

*Original Article***Comparative study of the therapeutic effects of corticosteroid injection accompanied by casting and heel pad in treatment of heel pain***Mehdi Motifard\*, Mohammad Javdan\*, Mehdi Teimouri\*\****Abstract**

**BACKGROUND:** Heel pain is a common condition in adults that may cause significant discomfort and disability. This study was conducted to evaluate the therapeutic effects of corticosteroid injection accompanied by casting, compared with heel pad utilization in treatment of heel pain.

**METHODS:** In this randomized clinical trial study, among patients referred to orthopedic clinics in Isfahan, Iran, from December 2004 to December 2006, 90 patients with heel pain were enrolled. They were randomly assigned into two groups. Heel pad was the only therapeutic method utilized in group A for six months. Corticosteroid injection accompanied by casting was performed for patients in group B. The evaluated information was compared before and after treatment.

**RESULTS:** Among patients in group A, after 6 months of heel pad utilization, heel pain was completely improved in 3 patients (6.7%), relatively decreased in 22 patients (48.9%) and didn't change in 20 patients (44.4%). However, among patients in group B, heel pain was completely improved in 11 patients (24.5%), decreased in 29 patients (64.4%) and didn't change in 5 patients (11.1%) after the treatment completed.

**CONCLUSIONS:** It seemed that corticosteroid injection in companion with casting was a more effective therapeutic method in heel pain treatment than heel pad utilization.

**KEYWORDS:** Corticosteroid injection, casting, heel pad, heel pain.

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Heel pain is a common condition in adults that may cause significant discomfort and disability.<sup>1</sup> A variety of soft tissue, osseous, and systemic disorders can cause heel pain.<sup>2,3</sup> The most common cause of heel pain in adults is plantar fasciitis; it typically results from repetitive use or excessive load on the fascia.<sup>4-8</sup> Tendonitis also may cause heel pain.<sup>9</sup> Achilles tendonitis is associated with posterior heel pain.<sup>10</sup> Bursae adjacent to the Achilles tendon insertion may become inflamed and cause pain.<sup>11</sup> Calcaneal stress fractures are more likely to occur in athletes who participate in sports that require running and

jumping.<sup>12</sup> Patients with plantar heel pain accompanied by tingling, burning, or numbness may have tarsal tunnel syndrome.<sup>13</sup> Less common causes of heel pain, which should be considered when symptoms are prolonged or unexplained, include osteomyelitis, bony abnormalities (such as calcaneal stress fracture), or tumor.<sup>14</sup> Heel pain rarely is a presenting symptom in patients with systemic illnesses, but the latter may be a factor in persons with bilateral heel pain, pain in other joints, or known inflammatory arthritis conditions.<sup>15</sup> A thorough history and a physical examination of the lower extremity should be conducted to locate

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the pain, define its attributes, and narrow the differential diagnosis.<sup>16</sup> Imaging studies may be indicated when there is suspicion of infection, stress fracture, or trauma.<sup>17</sup> Treatment of plantar fasciitis begins with first-line strategies: stretching exercises, avoiding walking barefoot, ice use, shoe modifications, medications [such as nonsteroidal anti-inflammatory drugs (NSAIDs)], and lose weight.<sup>18,19</sup> If the patient still has pain after several weeks, it may be necessary to add one or more of the following approaches: padding and strapping, orthotic devices, corticosteroid injection therapy, removable walking cast, night splint, and physical therapy.<sup>20,21</sup> A survey was conducted on members of the American Academy of Podiatric Sports Medicine about their strategies for managing plantar heel pain syndrome, especially the role of injectable corticosteroids. They reported that for early-stage plantar heel pain syndrome, they generally recommend avoidance of wearing flat shoes and walking barefoot, use of over-the-counter arch supports and heel cushions, regular stretching of the calf muscles, strapping of the foot, cryotherapy applied directly to the affected part of the foot, and nonsteroidal anti-inflammatory drug therapy. When these measures fail to relieve heel pain, most of the responding podiatric physicians recommend using custom orthotic devices and corticosteroid injection as intermediate therapy. Surgical plantar fasciotomy, cast immobilization, and extracorporeal shockwave therapy are generally recommended as late-stage therapy for resistant cases.<sup>22</sup> In other study, Crawford and Thomson searched the Cochrane Musculoskeletal Injuries Group specialized register (September 2002), the Cochrane Central Register of Controlled Trials Register, MEDLINE (1966 to September 2002), EMBASE (1988 to September 2002) and reference lists of articles and dissertations. In their study there was limited evidence for the effectiveness of topical corticosteroid administered by iontophoresis; which is an electric current, in reducing pain. There was some evidence for the effectiveness of injected corticosteroid providing temporary relief of pain. There was con-

flicting evidence for the effectiveness of low energy extracorporeal shock wave therapy in reducing night pain, resting pain and pressure pain in the short term (6 and 12 weeks) and therefore, its effectiveness remains equivocal. In individuals with chronic pain (longer than six months), there was limited evidence for the effectiveness of dorsiflexion night splints in reducing pain. There was no evidence to support the effectiveness of therapeutic ultrasound, low-intensity laser therapy, and exposure to an electron generating device or insoles with magnetic foil. There was limited evidence for the superiority of corticosteroid injections over orthotic devices. There is limited evidence that stretching exercises and heel pads are associated with better outcomes than custom made orthoses in people who stand for more than eight hours per day.<sup>23</sup> In some studies, steroid injection provided relief from heel pain.<sup>24</sup> Extracorporeal shock wave may help accelerate the healing process via unknown mechanism.<sup>25</sup> This study was conducted to evaluate the therapeutic effect of corticosteroid injection accompanied by casting in companion with heel pad in treatment of heel pain.

## Methods

In this randomized clinical trial study, among patients referred to orthopedic clinics in Isfahan, Iran, from December 2004 to December 2006, 90 patients with heel pain were enrolled. Their demographic information, signs, symptoms and "pain scores" were evaluated before initiating the treatment. Pain severity (before and after treatment) was classified into ten classes (0 to 10). Class 0 was defined as having no pain and class 10' was defined as maximum pain existence according to VSA. No previous treatment had been done for these patients. Imaging studies were done when there was suspicion of infection, stress fracture or trauma. Furthermore, patients were randomized simply into two groups: group A and group B. Heel pad was the only therapeutic approach that was utilized in group A without any drug for six months. However, corticosteroid injection accompanied by casting was per-

formed for patients in group B Prednisolone acetate from Razi company, 80 mg, single dose, was injected in region of maximum pain in companion with casting for 1-2 weeks after injection. After the period of casting, heel pad was utilized for up to 6 months. Six months after treatment initiation, another evaluation was performed in patients. All patients accepted treatment plan. Patients who had any other disorders were excluded from the study. The data were analyzed, using SPSS software, V11.5 (SPSS Inc, Chicago, IL), by Mann Whitney and Chi Square statistic tests. P value less than 0.05 was considered statistically significant).

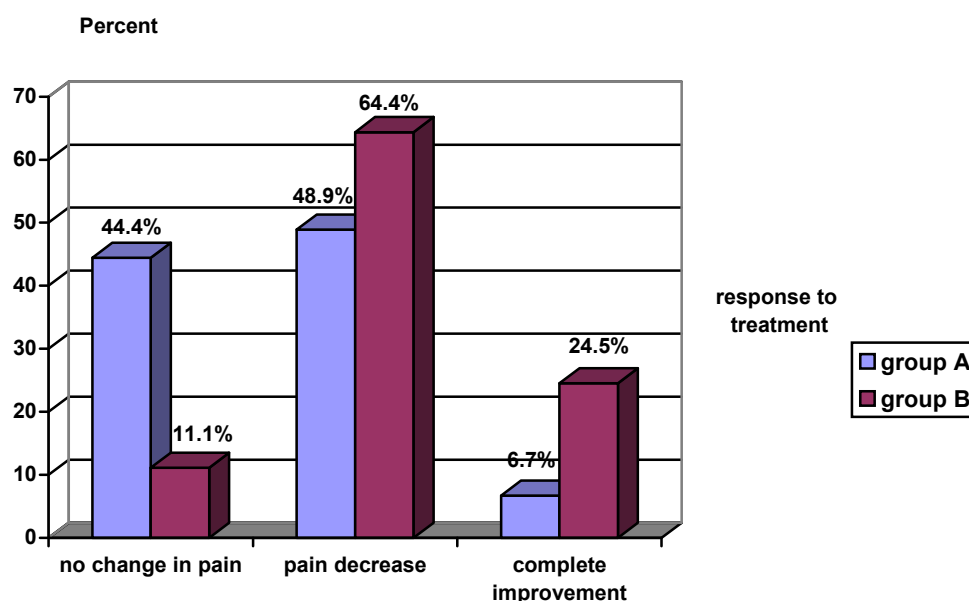
## Results

Among ninety studied patients, 58 were female (64.4%) and 32 were male (35.6%). Patients were randomly assigned into two groups (groups A and B) and 45 patients were in each group. It was found that 55 patients were housewives (61.1%), 18 were businessmen (20%), 12 were government employees (13.3%) and 5 were labor men (5.6%) (table 1). Among the patients, 5 patients had heel pain for 6 months (5.6%), 34 patients for 12 months (37.8%), 8 patients for 13-24 months (8.9%) and 43 patients for more than 24 months (47.6%) (table 1). Also, it was found that severity pain score was less than 7 in one patient (1.1%), 7 in 19 patients (21.1%), 8 in 41 patients (45.6%) and 9 in 29 patients (32.2%) (table 1). In addition, pain was localized in unilateral plantar surface in 76 patients (84.4%), planter and dorsal surfaces in 2 patients (2.2%), and only dorsal surface in 5 patients (5.6%) (table 1). A total of 62 cases didn't have any athletic activities (68.9%), 20 patients had a daily walking program (22.2%), 5 patients were members of volleyball teams (5.5%) and 3 patients were involved in body fitness programs (3.3%) (table 1). Among patients in group A, after 6 months of heel pad utilization, heel pain was completely improved in 3 patients (6.7%), relatively decreased in 22 patients (48.9%) and didn't change in 20 patients (44.4%) (figure 1).

**Table 1.** The classification of the studied patients based on sex, age, occupation, athletic activities and pain duration, score and localization.

Variable	Frequency	Percent
<b>Sex</b>		
Male	32	35.6%
Female	58	64.4%
<b>Age (year)</b>		
30-40	15	16.7%
41-50	30	33.3%
51-60	33	36.7%
61-70	12	13.3%
<b>Occupation</b>		
Housewife	55	61.1%
Businessman	18	20%
Employee	12	13.3%
Workman	5	5.6%
<b>Pain duration (month)</b>		
< 6	5	5.6%
6-12	34	37.8%
12-24	8	8.9%
24 <	43	47.7%
<b>Pain score (pain severity)</b>		
7 >	1	1.1%
7	19	21.1%
8	41	45.6%
9	29	32.2%
<b>Pain localization</b>		
Unilateral plantar	76	84.4%
Bilateral plantar	7	7.8%
Dorsal and plantar	2	2.2%
Dorsal	5	5.6%
<b>Athletic activities</b>		
Negative	62	68.9%
Walking	20	22.2%
Volleyball	5	5.6%
Body Fitness	3	3.3%

However, among patients in group B, heel pain was completely improved in 11 patients (24.5%), decreased in 29 patients (64.4%) and didn't change in 5 patients (11.1%) after the treatment was completed (figure 1). Statistical analysis of data showed that the therapeutic effect of corticosteroid injection accompanied by casting was better than that of heel pad in treatment of patients with heel pain ( $P < 0.001$ ). Furthermore, no statistically significant relation was found between pain severity score and response to treatment ( $P = 0.72$ ). The mean pain score reduction was 2.1 in group A vs. 4.2



**Figure 1.** Response to treatment in the studied groups.

in group B ( $P < 0.001$ ). In addition, there wasn't any statistically significant relation between response to treatment with patients' athletic activities and pain localization ( $P = 0.6$ ).

### Discussion

Heel pain syndrome is a compilation of disorders affecting the inferior aspect of the proximal part of the heel such as plantar fasciitis, inferior calcaneal bursitis, local nerve entrapment, and fat pad syndrome. The professional consensus is that 70% to 90% of patients with nonspecific heel pain can be managed conservatively.<sup>26,27</sup> Although there have been some advances in our understanding of the proximal plantar fasciopathy, this has not led to more successful treatment regimens. There are little data to provide guidance to the clinician with regard to the indications for the various treatment options for heel pain. A variety of conservative treatments have been described, but there is a paucity of comparative studies, and few have been placebo-controlled.<sup>28,29</sup> This research is the first study conducted to evaluate the therapeutic effect of corticosteroid injection accompanied by casting in companion with heel pad in treatment of heel pain. According to the results, the therapeutic effect of corticosteroid

injection accompanied by casting is more significant than heel pad utilization in patients with heel pain. In some studies, the corticosteroid injection therapeutic effect was significant<sup>24,30</sup> however, in some other studies, this treatment was not effective.<sup>23</sup> The exact mechanism of corticosteroid in treatment of heel pain is not clear. The histopathology behind the pain of plantar fasciitis is usually similar to chronic necrosis of tendinosis, which features loss of collagen continuity, increase in ground substance (matrix connective tissue) and vascularity, and presence of fibroblasts rather than inflammatory cells seen in tendinitis, with the cellular response to injury not being one of inflammation.<sup>31</sup> The location of injection affects the result of treatment and may be the reason of variant results of different studies. Deep tissue injection is the last initial conservative treatment when all others have failed.<sup>31</sup> Casting can reduce the heel pain with a period of rest; with a decrease in running and jumping activities, tension on plantar fascia will be relieved.<sup>32</sup> Schepsis et al reported that a period of cast immobilization was not helpful.<sup>32</sup> In another study, Tisdell et al reported that 42% of patients were completely satisfied with cast treatment and 12% were satisfied with

reservation and 44% were dissatisfied.<sup>33</sup> The heel pad theoretically works by cupping the soft tissues and thus absorbing some of the impacts on the inflamed area of the heel and supporting the foot and arch. With medial heel elevation effect, it provides some relief from pressure on the medial side of the heel.<sup>34</sup> Most studies reported that heel pad utilization has no significant therapeutic effect in patients with heel pain, which is in agreement with our results.<sup>23,34</sup> It seemed that the therapeutic effect of corticosteroid injection accompanied by casting is more significant than that of either one. The results of this study showed a high degree of heel pain in studied subjects. More than 77% of patient had VAS scores of more than 7. We think that is because most patients with lower VAS scores are not referred to orthopedic specialist clinics and are treated by general physicians. Despite some other studies that reported a significant heel pain prevalence in businessmen, in this study heel pain was

most common in housewives.<sup>19,21</sup> Furthermore, despite other researches that confirmed higher prevalence of heel pain in populations who had athletic activities, in this study we found that heel pain prevalence is more in cases that have no athletic activities.<sup>14,16</sup> However, no statistically significant relation was found between athletic activity and the response to treatment. Also, there was not any significant difference in treatment responses between male and female patients. It is suggested that other researchers evaluate the therapeutic effect of these two approaches in heel pain treatment on other populations with longer follow up periods and also assess the etiologies of heel pain disorder.

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