

Clavicle Injuries

Contributors

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Overview

The two most common sports related clavicle injuries are clavicle fractures and acromioclavicular joint (ACJ) separation. The clavicle is susceptible to fractures due to the forces transmitted through relative to its size. Approximately 80% occur in the middle third of the clavicle as the medial and lateral aspects are firmly secured by ligaments and muscles. The middle aspect lacks any strong attachments and is therefore more vulnerable to trauma.¹ ACJ injury commonly involves separation of the two articulating surfaces.² Usually there is associated soft tissue damage, including ligament injury. If the coracoclavicular ligament is torn, weight of the upper limb is not supported and the humerus moves inferiorly, increasing the prominence of the clavicle. During sport, both of these injuries occur most commonly due to direct force to the shoulder (for example, falling onto it or being hit in a contact sport), or due to a fall onto an outstretched hand (FOOSH).

Upper limb injuries to consider if the mechanism of action is a FOOSH: clavicle fracture, ACJ separation, humerus fracture, radius fracture, Colles or Smith fracture, scaphoid or triquetral fracture and ulnar collateral ligament injury.

Case Studies

1) Mr Wilson is a 38-year-old man who works as a builder. He was working at the building site when he tripped and fell over. He had tried to break the fall with his outstretched right hand, but subsequently developed pain in his right shoulder region. He presented to the Accident and Emergency Department (A&E) holding his right arm across his chest. He reported severe pain scoring 8 out of 10 on visual analogue scale. Examination revealed tender swelling over his clavicle with reduced range of movement of his left shoulder, in particular a limitation of abduction. He was given analgesia and a sling and sent for a shoulder X-ray. The X-ray showed a non-displaced fracture approximately halfway along his clavicle. He was discharged home with analgesia and an appointment to attend fracture clinic. He was managed conservatively with physiotherapy.

2) Ms Hodgson is a 19-year-old student. While making a tackle in a rugby game, she fell hard onto her left shoulder. This resulted in immediate shoulder pain. She presented to A&E with shoulder swelling, pain worse on palpation over the ACJ and a step-deformity at the lateral aspect of the shoulder. She also had extremely reduced range of movement (ROM) of her left shoulder. Scarf test was positive. She was given analgesia and her left arm was put in a sling. An X-ray showed a suspected Type 5 ACJ separation.

Anatomy

The clavicle is located between the manubrium of the sternum and the acromion of the scapula. It is a relatively thin bone in the shape of an 'S'. The ACJ is located between the lateral end of the clavicle and the acromion of the scapula. On palpation the ACJ is the protrusion near the superior and lateral edge of the shoulder. The ACJ is stabilised by the acromioclavicular (AC) and coracoclavicular (CC) ligaments, and by the deltoid and trapezoid muscles.

Take care not to confuse ACJ separation with shoulder dislocation. Shoulder dislocation involves the glenohumeral joint, not the ACJ.

Aetiology

Clavicle fractures make up 2-4% of all fractures in adults and usually occur in young adults. 70% of cases occur in males.³ 44% of ACJ injuries occur in 20-30 year olds and are 5 times more common in men than women.⁴ ACJ injuries most commonly occur in patients who play contact sports.⁵

Clinical Features^{6,7}

The differences in presentations between clavicular fractures and ACJ are outlined in the following table.

	Clavicle Fracture	ACJ separation
Pain	Pin-point tenderness over the clavicle, usually along the middle aspect.	In the superior-anterior aspect of shoulder with point tenderness over the ACJ
Inspection	It may appear as if the medial end of the clavicle is displaced superiorly. Actually, it is the lateral end that is displaced inferiorly due to the weight of the arm.	Swelling over the lateral aspect of the shoulder. A step-deformity may occur depending on the severity of the injury, in which the distal clavicle appears superiorly displaced (however, it's actually the humerus that has dropped inferiorly)
Range of Movement (ROM)	Reduced passive and active ROM secondary to pain	Reduced passive and active ROM secondary to pain, particularly of abduction
Clinical Tests	----	Positive scarf test (pain over the ACJ on passive adduction of the shoulder). See video entitled 'Examination of the Shoulder' on the BASEM learning portal ⁸

Other differentials to consider are: osteoarthritis, thoracic outlet syndrome, osteomyelitis, cancer and referred pain from abdominal pathology (phrenic nerve related)

During clinical examination, ensure you NEVER miss:

- nerve or vessel damage (always perform a full neurovascular exam of the affected extremity).
- fractures threatening the viability of skin.

If either are present, senior review and urgent treatment may be required.

Investigations

Clavicle Fracture: Anteroposterior (front to back) shoulder X-ray usually shows a clavicular fracture clearly.⁷

ACJ separation: X-ray, including standing weighted views of the ACJ with the patient holding the weight in their hand (allows the separation to be seen more clearly). Comparing with imaging of the unaffected, contralateral side. If still uncertainty US or MRI can be used to confirm diagnosis.⁶

Management options

Clavicle fractures: Undisplaced clavicle fractures involves 'PRICE' (pain relief, rest, ice, compression & elevation consideration of sling support, analgesia and physiotherapy promoting ROM exercises as tolerated).⁹ The aim is to promote quick return to activity: usually non-contact sports after 6 weeks and contact sports after 8-16 weeks. Cases with displaced or comminuted fractures or if there is associated neurovascular complications, should be referred for an orthopaedic opinion.⁷

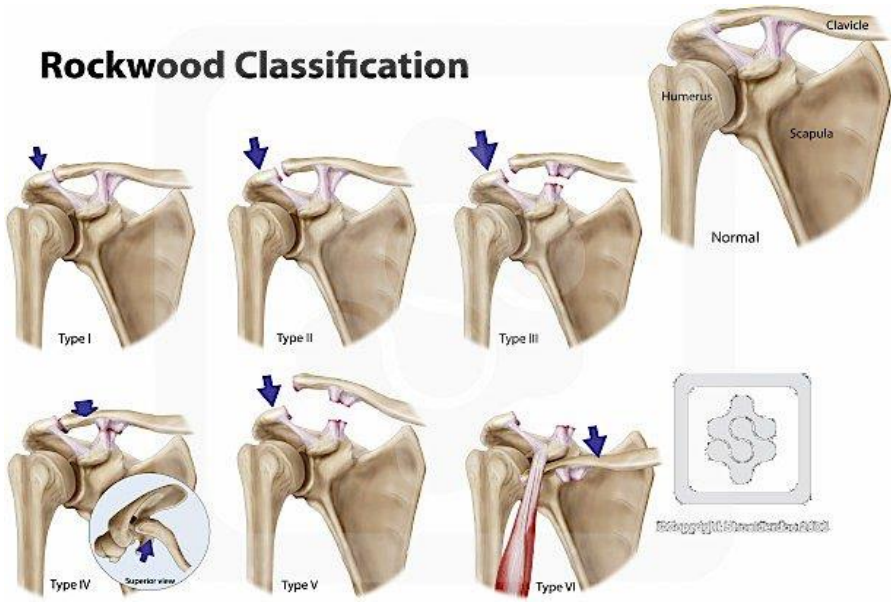
ACJ separation⁹⁻¹³: The management of ACJ separation injuries depends on its grade and severity. Type 1 and 2 injuries are usually managed conservatively with PRICE for 48-72 hours, a sling if needed, and physiotherapy. Treatment of Type 3 injuries is more controversial: they can be managed non-operatively or surgically and are judged on a case by case basis. Type 4 and 5 have traditionally been managed surgically. Overall most injuries are managed non-operatively, patients regaining function by 6 weeks and returning to normal activity by 12 weeks. Following surgery patients have a longer recovery time gradually returning to full activity at around 6 months.

*Be aware that clavicle fractures resulting in clavicle shortening **may** have increased risk of man-union and atypical scapula movements, although the jury is still out on this!^{14,15}*

Classification of ACJ separation injuries⁵

The Rockwood classification of ACJ separation is commonly used and grades the injury according to the ligament damage, and the degree and direction of clavicular displacement.

Rockwood classification of ACJ separation	
Type 1	AC ligament sprain with ACJ remaining intact. Normal X-ray.
Type 2	AC ligament tear, CC ligaments intact, and ACJ subluxation but not complete separation. May see slightly elevated clavicle on X-ray.
Type 3	AC and CC ligament tears with complete ACJ dislocation. A 25-100% displacement of the distal clavicle is seen compared to the contralateral side on X-ray.
Type 4	Both ligaments are torn and there is complete dislocation with posterior displacement of the distal clavicle into the trapezius muscle.
Type 5	A more severe form of Type 3. Both ligaments are torn and there is exaggerated superior dislocation of the AC joint between 100% and 300%, increasing the coracoclavicular distance 2 to 3 times. The origin of the deltoid and insertion of the trapezoid are torn.
Type 6	Both ligaments are torn and there is complete dislocation with inferior displacement of the distal clavicle into a subacromial or subcoracoid position. This is associated with severe trauma.



In depth knowledge of the classification is not necessary, but it is good to be aware of the classification and have an idea of the difference between each type.

Image courtesy of Lennard Funk, Shoulderdoc.co.uk¹⁶

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