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Medial Epicondylitis: A Systematic Review on Causes, Symptoms and Treatment

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ABSTRACT

Introduction: Medial epicondylitis, often called golfer's elbow, involves pain on the inner side of the elbow. It usually results from repetitive strain on the tendons that connect the forearm muscles to the medial epicondyle. While commonly linked to golfing, it can affect people engaged in various activities requiring repetitive wrist flexion and gripping.

Purpose of work: This paper aims to provide a comprehensive overview of the pathogenesis, imaging characteristics, and treatment strategies for medial epicondylitis.

State of knowledge: Medial epicondylitis can be worsened by activities that require forceful gripping, such as golfing or weightlifting [1][2]. The condition has been extensively studied and is well-documented in the scientific literature. Various treatments are available, including conservative methods like rest, physical therapy, and injections, as well as surgical interventions for persistent cases.

Material and methods: This review draws upon an in-depth analysis of current scientific literature, including recent publications in prominent medical journals and relevant research studies. To identify pertinent scientific publications and research studies, comprehensive searches were conducted on widely recognized academic databases, such as PubMed and Google Scholar.

Summary: Medial epicondylitis, also known as "golfer's elbow," is characterized by pain and tenderness over the bony prominence on the inner side of the elbow. It often results from repetitive strain or overuse of the muscles that flex the wrist and pronate the forearm [3]. Diagnostic imaging, such as X-rays and MRI, can help evaluate this condition [1][4]. Treatment typically involves a combination of conservative approaches, including rest, physical therapy, and anti-inflammatory medications, as well as more invasive options like corticosteroid injections or surgery for persistent cases.

Keywords: elbow tendinopathy; athletes; sports; rehabilitation; cumulative trauma disorders

INTRODUCTION

Medial epicondylitis, often referred to as "Golfer's Elbow," is characterized by degeneration and microscopic tearing of the tendons that attach to the medial epicondyle of the humerus. It is distinct from lateral epicondylitis, as it specifically involves the flexor-pronator muscle group, which is responsible for wrist flexion and forearm pronation. This condition manifests as pain, tenderness, and functional impairment in the elbow region.

The condition is commonly observed among individuals whose occupations or recreational activities involve repetitive movements of the wrist and forearm, such as golfers, baseball players, and manual laborers [5]. While the condition is often referred to as "Golfer's Elbow," only a small percentage of those affected are actually golfers, indicating it affects a broader population demographic. Epidemiological studies have estimated the approximate annual prevalence of the disease to be 0.4% of the general population, with a higher incidence observed among individuals aged between 40 and 60 years. Furthermore, men are slightly more frequently involved, which may be attributed to their increased participation in high-strain activities [6].

Medial epicondylitis is a condition of significant clinical and economic importance. It can severely impair patients' quality of life, as the associated pain and diminished grip strength restrict both everyday tasks and recreational pursuits [7]. Furthermore, this disorder carries a substantial economic burden, encompassing direct treatment expenses as well as indirect costs stemming from occupational disability and reduced workplace productivity [7].

This review examines the anatomy, pathology, and clinical aspects of medial epicondylitis, discussing its risk factors, diagnostic approaches, and treatment strategies [8]. The text also highlights preventive measures and early intervention as means to mitigate long-term consequences. The insights gained are expected to inform better rehabilitation protocols and improve outcomes by enhancing the understanding of this condition.

ANATOMY AND PATHOPHYSIOLOGY

Anatomy of the Medial Epicondylitis

The medial epicondyle of the distal humerus serves as the primary attachment site for the tendons of the flexor-pronator muscle group. This group includes the flexor carpi radialis, palmaris longus, flexor carpi ulnaris, and pronator teres - muscles essential for wrist flexion and forearm pronation [5]. This bony protrusion provides a mechanical advantage to the flexor-pronator complex, enabling proper functioning during repetitive elbow, hand, and wrist movements involving gripping, throwing, or swinging activities [9].

The anatomical structure of the medial epicondyle is closely associated with the ulnar collateral ligament and surrounding soft tissues, which collectively contribute to elbow joint stability. This bony prominence becomes a highly stressed area when subjected to repetitive or forceful activities. The excessive tension applied to this region can lead to microtears within the tendons, initiating the pathological process that results in medial epicondylitis.

Pathophysiology of Medial Epicondylitis

Medial epicondylitis is primarily an overuse injury, stemming from repetitive strain on the tendons of the flexor and pronator muscle groups [10]. The typical pathology involves chronic overloading leading to microtears at the origin of the flexor muscles, which commonly attach to the medial epicondyle. These small tears fail to heal properly under persistent tension, resulting in the development of tendinopathy instead of an acute inflammatory response.

Histological examinations of damaged tendons have revealed degenerative alterations, including disorganization of collagen fibers, vascular invasion, and fibroblast infiltration, all of which suggest unsuccessful tendon healing [11]. This condition is also known as angiofibroblastic hyperplasia, marked by neovascularization, but the newly formed vessels are often dysfunctional and unable to properly support tissue repair. Additionally, there is a decrease in type I collagen levels, leading to a loss in tendon tensile strength, while type III collagen, characteristic of scar tissue, becomes more prevalent.

The molecular mechanisms underlying early-stage tendinopathy involve elevated levels of inflammatory mediators, such as prostaglandins and cytokines, particularly interleukin-6 [7]. These mediators can contribute to increased pain sensitivity and tissue degradation, perpetuating a detrimental cycle of injury and dysfunction. In chronic tendinopathy, the tendons become thickened, weakened, and more susceptible to re-injury, leading to greater functional impairments.

Comprehending the anatomical and pathological underpinnings of medial epicondylitis is fundamental for conceptualizing effective treatment approaches, despite the need for diverse mechanical and molecular interventions to address the varying etiologies of this condition.

CAUSES AND RISK FACTORS

Common Causes

The primary etiology of medial epicondylitis, also known as "Golfer's Elbow," involves repetitive strain on the tendons of the flexor-pronator muscle group, which originate from the medial epicondyle of the humerus. Activities involving repetitive wrist flexion and forearm pronation, such as swinging a golf club, throwing a baseball, or using hand tools, can lead to microtrauma and cumulative overload of these tendons. This repetitive strain creates sustained stress at the tendon's attachment site, ultimately resulting in tendon degeneration if the condition is left unmanaged.

Improper technique during physical activities is a significant risk factor for medial epicondylitis. For instance, poor wrist alignment during a golf swing or excessive force in a tennis serve can increase strain on the medial elbow, heightening the susceptibility to tendon injury. Similarly, the lack of well-designed training programs and insufficient development of supporting musculature can diminish tendon elasticity and resilience, thereby predisposing individuals to injury [5].

Risk Factors

Occupational activities involving repetitive and strenuous movements have been identified as significant risk factors for medial epicondylitis [6]. Professions such as construction, carpentry, and assembly line work, which require frequent use of tools like screwdrivers and hammers, can subject the flexor tendons to sustained tension, thereby increasing the likelihood of developing microtears and tendon degeneration.

Certain systemic medical conditions can further increase the risk of developing medial epicondylitis. Diabetes and obesity, for example, are associated with impaired tendon health due to chronic inflammation and reduced tissue healing capacity [7]. Diabetes compromises the microvascular circulation essential for tendon repair, while obesity leads to excessive mechanical loading on the musculoskeletal system. Similarly, disorders such as rheumatoid arthritis and hypothyroidism have been linked to this condition, as the integrity of connective tissues appears to influence susceptibility to tendon degeneration.

Additionally, demographic factors like age and gender play a role. Medial epicondylitis is most commonly observed in individuals within the 40- to 60-year age range and is more prevalent among males, who tend to engage in high-strain activities [11]. Recognizing these risk factors presents opportunities for targeted prevention strategies, such as appropriate ergonomic adjustments or exercises to strengthen the affected musculature, which could help reduce the incidence of this injury.

CLINICAL PRESENTATION AND DIAGNOSIS

Symptoms

Patients with medial epicondylitis typically exhibit pain and tenderness localized to the medial epicondyle of the humerus. They may report an aching or burning discomfort that radiates along the inner forearm. Symptoms are exacerbated by activities involving wrist flexion, forearm pronation, or gripping, particularly during repetitive arm movements such as swinging a golf club or using tools. The medial epicondyle is notably tender upon palpation, which is a highly indicative clinical sign of this condition [12].

Additionally, affected individuals may present with reduced grip strength and a limited range of motion in the wrist and forearm. This is often attributed to pain-induced inhibition of the flexor-pronator muscles and degenerative changes within the tendons. Severely impaired patients who struggle to perform basic daily tasks like lifting or typing can experience a significant decline in their quality of life. Without proper interventions, these symptoms tend to persist and worsen, underscoring the importance of early diagnosis and effective management.

Diagnostic Tools and Criteria

Most cases of medial epicondylitis are primarily diagnosed through a comprehensive clinical assessment, including a thorough medical history and physical examination. Provocative tests, such as resisted wrist flexion or pronation, are typically utilized to reproduce the patient's symptoms and confirm the diagnosis. Furthermore, palpation of the medial epicondyle, with the elbow in a flexed position, aids in localizing tenderness and differentiating this condition from other pathologies, such as ulnar nerve entrapment.

While imaging modalities play a supplementary role in the diagnostic process, they can provide valuable information. Magnetic resonance imaging is superior in depicting degenerative changes and tendon tears, along with associated soft tissue abnormalities, thereby enabling a detailed evaluation of injury severity [13]. Ultrasonography, being a more economically reasonable alternative, can detect tendon thickening, hypoechogenicity, and neovascularization as indicators of tendinopathy. Additionally, ultrasound allows for dynamic real-time analysis. Although less sensitive, X-rays can be useful in ruling out bony pathologies, such as calcification or fractures.

By integrating the clinical findings with the imaging data, a more accurate diagnosis can be achieved, which is crucial for tailoring the management approach. Early recognition and appropriate intervention for medial epicondylitis are essential to prevent the development of chronicity and functional impairment.

TREATMENT APPROACHES

Conservative Treatments

The initial management for medial epicondylitis adopts a conservative approach, aiming to alleviate symptoms and promote functional recovery. Rest, coupled with activity modification, serves as an important first step, where patients are advised to avoid activities that typically exacerbate their symptoms, such as repetitive wrist flexion or pronation, to prevent further deterioration of the tendons [14]. Moreover, ergonomic adjustments to work stations or athletic equipment can help reduce strain on the affected tendons, facilitating recovery or preventing exacerbation.

Physical therapy is a fundamental component, employing stretching and strengthening exercises to enhance muscle flexibility and tendon resilience. For instance, eccentric strengthening of the flexor-pronator muscles has demonstrated improved structure and function of the flexor carpi radialis tendon, as well as pain reduction [15]. Additionally, manual therapy techniques, such as soft-tissue mobilization, can manage pain and improve the range of motion in the elbow and wrist.

Anti-inflammatory medications, including NSAIDs like ibuprofen or naproxen, can be prescribed on a short-term basis to alleviate inflammation and pain. Topical formulations offer more localized pain relief with fewer systemic side effects [16]. Bracing or splinting the affected arm with counterforce straps can also reduce the strain imposed on the tendon during activities. Overall, these conservative treatments have shown substantial efficacy in managing medial epicondylitis.

Advanced Interventions

For individuals who fail to respond to conservative management, advanced interventions may be considered as alternative treatment options. Corticosteroid injections are one of the most widely used advanced therapies, leveraging their potent anti-inflammatory properties. When administered directly to the affected area, corticosteroids can rapidly alleviate pain; however, their long-term efficacy remains a subject of debate due to the potential risks of tendon weakening and symptom recurrence [17].

Platelet-rich plasma represents a newer modality that shows promise in managing chronic tendinopathies. PRP therapy stimulates healing by promoting the release of growth factors following the injection of the patient's concentrated platelets into the affected tendon [18]. Clinical evidence suggests that PRP injections can improve pain and function over several months, particularly in individuals who are resistant to more conventional treatment approaches. Nonetheless, further investigations are warranted to assess clinical outcomes and the variability in PRP preparation protocols.

Extracorporeal shock wave therapy is another non-invasive alternative for the management of chronic medial epicondylitis. ESWT is thought to promote neovascularization and disrupt the pain pathways within the tendon by delivering high-energy acoustic waves, thereby enhancing its repair mechanisms [19]. Despite its demonstrated effectiveness, ESWT often requires multiple treatment sessions, and the compliance of the patient plays a crucial role in the success of this approach.

Surgical Options

Surgical intervention is generally reserved for patients with severe, treatment-resistant medial epicondylitis who have not responded to conservative and advanced interventions for six to twelve months [20]. Common surgical indications include persistent pain, significant functional impairment, and imaging evidence of tendon degeneration or tearing [21].

Surgical techniques typically focus on debridement of the injured tendon tissue and either repair or reattachment of the flexor-pronator origin. Various approaches, including open, arthroscopic, and percutaneous techniques, may be performed depending on the severity of the condition and the surgeon's preferred method. Open surgery is considered the standard for diffuse lesions, while arthroscopy offers the advantage of shorter recovery times and fewer complications [22]. The post-operative outcomes are generally favorable, with most patients experiencing significant pain relief and improved elbow function. However, a crucial aspect of the recovery process is rehabilitation, which emphasizes a graduated approach from passive range-of-motion exercises to active strengthening over several weeks [23]. Although effective, surgical intervention is typically reserved as a last resort due to its invasive nature and associated risks.

PROGNOSIS AND RECOVERY

The prognosis for medial epicondylitis is largely contingent on the severity of the condition and the chosen treatment approach. Recovery timelines vary, with conservative management generally resolving mild to moderate cases within 3 to 6 months [24]. However, conditions requiring more advanced interventions, such as PRP or ESWT, may exhibit symptomatic improvement in 6 to 12 weeks, though full recovery could take up to 6 months [25]. Surgical recovery, on the other hand, tends to be more protracted, often necessitating 6 to 12 months for optimal functional outcomes [26].

Several factors influence the prognosis. Age is a crucial determinant, as younger patients typically exhibit faster healing due to better tissue regeneration, whereas older individuals may experience delayed recovery owing to tendon degeneration. Activity level is another factor, with athletes or those subjected to repetitive occupational strain potentially requiring extended recovery periods or modifications to their technique to prevent recurrence [27]. The severity of the condition, ranging from tendinous tears to chronic degenerative changes, also significantly affects recovery times and outcomes.

Adherence to prescribed treatment and rehabilitation protocols is vital for successful recovery. Additionally, the presence of comorbidities, such as diabetes or obesity, may further hinder the healing process, necessitating alternative management strategies. Early intervention and personalized care plans are essential in ensuring a favorable prognosis for the majority of patients.

PREVENTION STRATEGIES

Preventive strategies for medial epicondylitis encompass ergonomic adjustments, protective measures, and targeted exercises. Ergonomic modifications, particularly for individuals engaged in repetitive activities or professional sports, are crucial. Adjusting workstations to maintain a neutral wrist and elbow position can minimize strain on the flexor-pronator muscles. Similarly, utilizing equipment designed to fit one's biomechanics, such as properly sized tennis rackets or golf clubs, can reduce tension on the medial epicondyle [28].

Protective equipment, including wrist supports or counterforce braces, may also prove beneficial. Counterforce braces dissipate the force across the brace, diverting it away from the medial epicondyle and decreasing the risk of overuse injuries during repetitive tasks. Occupation-specific measures, such as padded gloves or vibration-dampening tool handles, can further safeguard the elbow.

Strengthening and stretching exercises have become integral components in managing tendinopathic conditions. Targeted exercises for the flexor-pronator group can enhance tendon strength and resilience, as eccentric strengthening has been shown to improve the structure and function of tendons at various levels [29]. Maintaining the health of the forearm muscles, including stretching the affected area, is crucial in preventing medial epicondyle traction. Incorporating these practices into regular warm-up and cool-down routines can help mitigate the risk of medial epicondylitis.

FUTURE RESEARCH DIRECTIONS

Emerging therapies like gene therapy and stem cell treatments hold promise for more effective and long-lasting solutions to medial epicondylitis. Gene therapy aims to accelerate tendon healing by enhancing collagen production and reducing inflammation, while stem cell-based approaches may facilitate the regeneration of damaged tissue, thereby improving tendon function [30].

Despite advancements in management, gaps in knowledge remain, particularly regarding the long-term efficacy of newer interventions. While treatments involving PRP or ESWT have shown promise in promoting tendon healing, the precise mechanisms underlying their effectiveness have not been fully elucidated. Further controlled studies will be necessary to assess the relative efficacies of these treatments [31]. Additionally, investigating the genetic factors involved in tendon healing may uncover personalized treatment options for chronic conditions.

Similarly, gaining deeper insights into the role of nutrition and diet in tendon repair is an important area for continued research and exploration, as such insights could lead to further improvements in patient outcomes.

CONCLUSIONS

Medial epicondylitis, commonly referred to as golfer's elbow, typically arises from chronic overuse injuries to the medial epicondyle due to repeated strain from excessive grip actions. Early diagnosis combined with tailored treatment approaches is crucial for optimizing recovery outcomes, which may range from conservative physical therapy to more sophisticated interventions such as PRP therapy. Preventive measures, including ergonomic adjustments, protective equipment, and targeted strengthening exercises, can mitigate the risk of this elbow condition. To effectively address the growing prevalence of medial epicondylitis, ongoing efforts should focus on standardizing treatment protocols and exploring the potential of advanced therapies.

Public health campaigns aimed at disseminating preventive strategies will also be instrumental in reducing incidence rates and enhancing the quality of life for affected individuals. Furthermore, continued research into emerging treatments, including the genetic factors influencing tendon healing, offers exciting prospects for more effective management of this condition. Maintaining a focus on early intervention and personalized care remains essential for achieving optimal patient recovery.

DISCLOSURE

Authors contribution:

Conceptualization: Alicja Grzelak

Methodology: Alicja Grzelak

Software: Alicja Grzelak

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Formal Analysis: Alicja Grzelak

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