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Review Article

Orthopaedics Section

The Management of Lateral Epicondylitis: A Narrative Review

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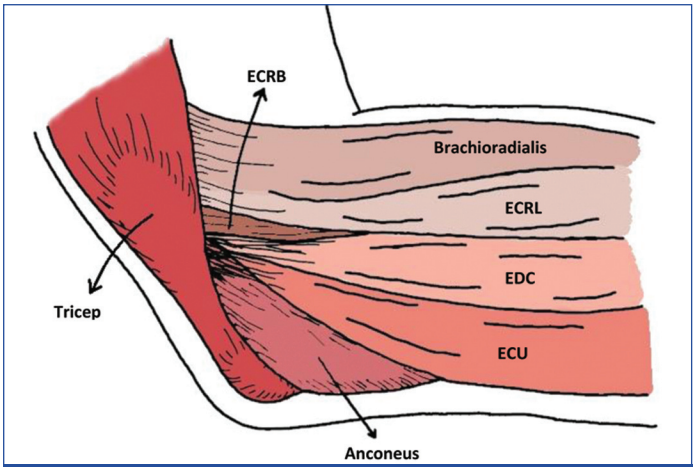
ABSTRACT

Lateral epicondylitis, commonly known as Tennis Elbow, affects approximately 1-3% of the population. Despite the absence of histological evidence of inflammation in the affected tissue, the term "epicondylitis" implies inflammation. The Extensor Carpi Radialis Brevis (ECRB) muscle is primarily affected, and the condition is attributed to excessive use of this muscle. Non surgical treatment options, such as rest, physiotherapy, cortisone injection, platelet-based therapies, and restricted movements, are recommended. Surgical intervention is suggested for cases involving physical impairment or chronic pain. This review aims to provide healthcare professionals with an understanding of the condition, including its causes, symptoms, diagnosis, and treatment planning options.

Keywords: Elbow tendinitis, Enthesopathy, Tendinopathy, Tennis elbow

INTRODUCTION

Lateral epicondylitis, commonly known as tennis elbow, was first reported by Runge in 1873, and the term "tennis elbow" was coined in the same year [1,2]. It is now understood that lateral epicondylitis is a degenerative disorder that originates from the lateral epicondyle of the upper arm bone, gradually extending into the joint. While terms like epicondylitis and tendinitis are used to characterise the tennis elbow, studies suggest that this condition is not characterised by inflammation but rather by a form of tendinitis caused by a process called Angiofibroblastic Degeneration, involving fibrous cell response and blood vessels [3]. Although the condition has been associated with tennis, only 5-10% of patients develop it due to the sport [4]. Degenerative symptoms of the elbow ligaments are also common among non sports individuals. Lateral epicondylitis affects both males and females equally, typically occurring in the dominant arm, as seen in tennis players, other sports enthusiasts, and individuals engaged in heavy labour activities [3]. The development of lateral epicondylitis involves microlesions at the ends of the muscles connecting the elbow and wrist, often affecting the ECRB and Extensor Carpi Radialis Longus (ECRL) muscles [Table/Fig-1].



[Table/Fig-1]: Diagrammatic representation of lateral side of the elbow showing Extensor Carpi Radialis Brevis (ECRB), ECRL Extensor Digitorum Communis (EDC), Extensor Carpi Ulnaris (ECU).

Pathophysiology

Previously, epicondylitis was believed to be an inflammatory condition. However, thorough examinations following surgery in several patients revealed gray tissue with oedema characteristics, indicating a degenerative condition rather than inflammation. This type of disorder occurs in patients with degenerative ligaments, and pain can occur in the lateral, middle, or posterior regions. Microscopic examinations conducted by Bunata RE et al., Nirschl RP, and Potter HG et al., showed normal and fragmented tissues with collagen fibre structure, fibroblasts, and granulation tissue formation that contribute to the repair process of worn parts [3,5,6]. Tissue changes, such as angiofibroblastic hyperplasia and the formation of thin gray tissue as replacement granulation tissue, are observed.

However, early stages of epicondylitis may exhibit symptoms resembling inflammation [3,6,7]. Nirschl RP categorised secondary lesions as minor tendon soreness. In the case of lateral epicondylitis, there are four stages- inflammation (which can heal without pathological changes), angiofibroblastic degeneration, tendon transformation and tissue remodeling, and finally, changes in the fascia and the presence of calcium substances in the muscles [8].

Diagnosis

Basic diagnosis is carried out by collecting information, patient history, and treatment history. The main symptoms reported by patients include pain in the lateral bone of the upper arm and the back of the forearm, which hampers their ability to play sports or engage in labour-intensive activities in daily life [8].

Physical Examination

Palpation begins by identifying the points on the lateral bone button and the tip of the elbow. The tender area is located on the lateral bone button at the ECRB, which leads to inflammation of the outer elbow ligaments. It is important to differentiate symptoms caused by Radial Tunnel Syndrome and to assess the head of the radial bone by pressing down on the lower area of the ECRB. To evaluate muscle appearance and normality, the hands are turned upside down and the elbows are extended. Cozen's test, also known as the antifriction wrist surge test, is performed by setting the elbow at a 90° angle and asking the patient to perform the prescribed movement. A positive test result is indicated by pain in the lateral bone button area and the Extensor Digitorum Communis and ECRB muscles [9].

Another test, known as Mill's test, involves the patient straightening their arms, bending their wrists, and extending their elbows. The lateral epicondyle button is palpated with one hand while the other hand holds the patient's hand in an upside-down position, fully flexing their wrist and straightening their elbow. A positive test result is indicated by pain in the lateral bone button area [9].

Additional supplementary tests include X-ray imaging, which is useful for ruling out other disorders such as osteoarthritis, osteochondritis dissecans, and intra-articular free bodies. However, X-ray images typically show normal results in most patients, with calcium substances in the lateral bone button area [Table/Fig-2] found in only about 22% of patients [8,10]. Pomerance J, examined X-ray images of the elbow in 272 patients with lateral epicondylitis, and only 7% of the patients showed calcium on the lateral side of the elbow button [11]. Therefore, the necessity and usefulness of X-ray examinations in the initial stages of lateral epicondylitis are controversial, as the results may vary depending on the examiner.

[Table/Fig-2]: X-ray image of elbow showing transition to limestone or calcium carbonate in the lateral bone button of the upper arm (arrow).

Magnetic Resonance Imaging (MRI) is becoming increasingly common for evaluating and treating epicondylitis. Li X et al., used MRI to evaluate patients with chronic lateral elbow ligament pain and found that 50% of patients showed increased T2-characteristic visual effects (a photogenic characteristic of MRI indicating a pathological condition, about the cause of the disease) at the adhesion point of the Extensor Digitorum Communis (EDC) and ECRB tendon attachment site [12]. Van Kollenburg JA et al., also found signs of increased T2-characteristic images at the EDC and ECRB [13]. These changes were observed in the lateral bone button area as well. In a study involving 24 patients with chronic lateral epicondylitis, surgical treatment targeting specific areas characterised by MRI, including the ECRB muscle attachment site and the lateral epicondyle, resulted in improved symptoms. The authors concluded that MRI can help guide appropriate treatment or surgical intervention for patients with tennis elbow.

Differential Diagnosis

There are several conditions that can occur separately or in association with lateral epicondylitis. The most common condition is Radial Tunnel Syndrome. Other differential diagnoses include neck muscle pain, shoulder ligament pain, and joint abnormalities such as joint lining inflammation and intra-articular free bodies.

To differentiate tennis elbow from other conditions, it is important to consider the following factors. The location of pain: Tennis elbow specifically affects the outer part of the elbow, while other conditions may cause pain in different locations of the elbow or forearm. Tennis elbow is commonly associated with repetitive activities involving the forearm and wrist, such as tennis, golf, painting, or certain occupational activities. A history of repeated motions increases the likelihood of tennis elbow. Diagnostic imaging, such as X-rays or other imaging tests, may be used to rule out other potential causes of elbow pain, such as fractures or arthritis [14].

Non Surgical Treatment

Patients with lateral epicondylitis commonly experience painful symptoms. For individuals engaged in sports or activities involving movement around the elbow, appropriate treatment can enhance training and prevent elbow injuries. Sports such as tennis, golf, racket sports, badminton, swimming, weightlifting, and manual tasks that require frequent hand and arm use, like printing, are associated with elbow pain. Pain relief is crucial, and Non Steroidal Anti-Inflammatory Drugs (NSAIDs), cryotherapy, ultrasound, and laser therapy are potential options for alleviating pain caused by lateral epicondylitis, which is considered a degenerative process. A comparison between ultrasound treatment and placebo demonstrated no statistical difference in their effectiveness [14]. Wearing an elbow brace can limit the expansion of the extensor muscle near the torso, reducing strain on the affected area. Biomechanical evidence supports the effectiveness of this approach [15]. However, the splint method may not be very effective as it can cause pain when the patient resumes the same activity, except during the initial inflammatory stage [15].

In cases where oral therapy and physiotherapy have not improved the pain, corticosteroid injections are preferred. These injections administered near the bone button of the elbow, should be used cautiously as repeated administration may lead to side-effects such as cell death, tissue atrophy, and tendon injuries [Table/Fig-3] [16]. Acute pain can be effectively managed with corticosteroid injections [17]. However, the long-term effects of locally injectable corticosteroids are comparable to medium-term effects [17].

[Table/Fig-3]: Point for cortical steroid injections in the treatment of lateral epicondylitis. Lateral epicondylitis injection is performed with the needle entering the skin at a 45-degree angle and entering 1 cm anterior and 1 cm (Red) distal to the lateral epicondyle (Blue).

Butolinum toxin administration has been proposed as a novel treatment to promote tissue recovery in a stress-free environment. It temporarily paralyzes the extensor muscles by inhibiting acetylcholine, a neurotransmitter that affects bodily functions [18]. Studies have reported mixed results, with one indicating reduced pain after 16 weeks compared to a placebo [18], while another showed no significant differences [19]. Butolinum toxin treatment has limitations and may cause muscle enlargement in the fingers and wrists.

After treatment, patients can engage in exercises to stretch and improve the range of motion of the wrists and elbows. Muscle spasm exercises involve briefly tensing a part of a muscle at full strength, while movement exercises help in muscle development. If there is no pain, the next stage of muscle development can be initiated using elbow knuckles to control muscle expansion. Patients can gradually return to athletic training or strenuous work if they can exercise without experiencing pain.

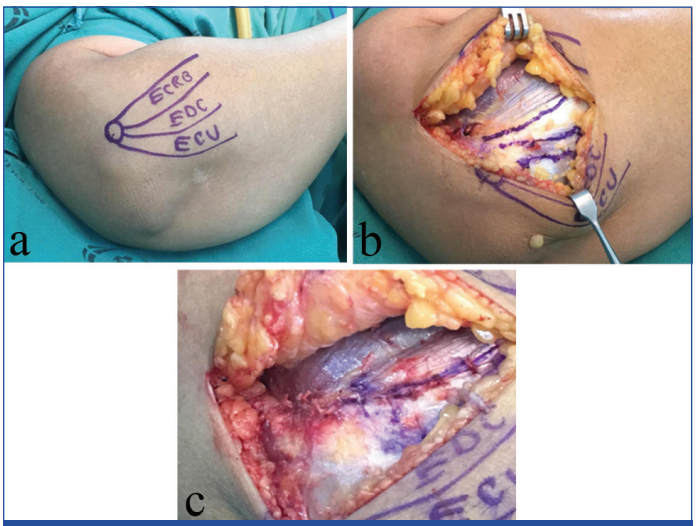
Shock wave therapy is another treatment option. However, studies have shown mixed results, with one study suggesting better effects with shorter follow-up durations [20,21], while a literature review indicated relatively small benefits [22].

Platelet-Rich Plasma (PRP) is a liquid or bloody fluid containing a high concentration of blood platelets obtained through centrifugation, which separates platelets from the patient's blood. PRP has been utilised for its potential benefits, including reducing inflammation, promoting new blood vessel formation, reducing fibrosis, enhancing collagen synthesis, and improving tissue conditioning [23]. However, there has been some debate regarding the use of PRP in certain statistical studies. Arirachakaran A et al., conducted evidence-based research comparing the topical administration of PRP to corticosteroid administration for treating lateral epicondylitis. The study followed a group of 374 patients who were randomly assigned to receive either PRP or corticosteroids, and the results showed that the PRP group experienced less pain and achieved better recovery compared to the other group during the two-year follow-up [24].

Surgical Treatment

Surgical treatment is recommended for patients who have undergone proper rehabilitation for atleast nine months but continue to experience persistent pain that cannot be managed. Surgery may be considered when non surgical treatments have been administered three or more times without success or when the treatment limitations hinder the patient's daily activities.

One commonly used open surgery technique, described and published by surgeon Nirschl RP based in Virginia, involves identifying and removing the degenerative tendon and cutting off that part, which may include the adhesion points of the EDC and the ECRB [25,26], as shown in [Table/Fig-4]. In 1979, Nirshl et al., [5] published an operative technique for the treatment of Lateral Epicondylitis, which involved excision of all visibly damaged parts in the area of the insertion of the ECRB muscle. The authors reported an improvement in 97.7% of the patients after surgery. The surgical incisions have become smaller, approximately 1.5 to 3 centimeters, and now only penetrate the side of the bone button instead of the top section [27]. After surgery, the elbow is immobilised with a splint for seven days, followed by muscle spasm and elbow movement exercises. After three weeks, a splint is used in conjunction with controlled muscle movement. The splint should be worn for several months, including during daily activities. Gradual return to normal sports activities can begin around eight weeks post-surgery. Dunn JH et al., reported excellent results in 84% of the cases using this "small open surgery" technique on 92 patients. Their notable achievement was the long-term follow-up of atleast 10 years, which demonstrated the long-lasting effectiveness of their surgical techniques [27].



[Table/Fig-4]: Surgical techniques used to treat lateral epicondylitis: (a) Muscle access; (b) Intermuscular gaps (ECRB) and stretched muscle fibrosis (EDC); (c) Sutures of the channel between ECRB and EDC muscles.

Complications of the Techniques

Like any surgical procedure, open surgery for lateral epicondylitis carries a risk of infection. This risk can be minimised by following strict sterile techniques, administering antibiotics before and after surgery, and maintaining cleanliness and dryness at the surgical site. During surgery, there is a risk of damaging the nerves in the area, which can lead to numbness, weakness, or loss of sensation in the affected arm or hand. The surgical incision will result in a noticeable scar, which may limit mobility in the affected joint. Proper wound closure and adherence to post-surgical care instructions can help minimise scarring. Pain is a common occurrence during and after surgery, but appropriate pain medication can be prescribed to manage discomfort.

Future Perspectives

Ongoing research is focused on developing new treatment options that aim to minimise pain and improve function through interventions such as physical therapy, occupational therapy, and other non invasive approaches. In severe cases, surgical intervention may still be necessary, but advancements in minimally invasive procedures have led to improved outcomes and reduced recovery times. Additionally, emphasising prevention techniques, such as proper technique and equipment selection for activities that strain the elbow joint, can help reduce the incidence of lateral epicondylitis. With ongoing research and advancements in treatment options, the future of lateral epicondylitis looks promising [25].

CONCLUSION(S)

Management of lateral epicondylitis involves a combination of non surgical and surgical approaches, depending on the severity of the condition. Non surgical treatment options include rest, NSAIDs, physical therapy, and activity modification. Additional treatments such as braces, corticosteroid injections, PRP treatment, and shockwave therapy may also be utilised. When non surgical treatments fail to alleviate symptoms, surgery may be considered. The most appropriate approach should be determined by the treating physician after a thorough evaluation of the patient's condition. Early intervention is crucial in preventing the progression of lateral epicondylitis and its associated complications.

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