

Pain Scale for Plantar Fasciitis

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Background: Plantar fasciitis (PF) is a common and debilitating pathology whose chief complaint is acute plantar heel pain. This pathology affects between 1 and 2 million Americans each year, but a specific descriptive pain/disability scale has not been available to measure the severity and/or changes in pain specific to this pathology. The purpose of this study was to examine the PF, Pain and Disability Scale (PFPS) and its ability to discriminate between pain from PF and other heel pain.

Methods: The PFPS survey includes a series of key questions that relate to symptoms and control questions for PF. It also includes visual analogue scale and questions to measure the effect the pain has on activities of daily living. This questionnaire was administered to 400 patients who had been diagnosed with either PF or another pathology causing heel pain (e.g. calcaneal bursitis). Patients' mean age was 50 years ± 16 (242 females and 158 males).

Results: There was a significant difference in scores from PF patients versus other heel pain patients when compared in a one-way analysis of variance ($P < 0.0001$). Post-hoc t-tests did not show a difference between genders ($P > 0.05$) or ethnicity ($P > 0.05$).

Discussion: The survey was effective in measuring pain that is unique to PF through questions of mobility/function and activities of daily living, and it showed a significant difference between patients with other heel pain vs. PF. This could become an effective tool in diagnosis and assessment of pain unique to PF.

Key words: Plantar fasciitis, Pain and disability scale, heel pain

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Plantar fasciitis (PF) is considered to be one of the most common foot pathologies affecting 1 to 2 million Americans each year.^{7,9-11} However, a descriptive pain/disability scale has not been available to measure severity and/or changes in pain specific to this pathology.

Current orthopaedic pain scales include a simple 10 point Visual Analogue Scale (VAS)^{7,18} to the "Disabilities of Arm/Shoulder/Hand" and the "Levine-Katz Functional Survey," which measure the effect and disabilities of upper extremity pain has during Activities of Daily Living (ADL).

An overall foot-health questionnaire has been developed,¹ but this survey measures the broad health status of one's foot and would not show specific changes in pain from PF in accordance to ADLs. The VAS scores pain on a scale of 1 to 10 or 1 to 100 and has been effective in helping clinician's measure pain. However, confounding variables affect these scores.

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Differences in VAS scores between different dates may not be true barometer of the change in pain. The foot health status questionnaire^{7,8} and the VAS^{2,7,8,13,17,18} have been used in many studies, but other authors have searched for a better method to measure changes following treatment of PF. Rose, et al., examined this question using nerve conduction (medial calcaneal nerve and the posterior nerve) to gain further insight into patient's true recovery from PF.¹⁵

The foot function index (FFI)^{2,8} was compared in clinical settings with PF patients by Landorf and Radford.⁸ Patients were recruited for two trials to examine the "minimal important difference" for the patients when comparing these pain scales. The results indicated the difference that would benefit clinician's interpretation, but Landorf and Radford remarked that these pain scores themselves do not "Take into account the affect a disorder has on the patient's life in general."⁸

Effective Orthopaedic Rehab: Seven Steps to Complete Recovery was written as a supplemental book for athletic training students and measures pain in ADLs and the effect motion and movement may have on the pain. Reviewers of this scale felt that it was a more complete, analytical measurement of pain than would be acquired by a VAS.¹⁹

The validity and source of the questions used in this PF, Pain and Disability Scale (PFPS) survey came from examination and comparison to questions in other text books, recent manuscripts, and from the clinical practice of diagnosing and treating PF.^{1,3,8,11,17-19} The PFPS has been compared and validated beside the foot function index, and the 100 point VAS is actually included in the PFPS. However, the PFPS gives a more detailed, analytical analysis of patients' pain by also examining symptomatic questions used in the differential diagnosis and questions regarding pain in ADLs. The purpose of this study was to examine the PFPS survey's ability to discriminate between pain from PF and other heel pain.

Methods

Four hundred patients who presented with acute heel pain were recruited at four different foot/ankle clinics. Each patient was clinically examined to diagnose and categorize PF versus another heel pain condition such as calcaneal bursitis or calcaneal fractures. (See differential diagnosis on Table 1 and demographics of the patients can be seen in Table 2.) All patients completed the PFPS and informed consent was obtained for each patient participating in this study. Ethical approval for this study was granted by the Copernicus Group IRB.

The PFPS includes unique symptomatic questions in differentiating PF and control questions as well, which make scores of 0 or 100 points to be invalid. If a patient had recorded either of these scores the test would have been deleted from this study, but no such incidence occurred. The PFPS questions were internally validated with inclusion of the 100 point VAS and externally validated through orthopaedic text and podiatric publications.^{1,6,8,16,18,19}

Data Analysis

After PFPS questionnaires were collected from patients at four foot/ankle clinics (This form is blinded to the patient's name and only the Date of Birth was used for tracking as required under the Declaration of Helsinki). A one-way analysis of variance (ANOVA) with post-hoc t-tests were used to determine differences between gender or ethnicity. All statistical tests were performed at an alpha level of 0.05 using SPSS and Microsoft Excel software.

Results

There was a statistically significant difference in scores of PF patients vs. scores of other heel pain patients ($P < 0.0001$, $t = 23.78$, $n = 400$, $df = 398$, $sed = 1.487$) (see Table 3). There was not a statistically significant difference between genders ($P > 0.05$) or ethnicities ($P > 0.05$).

Abductor digiti quintri nerve entrapment
Ankylosing spondylitis
Bone bruise
Calcaneal epiphysitis
Calcaneal stress fracture
Fat-pad atrophy
Heel contusion
Inflammatory arthropathies
Neuropathic pain
Paget disease
Psoriatic arthritis
Reiter syndrome
S1 radiculopathy
Sickle cell disease
Spondyloarthropathy

Table 1 Differential diagnosis in PF.

The mean difference between PF vs. other heel pain was more than 35 points and this is believed attributed to the fact that the PFPS includes questions uniquely symptomatic to PF like pain from the first steps in the morning and reduced morning pain from toe walking. (See Figure 1, study questionnaire.) The purpose of this study was to examine the PFPS survey’s ability to discriminate between pain from plantar fasciitis (PF) and other heel pain.

Discussion

Current studies support the need for a pain scale that can uniquely assess pain exclusive to PF for diagnosis and assessment.^{2,6,8,11,15,18} Landorf and Radford question the statistical significance in changes with the VAS because of the multiple confounding variables associated with that test. They determined that a “*Minimally Important Difference*” was based not on statistical values alone but changes in “*the effect a disorder has on the patient’s life in general*”.⁸

n = 400
Mean Age 50.9 (±16.5)
Female 60%, Male 40%
Ethnicity (Asian 6%, Black 16%, Caucasian 40%, Hispanic 36% Other 2%)

Table 2 Patient demographics.

Patients	Plantar Fasciitis	Other Heel Pain
n =400	201	199
Mean Score:	67.3	31.5
SD:	12.7	16.4
Score Range:	(23-94)	(8-80)

Table 3 Results (SD = standard deviation)

Bennett, et al., developed a questionnaire to measure overall foot health.¹ Their questionnaire examined four different domains of questions (with 107 participants). The “*domains*” (or categories) of questions were Pain, Function, Footwear, and General Foot Health. One functional question was “*How much does your foot health limit you in walking*” which is ideal in measuring the overall foot health but is not symptom specific to PF.

Rose, et al.,¹⁵ suggest using nerve conduction to evaluate changes in PF but few podiatrists may have nerve conduction equipment in their office. The PFPS can be administered in almost any setting. The existing pain scales are effective in gauging overall pain,^{1,2,8,13,17,18} but they lack the specific inclusion of symptomatic questions that will allow specific, objective, analytical measurement of change in symptoms unique to PF. The PFPS effectively showed the difference between PF patients vs. patients with other pathologies causing heel pain.

The PFPS will allow clinician’s more descriptive, exclusive analysis of PF pain for evaluation of treatment than the 100-point VAS scale.

For example a young woman's score VAS and PFPS drops from 70 to 60 which would be "statistically significant" but, it may not show "Minimally Important Difference".⁸ However a comparison the current vs. previous PFPS tests of this patient, shows a changed Q#14 because she no longer prefers toe walking, and Q#15 which shows reduced pain from "Walking in the morning" and reduced pain from "Standing after watching a movie." This would display a "Minimally Important Difference"⁸ and answer the need for a pain scale that can uniquely assess pain exclusive to PF for diagnosis and evaluation.^{2,6,8,11,15,18}

In this study the PFPS has effectively discriminated pain unique to PF patients vs. heel pain caused by other foot pathologies. A future study should be conducted using this PFPS to measure changes in PF patients' pain through a treatment regime, lasting several months. That would further validate the efficacy of this questionnaire in diagnosis and assessing pain unique to PF.

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PFPS *Plantar Fasciitis Pain/Disability Scale*

MALE or FEMALE

Dx:

Today's date ____ _

Date of Birth_____

Ethnicity_____

Onset of pain _____

1. **VAS:** Rate your pain on a scale of 1 to 100. _____ ÷ 8.3 = score of _____
2. How many days a week does pain affect your mobility? (1-7) _____
3. Is the pain on the surface or deep? ____ Surface = 1, Deep = 3

Pain Description

4. Where is your pain located? 0 = Toes, 1 = Ball of foot, 2 = Mid sole, 3 = Bottom of Heel
5. In the past 6 weeks how often have you had pain?
0 = Every other week 1 = Once a week 2 = Once a day 3 = Many times a day
6. How often since the onset of pain, have you been pain free?
0 = weeks, 1 = days, 2 = hours, 3 = minutes
7. How long does the pain last?
0 = only when I over exert, 1 = pain lasts for less than one hour, 2 = pain lasts for one to two hours,
3 = pain lasts for more than two hours
8. In the past 6 weeks what time of day is your pain the worst? (Note this specifically for diagnosis of different problems).
0 = Always the same, 1 = Only in the afternoon, 2 = Both day & night,
3 = Only when you first get up
9. In the past 6 weeks does the pain make it hard to get to sleep?
0 = Never, 1 = Some nights, 2 = most nights, 3 = every night
10. In the past 6 weeks, how often does your pain awaken you?
0 = Never, 1 = Some nights, 2 = most nights, 3 = every night
11. How difficult is it to cope with your pain?
0 = Easy to deal with, 1 = Inconvenient, 2 = Troublesome, 3 = Almost impossible
12. How much does the pain interfere with your athletics or with weight-bearing activities such as walking?
0 = never, 1 = occasionally, 2 = frequently, 3 = always

Mobility/Function

13. When you awake, how many minutes must elapse before you can walk comfortably?
 0 = No time, 1 = less than 10 minutes, 2 = 11 to 30 minutes, 3 = it takes over 30 minutes until I can walk comfortably
14. Is it more comfortable to walk on your toes than walk flat footed?
 0 = No, 3 = Yes
15. Please check the columns below that describe how much your pain affects you in different conditions. (If you are unable to perform such a task list check "Severe.")

Activity	0 = Not at all	1 = Very little	2 = Moderate	3 = Severe
Walking in the morning				
Standing up on your toes				
Driving				
Climbing Stairs				
Descending Stairs				
Reaching up				
Bending over				
Walking bare foot				
Standing after watching a movie				
Riding a bike				
Running a short distance				

16. How often do you take medication for your pain?
 0 = Less than once a week, 1 = Several times per week, 2 = Once Daily, 3 = More than once every day, since the injury
17. Describe the medications' affect on your pain.
 0 = It always stops the pain, 1 = Decreases the pain, 2 = Usually takes the pain away, 3 = Little or no affect on the pain
18. How does the pain affect you emotionally?
 0 = No affect, 1 = It causes anxiety, 2 = The pain worries me daily, 3 = It makes me consider giving up my recreational activities
19. Rate the limitations that your pain/injury affects your daily life style.
 0 = Does not limit your lifestyle, 1 = some activities avoided (i.e. riding in car or sitting in stadium for hours), 3 = You avoid all activity due to injury

Total Score _____ Date _____