



The effect of high-intensity versus low-level laser therapy in the management of plantar fasciitis: a randomized clinical trial

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Abstract

We aimed to compare the efficacy of low-level laser therapy (LLLT) and high-intensity laser therapy (HILT) in the treatment of plantar fasciitis (PF). Seventy patients were randomized into either the LLLT (8 men, 27 women; mean age 48.65 ± 10.81 years) or HILT (7 men, 28 women; mean age 48.73 ± 11.41 years) groups. LLLT (904 nm) and HILT (1064 nm) were performed three times per week, over a period of 3 weeks. Each treatment combined with silicone insole and stretching exercises. Patients' pain and functional status were evaluated with Visual Analog Scale, Heel Tenderness Index, and Foot and Ankle Outcome Score before and after treatment. A chi-square test was performed to compare demographic and clinical characteristics. Within-group and between-group differences were also investigated. Paired samples *t* test was used to analyze the differences between baseline and after treatment values, while independent samples *t* test was used to compare the two groups. Both groups contained similar demographic characteristics including age, sex, and body mass index (all $p > 0.05$). Three and two patients in the HILT and LLLT group, respectively, were lost to follow-up. At the study onset, there were no statistically significant differences between the two groups in the Visual Analog Scale, Heel Tenderness Index, and Foot And Ankle Outcome Scores. Three weeks later, both groups showed significant improvement in all parameters ($p < 0.05$). The HILT group demonstrated better improvement in all parameters than the LLLT group. Although both treatments improved the pain levels, function, and quality of life in patients with PF, HILT had a more significant effect than LLLT.

Keywords Low-level laser therapy · High-intensity laser therapy · Plantar fasciitis · Visual Analog Scale · Heel Tenderness Index

Introduction

Plantar fasciitis (PF) is the most common cause of heel pain in adults. Although the exact cause is unknown, risk factors include middle age, obesity, excessive foot pronation, pes cavus, excessive running, pes planus, and prolonged standing [1, 2]. The pathological process, often called “calcaneal spur,” with severe pain syndrome, is caused by degenerative-dystrophic

changes in the plantar aponeurosis; this occurs at the place of attachment to the calcaneus [1, 2]. Most patients with PF experience pain in their first steps after rising from bed or after prolonged sitting. After the first few steps, pain and stiffness may decrease, but the former may intensify throughout the day, most often when climbing stairs or after standing for long durations [3, 4]. Stretching the plantar fascia and weight bearing on the heel may trigger symptoms [4].

Conservative therapy provides significant relief in approximately 90% of patients with PF [1]. Numerous methods have been used to treat PF, including nonsteroidal anti-inflammatory drugs, cortisone injections, foot orthoses, physical therapy, stretching exercises, night splints, and extracorporeal shockwave therapy (ESWT) [5–9]. A small number of patients undergo surgery, including spur resection and release of all parts of the fascial band [9]. Another method for treating PF is via low-level laser therapy (LLLT). Laser therapy presents a non-invasive and painless method of treatment for patients with PF [10, 11]. Recently, the pulsed neodymium-doped yttrium aluminum garnet (Nd: YAG) laser, a form of

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