

Evaluation of the Therapeutic Effect of Extracorporeal Shockwave Therapy in Chronic Plantar Fasciitis

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Abstract

Background: Plantar fasciitis is a common pain syndrome of the foot associated with severe discomfort and often results in the patient's limitation. Extracorporeal shock wave therapy (ESWT) is a widely used treatment option which offers an alternative to other conventional methods. The objective of this study was to evaluate the effectiveness of ESWT in the treatment of plantar fasciitis.

Material and methods: Thirty-two participants were enrolled in a prospective, randomized, placebo-controlled and double-blinded study. All participants were randomized into two groups. Therapy group received 3 sessions of focused ESWT in a weekly interval. Control group received placebo intervention with the same frequency. Outcomes of the follow-up were taken after the last treatment session and again in a 3-month follow-up. Evaluation of the treatment was achieved with the Visual Analog Scal (VAS) and Roles and Maudsley score.

Results: Treatment with ESWT provided superior results in evaluation with (VAS) and also with Roles and Maudsley score when compared with the placebo treatment. Decrease of pain in the first few steps in the morning was 29.9% after the last therapy and 63.2% in the 3-month follow-up in the therapy group. In the control group the decrease was 11% and 23.7% respectively. Decrease of pain in the normal daily activities was 29.0% after the last therapy and 63.0% in the 3-month follow-up. In the control group the decrease was 8.7% and 24.3% respectively. Satisfaction with the therapy results measured by Roles and Maudsley score improved by 28.1% after the last treatment and by 46.9% in the 3-month follow-up in the therapy group. In the control group the improvement was 6.3% and 18.8% respectively.

Discussion: Although the biologic effects of ESWT are not yet fully understood, the clinical evidence of its efficiency is being proved in a growing number of studies. It is not surprising that for this reason, ESWT is often being compared to other treatment approaches such as corticosteroid injections. Another frequently discussed topic regarding the use of the ESWT in plantar fasciitis is the possible time-dependent cumulative effect.

Conclusion: Focused ESWT is an effective modality in the treatment of patients suffering from chronic plantar fasciitis in both short and long period.

Keywords: Focused extracorporeal shockwave therapy (ESWT); Plantar fasciitis; Visual analog scale; Roles and maudsley score

Introduction

Plantar fasciitis is a very common musculoskeletal foot disorder characterized by pain in the inferomedial aspect of the heel, where the origin of the plantar fascia lies [1]. In the past plantar fasciitis was considered an inflammatory disease. Histological findings from recent studies, however, are proving that there are degenerative, non-inflammatory processes occurring during this painful condition [2]. Diagnosis of plantar fasciitis usually consists of the history and physical examination of the patient. Patients diagnosed with plantar fasciitis may walk with their affected foot in an equine position to relieve pressure on the painful side of the heel. Pressure on the medial plantar calcaneal area will usually cause sharp pain [3]. In most patients, pain is the worst upon the first steps in the morning. The use of corticosteroids may cause heel pad atrophy, especially in elderly patients [8].

Surgical intervention of plantar fasciitis should be considered as the last treatment option for patients who did not respond to non-invasive methods [4]. The rates of complications vary within affected individuals. In general, they occur more frequently in those patients where the symptoms were more severe and chronic [9]. Another treatment option which is currently available for patients suffering from plantar fasciitis is extracorporeal shockwave therapy (ESWT). Since 1980, high

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Received November 15, 2019; Accepted December 04, 2019; Published December 11, 2019

Citation: Hench M, Seppel G (2019) Evaluation of the Therapeutic Effect of Extracorporeal Shockwave Therapy in Chronic Plantar Fasciitis. Clin Res Foot Ankle 7: 292

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energy extracorporeal shockwaves were used for the treatment of kidney stones. Because of the transcutaneous application of high energy to the patient's body, much research has been done regarding the possible side effects of this therapy. From these early applications treatments using ESWT, the basis for regenerative effects of tissues were discovered and ESWT was introduced in the field of orthopedics [10]. In 1995, the treatment of plantar fasciitis with the use

There were no significant ($P < 0.01$) differences between both groups regarding the baseline characteristics of the age, sex, BMI or duration of heel pain before treatment (Table 1). The difference between the therapy group and the control group in baseline VAS for pain during the first few steps in the morning was not significant ($P < 0.01$) with 7.3 ± 1.1 and 7.4 ± 1.0 respectively. Also, the difference between the groups was not significant ($P < 0.01$) for pain during normal daily activities with 6.3 ± 1.1 in the therapy group and 6.4 ± 1.4 in the control group.

Participants from the therapy group reported a significant ($P < 0.01$) decrease in pain during the first few steps in the morning evaluated with VAS in both evaluations. The mean change was from a baseline of 7.3 ± 1.1 to 5.1 ± 1.1 (29.9%) after last treatment and to 2.7 ± 1.7 (63.2%) in the 3-month follow-up.

the process of tissue regeneration [21]. This effect thus plays a potential role in the explanation of long-term improvement of painful conditions such as plantar fasciitis. The results of our study provided statistically significant data regarding the difference in the outcome measures between the group treated with ESWT and the control group. Although considerably lower, certain improvements were noted in the control group as well. This may be explained by spontaneous remission by the placebo effect or by the different qualities of other treatment methods used by participants. With regards to the results obtained in our study, we suggest that ESWT is an effective modality in patients with plantar fasciitis in the short-time period, thus adding to the significance of this opinion already reported in multiple studies [19,17].

Furthermore, number of recent studies reports better results with ESWT when compared with other possible approaches of treatment of plantar fasciitis. Mishra et al. conducted prospective comparative non randomized study comparing ESWT and methylprednisolone injections in 60 patients. In a 6 weeks follow-up 26 (86.7%) patients reported VAS <5 in ESWT group compared to 16 (53.3%) patients in the group that received the injections [22]. In a meta-analysis conducted by Xiong, et al. efficacy of ESWT was compared to efficacy of corticosteroids injections (CSI). Although inter-group differences were not significant, the VAS score was better improved in the ESWT group [23]. In a prospective randomized trial, Lai et al also compared CSI to ESWT in the treatment of plantar fasciitis. In the twelve week follow-up the treatment option with ESWT was more efficient in pain level outcome than the CSI.

Park, et al. investigated the use of ESWT on 25 patients with plantar fasciitis and reported a success rate of 63,3% one week after the last treatment intervention and 80.0% in a 24-month follow-up using the Roles, et al. score [24]. Metzner et al. applied ESWT on 63 patients achieving at least 50% VAS reduction in pain in 50% of all patients in the 6-week follow-up, in 62% of all patients around the 18-month follow-up and in 90% of all patients approximately in the 72 month follow-up [25]. Wang, et al. proposed that effect of ESWT on plantar fasciitis seems to be cumulative and time-dependent. In their study the results in 79 patients in a one year follow-up were 75.3% of complaint-free, 18.8% significantly better and 5.9% slightly better [26].

Conclusion

These findings therefore suggest that improvement continues even in the long period after the treatment. This is considered as a limitation in our study, since the last evaluation of our patients was in the 3-month follow-up. Another limitation of the study was a relatively small sample of the participants. To increase the evidence value of the activity of shockwave therapy, further research with a larger sample of participants is necessary.

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