**Tennis Elbow and Golfer’s Elbow**

**Synonyms:** lateral epicondylitis (tennis elbow), medial epicondylitis (golfer’s elbow)

Tennis elbow and golfer’s elbow are considered to be overload tendon injuries, which occur after minor and often unrecognised trauma to the proximal insertion of the extensor (tennis elbow) or flexor (golfer’s elbow) muscles of the forearm:

- **Tennis elbow:** reactive tendon pathology of extensor forearm muscle origins, causing lateral elbow and upper forearm pain and tenderness. Caused by repetitive stress at the muscle-tendon junction and its origin at the lateral epicondyle.
- **Golfer’s elbow:** reactive tendon pathology of flexor forearm muscles, causing medial elbow pain. Caused by repetitive stress at the muscle-tendon junction and its origin at the medial epicondyle.

**Epidemiology**[^1]

- Tennis elbow is estimated to have a prevalence of 1-3% of the population. The peak incidence is between 40 and 50 years of age. Men and women are affected equally.
- Golfer’s elbow is the most common cause of medial elbow pain; however, the incidence is about one fifth as common as tennis elbow[^2].
- Tennis elbow and golfer’s elbow may be seen in any age group if hobbies, jobs or sports activities can lead to overuse injuries.

**Aetiology**[^3]

Previously thought to be an inflammatory process, these tendinopathies are now thought to be on a continuum of change. This is now thought not to begin with an inflammatory reaction; rather, it is thought to be the result of a proliferative reaction due to overload. This causes a thickening of the tendon which, if not treated, can progress to tendon disrepair and eventual degeneration. The term ‘epicondylitis’ is increasingly thought to be a misnomer, with clinicians reverting to the informal names of tennis/golfer’s elbow or using terms such as epicondylalgia.

Repetitive, forceful work or leisure activity often causes the tendon to swell. Examples include[^4, 5]:

**Tennis elbow**

- Tennis - classically, although less so since the advent of lighter tennis rackets and two-handed backhands. Tennis is not the cause in the majority of people with tennis elbow.
- Jobs involving repetitive heavy lifting or the use of heavy tools.
- Jobs involving movements in an awkward posture - eg, arms lifted in front of the body, hands bent or twisted, and precision movements, particularly squeezing and twisting movements.
- New and unaccustomed strains such as DIY, gardening, lifting a new baby, moving house, carrying luggage.

**Golfers elbow**

- Golf and other sports involving gripping or throwing.
- Jobs and hobbies using repetitive elbow movements - eg, DIY, computer use, gardening, chopping, climbing or painting.
- Use of vibrating tools.

**Presentation**

**Tennis elbow**[^1]

- Usually a history of gradual onset.
- Usually unilateral but some cases are bilateral. The dominant arm is involved in 75% of people.
- Pain and tenderness over the lateral epicondyle of the humerus, radiating into the forearm, and pain on resisted dorsiflexion of the wrist, middle finger or both. A tender spot can usually be identified just below the lateral epicondyle on the outside of the elbow.
- The onset of pain is usually gradual and worse with use of affected muscles - eg, opening a jar. The person may report not being able to hold items such as cups due to pain.
- Pain is exacerbated by active and resisted movements of the extensor muscles of the forearm. For example, pain on resisted extension of the middle finger is typical in tennis elbow.
- Movements of the elbow are normal. If the range of movement is restricted, consider other diagnoses.
- **Mills’ test:**
  - Straighten the patient’s arm and palpate the lateral epicondyle.
  - Fully bend (flex) the wrist.
  - Pronate the patient’s forearm.
If this is painful the test is positive.

- **Cozen's test**:
  - Elbow in 90° of flexion, patient makes a fist and deviates wrist radially with forearm pronated.
  - Resisted extension of the wrist.
  - Pain in the area of lateral epicondyle is a positive result.

Golfer’s elbow
- Pain and tenderness are maximal over the medial epicondyle, radiating into the forearm. Pain is aggravated by wrist flexion and pronation.
- Dull ache at the medial epicondyle.
- The onset of pain is usually gradual and aggravated by using the affected muscles - eg, grasping objects and shaking hands.
- It is worsened with affected muscle use - eg, forearm rotation or grasping, opening a jar.
- **Golfer's elbow test**: pronate and flex the wrist and forearm at the same time (turns from palm up to palm down and bends the wrist back towards them). A result is positive when pain is located over the attachment of the wrist flexor muscles on the medial aspect of the elbow.
- An associated ulnar neuropathy may cause decreased sensation and/or a tingling sensation in the 4th and 5th fingers and, in more severe cases, muscle weakness in the hand.

Enquire about activities which may have caused the tendinopathy.

**Differential diagnosis**[1]
- Olecranon bursitis.
- Elbow arthritis.
- Cervical nerve root entrapment.
- Radial tunnel syndrome - this is due to compression of the posterior interosseous nerve, and tenderness is more distal and more anterior.
- Medial ligament strain (golfer's elbow).
- Radiation of pain from shoulder or wrist injuries.
- Carpal tunnel syndrome.

**Investigations**
- These are usually not required but may be indicated if the diagnosis is uncertain - eg, CRP, elbow X-ray, MRI.
- Nerve conduction study and electromyography may be indicated if ulnar nerve involvement is suspected in patients with golfer's elbow.

**Management**[4, 6]

Many treatments have been used to treat tennis or golfer's elbow. However, it is not clear whether these treatments work or if the pain simply goes away on its own. Despite its common nature, there is no universally accepted, evidence-based management regime. Reviews of management options have not been conclusive. Much of the evidence which is available refers to tennis elbow; however, as the pathology is the same for golfer's elbow, treatments used are similar. The following are some of the management options used.

**General advice and education**
This ideally involves referral to a physiotherapist for advice about activity and exercises.
- Modify activities causing or exacerbating the symptoms
- Activity restriction: avoid lifting, gripping and pronation or supination of the affected extremity.
- Rehabilitation exercises. The key to treatment is to increase the strength of the tendons gradually, while avoiding any activity that overloads the tendons. Rehabilitation exercises include painless passive wrist flexion and progressive resisted wrist extension.

**Non-steroidal anti-inflammatory drugs (NSAIDs)**[7]
A Cochrane review found conflicting evidence about the benefit of both oral and topical NSAIDs. There is no evidence that they improve long-term outcome, and they have a risk of adverse effects. This suggests they should not currently be recommended for routine use for these conditions.

**Injections**
- **Local corticosteroid injection**: Steroids can be injected into the point of maximum tenderness. Extra care is required with injecting golfer's elbow, to ensure avoiding the ulnar nerve. Superficial injections should be avoided, as they are ineffective and may cause skin atrophy. Steroid injections can be repeated after six weeks to two months.
- Steroid injection may be useful for acute relief of pain; however, it confers no long-term benefit and there is a high relapse rate. There may be some circumstances where the short-term benefit outweighs the poorer long-term prognosis; however, in most they are probably best avoided.
• **Autologous blood products** - eg, platelet-rich plasma (PRP): a sample of the patient's blood is centrifuged and then the heaviest layer of plasma (with a higher concentration of platelets) is injected back into the patient. Evidence of efficacy was determined by the National Institute for Health and Care Excellence (NICE) to be inadequate. Therefore, current recommendations are that this can only be done where there are "special arrangements for clinical governance, consent and audit or research"[8].

• **Hyaluronan gel injection**: this gel is injected into the joint. It is more commonly used in arthritic joints. Despite the fact that the problem is not thought to be within the elbow joint, efficacy has been demonstrated for tennis elbow in clinical trials[9, 10].

• **Botulinum toxin**: is used in very severe cases. It is injected into extensor digitorum longus muscles for the third and fourth fingers, thus paralysing them on a temporary basis. This takes the load off the tendon, but is disabling in the short term.

### Physical treatments[1]

- **Acupuncture**: NICE CKS found evidence conflicting and limited. They were unable to recommend the use of acupuncture.

- **Orthotics**: These may be splints, casts, straps, or braces and many are available over-the-counter. They are used widely, although there is no evidence confirming efficacy. In practice, forearm bands and wrist splints are most used; however, the majority of evidence is anecdotal. No conclusions could be drawn when these were last subject to a Cochrane review; however, there has not been one for over ten years.

- **Physiotherapy**: This may include exercises, massage, ultrasound therapy or taping. Physiotherapy combining elbow manipulation and exercise has a superior benefit to "wait and see" in the first six weeks and to corticosteroid injections after six weeks[11, 12]. There are currently no high-quality studies demonstrating suitability of one technique over another.

- **Extracorporeal shock wave treatment**[13]: Although effective for other tendinopathies, this has not been shown to be effective for treating tennis elbow. However, NICE encourages further research into this.

### Glycerol trinitrate patches

Glycerol trinitrate patches applied over the painful area improve outcomes in the first six months. Longer-term results have shown neither benefit nor long-term harm. This is used on an off-label basis.

### Surgery

Release of the extensor/flexor origin is occasionally indicated for patients who do not respond to a sustained period of conservative treatment. There is a marked shortage of evidence for the effectiveness of surgery[14].

### Prognosis[6]

- Tennis elbow is a self-limiting condition. The average duration of a typical episode is about six months to two years, but most patients (89%) recover within one year. 5-10% do not resolve and may require further treatment such as surgery.

- Golfer's elbow is also a self-limiting condition with a similar prognosis.

### Prevention

- Patients often have to modify their activities or the particular techniques that led them to develop this overuse injury. This may need to include the help of a coach for sporting activities.

### Further reading & references

1. **Tennis elbow**: NICE CKS, October 2012 (UK access only)
8. Autologous blood injection for tendinopathy; NICE Intervventional Procedure Guidance, January 2013
13. Extracorporeal shockwave therapy for refractory tennis elbow; NICE Intervential Procedure Guidance, August 2009

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