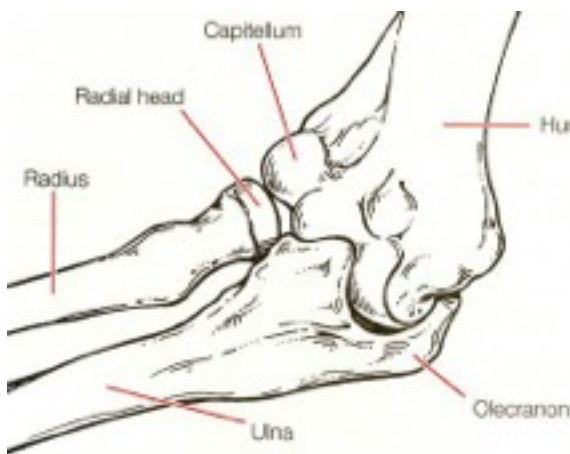


ELBOW, ARM, WRIST AND HAND CONDITIONS

ELBOW PAIN



The elbow is a hinge joint. Together, the ulnohumeral and radiohumeral joints provide about 50% of the joint stability, the rest being due to soft tissue constraint. It is a compound synovial joint since it is composed of articulation between the ulnar notch and trochlea of the humerus, and between the radial head and humeral capitellum. In continuity with these is the proximal radioulnar joint.



Tendon and ligament attachments to the elbow are common sites of enthesopathy.

Movement at the elbow includes the cubital joint itself and the proximal radioulnar joint. Flexion at the elbow is carried out by the brachialis and biceps, with the biceps also acting as a supinator of the forearm. Extension is carried out by the triceps aided by the anconeus. Pronation and supination require an intact distal radioulnar joint as well as a proximal one.

Examination of the elbow must be preceded by a precise history. Presenting complaints usually consist of pain, loss of movement, weakness, clicking or locking. Sharply localized pain is typical of extra-articular pathology. Deep joint pain may be present or the poorly localized pain of ulnar neuropathy with or without typical paresthesia extending to the hand.

The functional interplay between elbow, shoulder and wrist means the examination of all these joints may be necessary. Referred pain into the elbow, especially from the neck or shoulder, is usually diffuse.

Inspection of the elbow is important as much of the elbow joint is subcutaneous and alterations in soft tissue or bony anatomy are easily seen. Synovial proliferation and effusion are each detected as fullness in the region of the lateral infracondylar recess. A hard bony swelling is detected where there is radial head pathology, such as previous fracture. Posteriorly, swelling of the subcutaneous olecranon bursa may be detected, and in rheumatoid arthritis nodules often occur.



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Active and passive ranges of movement should be tested including flexion, extension and rotation. Most frequently, a reduced range of movement is due to pain. In extension, posterior pain indicates a posterior impingement problem, while anterior pain indicates tightness of the anterior capsule. The reverse is true for loss of flexion. Early in arthritis flexion and extension are limited, but rotational movements are often spared.

Pain should be sought on resisted active movements, particularly where there is no major intra-articular pathology. Passive movements producing pain indicate intra-articular pathology, whereas pain on resisted movement alone indicates musculotendinous pathology associated with that movement.

Neurologic assessment should be done, with particular attention paid to the C5, C6, and C7 nerve roots.



Pain in the elbow is usually due to local musculoskeletal disorders. It may also be produced by lesions of the cervical spine or less commonly as a referred pain from lesions in other areas of the arm. Occasionally pain may be felt in the elbow from an entrapment neuropathy of the median nerve in the carpal tunnel. An acutely injured elbow with swelling could mean a radial head fracture.

Acute elbow injuries are often collision related; chronic elbow injuries typically stem from overuse and valgus stress. What seems a purely traumatic injury, though, may actually represent an acute-on-chronic process, so a detailed history and physical exam are essential in pinpointing the injury process and making a specific diagnosis.

Elbow Injury

Acute injuries are most often the result of collision of an outstretched hand with the ground. If the elbow is somewhat flexed, posterolateral dislocation may occur. If the elbow is fully extended, force transmitted up the radius may cause a fracture of the radial head or capitellum. Varus or valgus shear forces at the time of impact may cause a fracture of condylar and supracondylar structures, but this injury is more common in children. Direct impact to the elbow may result in fracture of the olecranon.

The most common causes of overuse include eccentric overuse of the forearm extensors leading to tennis elbow, and valgus stress in throwing (ulnar collateral ligament rupture, golfer's elbow, olecranon compartment chondromalacia and loose bodies secondary to valgus instability).



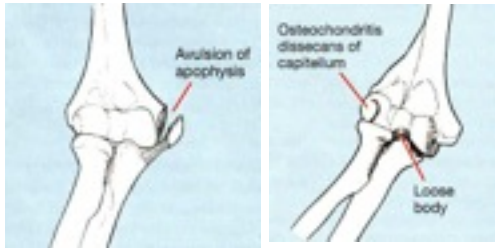
Varus forces disrupt lateral soft tissues and compress medial elbow structures.



Valgus forces injure the ulnar collateral ligament and compress the radiocapitellar joint.



To test for valgus instability, the patient's elbow is supinated and flexed about 20 degrees to release the olecranon. The examiner stabilizes the humerus by grasping above the condyles with one hand. The other hand applies valgus stress to the elbow with an abduction force to the distal ulna.

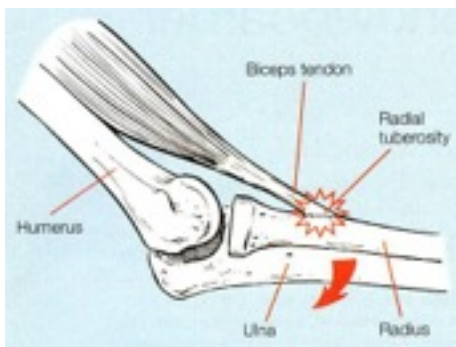


In adolescents, throwing or collision can produce avulsion of the medial epicondylar apophysis (Little League elbow). A common companion to Little League elbow is osteochondritis dissecans of the capitellum.

When a patient reports swelling and clicking or grinding, intra-articular pathology of the synovium, cartilage, or bone is suspected.

Soft Tissue Elbow Lesions

Apart from lateral epicondylitis (tennis elbow), medial epicondylitis (golfer's elbow) and olecranon bursitis, soft tissue lesions at the elbow are relatively rare.



Biceps tendinitis is characterized by local pain and tenderness in the region of the bicipital tuberosity of the radius, with pain on resisted flexion and supination. Pain on resisted flexion alone indicates the rarer brachialis muscle lesion with pain and tenderness well localized and found behind the biceps tendon. The distal biceps and brachialis musculotendinous units may be injured in sports that require repetitive elbow flexion such as bowling, gymnastics, and

weight lifting.



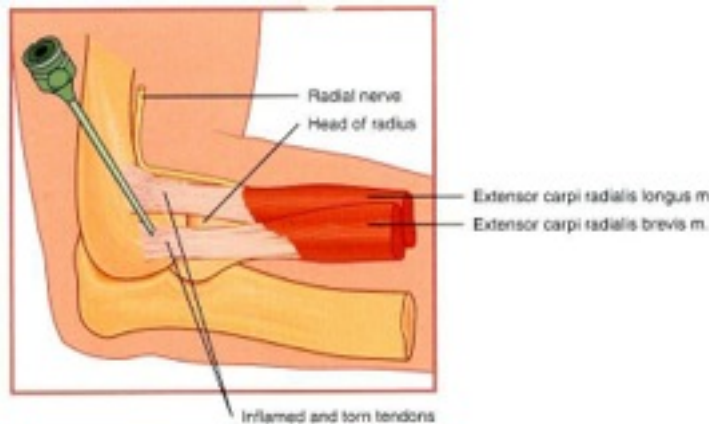
The distal triceps musculotendinous unit is subject to repetitive stress in sports such as shot put, weight lifting, javelin, football line play, gymnastics, and throwing or racket sports that require forceful elbow extension. Patients with triceps tendinitis typically have posterior elbow pain and are tender at the triceps

insertion on the olecranon. Pain is present with forced elbow extension against resistance.



Bursal inflammation around the elbow can occur and principally affects the olecranon bursa. Due to its superficial position over the olecranon, the bursa is prone to injury by friction or a blow. Swelling occurs easily and is readily seen. It may also be involved in crystal arthropathies (gout and rarely calcium pyrophosphate arthritis) or in generalized inflammatory arthritis, especially rheumatoid

arthritis. Septic olecranon bursitis is possible.



Palpable tenderness over the origin of the extensor carpi radialis brevis indicates tennis elbow (lateral epicondylitis). If there is no inflammation but rather degeneration, the term tendinosis is used.



Tennis elbow mostly occurs in those aged between 40 and 60 years, the dominant arm being affected most frequently. It is believed that the majority of cases are due to a musculotendinous lesion, either inflammatory or degenerative, of the common extensor tendon at the attachment to the lateral epicondyle or nearby, especially that portion derived from the extensor carpi radialis brevis.

Ischemic stress may be important because the tenoperiosteal junction (enthesis) and nearby tendon are relatively avascular. Age is an important factor, since lateral epicondylitis rarely occurs before the age of 30 years. Adult maturity is associated with alterations in the enthesis, including changes in collagen content, reduction in cells and ground substance and increase in lipids, which then predispose it to injury.

Lateral epicondylitis usually arises slowly and apparently spontaneously; a blow or acute traumatic episode are relatively rarely remembered. Pain is localized to the lateral epicondyle but may spread up and down the upper limb. Grip is impaired due to pain, and this may result in restricted daily activities. Tenderness over the epicondyle is usual, although maximum tenderness is sometimes found at nearby sites. The other cardinal sign is increase in pain on resisting wrist dorsiflexion with the elbow in extension. Symptoms may also be precipitated by extending the elbow with the wrist flexed and by resisted middle finger extension. Resisted supination may also be painful. The range of movement of the elbow is usually normal.



A nerve entrapment around the elbow may produce diagnostic confusion. Radial tunnel syndrome or compression of the posterior interosseous nerve can produce lateral elbow and upper forearm pain.

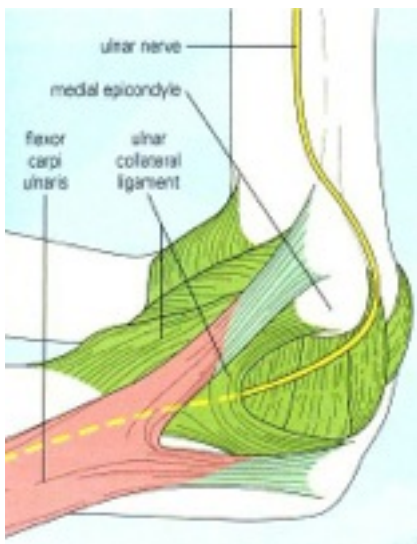


Tenderness over the tip of the medial epicondyle extending 1-2 cm along the track of the flexor carpi radialis and pronator teres typifies medial epicondylitis or golfer's elbow. It is a lesion of the common flexor tendon at the medial epicondyle.

The condition is usually milder and often pain and tenderness are less well localized to the medial epicondyle, being felt a little distal to the flexor origin. Pain on resisted wrist flexion with the elbow in extension is the most reliable sign.



The pathology and management are essentially the same as for tennis elbow.



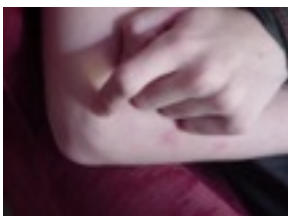
Ulnar nerve entrapment, or cubital tunnel syndrome, occurs most often in players of throwing and racket sports. Patients usually experience numbness and tingling in the 4th and 5th fingers, and sometimes pain along the medial side of the elbow. Physical findings include a positive Tinel's sign and tenderness to palpation along the cubital tunnel. The motor and sensory exams are often normal, but decreased sensation in the 5th digit and ulnar aspect of the 4th digit may be present, as may intrinsic muscle weakness and hypothenar atrophy. Entrapment or irritation of the ulnar nerve at the elbow is associated with compression under the flexor carpi ulnaris attachment and aponeurosis.

Myofascial Disruption Treatment

Tennis and golfer's elbow usually present as a myofascial band or enthesopathy. Myofascial bands produce pulling or burning pain down the medial or lateral forearm. The band is treated with stroking release starting on the sorest spot on the epicondyle and following the band from the elbow down to the wrist.



Enthesopathies of the elbow hurt in one or more



spots and the patient will point to the area of pain with one finger. Enthesopathies are treated with the elbow flexed and

compression with the tip of the thumb is applied to the most-tender spot. Electric point stimulation can also be used.

With a superficial fascial disruption of the elbow the patient will state the elbow hurts all over, and exact location can't be determined. Mechanism of injury is usually a pulling or twisting of the upper extremity. There are no spots of tenderness that increases the discomfort. Double hand traction and rotation is used with one hand above the elbow and the other below. The hands are pulled apart to exert a traction force and the hands are twisted in opposite directions until a release is felt. Reverse the twist if no response is obtained. A generalized sense of weakness of an extremity in the absence of pain is usually due to a superficial fascial disruption.

With synovial fixation of the elbow the patient will state the elbow feels stiff and needs to be popped or cracked. With myofascial layer disruption joint dysfunction of the elbow the patient will say the pain is deep in the elbow joint. The mechanism of injury (traction or compression) and a test with traction will determine if compression or traction thrust is to be used.

Myofascial trigger points that cause lateral epicondylar pain occur in the:

- Ring finger extensor digitorum
- Supinator
- Extensor carpi radialis longus
- Triceps brachii
- Supraspinatus
- Anconeus

Myofascial trigger points that can cause medial epicondylar pain include the:

- Triceps brachii
- Pectoralis major

Myofascial trigger points that can cause antecubital pain occur in the biceps brachii muscle. Trigger points of the triceps brachii can cause olecranon area elbow pain.

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