The Effectiveness of Therapeutic Class IV (10 W) Laser Treatment for Epicondylitis

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Background and Objective: Photobiomodulation has been shown to modulate cellular protein production and stimulate tendon healing in a dose-dependent manner. Previous studies have used class IIIb lasers with power outputs of less than 0.5 W. Here we evaluate a dual wavelength (980/810 nm) class IV laser with a power output of 10 W for the purpose of determining the efficacy of class IV laser therapy in alleviating the pain and dysfunction associated with chronic epicondylitis.
Methods: Sixteen subjects volunteered for laser therapy, or an identically appearing sham instrument in a randomized, placebo-controlled, double-blinded clinical trial. Subjects underwent clinical examination (pain, function, strength, and ultrasonic imaging) to confirm chronic tendinopathy of the extensor carpi radialis brevis tendon, followed by eight treatments of 6.6 ± 1.3 J/cm^2 (laser), or sham over 18 days. Safety precautions to protect against retinal exposure to the laser were followed. The exam protocol was repeated at 0, 3, 6 and 12 months post-treatment.
Results: No initial differences were seen between the two groups. In the laser treated group handgrip strength improved by $17 \pm 3\%$, $52 \pm 7\%$, and $66 \pm 6\%$ at 3, 6, and 12 months respectively; function improved by $44 \pm 1\%$, $71 \pm 3\%$, and $82 \pm 2\%$, and pain with resistance to extension of the middle finger was reduced by $50 \pm 6\%$, $93 \pm 4\%$, and $100 \pm 1\%$ at 3, 6 and 12 months, respectively. In contrast, no changes were seen until 12 months following sham treatment (12 months: strength improved by $13 \pm 2\%$, function improved by $52 \pm 3\%$, pain with resistance to extension of the middle finger reduced by $76 \pm 2\%$). No adverse effects were reported at any time.
Conclusions: These findings suggest that laser therapy using the 10 W class IV instrument is efficacious for the long-term relief of the symptoms associated with chronic epicondylitis. The potential for a rapidly administered, safe and effective treatment warrants further investigation. Lasers Surg. Med. 45:311–317, 2013.

Key words: epicondylalgia; photobiomodulation; tendinopathy; tendinosis; tenosynovitis

INTRODUCTION

Tendinopathy is a common and painful condition that occurs following damage to a tendon [1–3]. The onset of symptoms is associated with overuse, increased load, vibration and/or repetitive movements and while tendon injuries are sometimes acute, they are most often chronic in nature resulting in significant restriction of activity and lost work-time [3,4]. Characteristic findings include necrosis [3], abnormal neovascularization [5], edema, crepitus, and impaired function [4,6]; however, the etiology remains incompletely understood. Furthermore, while most cases resolve themselves within 12 months of rest, approximately 15–20% are persistent, with reoccurrence of symptoms when activity is resumed [6,7].

There is little consensus regarding effective treatments for tendinopathy [4,8]. Rest, ice, and analgesics are general guidelines used to provide pain relief. Orthotic devices [9], ultrasonography [10] and deep transverse friction massage [11] are often recommended, although there is no conclusive evidence as to the effectiveness of these treatments. Similarly, while eccentric exercises have been shown to be more effective than no treatment in relieving symptoms for some tendinopathies, compliance can be problematic and there is a great deal of heterogeneity in protocols [12]. Randomized controlled studies of epicondylitis have determined that oral non-steroidal anti-inflammatory treatment was not significantly better than placebo [13] and although early corticosteroid injection did provide symptom relief in some patients, studies that were extended to 3 [14] and 12 [13] months post-injection indicated that corticosteroid injection could even produce a detrimental outcome. Extracorporeal shock therapy for treatment of tendinopathy is also not supported by systematic reviews of the literature [15], except perhaps for cases resistant to conventional treatments [16].

Conflict of Interest Disclosures: All authors have completed and submitted the ICMJE Form for Disclosure of Potential Conflicts of Interest and none were reported.
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