive pain and/or weakness.
- More clinical data are needed to determine if treatment of the primary offending etiology in cases of traction from a rotator cuff tear or compression from a cyst secondary to a labral tear is sufficient or whether concomitant decompression of the nerve is warranted for management of the neuropathy.

Retraction cuff tear



Ganglion on SSN

OCNA 34 (2003) 521– 528

They are associated commonly with labral tears, most commonly SLAP lesions.

MRI has become commonplace in evaluating shoulder pain and has led to the increased awareness of shoulder cysts.

It also has shown the frequent association of intraarticular pathology with these cysts

Despite that MRI can detect atrophy [34,47], the diagnosis of SSN compression can be confirmed only by EMG/NCS, because the presence of a cyst does not necessarily mean the nerve is compressed

Likewise, a positive EMG does not confirm that the compression is caused by a cyst.

A trial of nonoperative management is warranted; however, this is associated with a high failure rate.

Aspiration techniques are successful for decompression of the cysts and initial pain relief; however, the intra-articular pathology is not addressed and there is a higher rate of recurrence.

Open resection of the ganglion cyst is successful; however, the intra-articular labral tears are not addressed, which can lead to recurrence and the morbidity of the cyst excision is not warranted.

Shoulder arthroscopy has led to the identification of associated intra-articular pathology such as SLAP lesions.

Arthroscopic techniques have evolved to allow decompression of the ganglion cysts and repair

- of the labral lesions. This should decrease the possibility of recurrence of the cyst by eliminating the cyst and the pathologic lesion that created it.

Arthroscopic excision also avoids much of the morbidity of the open approach and allows intraarticular pathology

Table II Visual analog scales (VAS) of pain, function, and patient satisfaction with the results of intra-articular (IA) vs oral glucocorticoid application

VAS variable*	Begin	4 weeks	8 weeks	12 weeks	6 mon	1 year
Pain						
IA	2.8 ± 1.3	4.5 ± 2.2	6.0 ± 2.1	6.4 ± 2.3	6.3 ± 2.5	7.1 ± 2.7
Oral	2.9 ± 2.0	5.2 ± 2.0	5.6 ± 2.1	6.0 ± 2.0	7.0 ± .09	6.8 ± 1.9
<i>P</i>		.305	.560	.594	.322	.739
Function						
IA	3.0 ± 1.4	4.3 ± 1.5	5.7 ± 2.5	6.1 ± 2.5	6.8 ± 2.4	8.0 ± 2.1
Oral	3.5 ± 1.0	5.2 ± 1.6	5.0 ± 1.9	6.1 ± 1.9	6.3 ± 1.8	6.3 ± 2.7
<i>P</i>		.063	.338	.903	.583	.099
Satisfaction						
IA	3.0 ± 1.2	5.8 ± 2.6	7.3 ± 2.6	7 ± 2.7	6.7 ± 3.0	7.9 ± 2.6
Oral	2.0 ± 1.4	5.1 ± 2.0	5.3 ± 2.7	5.0 ± 2.3	5.0 ± 1.9	4.7 ± 1.6
<i>P</i>		.359	.035 [†]	.026 [†]	.084	.003 [†]

* Mean VAS scores are presented with the standard deviation.

[†] Indicates significant difference between the two treatment regimens.

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- Skeletal Radiol. 1992;21(7):449-51.
- **Shoulder impingement syndrome: impingement view and arthrography study based on 100 cases.**
- [Jim YF](#), [Chang CY](#), [Wu JJ](#), [Chang T](#).
- **Source**
- Department of Radiology, Veterans General Hospital, Taipei, Taiwan, Republic of China.
- **Abstract**
- A prospective evaluation combining the shoulder impingement view and arthrography was made in patients presenting with chronic shoulder pain. Five hundred and twenty-three patients with chronic shoulder pain were X-rayed using conventional views and impingement views. One hundred of these patients (mean age 62 years) had subacromial bony spurs on the impingement view; these underwent arthrography. They were divided into two groups according to the degree of **spur** formation--whether or not the size of the **spur** exceeded one half of the **acromial** width as measured from the outer margin to the acromioclavicular joint. Of the 100 subacromial spurs demonstrated on the impingement view, only 18 were visible on the conventional view as assessed by an independent radiologist. Arthrography showed 35 cases of rotator cuff tear. The size of the bony **spur** was strongly associated with the incidence of rotator cuff tear ($P < 0.02$).

Effects of scapular dyskinesis

- J Shoulder Elbow Surg. 2011 Mar 26. [Epub ahead of print]
- Scapular dyskinesis is an abnormal scapular motion or position during active arm elevation. Dyskinesis is theorized to contribute to impingement syndrome by decreasing the subacromial space. A corrective maneuver of the scapular assistance test (SAT) proposes to increase scapular upward rotation and posterior tilt to increase the subacromial space.
- There were no differences in acromiohumeral distance or scapular kinematics with static active arm elevation between groups. The SAT increased scapular upward rotation, posterior tilt, and acromiohumeral distance in both groups. Participants with dyskinesis demonstrated greater scapular mobility in upward rotation with the SAT, but no additional increase in acromiohumeral distance.
- Scapular dyskinesis identified during active motion did not result in different 3-D scapular orientation or acromiohumeral distance during active arm elevation in static positions; however, the SAT altered scapular kinematics and increased acromiohumeral distance. The SAT may be helpful to identify individuals where subacromial compression is producing symptoms, regardless of dyskinesis.

- **THORACIC OUTLET
SYNDROME**

TOS

Neurosurgery 55:897-903, 2004

- **OBJECTIVE:** Thoracic outlet syndrome (TOS) is one of the most controversial clinical entities in medicine. We provide a review of this difficult-to-treat disorder, including a brief overview, clinical presentations, surgical anatomy, treatment options, and outcomes.
- **METHODS:** TOS represents a spectrum of disorders encompassing three related syndromes: compression of the brachial plexus (neurogenic TOS), compression of the subclavian artery or vein (vascular TOS), and the nonspecific or disputed type of TOS. Neurovascular compression may be observed most commonly in the interscalene triangle, but it also has been described in the costoclavicular space and in the subcoracoid space. Patients present with symptoms and signs of arterial insufficiency, venous obstruction, painless wasting of intrinsic hand muscles, paresthesia, and pain. A careful and detailed medical history and physical examination are the most important diagnostic tools for proper identification of TOS. Electromyography, nerve conduction studies, and imaging of the cervical spine and the chest also can provide helpful information regarding diagnosis. Clinical management usually starts with conservative treatment including exercise programs and physical therapy; when these therapies fail, patients are considered for surgery. Two of the most commonly used surgical approaches are the supraclavicular exposure and the transaxillary approach with first rib resection. On occasion, these approaches may be combined or, alternatively, posterior subscapular exposure may be used in selected patients.
- **CONCLUSION:** TOS is perhaps the most difficult entrapment neuropathy encountered by neurosurgeons. Surgical intervention is indicated for vascular and true neurogenic TOS and for some patients with the common or nonspecific type of TOS in whom nonoperative therapies fail. With careful patient selection, operative intervention usually yields satisfactory results.

