

## “PLANTAR FASCIITIS : A REVIEW OF CURRENT CONCEPTS.”

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### ABSTRACT:

Plantar fasciitis is reported to be one of the most common causes of inferior heel pain in both athletic and non athletic population. It is estimated that 11% to 15% of all foot complaints requiring medical attention can be attributed to this condition. The disorder classically presents with pain that is particularly severe with the first few steps taken in the morning. This article present on overview of the current knowledge on plantar fasciitis and focuses on Etiology, Diagnosis and treatment strategies, conservative treatment are discussed and recent surgical techniques are outlined. This information should assist health care practitioners who treat patients with this disorder.

**Key words:** Plantar fasciitis, diagnosis, conservative treatments

### Introduction:

Plantar fasciitis is a common cause of inferior heel pain managed by many physical therapists in variety of clinical settings and wildy treated conservatively. The purpose of this paper is to review the relevant anatomy, patho mechanics, diagnosis, conservative and surgical care for the patients with plantar fasciitis

Plantar fasciitis is a degenerative syndrome of plantar fascia resulting from repeated trauma at its origin on the calcaneus<sup>1</sup>.the other names of the PF include painful heel syndrome, heel spur syndrome<sup>2</sup>runners heel, subcalcaneal pain, calcaneodyniaand calcaneal periostitis<sup>3</sup>.A heel spur may be present but also been reported up to 27% of patients without symptoms<sup>4</sup>

### Anatomy

Plantar fascia is a thickened fibrous sheet consist of contractile irregularly ordered collagen fibers with minimal elastic properties, originates from the medial tubercle on the under surface of the calcaneal bone and fans out, attaching to the

plantar plates of the meta taso phalangeal joint<sup>5,6</sup>.It is triangular in shape. The apex which is proximal, attached to the medial tubercle of the calcaneum proximal to the attachment of flexor digitorum brevis. The base which is distal divided into processes near the head of the metatarsal bones. Each process splits opposite to the meta tarsophalangeal joint into a superficial and deep slip. The superficial slip is attached to the skin. The deep slip divides into two parts which embrace the flexor tendons and blends with the fibrous flexor sheaths and with the deep transverse meta tarsal ligaments. The plantar fascia provides stability to the arch of the foot and aid in re supination of the foot during propulsion<sup>7,8</sup>

### Biomechanics

From the beginning to the end of the stance phase of the gait, tension of the plantar aponeurosis increases with in vivo experiments using radiographic fluoroscopy to show that plantar fascia deforms on stretches nine percentages to twelve percentages during this time<sup>9</sup>. The plantar fascia is the main stabilizer of

the medial longitudinal arch of the foot against the ground reaction forces and is instrumental in re configuring the foot into a rigid platform before toe –off.<sup>10</sup>. The plantar fascia plays a major role in this regard, primarily as a result of its anatomical position, the great mechanical strength and biomechanical properties. Rupture, partial or complete surgical sectioning of the plantar fascia may lead to progressive pes planus with associated complications.

### **Etiology and risk factors**

Plantar fasciitis is common in sports that involve running and also frequent in dancers, tennis players and basket ball players<sup>11</sup>. It effects in individuals regardless of sex, age and ethnicity. It seen in physically active individuals such as runners and military personals but also prevalent in general population particularly in women ages 40-60<sup>12</sup>. In athletes Plantar fasciitis appears to be associated with overuse, training errors, training on unyielding surfaces and improper or excessively worn foot wear. Sudden increase in weight bearing activity ,particularly those involved in running can cause micro trauma to the plantar fascia at a rate that exceed the body's ability to recover. The anatomical risk factors consist of leg length discrepancy, excessive lateral tibial torsion, excessive femoral ante version, pes planus, muscle weakness, muscle imbalance and plantar fascia shortening. The risk factors which are related to training errors include overuse or overtraining, sudden increase in activity level, improper shoe fir and shoe wear and training on unyeild surfaces. The systemic factors are overweight and systemic diseases like gout, inflammatory arthritis, sarcoidosis, hyper lipoprotienemia and reiter syndrome

### **Signs and symptoms**

The classical presentation of plantar fasciitis is pain on the sole of the foot at the inferior region of the heel<sup>13</sup>.Patients usually describe pain in the heel on taking the first several steps in the morning, with the symptoms lessening as walking continues<sup>14</sup>.the pain can be so severe the patient limps or hobbles around with the effected heel off the ground. Initial reports of heel pain may be diffuse or migratory ,however with time

it usually focuses on the area of the medial calcaneal tuberosity .Generally the pain is more significant when weight bearing activities are involves , and often can correlated to increased amount or intensity of physical activity prior to the onset of symptoms<sup>15</sup>.

### **Investigations**

Imaging rarely place a role in diagnosis of plantar fasciitis. It can be used to rule out other diagnosis in complicated cases. Plain radiographs may reveal arthritis, neoplasm or other lesions in the bone or soft tissue secondary to trauma, infection on prior surgery. Although the detection of heel spur is of no value in either confirming the diagnosis of plantar fasciitis or ruling out.

Bone scan have 60% to 98% sensitivity and 86% specificity when used to diagnose plantar fasciitis, they are more helpful to detect the pressure of calcaneal stress fractures. Ultra sonography may be diagnostically useful , magnetic resonance imaging may demonstrate thickening of the plantar fascia , the fascia of the patients with plantar fasciitis has been measured at 7.40mm  $\pm$ 1.17 while asymptomatic individuals it measures 3.22 mm  $\pm$ .44 .

### **Diagnosis**

Diagnosis of plantar fasciitis usually made on the basis of history and physical examination. Pain on the first step in the morning is the typical feature of plantar fasciitis and may be helpful in distinguishing it from other forms of heel pain. Associated parasthesisa is not a common characteristic of plantar fasciitis. Patients typically report an insidious onset of pain under the plantar surface of the heel upon weight bearing after a period of non weight bearing. This pain in the heel region is most noticeable in the morning with first steps after walking on a period of inactivity .in some cases pain may be so severe that it result in an antalgic gait. the patient will usually report that the heel pain will lessen with increasing level of inactivity, but tend to worsen towards the end of the day.PF is usually unilateral but up to 30% of cases have a bilateral presentation . Bilateral presentation in young patients may indicate

presence of reiters syndrome. Patient should be questioned about other features of seronegative arthritis<sup>15</sup>.

### **Differential diagnosis**<sup>16,17</sup>

The following differential diagnosis have been suggested for plantar fasciitis

- Calcaneal stress
- Bone bruise
- Fat pad atrophy
- Tarsal tunnel syndrome
- Soft tissue primary or metastatic bone- tumors
- Pagets disease of the bone
- Severs disease
- Referred pain as a result of SI joint-radiculopathy

### **Management**

#### **Non operative management**

Conservative treatment for plantar fasciitis should focus on decreasing pain, promote healing, restoring range of motion and strength, correcting training errors, and limiting biomechanical deviations caused by structural abnormalities

**Splinting and walking casts:** the purpose of night splinting is to keep the patients ankle in neutral position overnight passively stretching the calf and plantar fascia while sleeping. A walking cast provides rest for heel at heel strike, provide arch support and prevent tightening of the Achilles tendon. The patient typically wears the cast for a period of 3-4 weeks<sup>13,17</sup>

**Orthoses:** Foot orthoses is to decrease the foot pronation that is thought to cause increased stress on medial band o plantar fascia. Foot orthosis can reduce the strain in plantar fascia during static loading, reduce collapse of medial longitudinal arch and reduce elongation of foot associated with pronation

**Foot wear:** Patient should be advice to avoid barefoot walking especially on hard surfaces. Shoes should have arch support and cushioned heels<sup>22</sup>. A laced sports shoe is better than an opened sandal.

**Anti inflammatory medication:** Anti inflammatory agents whether administrated orally, topically or through an injection have been a corner stone for the treatment of plantar fasciitis. There is a limited evidence to support the use of steroid injection to provide short-term pain relief<sup>18</sup>. A major concern with the steroid injection has been the risk of subsequent plantar fascia rupture and plantar fat pad regeneration<sup>19</sup>. But at the same time there are some recent studies which reported minimal or no risk for fascia rupture following steroid injection<sup>20</sup>.

**Stretching and strengthening :**Stretching and strengthening program are valuable because they can help to correct the functional risk factors such as tightness of Achilles tendon and the weakness of the intrinsic muscles of the foot .commonly used curb or stair stretches with focus on stretching the gastronemus and soleus muscles<sup>20</sup>. Stretching the Achilles tendon is beneficial as adjunctive therapy for plantar fasciitis. The patient is instructed to face a wall with one foot approximately 6 in from the wall and the other foot about 2 ft from the wall, and then lean toward the wall while keeping both heels on the floor. This exercise stretches the heel cord of the limb that is farther from the wall. It should be performed with both legs forward for two minutes each, three to five times daily. This stretching program should be continued for six to eight weeks, after which time the patient is reevaluated.

**Taping:** Studies indicate that taping does causes improvement in the function of plantar fascia in plantar fasciitis can calcaneal and low dye taping can be used to provide short term pain relief. Low dye taping in foot has been shown to be effective in limiting pronation<sup>12</sup>.Osborn and Allison (2006) reported that phonophoresis combined with low dye taping provide relief of pain and stiffness when assessed 4 weeks post treatment<sup>21</sup>

**Extra corporial shockwave therapy:** Extra corporeal shockwave therapy (ESWT) have been applied since 1990 , principally in Europe for treatment of numerous musculoskeletal disorders .Proponents of Extra corporeal shockwave therapy also referred as orthotripsy

claim it offers an effective means of treatment for chronic plantar fasciitis that has been non surgical treatment . It uses pulses of high pressure sound waves to bombard to damaged tissue to relieve pain associated with plantar fasciitis. It is a non invasive, has relatively short recovery times without the necessity of reduced weight bearing or immobilization. Extra corporeal shockwave therapy has been proposed as an alternative approach on the grounds that it may stimulate healing of the soft tissue and inhibit pain receptors<sup>17</sup>

### Operative treatment

Surgical intervention may be indicated in the small percentage of patients who have failed to benefit from conservative methods and who still have significant plantar heel pain after a lengthy period of treatment. Reports describe various surgical procedures including plantar fascia release with or without calcaneal spur excision, Steindler stripping, neurolysis and endoscopic procedures<sup>23</sup>. It is well documented that plantar fasciotomy alone, without inferior calcaneal exostectomy, is an effective surgical approach to this condition. Endoscopic plantar fasciotomy was developed as a minimally invasive way of accomplishing this. Endoscopic plantar fasciotomy is less traumatic than traditional open heel-spur surgery and allows earlier weight-bearing after surgery.

### Conclusion

Plantar Fasciitis regarded as a self limiting condition. It is usually caused by a biomechanical imbalance resulting in tension along the plantar fascia. The diagnosis is typically based on the history and the finding of localized tenderness. Many treatment options exist, including rest, stretching, change of footwear, low dye taping, orthotics, night splints, anti-inflammatory agents and surgery.

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