Common elbow conditions

Chronic overuse is the most common reason for elbow injury.

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Most elbow conditions result from chronic repetitive overuse injuries. Not only are they seen in sporting activities but are common in recreational and occupation-related activities. Although tennis elbow is the commonest condition, there are other conditions that we should be aware of. Most conditions can be diagnosed with a careful history and thorough examination. The surface anatomy and subcutaneous nature of the elbow joint lends itself to accurate localisation of sites of tenderness and ease of localisation of the pathology.

Tendon conditions

These are:

- Lateral epicondylitis
- Medial epicondylitis
- Biceps tendinopathy
- Distal biceps rupture.

Lateral epicondylitis

Although it is common in tennis players (up to 50%),[1] it commonly occurs in other sporting, recreational and occupational activities. It is now commonly seen with computer work, either as the initiating cause or by contributing to the perpetuation of the condition.

In severe cases, patients may experience pain at night and often find it painful and difficult to straighten their elbow in the morning.

Anatomy

The tendons of extensor carpi radialis longus, extensor carpi radialis brevis (ECRB), extensor digitorum communis and the extensor carpi ulnaris make up the common extensor origin of the elbow. Tennis elbow most commonly affects the tendon of ECRB.

Aetiology

It commonly occurs in the age range of 35 to 50 years and is initiated by any activity that increases tension in the extensors of the wrist and fingers. ECRB has been shown to be active with flexion, extension, varus and valgus stressing of the wrist, thus supporting the theory that it is an overuse syndrome.

ECRB, together with the other extensors, provide stability to the wrist in extension and radial deviation. Repetitive eccentric loading of these muscles may lead to overload and the onset of lateral epicondylitis.

Pathophysiology

It begins with micro-tears within the substance of the extensor tendons (predominantly the ECRB). This is followed by degeneration and the formation of reactive granulation tissue within the tendon and associated free nerve endings. There is invasion by fibroblasts and vascular granulation-like tissue (i.e. angiofibroblastic hyperplasia).[2] There is an absence of inflammatory cells.

Clinical findings

Pain is sited over the lateral epicondyle and radiates down the forearm along the extensor muscles. The pain may also radiate up the arm. The onset may be sudden after a particular activity and may even occur following a direct knock over the lateral epicondyle. The pain is exacerbated by activities which require resisted wrist extension such as lifting a kettle and shaking hands. In severe cases, patients may experience pain at night and often find it painful and difficult to straighten their elbow in the morning.

The ulna nerve is closely related to the medial epicondyle and associated entrapment must always be considered in medial epicondylitis.

Examination must include the neck and shoulder to rule out pathology arising from these areas. Tenderness is usually localised just anterior and distal to the lateral epicondyle. One must compare with the other side as undue pressure may elicit pain in the absence of pathology. Pain felt over the lateral epicondyle and down the forearm with resisted extension of the wrist (with elbow in the extended position) is diagnostic. Pain may also occur with passive pronation of the forearm and passive flexion of the wrist and fingers with the elbow extended. Few patients exhibit an inability to completely extend the elbow (pain inhibition) while most show a full range of movement.

Differential diagnosis

Posterior interosseous nerve entrapment may occur concurrently with a tennis elbow. Tenderness, however, is usually distal to the lateral epicondyle and more to the ulnar side, over the area where the nerve passes through ECRB. There is weakness of extension of the fingers, elicited by testing extension of the middle finger.

Investigations

Radiographs may show calcification in 22 - 25% of cases (Fig. 1).[3] Ultrasound and MRI will show the pathology but are not required to make a diagnosis.

The symptoms of biceps tendonitis are vague, with patients complaining of poorly localised pain around the cubital fossa which radiates up into the biceps muscle and down into the forearm.

Treatment

Non-operative

Conservative treatment is successful in most cases and there are a multitude of modalities that have been used.

Fig. 1. Calcium in extensor tendons.

In the acute case, rest, application of ice and non-steroidal anti-inflammatories are used.

In the chronic cases the following modalities are used.

- Alteration of equipment and training. Racquet handle size is important and the appropriate hand circumference can be measured, i.e. the distance from the proximal palmar crease to the tip of the ring finger[1,4] measured on the radial side (Fig. 2). Alteration of technique may also assist.[4]

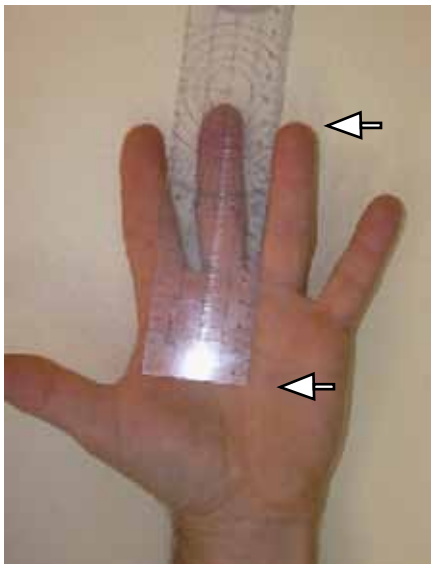

Fig. 2. Method for determining the correct racquet handle size.

- Physiotherapy is aimed at stretching the extensors by extending the elbow and passively flexing the wrist. Stretching is important prior to partaking in activities. Strengthening of the wrist flexors and extensors is required, especially an eccentric strengthening programme.
- Bracing. An extension wrist splint is probably only useful in the acute phase of the condition.[5] Counterforce bracing (Fig. 3) provides an effective constraint against full expansion of the muscle, thus decreasing the forces on the lateral epicondyle.[6]

Fig. 3. Counterforce brace.

- Steroid injection. Injection of steroid remains the main form of treatment: 1 ml of corticosteroid mixed with 1 - 2 ml of local anaesthetic is used. The injection is given at the point of maximum tenderness (anterior and slightly distal to the lateral epicondyle). The injection must be given deep and slowly; a superficial injection may result in dermal atrophy.[5] The patient should have complete relief of pain a few minutes after the injection, indicating that it is in the most appropriate site. Patients must be warned that they may experience a severe ache for a day following the injection. Steroid injection has been shown to be effective for early relief of pain compared with other modalities (physiotherapy, non-steriodal anti-inflammatories, local anaesthetic).[7]
- Injection with platelet-enriched plasma has been shown to have a slow but longer lasting effect than corticosteroids but is far more costly and the cost-effectiveness remains in question and is still considered experimental.

Operative

On average 5 - 10% of patients will require surgery. Surgery is indicated when there is failure of conservative treatment after 6 - 12 months.

There are numerous operations described for tennis elbow. The release may be performed percutaneously, open or athroscopically. A prospective randomised trial comparing these three methods showed no significant difference in their results.[8]

Medial epicondylitis (golfer's elbow)

This is much less common than tennis elbow, occurring at a ratio of 1:20 to tennis elbow and is seen in other sporting, leisure and occupational activities beside golf.

Anatomy

The flexor mass comprising the pronator teres, the flexor carpi radialis, the flexor digitorum superficialis and the flexor carpi ulnaris is affected. The ulnar nerve is closely related to the medial epicondyle and associated entrapment must always be considered in medial epicondylitis.

Clinical features

Pain felt over the medial epicondyle is the main symptom and is related to repetitive or forced pronation of the forearm or flexion of the wrist and fingers. The pain often radiates down the forearm or up the arm. Twenty per cent occur after an acute injury but most are insidious in onset. It is twice as common in men and more often affects the dominant arm. Ulna nerve involvement occurs in up to 50% of cases.

A diagnosis of tennis elbow should never be made in a teenager.

Examination reveals tenderness over the medial epicondyle and pain is elicited with resisted pronation of the forearm and/or resisted flexion of the wrist and fingers. Careful assessment of the ulna nerve function must be made.

Differential diagnosis

This includes injury to the medial collateral ligament and ulna nerve entrapment.

Investigations

Calcification is seen on the plain radiographs in approximately 10% of cases.[9] Ultrasound and MR will delineate changes within the tendon but is not necessary to make a diagnosis.[10] Nerve conduction studies may be done when there are ulna nerve symptoms and signs.

Treatment

Non-operative

In the acute situation rest, ice and non-steroid anti-inflammatories are useful.

Physiotherapy aimed at stretching the flexors and pronator as well as strengthening of the flexors and extensors of the wrist.

Bracing includes a wrist extension splint as well as a counterforce brace which is particularly useful when the patient continues to partake in the offending activity.

Corticosteroid injection provides quick and short-term relief.[11] The ulna nerve must be examined to check for anterior subluxation to avoid inadvertent damage to the nerve when injecting. Patients should be warned that the local anaesthetic might diffuse into the area of the nerve and cause paraesthesia for a few hours, and that the pain may be worse for 24 hours after the injection.

Platelet-enriched plasma is a more costly alternative to corticosteroids.

Operative

The indications for surgery are the same as for lateral epicondylitis. Surgery involves excision of degenerate tendon within the flexor mass. Concomitant release of the ulna nerve is performed if there are symptoms of entrapment. Transposition of the nerve is performed if it is subluxing. The results of surgery are not as good as for tennis elbow release especially if there is ulnar nerve symptoms.

Biceps tendinopathy

Distal biceps tendinopathy is a less common but often missed condition. This condition has only recently been reported in the literature.[12] It is an overuse syndrome and more commonly seen in people doing weight-lifting.

Clinical features

The symptoms are vague, with patients complaining of poorly localised pain around the cubital fossa which radiates up into the biceps muscle and down into the forearm. Examination reveals tenderness along the biceps tendon with point tenderness over the bicipital tuberosity of the radius with the forearm fully supinated. The diagnostic test is pain on resisted supination of the forearm. The same tests used for the proximal biceps elicit the pain (Speed and Yergason).

Investigations

Ultrasound and MRI may show fluid in the radial bursa at the tuberosity or changes in the tendon (Fig. 4).

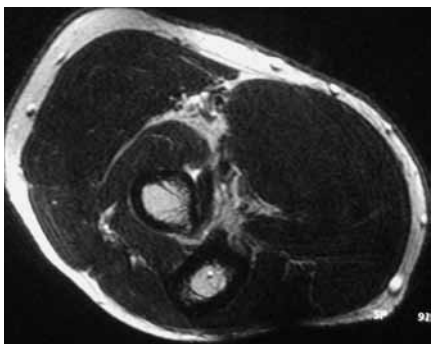

Fig. 4. MR scan showing fluid at distal biceps insertion.

Treatment

The treatment is injection with local anaesthetic and corticosteroid at the point of maximum tenderness. Injection done under ultrasound control is safe and accurate. Patients must be warned of temporary paraesthesia in the hand.

Biceps tendon rupture

Rupture of the distal biceps tendon from its attachment to the bicipital tuberosity of the radius is relatively common.

Mode of injury

It occurs following forced flexion of the elbow against resistance with the forearm supinated.

Clinical features

Patients feel a sudden snap in the elbow associated with pain. Bruising appears within 2 days, is often extensive and a key to the diagnosis (Fig. 5). There may be a deformity of the distal biceps with the muscle retraction (i.e. 'popeye muscle'). Examination will reveal weakness and pain on resisted supination of the forearm.

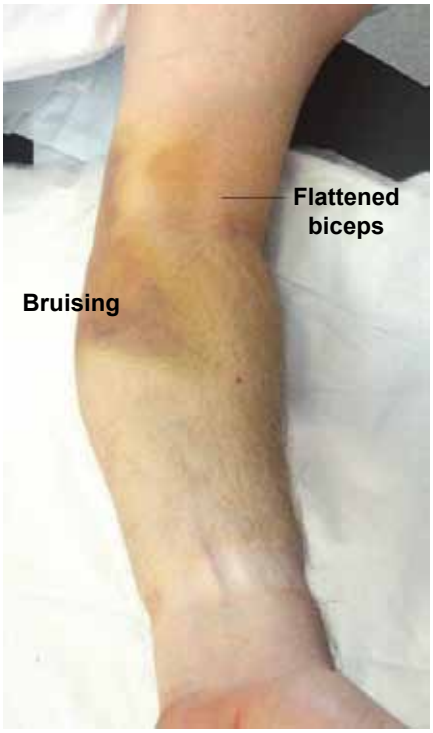

Fig. 5. Rupture of the distal biceps showing bruising and change in muscle.

Treatment

Surgical repair is indicated in most patients except the elderly.

Ligament conditions

These may occur after an acute injury or after chronic repetitive strain. The clinical features are often subtle and the diagnosis may be one of exclusion:

- articular injuries
- osteochondritis dessicans
- loose bodies
- posterior olscranon impingement
- osteoarthritis.

Osteochondritis dessicans

Aetiology

This condition is poorly understood though it is thought to be due to a vascular insufficiency.[13] It is a focal lesion, usually of the capitellum, which may be due to compressive forces producing arterial insufficiency leading to avascular necrosis.

Clinical features

It occurs most commonly in the age group from 10 to 15 years. Pain and swelling occurs with activity. There may be symptoms of locking and recurrent effusions. Patients with this condition are often misdiagnosed with a tennis elbow and given injections. A diagnosis of tennis elbow should never be made in a teenager. Examination may reveal loss in the range of motion and tenderness over the lateral joint margin.

Once there are mechanical symptoms, i.e. locking and loss of motion, separation of the fragment may have occurred and there may be loose bodies in the elbow.

Investigations

Plain radiographs may be normal but in the later stages may show flattening or cysts in the capitellum (Fig. 6). Loose bodies may be present. MRI will define an early lesion within the capitellum (Fig. 7).[14]

Fig. 6. X-ray showing cysts in the capitellum.

Fig. 7. MR showing oedema in the capitellum; early sign of OCD.

Treatment

In the early stages, when the main complaint is pain without loss of motion and there is oedema in the capitellum on MRI, rest and anti-inflammatories are all that are required. Once there are mechanical symptoms, i.e. locking and loss of motion, separation of the fragment may have occurred and there may be loose bodies in the elbow. In this situation surgery is indicated and entails an arthroscopy. In the more extreme cases grafting of the defect may be necessary but is rarely undertaken.

If the loose bodies are bony they can be seen on plain radiographs, but many are cartilagenous and may only be seen on ultrasound, CT and MRI.

Prognosis

The prognosis is worse if the growth plates are closed. Up to 50% of patients will continue to have symptoms and there is a high incidence in degenerative changes in later life.

Entrapment of nerves may occur around the elbow either in isolation as part of a more complex condition, e.g. instability with ulna nerve irritation.

Loose bodies

These may result from degenerative change, injury where an articular fragment may separate, osteochondritis dissecans, olecranon impingement and synovial chondromatosis.[15]

Clinical features

A previous history of injury is usual. Symptoms include pain, locking and recurrent effusions when the patient notices episodes of decreased range of movement, particularly after an episode of locking.

Investigations

If the loose bodies are bony they can be seen on plain radiographs (Fig. 8), but many are cartilagenous and may only be seen on ultrasound, CT (Fig. 9) and MRI.

Fig. 8. Lateral X-ray of the elbow showing loose body in the coronoid fossa.

Treatment

Removal is effectively done arthroscopically and the results are excellent. Recurrence of loose bodies may occur in subsequent years and patients should be warned about this.

Olecranon impingement

This is not an uncommon injury condition and the diagnosis is often missed. It may be initiated after an acute event when there has been forced extension of the elbow (e.g. a backhand shot at squash or badminton, a direct blow to the back of the elbow when it is extended). The tip of the olecranon impinges on the fat pad in the olecranon fossa (Fig. 10). The history may be of an insidious onset following many repetitions of hyerextension (e.g. in fencing).

Fig. 9. CT confirming a loose body.

Fig. 10. MR of the elbow showing prominent tip of the olecranon impinging in the olecranon fossa.

Clinical features

Patients complain of pain over the back of the elbow which is initiated or exacerbated by attempts at fully extending the elbow.

Examination may reveal loss of extension. There is tenderness over the olecranon fossa and classically pain and apprehension on passive extension of the elbow.

Investigations

Plain radiographs are usually normal. There may be osteophytes on the tip of the olecranon (Fig. 11) and/or bone in the olecranon fossa.

Fig. 11. AP X-ray with osteophyte on the tip of the olecranon.

Treatment

Injection of local anaesthetic and corticosteroid into the olecranon fossa is effective in many cases. Complete relief of pain and the eradication of pain on passive extension is diagnostic following the injection.

Resolution with conservative measures is less likely if symptoms have been ongoing for more than 6 months, there is some loss of extension and there are changes on X-ray. In these cases arthroscopic debridement of the olecranon fossa and shaving bone of the tip of the olecranon is effective.

Osteoarthritis

This is uncommon and most often is seen years after an injury. Most patients do not experience excessive pain but mainly notice that they are no longer able to extend their elbow fully.

Nerve conditions

Entrapment of nerves may occur around the elbow either in isolation as part of a more complex condition, e.g. instability with ulna nerve irritation. The ulna nerve is the most common nerve involved and its involvement must always be considered in combination with other conditions, e.g. medial epicondylitis. It can be the cause of unexplained pain.

Entrapment of the posterior interosseous nerve may mimic a tennis elbow and its occurrence must be considered when there has been failure of treatment for a tennis elbow.

References available at www.cmej.org.za

IN A NUTSHELL

- Tennis elbow predominates and the treatment of choice is injections and physiotherapy.
- Tennis elbow does not occur in teenagers.
- Diagnosis of biceps tendinopathy is often missed and the diagnostic test is pain on resisted supination of the forearm.
- Treatment for biceps tendinopathy is injection with steroid under ultrasound control.
- Rule out a tendon rupture when bruising occurs days after an injury in the absence of a fracture.
- The treatment of a distal biceps tendon rupture is repair.
- Pain felt at the back of the elbow with pain on extension of the elbow is indicative of olecranon impingement.
- Loss of extension of the elbow indicates intra-articular pathology.
- Osteoarthritis is often painless and patients only notice loss of elbow extension.
- Ulna nerve entrapment may be the cause of unexplained elbow pain.

SINGLE SUTURE

Healthy X-rays?

Hospital workers who are regularly exposed to 'safe' levels of X-rays have experienced changes at cellular level that might actually prove beneficial.

Gian Luigi Russo and colleagues at Italy's National Research Council took blood samples from 10 cardiologists who are exposed to 4 millisieverts of radiation per year from X-ray-guided surgery. Those levels were slightly above natural levels but well within the US Code of Federal Regulation's safe limit of 50 millisieverts per year.

Russo's team found that the blood contained levels of hydrogen peroxide – a marker of cell damage – three times higher than expected. On the flip side, it also contained twice the normal level of glutathione, an antioxidant that protects cells.

It is possible that this may protect the cardiologists against damage to the heart muscle.

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