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INSERTIONAL ACHILLES TENDONITIS- A REVIEW LITERATURE REGARDING ITS SYMPTOMPS AND TREATMENTS

Anatomy

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ABSTRACT

INTRODUCTION: Achilles tendonitis is one of the most frequently ankle and foot overuse injuries, which is a clinical syndrome characterized by the combination of pain, swelling, and impaired performance. The two main categories of Achilles tendonitis are classified according to anatomical location and broadly include insertional and non insertional tendinopathy The two main categories of Achilles tendon disorder are broadly classified by anatomical location to include non-insertional and insertional conditions.here we have reviewed the insertional achilis tendonitis condition here in this article . insertional Achilles tendinopathy is improved by recognizing coexisting pathologies around the insertion. Conservative rehabilitation protocols as used in non-insertional disorders are thought to prove less successful, but such methods are being modified, with improving results. Treatment such as shockwave therapy is also proving successful. Surgical approaches specific to the diagnosis are constantly evolving, and good results have been achieved. However, there has not been a gold standard of
these treatments because of the controversial clinical results between various studies. In the future, new level I researches will be needed to prove the effect of these treatment options.

MATERIALS & METHODS : Studies are being carried out on various patients by groups of authors in various medical colleges especially in Departments of Anatomy and other departments like Physiotherapy , Occupational therapy and Surgery in various places of world and years. In these studies Authors have done the Histological studies of Tendonitis and for the treatment authors have used conservative (like Diathermies , Electro modalities Ultra sound) and surgical methods to treat the condition...Finally results were noted under separate headings.

DISCUSSIONS: Then studies of different authors and their findings were correlated with available literatures. Various authors findings and conclusions on symptoms and treatments are being considered for study of review Articles

CONCLUSIONS: This study on symptomps , treatments either conservative or surgical (which is effective) for insertional achilies tendonitis has been discussed and reported.

KEYWORDS

Insertional , Noninsertional , Tendonitis , Conservative treatment , Avascular , Tenocytes , Fishhook Osteophyte , Hyperostotic , Osteopathy.

INTRODUCTION

Pain in the Achilles tendon is relatively common in recreational exercisers and individuals active in sports.[1] Achilles tendon pain has also been reported in inactive individuals.[2] It is seen most commonly in the mid portion of the tendon, but also occurs at the junction of bone and tendon. A study on chronic Achilles tendinopathy (342 tendons) showed that physical activity was not correlated with the extent of histopathology, suggesting that physical activity could be more important in provoking the symptoms than being the root cause of pathology.[3]The lack of association between activity, pain and structural abnormality has also been reported in other tendons, and pathological changes are seen on imaging in physically active asymptomatic individuals.[4]

Achilles tendinopathy is one of the conditions that cause posterior heel pain. Clain and Baxter 5 with a view to plan better management introduced the terms insertional and noninsertional Achilles tendinopathy. Insertional tendinopathy had a prevalence of 20% in a surgical and histopathologic survey of 163 patients who had chronic Achilles tendinopathy [6] .In a consecutive series of 432 patients who had chronic Achilles overuse injury in Finland, 107 (24.7%) had insertional Achilles pathology. Of these, 5% (21 patients) had pure insertional tendinopathy, and 20% (86 patients) had calcaneal bursitis alone or in combination with insertional tendinopathy[7]. Insertional tendinopathy often is diagnosed in older, less athletic, overweight individuals[8] and in older athletes[9].

This article is specifically concentrated only on Achilles insertional tendinopathy. The use of the term "tendinopathy" is for a clinical diagnosis, that is based on pain, swelling (diffuse or localized), and impaired performance.

Anatomy

The tendinous portion of the gastrocnemius and soleus muscles merge to form the Achilles tendon, which is the largest and strongest tendon in the human body[10, 11]. It has a round upper part, and is mostly flat in its distal 4 cm. Its fibers spiral through 90 degree and increase the release of stored energy during locomotion [12]. The Achilles tendon inserts into the posterior surface of the calcaneus, which can be divided into three areas[13]:

1. A triangular bursal area with superior apex. The tendon is not inserted in this area.
2. A rough quadrilateral area inferior to the bursal area that provides insertion to the central part of the Achilles tendon.
3. A triangular inferior area with inferior apex. This gives attachment to fascial structures that are continuous with the plantar fascia below and with the sheath of the Achilles tendon above.

4. Histology - The normal tendon is seen as a fibrillar and generally rounded structure that is white and elastic, because most of them are avascular. Two kinds of cells, tenoblasts and tenocytes, account for 90–95% of the cellular element of the tendon. The cells in a normal Achilles tendon are well organized.The remaining 5–10% of cells are chondrocytes at the entheses and a few synovial cells in the synovial tendon sheath.[14,15]The extracellular matrix between the collagen fibers and tenocytes is composed of glycosaminoglycans, glycoproteins, and proteoglycans, whose high hydrophilicity contributes to the elasticity of the tendon .The tendon is mainly composed of collagen fibers, which make up 90% of the tendon protein or 70% to 80% of the dry weight of the tendon. Type I collagen is the commonest; it forms 95% of tendon collagen, and most of the collagen fibers are aligned longitudinally . Other types of collagen, such as type III, type V, and type XII, are also important in the tendon .[14] Type III collagen has an important role in the healing and developing process. As type III collagen tends to produce smaller, less organized fibrils, this has implications for the mechanical strength of the tendon. Type V collagen is intercalated into the core of the type I collagen fibril, where

it forms a template for fibrillogenesis and modulates fibril growth. Collagen type XII has been postulated to integrate adjacent matrix components due to its ability to bind proteoglycans, fibromodulin, and decorin, while interacting with collagen type I fibrils The insertion of the Achilles tendon, the posterior aspect of the calcaneus, the retro calcaneal bursa, and the pretentious bursa constitute the posterior aspect of the heel. The enthesis, the bursa, and the bursal walls form a complex insertional region that protects the Achilles tendon and the posterior aspect of the heel[14,15,16]

Epidemiology

Achilles tendinopathy is one of the most frequently ankle and foot overuse injuries [17] This disorder is more likely to be found in the individuals who participate in the physical

activities such as running and jumping. It may affect 9% of recreational runners and cause up to 5% of professional athletes to end their careers [18] In an epidemiologic investigation of 1394 nonathletes, Achilles tendinopathy was found in 5.6% of the subjects (4% insertional, 3.6% noninsertional, and 1.9% both forms) [19]. In another research, Kvist found that 20% to 25% of Achilles tendinopathy patients had insertional disorder, 66% had noninsertional, and 23% had either retrocalcaneal bursitis or insertional tendinopathy [20].

Etiopathophysiology

Classically, overuse and poor training habits are considered to be the main etiology of Achilles insertional tendinopathy.

Sports injuries can be caused by intrinsic or extrinsic factors, either alone or combination. In acute trauma, extrinsic factors predominate, whereas overuse injuries generally are multi-factorial in origin. In chronic tendon disorders, an interaction between these two types of factors is common[21.]

Lyman et al [22] studied the in vitro strain behavior of the anterior portion of the Achilles tendon as it is affected by the insertional tendinopathy. Relative strain shielding was noticed in this portion of the tendon; this suggests that the role of repetitive tensile loads in the causation of Achilles insertional tendinopathy is complex.

There is a distinct tendency to develop cartilage-like or atrophic changes on the stress-shielded side of the enthesis as a response to the lack of tensile load [23,24]. Over long periods, this process may induce a primary degenerative lesion in that area of the tendon. Thus, tendinopathy is not always activity- related, and can be correlated with age; this suggests that insertional tendinopathy would result from stress shielding, rather than overuse injury.

As the stress shielding may have led to tensile weakening over time, an injury may occur more easily in this region. In this manner, insertional tendinopathy could be considered to be an overuse injury, but is predisposed by pre-existing weakening of the tendon. Accumulation of these injuries could lead to the intratendinous degeneration that is seen in tendinopathy.

Clinical Features

It recently was recommended that the clinical syndrome—characterized by a combination of pain and swelling (diffuse or localized) in and around the Achilles tendon, accompanied by impaired performance—should be called Achilles tendinopathy[11,25].

Patients with insertional tendinopathy present with posterior heel pain that is maximal in the central region and at the insertion of the tendon. At first, the pain is noted after activity alone, but becomes more constant over time. The pain is made worse by jumping or running and especially with sports requiring short bursts of these activities. There is tenderness directly over the back of the heel bone and often there is a bone prominence at this area. Positioning the ankle above a 90-degree position is limited by pain.

Differential Diagnosis

Other causes of posterior heel pain should be considered. Achilles insertional tendinopathy is a localized manifestation of systemic conditions. Systemic corticosteroids and oral fluoroquinolones may induce Achilles insertional tendinopathy. Local conditions, such as Haglund's deformity, retro calcaneal bursitis, so trigonum, posterior impingement, posterior talar process fracture, flexor hallucus longus tendinopathy, peroneal tendinopathy, tibialis posterior tendinopathy, deltoid ligament sprain, and osteochondral lesions of talus should be ruled out.

Investigation

Plain radiographs should include a lateral weight-bearing view of the foot and ankle and an axial view of the heel. Radiographs may reveal ossification at the insertion of the Achilles tendon or a spur (fishhook osteophyte) on the superior portion of the calcaneum. There is often calcification within the central portion of the Achilles insertion.
Ultrasound scan and MRI can both provide useful information about the tendon and bursae[26].

Management

Conservative management produces an 85% to 95% success rate [27] with rest, ice, and modification of training, heel lift, and orthoses. Nonsteroidal anti- inflammatory medications in Achilles tendinopathy may only provide an analgesic effect[28].

In athletes, nonweight-bearing activities can help to maintain fitness until symptoms improve. Immobilization of the ankle in a below-knee weight-bearing cast or a walker boot can be counterproductive, although it was suggested by some investigators[22, 29]. Modification of training, stretching, and strengthening exercises also are effective; however, eccentric calf muscle training helped only 32% of cases of Achilles insertional tendinopathy compared with 89% of cases of noninsertional tendinopathy[30].

Ultrasound is a common prescribed modality of physical therapy. studies found that ultrasound could stimulate collagen synthesis in tendon fibroblasts cells. Therapeutic ultrasound has been shown to reduce the swelling in the acute inflammatory phase of soft-tissue disorders, relieve pain, and may enhance tendon healing. However, due to a lack of new, high quality data on the effect of ultrasound on Achilles tendinopathy, the evidence remains insufficient to support its clinical use.[31]

Low level laser therapy (LLLT) could reduce the expression of proinflammatory markers such as IL-6 and TNF- in gene level.[32]

NSAIDs used in chronic tendinopathy is questionable, because the histological examination in the tendinopathic tissue shows no inflammatory cells The benefits of NSAIDs use are reliving pain in the acute phase and reducing the possibility of leg stiffness.[33]

Many studies and systematic reviews have found that eccentric exercises are beneficial in the early treatment of noninsertional Achilles tendinopathy , but the mechanism of how this exercise works is poorly understood. Theoretically, the reasons of eccentric exercise in reducing pain and improving healing process include more rapid strengthening of the calf muscle, stiffening and lengthening of the myotendinous unit, and decreasing of neovascularization in the tendon [34]

Deep friction massage (DFM) and tendon mobilization may also be helpful in the treatment of Achilles tendinopathy. DFM has been advocated for tendinopathy and paratendinopathy. Friction has been shown to increase protein output of tendon cells. [35]

Surgical Management

Surgical treatment is reserved for posterior heel pain that has not responded to exhaustive non-operative treatment. The principles of surgery include debridement of the calcific or diseased portion of the Achilles insertion, excision of the retro-calcaneal bursa, and resection of the superior prominence.

Anderson et al [36] studied the surgical management of chronic Achilles tendinopathy in 48 patients that included 27 competitive athletes. Twenty-eight (58%) patients underwent surgery for Achilles insertional tendinopathy with tenolysis, excision of the bursa, or excision of the posterosuperior portion of the calcaneum through a 10-cm medial incision. The recovery in these patients was longer (31 weeks) when compared with an Achilles tenolysis group (22 weeks) with a success rate of 93%.

Van Dijk and colleagues[37] reported excellent results in a series of 21 heels (20 patients) treated by endoscopic calcaneoplasty for retrocalcaneal bursitis. There were no complications and a rapid return to normal function. One patient had a fair result whilst the other results were good or excellent. Follow-up was between 2 and 6 years.

McGarvey et al [38] reported the results on 22 heels that had surgery using a midline-posterior skin incision combined with a central tendon splitting approach for debridement, retro calcaneal bursectomy, and removal of the calcaneal bursal projection, as necessary. Twenty of 22 patients were able to return to work or routine activities by 3 months. Only 13 of 22 patients were completely pain-free and were able to return to unlimited activities. Overall, there was an 82% (18 of 22 patients) satisfaction rate with surgery.

Leitze et al [39] recently reported decompression of the retro calcaneal space using a minimally invasive technique. Patients who had retro calcaneal bursitis, mechanical impingement, or Achilles insertional tendinopathy who failed to respond to conservative management underwent endoscopic decompression; major calcific insertional tendinopathy of the Achilles tendon was considered to be a contraindication for endoscopic decompression. The advantages of the endoscopic procedure included quicker surgery and fewer complications, al- though the recovery time was similar to open decompression.

Insertional Achilles tendinopathy

Disorders of the Achilles insertion account for around 20% to 25% of tendo Achillis disorders[40] Predisposing factors are increasing age, inflammatory arthropathies, corticosteroid use, diabetes, hypertension, obesity, gout, hyperostotic conditions, lipidaemias and quinolone antibiotics. Other factors include genetic susceptibility, and extrinsic factors such as increased repetitive loading1, or inadequate footwear can contribute, with uneven wear causing excessive subtalar joint movement or poor shock absorption; uneven or sloping surfaces also play a role.4 Intrinsic hindfoot and lower limb malalignment and altered biomechanics of the subtalar joint in particular can result in micro-tears and tendinopathic changes.[41]

The anterior aspect of the insertion is commonly affected more than the posterior aspect in tendinopathy. As the posterior aspect undergoes a higher strain on dorsiflexion, it has been thought that stress shielding and potential under-use phenomenon have a role to play in the aetiology of insertional tendinopathy[42]

In two systematic reviews, Wiegerinck et al[43] quoted 89% overall satisfaction, and Kearney and Costa[44] simply mentioned that the studies reviewed report good/excellent outcomes in most. Overall, most studies report satisfaction rates from 82% to 97% and significant improvements in function scores with reasonable follow-up (over four years in some).Nunley at al[45] & Maffuli at al[11] There is no evidence to suggest that one particular method, i.e. FHL graft or detachment/reattachment versus debridement,163 is superior from published data, but few directly comparative studies exist.

CONCLUSION

Achilles tendonitis is a clinical syndrome characterized by the combination of pain, swelling, and impaired performance. Achilles insertional tendonitis is an inflammatory, lesion, although the accompanying bursitis may show signs of an inflammatory lesion. Achilles insertional tendonitis is recognized as being distinct from retrocalcaneal bursitis and Haglund's deformity, although they often can coexist The etiology of Achilles tendonitis is multifactorial including intrinsic and extrinsic factors. The histological studies demonstrate an increased number of tenocytes and concentration of glycosaminoglycans in the ground substance, disorganization and fragmentation of the collagen, and neovascularization. The sources of pain in Achilles tendonitis are very complicated. The pain may originate from multiple factors. The occurrence of this lesion is more common in older, less athletic, overweight individuals, and persons with poor warm-up and stretching habits, and a recent increase in training. Various surgical techniques are aimed at debriding the degenerate area of the Achilles tendon; this is accompanied by excision of the retro calcaneal bursa and resection of the superior prominence. However, there is no gold standard of the treatments because of the controversial clinical results between various studies. In the future, more new level I researches are needed to prove the effect of these treatment options.

The literature supports Achilis Tendinitis management using loading protocols with other modalities used synergistically to reduce pain. Exercise programs have the advantage of benefiting the tendon (patellar tendon, the muscle, as well as the cortical control of that muscle (again the patellar tendon)[46] which may lead to improvements in function and a positive clinical outcome. Progressive muscle/tendon loading appears to be beneficial, although it is unclear exactly which program and progressions are superior and may lead to better patient adherence, satisfaction and outcomes to treatment. [47] Research in Achilles tendinopathy is constrained by issues of small numbers in research, blinding of research personnel leading to methodological scores that are variable, and many studies score low to moderate on quality tools. Outcomes measures must be tendon specific, rather than generic foot and ankle scores that are likely less sensitive to changes in tendon symptoms.[48]

In conclusion, the majority of patients with non-insertional tendinopathy will respond to non-surgical management. Rest may be useful in the acute phase, and a structured course of eccentric exercises in more chronic cases. Paratenon injections and shockwave therapy may have a role. In the 20% to 30% of patients who do not respond surgery may be necessary, where minimally invasive techniques may reduce the risks of complications. Satisfactory outcomes following surgery may be expected in about 85% of patients. In diagnosing insertional disorders clear distinctions exist between the differing pathologies described, and as a result differing therapies can be instituted. Endoscopic surgical excision of calcaneal prominences and/ or bursae may be beneficial, but the procedure can be technically challenging. Open surgical debridement and reattachment with or without augmentation should be considered after all other treatment modalities have failed, with > 80% of patients likely to gain significant benefit. In summary, Achilis Tendinitis rehabilitation should be based on progressive loading of the muscle-tendon unit and the lower extremity (kinetic chain). However, the optimal protocol of exercise loading needs further investigation. Electrotherapeutic modalities, manual therapy techniques, bracing/taping and acupuncture should not be substitute but instead adjuncts to exercise programs. Further research is needed to find out which treatment strategy, combined with progressive exercise loading will provide the best results in the rehabilitation of Achilles tendinopathy.

Competing Interests

The authors declare that there are no competing interests regarding the publication of this paper.

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