

High-intensity versus low-level laser therapy in the treatment of patients with knee osteoarthritis: a randomized controlled trial

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Abstract The aim of this randomized controlled study was to compare the effects of low-level laser therapy (LLLT) and high-intensity laser therapy (HILT) on pain relief and functional improvement in patients with knee osteoarthritis (KOA). A total of 53 male patients participated in this study, with a mean (SD) age of 54.6 (8.49) years. Patients were randomly assigned into three groups and treated with HILT and exercise (HILT+EX), LLLT and exercise (LLLT+EX), and placebo laser plus exercise (PL+EX) in groups 1, 2, and 3, respectively. The outcomes measured were pain level measured by visual analog scale (VAS) and knee function measured by Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC). Statistical analyses were performed to compare the differences between baseline and posttreatment measurements. The level of statistical significance was set as $P < 0.05$. The result showed that HILT and LLLT combined with exercise were effective treatment modalities in decreasing the VAS and WOMAC scores after 6 weeks of treatment. HILT combined with exercises was more effective than LLLT combined with exercises, and both treatment modalities were better than exercises alone in the treatment of patients with KOA.

Keywords High-intensity laser therapy · Low-level laser therapy · Knee osteoarthritis

Introduction

Knee osteoarthritis (KOA) is a common musculoskeletal joint disease that affects the elderly [1]. KOA is characterized by degeneration of the articular cartilage in the involved joints and its underlying bone within a joint as well as bony overgrowth [2]. It is one of the major causes of physical disability that has a social and public health impact [3] due to pain, stiffness, joint instability, and muscle weakness [4, 5]. It is believed to be a result of both mechanical and molecular events in the affected joint with gradual onset and usually begins after the age of 40 [6]. Before the age of 50, men are more likely to have KOA than women, but after 50, women are statistically more likely to be affected. One third of people aged 65 years and older have KOA and this is evidenced by radiography [7]. By 65 years of age, more than half of all people report having some degree of joint pain in their neck, hands, back, knees, or hips [8]. In Saudi Arabia, Al-Arfaj and Al-Boukai [9] reported in their study that KOA affects 53.3 % of males and 60.9 % of females with age from 30 to 90 with a mean age of 49 years with bilateral affection of 85.4 % in males and 86.4 % in females [9].

The major cause of functional impairment and disability in people with KOA is pain [7], whereas osteophyte formation, cartilage loss, or periarticular muscle spasm and contracture cause limitation of knee range of motion. In addition, muscle weakness decreases neuromuscular protective mechanisms and increases the functional joint instability which may contribute to the progression of KOA [4, 7].

According to the severity of joint destruction, the treatment of KOA involves both pharmacological and non-pharmacological interventions [10]. Physical therapy modalities are commonly used for pain management that may include magnetic therapy, diadynamic current, ultrasound, and low-level laser therapy (LLLT) [11, 12].

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