

Tightness of Calf and Hamstring Musculature among Plantar Fasciitis

LARAIB JAVAID, SHOAB WAQAS, HAFIZ MUHAMMAD ASIM

ABSTRACT

Aim:To determine whether tightness of the posterior muscles of the lower extremity was associated with planter fasciitis.

Methodology:A sample size of 100 patients was collected by convenience sampling technique from different tertiary care hospitals of Lahore under descriptive cross sectional study design. Both genders having planter fasciitis aged between 31 to 50 years was included in the study and planter fasciitis due to Systemic disease, foot pathology or Trauma or with osteophytes were excluded. A written informed consent was taken from all patients prior getting any information. A self-structured validated questionnaire was distributed among patients with four point Likert scale having validity 0.80%.All the information was kept confidential.

Results:While reaching from standing position with straight knees to the toes 68% subjects were presenting with bad scores, 29% were fair, 2% were good and 1% were with excellent percentage. While lying straight on back and lifting leg with straight knees 76% were with bad scores, 17% with fair, 5% with good and 2% with excellent scores. In case of reaching to toes from half sitting position with straight knees 70% were with bad scores, 25% with fair, 5% with good and 0% with excellent scores which was a strong indicator of hamstring and calf muscle tightness.

Conclusion:The current study concluded that there was noteworthy tightness in hamstring and calf muscles in subjects of planter fasciitis.

Keywords:Plantar fasciitis (PF), hamstring muscles and straight leg raising (SLR)

INTRODUCTION

Plantar fasciitis (PF) is also known as plantar heel pain, planter fasciopathy or jogger's heel. It is one of the most common musculoskeletal disorders of foot characterized by pain in the anterior-internal region of the calcaneus. The word "fasciitis" means inflammation of the planter fascia. It is a disorder of the insertion site. The presence of the fascia derived from repetitive trauma, causing progressive degeneration of collagen tendinitis, degeneration and necrosis of the fascia affect physical function and mobility¹.

About 10% individual have plantar fasciitis at some point in their life². Multiple factors such as Obesity, Occupational activity, Anatomical changes, impaired biomechanics, limited Talocrural dorsiflexion ROM, reduced heel pad thickness, prolonged standing and walking, standing on hard surfaces, inappropriate shoe fit, players of basketball, dancing, tennis, step aerobics, mechanical flat feet and high arch and Pregnancy are some factors that increase the risk of plantar fasciitis. Plantar fasciitis is generally regarded as a self-limited problem, it can resolve in months to years, presenting a challenge for clinicians³.

Musculoskeletal disorders related to work are also known as overuse syndrome, cumulative trauma disorder, repetitive strain injuries, muscles, tendons, bones, ligaments, nerves, cartilage, affect due to acute and chronic injuries. These disorders have impact on their working years. MSD's of Ankle and foot are more common in female especially pain that increases with age⁴.

On the basis of clinical assessment alone the diagnosis of plantar fasciitis can be made. Patient complains gradual onset of inferior heel pain that is usually worse with their first steps in the morning or after inactivity. Patients may express limping with the heel off the ground. The pain decreases gradually with increased activity but increases at the end of the day with prolonged duration of weight-bearing activity. Paresthesia associated with plantar fasciitis is uncommon. There is localized area of tenderness over the anteromedial side of the inferior heel of ankle and limited dorsiflexion due to tightness of the Achilles tendon^{4,5}.

Before the treatment of plantar fasciitis other less common causes of heel pain should be considered. These include sciatica (due to the pressure on the L5-S1 nerve root), tarsal tunnel syndrome (caused by compression of the posterior tibial nerve) and entrapment of 1st branch of lateral planter nerve, rupture of the planter fascia, calcaneal

Depat of Physiotherapy, Lahore Medical & Dental College, Lahore
Correspondence to LaraibJavaid,
Email: laraibjavaid@hotmail.com

stress fracture and calcaneal Apophysitis (Sever's disease). Rarely, systemic disorders can cause heel pain⁶.

The main aim of this study is to investigate the proposed risk factors. The nursing profession was selected for this study because of its work force and walking and prolongs standing requirements. Rationale of the study is to sort out the tightness of musculature on terms of hamstrings and calf. So that the researcher should guide and create awareness among population that will be beneficial for patients as well as physical therapist and community.

METHODOLOGY

A sample size of 100 patients was collected by convenience sampling technique from different tertiary care hospitals of Lahore under descriptive cross sectional study design. Both genders having planter fasciitis aged between 31 to 50 years was included in the study and plantar fasciitis due to Systemic disease, foot pathology or Trauma or with osteophytes were excluded. A written informed consent was taken from all patients prior getting any information. A self-structured validated questionnaire was distributed among patients with four point Likert scale having validity 0.80%. All the information was kept confidential. Data was analyzed by using SPSS version 23. Qualitative variables like pain and tightness was measured by mean of frequency and charts while quantitative variables (age) was assessed by mean and standard deviation.

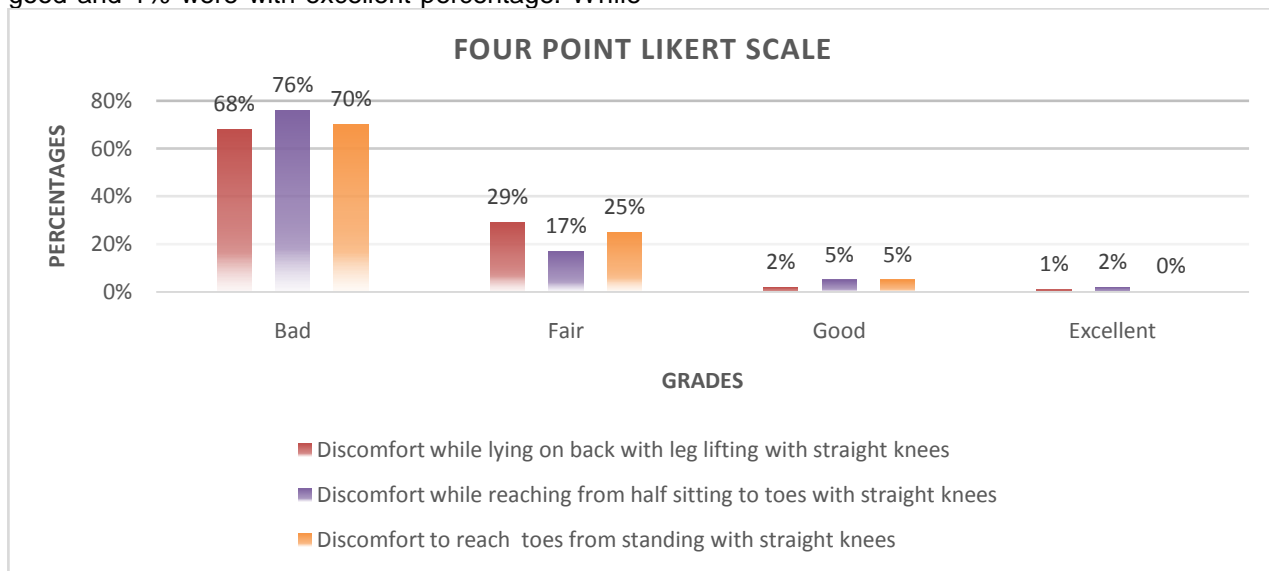
While reaching from standing position with straight knees to the toes 68% subjects were presenting with bad scores, 29% were fair, 2% were good and 1% were with excellent percentage. While

lying straight on back and lifting leg with straight knees 76% were with bad scores, 17% with fair, 5% with good and 2% with excellent scores. In case of reaching to toes from half sitting position with straight knees 70% were with bad scores, 25% with fair, 5% with good and 0% with excellent scores which was a strong indicator of hamstring and calf muscle tightness.

RESULTS

| Variables | Percentages |
|------------------|-----------------------------|
| Life style | Active=60%, Sedentary= 40% |
| Gender | Male= 42%, Female=58% |
| Marital status | Single=30%, Married= 70% |
| 90/90 SLR Test | Positive= 73%, Negative=27% |
| Calf muscle test | Normal= 21%, Tight= 79% |

| Variables | Bad | Fair | Good | Excellent |
|--|-----|------|------|-----------|
| Any discomfort/inability to reach your toes from standing position with straight knees? | 68% | 29% | 2% | 1% |
| While lying straight on your back how high could you lift your leg with knees straight | 76% | 17% | 5% | 2% |
| Any discomfort/inability to reach your toes from half sitting position on bed with straight knees? | 70% | 25% | 5% | 0% |



DISCUSSION

In the current study hundreddiagnosed plantar fasciitis subjects were taken with decreased ankle dorsiflexion and Hip flexion. Out of them, 69% of the patients were found with high difficulty while touching toes,70% of the patientscouldn't perform complete SLR and 70% of the Patients were unable to reach their toes while sitting with straight knees which was a strong indicator among plantar fasciitis, subjects in context of hamstring and calf muscle tightness.

The tightness among these muscles was owing to poor biomechanics of plantar fasciitis subjects. Due to pain, subjects altered their center of gravity and perform substituted movements. The flat feet subjects with decreased ankle dorsiflexion putting stress on back musculature. The fascia of calf and hamstring muscles were found to be taught which limit the sliding mechanism among the fibers of hamstring, calf and plantar muscles results in tightness⁶.

The causes of plantar fasciitis were obesity and prolonged standing as mentioned in another study with illustrations of limited ankle dorsiflexion, obesity, and prolonged weight bearing which can increase the risk of planter fasciitis².

The current study found that tightness of the posterior muscles of the lower limb present in the plantar fasciitis patients, but not in the healthy participants. Total of 100 subjects, 50 with plantar fasciitis and 50 matching controls were recruited. Hamstring and calf muscles were evaluated through the straight leg elevation test, popliteal angle test, and ankle dorsiflexion. All variables were compared and significant change was seen among all cases. The straight leg elevation test 94% and ankle dorsiflexion with the knee extended presented respective sensitivities of 100% as diagnostic tests for the participants as proved earlier with slight modification⁷..

In 2005 James Harty, Karen Soffe and Gary o toole. Tested fifteen patients mean age 40 ± 16.5 years with a diagnosis history of chronic plantar fasciitis were checked on the Pedro barograph. All these patients also had their hamstring tightness evaluated by measuring the popliteal angle. The mean popliteal angle was 23 degrees. Results show that an increase in hamstring tightness may induce prolonged forefoot loading and can resulting increases repetitive injury to the plantar fascia⁸.

A study done on the risk factors of plantar fasciitis which shows that the risk of plantar fasciitis increases when Talocrural dorsiflexion decreases and increase in body mass index (BMI>30). There is also a greater risk for development of plantar fasciitis who spend most of their workday on their feet².

Due to shortage of time the sample size was small and unable to generalize results. Planter fasciitis is self-limiting condition; typical resolution time is different from 6-18 months to sometimes longer. It should be recommended that a comparative survey can be made by using proper shoes and not in plantar fasciitis to feel the change.

CONCLUSION

The current study concluded that there was noteworthy tightness in hamstring and calf muscles in subjects of planter fasciitis.

Note: There was no nothing about any funding source and no conflict at all.

REFERENCES

1. Díaz López AM, Guzmán Carrasco P. Effectiveness of different physical therapy in conservative treatment of plantar fasciitis: systematic review. *Revista espanola de salud publica.* 2014;88(1):157-78.
2. Huffer D, Hing W, Newton R, Clair M. Strength training for plantar fasciitis and the intrinsic foot musculature: A systematic review. *Physical Therapy in Sport.* 2017;24:44-52.
3. Lucas R, Cornwall M. Influence of foot posture on the functioning of the windlass mechanism. *The Foot.* 2017;30:38-42.
4. Razzano C, Carbone S, Mangone M, Iannotta MR, Battaglia A, Santilli V. Treatment of Chronic Plantar Fasciitis with Noninvasive Interactive Neurostimulation: A Prospective Randomized Controlled Study. *The Journal of Foot and Ankle Surgery.* 2017;56(4):768-72.
5. Buchbinder R. Plantar Fasciitis. *New England Journal of Medicine.* 2004;350(21):2159-66. PubMed PMID: 15152061.
6. Fraser JJ, Corbett R, Donner C, Hertel J. Does manual therapy improve pain and function in patients with plantar fasciitis? A systematic review. *Journal of Manual & Manipulative Therapy.* 2017:1-11.
7. Bolívar YA, Munuera PV, Padillo JP. Relationship between tightness of the posterior muscles of the lower limb and plantar fasciitis. *Foot & ankle international.* 2013;34(1):42-8.
8. Harty J, Soffe K, O'Toole G, Stephens MM. The role of hamstring tightness in plantar fasciitis. *Foot & ankle international.* 2005;26(12):1089-92.