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The overlooked menace of plantar fasciitis in the Nigerian setting, with a contextualized treatment protocol

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Abstract

Context: Plantar fasciitis is the commonest painful condition of the heel. It has a worldwide prevalence of 10%, a major economic impact and a key negative impact on quality of life. While publications on this condition from the developed world are fairly common, the publications from Nigeria on this condition are scanty and none by a Physiotherapist was found. These findings suggest gross underdiagnosis and thus many people suffering from this condition in this environment may be in misery despite available remedies.
Objective: The aim of the study is to draw attention to Plantar fasciitis in this environment, highlight details of Physiotherapy care and provide a contextualized treatment protocol.
Study design, setting and subjects: This study applied a retrospective observational study design. A case report was included for depth of discourse. The participants were patients with this condition who presented to the outpatient clinic of the index Physiotherapy department.
Results: There were 10 patients with Plantar fasciitis over the 5-year period of the study. Seven of the patients were in the 40 – 60 year age group; nine out of the 10 patients were female; one patient was self-referred and the median duration of symptoms before presentation was seven months. The main features upon which diagnosis was based were inferior heel pain, first step pain and heel tenderness. All but one patient stopped attending clinic prematurely – probably due to frustration with delay in symptom resolution and fund constraints. A trace of the patients provided data on eight (80%) of them, which showed that six (60%) of the patients had full resolution of the posterior heel pain.
Conclusion: Plantar fasciitis is likely to be more common in this environment than published work in this setting indicates. Stretching of the Triceps surae / plantar fascia is the mainstay of treatment. A treatment protocol scaled to our resource constrained setting provides for the major components of diagnosis and treatment in the literature and from our experience. It is hoped that awareness of this condition will increase, and the suffering of patients be mitigated.

Key words: Plantar fasciitis, Nigeria, treatment, Africa, quality of life

Introduction

Plantar fasciitis is the commonest painful condition of the heel.[1] Its worldwide prevalence for the general population is 10% and its economic impact in the United States is about 2 million dollars annually.[2] It is considered that the prevalence of plantar fasciitis is higher in females aged 40-60 years.[3] However, there are mixed reports on gender preponderance of plantar fasciitis in the literature.[4] The negative impact of Plantar fasciitis on health-related quality of life is significant, with females being more severely affected, especially in the domains of general foot health, foot pain, footwear and foot function.[5] Despite the fairly common presentation to Physiotherapy outpatient clinics in the Western

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world, it is a rarity in published work from Nigeria on PubMed and African Journals Online – a review of the literature on PubMed on 8th December 2019, reveals three articles on Plantar fasciitis in the African context, including one from Nigeria. One of these articles suggests a strong association between plantar fasciitis and isolated gastrocnemius muscle tightness, which forms the basis for the major approach to care for the patients in this study.[6] The Nigerian article under reference indicates a 3.5% incidence of plantar fasciitis based on two patients seen over a five year period.[7] A further search on African Journals Online revealed two articles related to Plantar fasciitis, none of which was from Nigeria. A search on Google Scholar on the 6th of January 2020, revealed one clinical article on Plantar fasciitis from Nigeria, authored by a Physician.[4] Our study may be the first clinical work on Plantar fasciitis by a Physiotherapist in Nigeria and will be a major contributor to the African literature on Plantar fasciitis.

The aetiology of Plantar fasciitis has been considered to be due to an inflammation of the Plantar fascia, hence the term fascia 'itis' – however the direct relationship of this condition to inflammation is not well defined.[8] Other aetiological factors noted to be relevant to Plantar fasciitis are: findings at histology which indicate the condition is degenerative (a fasciosis), a high body-mass-index in non-athletes and a calcaneal spur.[9,10] In addition, tightness of the Hamstring and Triceps surae muscles has been noted in patients with Plantar fasciitis.[11]

The condition is also termed 'first-step pain', due to the finding that the first step of the day is usually the most painful.[8] It is thought that during the night, the foot becomes plantar flexed and thus the Plantar fascia contracts but the first step of the day moves the foot into dorsiflexion, thus stretching the Plantar fascia and resulting in pain.[12] This concept forms the basis for night splintage in the treatment of this condition.

This study is a retrospective review of Plantar fasciitis cases seen at the Physiotherapy outpatient department of a tertiary hospital in the South of Nigeria, with a report of one illustrative case to highlight details of presentation and care. The aim of this work is to draw attention to this condition which may be underdiagnosed in the Nigerian context and despite its major impact on quality of life, may be undertreated. Hence this discourse includes a suggested Physiotherapy treatment protocol scaled to our context.

Materials and method

A desktop review of the outpatient records of the Physiotherapy department in a teaching Hospital in Southern Nigeria, from January 2014 to December 2018 was carried out. All patient records of the cases identified in the outpatient register were obtained. Data was abstracted from the register and patient records using a structured questionnaire, which was developed based on similar studies in corpus literature. The data was filled onto an Excel spreadsheet. One illustrative case was delved to provide context and demonstrate some principles and practice of the treatment of Plantar fasciitis.

Results

There were 10 cases of Plantar fasciitis in the outpatient records over the five-year period of this study (Table 1). The age range of the patients was 29 years to 53 years, with a mean of 43.4 years. There were nine (90%) females. Ninety percent of our patients were referred (sixty percent from Orthopaedic surgeons, twenty percent from Physiotherapists and 10% from a General Practitioner). The median duration of heel pain before presentation was seven months. First step pain was noted in 90% of the patients – this symptom was not noted in one (10%) of them. Heel tenderness was elicited in 80% of the patients. The Windlass test was not carried out in 80% of the patients but was positive in the two (20%) patients for whom this test was performed. The mean number of treatment sessions in this series of patients was 5.6. In 70% of our patients, radiography was not done, while in 20% an X-ray was carried out, but no calcaneal spur was seen. One (10%) of our patients had full resolution of symptoms during the course of treatment. An additional six (60%) patients had resolution of symptoms when traced. Two (20%) of these patients who were traced noted that their symptoms recurred when they used shoes with high heels. Two other patients who were traced had persistent symptoms which they had endured for over two years – one of them stopped attending the Physiotherapy outpatient clinic due to fund constraints.

Table 1: Diagnosis and treatment of patients with Plantar fasciitis from January 2014 to December 2018

No	Age	Sex	Heel pain	Duration of heel pain (months)	First step pain	Limited ankle ROM	Heel tenderness	No of treatment sessions	Duration of treatment (months)	Education, Stretching, Manipulation, Home program	Electro-therapy	Thermo-therapy	Outcome	Contacted by phone/in-person
1	39	F	Right	Not available	Yes	No	Yes	7	3	Yes	Yes	No	Lost from follow up	Heel pain resolved
2	50	F	Bilateral	3	Yes	No	Yes	12	1.5	Yes	Yes	Yes	Lost from follow up	Heel pain resolved
3	45	F	Left	3	Yes	No	Yes	10	2.5	Yes	Yes	Yes	Heel pain resolved	Heel pain resolved
4	53	F	Bilateral	10	Yes	Not noted	Yes	13	4.5	Yes	Yes	Yes	Lost from follow up	Heel pain resolved
5	49	F	Right	7	Not noted	Not noted	Yes	3	0.5	Yes	No	No	Lost from follow up	Not available
6	44	F	Right	2	Yes	Not noted	Yes	6	1	Yes	Yes	Yes	Lost from follow up	Heel pain resolved
7	29	F	Bilateral	12	Yes	No	No	1	Not applicable	Yes	Yes	Yes	Lost from follow up	Not available
8	41	M	Bilateral	10	Yes	Yes	Yes	1	Not applicable	Yes	Yes	No	Lost from follow up	Pain persists
9	38	F	Right	36	Yes	Not noted	Yes	2	1.5	Yes	Yes	Yes	Lost from follow up	Pain persists
10	46	F	Right	4	Yes	No	Not certain	1	Not applicable	No	No	No	Lost from follow up	Heel pain resolved

ROM – range of motion

Case report

A 50-year-old female who presented on referral from an Orthopaedic surgeon on account of bilateral Plantar fasciitis.

She had been experiencing first-step pain on both heels for three months, which was persisting despite taking NSAIDs. Her past medical history was not significant.

She walked into the Physiotherapy unit unaided, with a normal gait.

She had tenderness at both heels but normal range of motion (ROM) in all joints of the lower limbs and normal power in both lower limbs. Each treatment session costs N1,500.00 for a patient with bilateral plantar fasciitis. Thus, the payment due was N15,000.00 (41USD) for 10 sessions, as patients are usually required to pay for 10 sessions at the beginning of care.

The aims of treatment were to reduce pain in both heels, to stretch the plantar fascia of both feet, to improve function, to educate the patient on the condition, posture and type of footwear and to regain confidence. This was achieved by;

a) Passive and active stretching of the Plantar fascia of both feet.
b) Active stretching of the hamstrings and triceps surae muscles.
c) Active mobilization exercises of both ankles and knees.
d) Anterior and posterior gliding of both ankle joints.
e) Medial and lateral gliding of both subtalar joints.
f) Ultrasound therapy to both heels for 10 minutes each (pulsed mode, 3MHz, 2.0W/cm2).
g) Massage (finger kneading and friction massage) to the painful areas with Diclofenac creams.
h) Reassurance to the patient.

The VAS scores before commencement of treatment were 8/10 in both heels. She reported a significant relief of the pain in both heels by the second treatment session, which occurred within 4 days of the first session. By the third session, a VAS pain score revealed a score of 3/10 at the left heel and 4/10 at the right heel.

At the fourth visit, there was a recurrence of heel pain noted to have occurred after a three-day period when the home stretching exercise was not carried out. The VAS pain score at this visit was 8/10 at both

heels. This score had reduced to 6/10 at the fifth visit. At the 11th visit, her score on the Foot and Ankle Ability measure was noted to be 68% as against an earlier score of 59%. At the twelfth visit, paraffin wax therapy was applied to the more painful right foot with immediate relief of pain. Subsequently, she was lost to follow-up. This patient was traced and reported that the pain on the heels had resolved but tended to recur if she used high heel shoes.

Discussion

We observed that most patients were in the 40 – 60 year age group; nine of the patients were female; one patient was self-referred and the median duration of symptoms before presentation was seven months. The main features upon which diagnosis was based were inferior heel pain, first step pain and heel tenderness. The standard treatment for our patients was education, stretching, manipulation (or manual therapy), electrotherapy and thermotherapy. The major limitation of this study was the small number of patients in the review. This was also noted from other papers in the Nigerian setting.[4] These small numbers are consistent with the aim of this work – to draw attention to this condition and address the issue of underdiagnosis and undertreatment.

Our findings with respect to age range, female gender predominance and indices for diagnosis are consistent with literature.[3,9] The median duration to presentation which we noted indicates patients tend to endure for a while before seeking formal treatment. It has been noted that the average duration of symptoms before the patients present for formal care is greater than one year.[1,13] This is probably due to the natural history of the condition, which starts gradually and does not usually disable sufferers, hence the patients adapt and present when the pain becomes unbearable or they come across information that the condition can be treated. It is likely that patients with bilateral affectation will tend to present for care earlier than those with unilateral heel pain – this remains to be studied. While we noted 40% of our patients to have bilateral Plantar fasciitis, other authors have noted this in 30% of patients.[14] Most of our patients did not have a limited range of ankle motion - in other series, 80% of patients had a limited ankle range of motion.[14] This study is intended to draw attention to the standard protocols for managing this condition and it is hoped will encourage a thorough assessment of these patients.

Most patients (90%) were referred, which is consistent with literature.[9] In our setting the usual referrals are from Orthopaedic surgeons, while in the developed world, most referrals are from General Practitioners – only one such referral occurred in our setting.[9]

The diagnosis of Plantar fasciitis is clinical. However, many clinicians request for an x-ray which typically has no positive finding. Only three radiographs were requested for in our series and two of them had no calcaneal spur. It has been noted that a calcaneal spur is present in 50% of patients with plantar fasciitis – it is considered by some authors to be an incidental finding.[12]

The diagnosis of plantar fasciitis in our experience hinged on a history of heel pain on the sole of the foot, first step pain and heel tenderness. Other criteria for diagnosis like the Windlass test, a negative Tarsal tunnel test and a limited ankle ROM were not usually applied, due to varied skill set of the staff and lack of a standard care protocol. Only 2 (20%) of our patients had a Windlass test carried out on them and it was positive. Other clinical findings in this condition are captured by the heel pain/plantar fasciitis guidelines for diagnosis by the Orthopaedic section of the American Physical Therapy Association (APTA), which provides for the following parameters:

"Plantar medial heel pain that is noticed during the initial steps post-inactivity and following prolonged weight bearing; heel pain triggered by a recent increase in weight -bearing activity; pain with palpation of the proximal insertion of the plantar fascia; positive Windlass test; negative Tarsal tunnel tests; limited active and passive Talocrural joint range of motion; abnormal foot posture index score; high body mass index in non-athletic individuals".[1]

The Windlass effect was described by Hicks as a tensioning of the plantar fascia during the latter weight bearing stage of the foot in the stance phase and as the metatarsophalangeal joints dorsiflex before toe off, the plantar fascia applies a traction force at its point of insertion on the calcaneum - "the drum of the windlass being the head of the metatarsal, the handle which does the winding being the proximal phalanx and the cable which is wound

on to the drum being the plantar pad and the plantar aponeurosis".[15]

The case presented illustrates the typical age range and more usual female gender. In this case, both feet were affected which tends to occur less commonly. She had a rather unusual early response to our multi-pronged care, and it was noted that there was recurrence of the symptoms when the home stretching exercise was not carried out. This is consistent with the emphasis in literature on stretching of the Triceps surae and Plantar fascia.[16]

The Plantar fascia is a thick fibrous aponeurosis that originates at the calcaneal tubercle and inserts at the heads of the metatarsals.[17] It plays a role in supporting the structure, proprioception and motor coordination of the longitudinal arch of the foot.[18] It is related to the paratenon of the Achilles tendon and thus tightness of the Triceps surae can account for Plantar fasciitis.[18] Accordingly, it has been found that stretching of the Hamstring and Triceps surae muscles is a significant component of protocols for treating Plantar fasciitis.[11,16] A review of literature showed that stretching of the Plantar fascia and calf had the most reliable long term results.[13,17]

Stretching of the Plantar fascia and Triceps surae form the major scaffold of the treatment protocol utilised in the treatment of Plantar fasciitis at this centre. The patients are educated on the methods of stretching the Gastrocnemius and the Soleus muscles, which they are prescribed to carry out twice a day for a repetition of 10 in each session, and a count of 10 per stretch, as part of the home program (Figures 1, 2 and 3). In the clinic, manipulation of the subtalar, midtarsal and longitudinal arch is done in addition to passive and active stretching of the plantar fascia and the calf muscles. Figure 1 shows a simple method of home stretching of the Plantar fascia, which requires a towel at the patient's bedside over the night and can be applied 3 times on waking from sleep, 30 seconds each time, with 30 seconds of rest in between sessions, in order to reduce first-step pain.[17] Figure 2 demonstrates Gastrocnemius stretch and figure 3 shows Soleus stretch.

Some risk factors for Plantar fasciitis include – obesity, reduced ankle dorsiflexion, tight Achilles tendon, pes planus, pes cavus, seronegative spondyloarthropathies and Gout.[12]

Figure 1: A towel loop used to stretch the left Plantar fascia and Gastrocnemius muscle

Figure 2: Stretch of the right Gastrocnemius muscle using the patients weight with marked dorsiflexion of the ankle and full extension of the ipsilateral knee.

Figure 3: Stretch of the right Soleus muscle using the patient's body weight with marked dorsiflexion of the ankle and about 30 degrees of ipsilateral knee flexion.

Differential diagnoses of Plantar fasciitis includes - Ankylosing spondylitis, Reiter's syndrome, Osteoarthritis, Rheumatoid arthritis (more likely in bilateral cases in women), abscess in the soft tissues, entrapment of the first branch of the lateral plantar nerve or the medial calcaneal nerve, S1radiculopathy and occult fracture.[12]

The treatment of this condition is usually prolonged, clinical recovery taking over a year.[19] The patient must be educated appropriately in order to minimise the patient's frustration with care. All but one of our patients were lost to follow up before recovery had been achieved. This may be due to frustration with the prolongation of the symptoms and difficulties with paying for care over a long period of time due to the usual payment from the pocket for health in a resource constrained environment.[20] One of those reached by a phone call indicated that financial constraints were the reason she stopped attending the Physiotherapy outpatient.

There are many means of treatment for Plantar fasciitis, which include – lifestyle modification, oral non-steroidal anti-inflammatory drugs, steroid injections, stretching the plantar fascia and the calf muscles, orthotic devices, botulinum toxin, extracorporeal shock wave therapy, protein rich plasma injections and surgery.[12] The patient should be reassessed at each visit with the use of an outcome measure (activity limitation and /or participation restriction measures) which helps to monitor changes in the level of function over time.[1] Other useful assessments include VAS for first-step pain and pain on palpation of the inferior heel, and active/passive range of ankle dorsiflexion. The various differential diagnoses earlier listed should be considered if the symptoms take too long to resolve as expected – usually 12 – 18 months for 90 – 95% of patients.[1,19] In this case the patient should be referred back to the Orthopaedic surgeon as more invasive procedures, such as those earlier listed, may be required.

In a study by Oguntona and Ogunsemi, 70% of their patients had complete resolution of Plantar fasciitis, with rolling their feet on an empty soda drink can and the use of NSAIDS when necessary.[4] This soda can method, which is considered a means of rolling the plantar fascia, can be used for short term relief, especially to obviate first-step pain but does not factor as adequate treatment if used in isolation.[17] It can also be used as a means of administering ice therapy, if a frozen can is used.[19] The major article cited by Oguntona and Ogunsemi includes Physiotherapy under conservative (i.e.non-surgical) management and suggests stretching as having a major role to play in leading to resolution of the heel pain, which is consistent with our findings.[13] In addition, Donley et al showed that when given along with a conservative regime which includes stretching, NSAIDS do not provide a significant reduction in pain and disability scores when compared with placebo.[21] In the case presented, there was no relief of pain despite taking NSAIDS. The standard of care for Plantar fasciitis is Physiotherapy, with analgesics as background care and occasional adjunctive intra-lesional steroid injections and other modalities as needed.[1]

A standard care protocol for treating Plantar fasciitis in this environment is as follows:

1) Diagnosis based on first-step pain, inferior heel pain after prolonged inactivity, limited active/passive ankle dorsiflexion range of motion and tenderness on palpating the proximal insertion of the Plantar fascia. Adjunctive tests could include a positive Windlass test and a negative Tarsal tunnel test.
2) Application of an assessment measure such as the foot and ankle ability measure and the VAS scale for pain – first-step pain and inferior heel tenderness.
3) Educate the patient on the prolonged course of care, with information on home program measures that can be continued even if the patient does not have the funds for formal Physiotherapy; poor foot use such as using a high heel (in females); early morning measures to limit first-step pain (figure 1).
4) Treatment, to emphasise manual therapy
   a. Ankle joint and soft tissue mobilisation.
   b. Stretching of the Triceps surae – figures 2 and 3.
5) Use of thermo- and electrical therapy for short-term pain relief. Ice therapy has been found quite useful in this regard.[19] As usual, the patient should not have sensory deficits.
6) Foot orthoses and night splints can also provide short term relief.
7) Regular reassessment, and referral for Specialist care if the condition fails to resolve as expected.

The literature on clinical aspects of Plantar fasciitis in this environment is scanty, going by the published work from Nigeria in PubMed, African Journals Online and Google Scholar. The paper by Olaosebikan et al, showcased two cases of Plantar fasciitis over a four year period.[7] It is noted that their

study was on the paediatric age group in whom plantar fasciitis is uncommon. Oguntona and Ogunsemi noted 20 cases of Plantar fasciitis over three and a half years, in a Rheumatology clinic.[4] Studies from the United Kingdom place the figures seen at the average Physiotherapy clinic at >16 cases per year.[9] These considerations may suggest that Plantar fasciitis is grossly underdiagnosed in this environment. It is hoped that this study will draw attention to this overlooked menace to comfortable living and provide a contextualised protocol of care for patients with Plantar fasciitis. The findings from this study and the suggested treatment protocol are transferrable to other societies with resource constraints.

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