

Ministry of Defence

Synopsis of Causation

Tennis Elbow (Lateral Epicondylitis of the Elbow) (incorporating Golfer's Elbow – Medial Epicondylitis)

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Disclaimer

This synopsis has been completed by medical practitioners. It is based on a literature search at the standard of a textbook of medicine and generalist review articles. It is not intended to be a meta-analysis of the literature on the condition specified.

Every effort has been taken to ensure that the information contained in the synopsis is accurate and consistent with current knowledge and practice and to do this the synopsis has been subject to an external validation process by consultants in a relevant specialty nominated by the Royal Society of Medicine.

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1. Definition

- 1.1. The terms “**tennis elbow**” and “**lateral epicondylitis**” are synonymous. They describe a condition that is characterised by pain around the lateral epicondyle, the bony prominence in the elbow at the outer aspect of the [humerus](#). The muscles responsible for [dorsiflexion](#) of the wrist originate from the lateral epicondyle.
- 1.2. It is believed that the majority of cases are due to a lesion involving the common extensor tendon at the attachment to the lateral epicondyle or nearby, especially within the portion derived from [extensor carpi radialis brevis](#).¹ In the past, the condition has been attributed to an inflammatory process, but studies of pathological specimens removed at surgery have reported no evidence of acute or chronic inflammation.² A more likely mechanism is a degenerative process, occasionally associated with a [macroscopic](#) or microscopic tendon tear, produced by mechanical overload occurring during sports participation or at work.³
- 1.3. A similar condition known as golfer’s elbow or medial epicondylitis affects the common flexor tendon at the [medial epicondyle](#). It is between 7 and 15 times less common than tennis elbow. Patients are managed in a similar way to those suffering from tennis elbow.

2. Clinical Features

- 2.1. Tennis elbow is one of the most common conditions to affect the arm with an incidence of 1-3%. It rarely occurs before the age of 30, and is most common in the 4th and 5th decades of life. There is near equality in incidence between the genders. Onset of symptoms may be sudden but is more commonly gradual. The dominant arm is more frequently affected. Sometimes both arms may be involved, either due to an increased stress placed on the hitherto unaffected arm, or as a result of a general tendency to soft tissue lesions that occurs in some individuals.¹
- 2.2. Pain is generally centred on the [lateral epicondyle](#) or just below it, but may spread up and down the arm. Handgrip is impaired because of associated pain, to an extent that may restrict the activities of daily living.
- 2.3. On examination, tenderness over the lateral epicondyle is usual, although the site of maximum tenderness is sometimes found nearby. A key sign is an increase in pain in the region of the lateral epicondyle when the patient attempts to [dorsiflex](#) the wrist against resistance with the elbow extended. The range of movement in the elbow is usually full, although a few degrees of extension may be lost in some severe and chronic cases.¹
- 2.4. Investigations are not usually helpful in this condition, unless required to exclude an alternative diagnosis. [MRI](#) has been used to identify tissue abnormalities prior to surgery in chronic cases, but should not be used in routine cases.
- 2.5. Conditions that cause elbow pain and which need to be distinguished from tennis elbow include arthritis, [osteochondritis dissecans](#) of the [capitellum](#), and [radial tunnel syndrome](#). It is also important to exclude conditions arising in the cervical spine or shoulder, which may give rise to referred pain in the elbow. Tennis elbow and radial tunnel syndrome may coexist. As treatment failure for tennis elbow is rare, the accuracy of the initial diagnosis should be reassessed when such failure to respond occurs.

3. Aetiology

- 3.1. Although tennis players commonly complain of tennis elbow, with up to 50% of players who are aged over 30 being affected at some time, the vast majority (around 95%) of cases arise in individuals who do not play the game. In fact, tennis elbow occurs most commonly in non-athletes, and can arise in people who are not manual workers. **Many of the individuals who are affected cannot describe any specific precipitating factors.**¹
- 3.2. Rarely, a history of a **direct blow** or **acute traumatic strain** provides a clear precipitant for tennis elbow.
- 3.3. In general terms, the factors that are most commonly implicated in the aetiology of tennis elbow involve:
 - **Repetitive activity** entailing flexion/extension or [pronation/supination](#) of the forearm
 - **Overuse** of the extensor musculature of the arm
 - **Psychosocial considerations**
- 3.4. Several specific **occupational, personal and sports medicine factors** have been linked to tennis elbow, as follows:
 - 3.4.1. **Sporting activities:** tennis elbow in sportsmen and women is not confined to tennis players, occurring in 50% of athletes who use **overhead arm motions**. With regard to tennis players, tennis elbow develops less frequently in top-class players, suggesting that faulty swing mechanics may play a part in the development of the condition in the less adept. Medial epicondylitis (golfer's elbow) is also associated with participation in sports that involve overhead arm actions such as golf, tennis, racquetball and squash.³
 - 3.4.2. **Manual work:** studies in a variety of occupational settings have suggested a link between strenuous manual tasks and epicondylitis. Occupations that have featured in studies where such a link has been observed include the following: meat-processing, slaughterhouse work, fish-processing, manufacturing assembly-line work, nursery school cooks, employment in gas- and waterworks, aluminium smelting, grocery checkers, and forestry.⁴
 - 3.4.3. Activities that have been documented as contributory factors in the development of tennis elbow include:
 - **Non-neutral postures** of hands and arms
 - Use of **heavy hand held tools**
 - **Forceful** work
 - **Repetitive actions**
 - Combinations of the above exposures
 - 3.4.4. Work activities involving either **precision demanding movements** or **vibration** have also been implicated but the evidence for these is less

consistent.⁵ No association has been demonstrated between epicondylitis and work with visual display units or use of a computer mouse.⁶

3.5. Psychosocial factors

3.5.1. There is a growing body of evidence to suggest that the aetiology of musculoskeletal disorders that affect the neck and upper limb may be multifactorial, with interaction between established mechanical risk factors and psychosocial factors. The psychosocial factors involved may arise in the **workplace** and/or be **non-work related**. In one recent study, tennis elbow amongst women was associated with **low social support** at work.⁵

3.5.2. In addition, **individual psychological factors**, such as depression and anxiety may also play a part, although it remains unclear whether these factors arise as a determinant or an outcome of musculoskeletal pain.⁴ With specific reference to tennis elbow, one study found the presence of **other upper-limb disorders** and **depressive symptoms** to be associated with the development of the condition.⁷

3.6. Unfortunately, there are methodological shortcomings associated with many of the studies that have been conducted in this field, and the literature allows few conclusions to be drawn about the relative importance of the various risk factors in the causation of tennis elbow.⁴

4. Prognosis

- 4.1. Tennis elbow will often resolve spontaneously and most patients improve within one year, with or without treatment. However, relapse is not uncommon, and some patients report prolonged minor discomfort persisting for several years.¹
- 4.2. Over 40 different treatment regimes have been described in the literature. Non-surgical treatment will prove successful in 90-95% of cases. The best results from conservative management are obtained in patients who present for the first time with a tennis elbow duration of less than 3 months.
- 4.3. Treatment options for early/mild cases of tennis elbow include:
 - Rest/activity modification. However, full rest is contraindicated, as is applying a plaster cast to prevent motion of the forearm, wrist and hand
 - Splinting. A hinged brace or a counterforce brace that encircles the forearm just below the elbow to reduce the overload of the wrist extensors, considered a major pathogenic factor in lateral epicondylitis, is often used but there is little scientific evidence of its efficacy and effectiveness⁸
 - Specific exercises designed to strengthen forearm muscles, indicated especially in the rehabilitation of athletes. Concentric exercises and stretching are less effective than eccentric exercises
 - Non-steroidal anti-inflammatory drugs taken orally or applied locally as a gel may relieve the pain of tennis elbow for a short while, but in the long term do not appear to be effective

In more established cases, the alternatives for further non-surgical intervention include:

- Local cortisone injections: despite initial relief, the vast majority of patients suffer a recurrence. This form of treatment should not be repeated more than twice and scientific evidence suggests it should probably be abandoned⁹
 - Extracorporeal shock wave therapy
- 4.4. Surgery may prove beneficial in the 5-10% of cases that fail to respond to conservative treatment, although it is not usually considered until symptoms have been present for 6 months. There is no clear consensus on the preferred method of surgical intervention. A wide range of procedures of varying complexity have been advocated, including:
 - Manipulation under general anaesthetic
 - 'Lateral release' operations designed to lengthen the muscle tendon complex: one such procedure can be performed under local anaesthetic
 - Repair of tears
 - Removal of abnormal tendon
 - [Arthroscopy](#) and intra-articular procedures such as [synovectomy](#)
 - [Denervation](#) of the lateral epicondyle for symptom relief in rare cases
 - 4.5. Surgical intervention is associated with a successful outcome in around 85% of cases. Improvement, which usually occurs over 4 to 6 months, may continue for two years from the operation. Thus, out of all the patients who initially present with tennis elbow, only 1-2% will experience severe symptoms that fail to respond to either conservative

or surgical treatment.¹⁰ Those patients whose symptoms persist should be reassessed to ensure that their symptoms are definitely attributable to tennis elbow, rather than any other condition.

- 4.6. Although the outcome is usually satisfactory, a less favourable response to treatment has been linked to employment in manual jobs, a high level of physical strain at work, and a high level of pain at baseline.¹¹ Mechanics, builders and domestic workers appear to be most susceptible to recurrence on resumption of activity. There may be scope in the treatment of tennis elbow for greater attention to be paid to job modifications to reduce physical demands during recovery.

5. Summary

- 5.1. Tennis elbow is one of the most common conditions to affect the arm, causing pain in the region of the [lateral epicondyle](#) of the elbow with an associated impairment of grip that may restrict the activities of daily living.
- 5.2. The condition is frequently related to mechanical overload occurring during sports participation or at work. Thus repetitive activity and overuse are often implicated. Psychosocial factors may also play a part. Direct trauma is involved on rare occasions. However, despite these known associations, no specific precipitating factor can be identified in many of the individuals who present with tennis elbow.
- 5.3. The outlook for patients who suffer from tennis elbow is good. Non-surgical measures prove successful in around 90% of cases, and only 1-2% of patients will experience severe symptoms that fail to respond to either conservative or surgical treatment. However, recurrence is not uncommon, especially among patients who are employed in manual jobs and who experience a high level of physical strain at work.

6. Related synopses

Osteochondritis

Carpal Tunnel Syndrome

7. Glossary

arthroscopy	Orthopaedic procedure that involves the introduction of a thin fiberoptic device into a joint space to allow direct visualisation and, in some cases, surgical repair of the internal structures.
capitellum	The small rounded eminence on the distal end of the humerus that articulates in the elbow with the radius.
denervation	Removal of the nerve supply to a tissue.
dorsiflexion	Turning upward of the hand or fingers (or foot or toes).
extensor carpi radialis brevis	Muscle running from the lateral epicondyle to the base of the third metacarpal bone in the wrist; action produces dorsiflexion of the wrist and abduction towards the radius.
humerus	Bone of the upper arm.
lateral epicondyle	The bony prominence of the outer aspect of the humerus.
macroscopic	Large enough to be observed by the naked eye.
magnetic resonance imaging (MRI)	An investigation technique used to image internal structures of the body, particularly soft tissues.
medial epicondyle	The bony prominence of the inner aspect of the humerus.
pronation	The act of turning the palm downward, performed by rotation of the forearm.
radial tunnel syndrome	A condition involving nerve entrapment caused by compression of the posterior interosseous nerve.
supination	The act of turning the palm upward, performed by rotation of the forearm.
synovectomy	Excision of all or part of the membrane that lines a joint cavity.

8. References

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