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Low-level laser therapy does not aid the management of tennis elbow

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The value of low-level laser therapy (LLLT) as a therapy for painful tennis elbow is dubious since evidence for its efficacy is conflicting. This report presents the results of a randomized, double-blind, controlled study on patients with tennis elbow ($n = 29$) using a gallium aluminium arsenide laser. Two different methods of assessing pain, visual analogue scores and a Marcy Wedge Pro® exerciser, were used. No significant differences were found between the treatment and placebo groups. This suggests that LLLT at the dosage and duratiion used in this study is without benefit in the short-term management of painful tennis elbow.

Introduction

Tennis elbow (lateral epicondylitis) is a common, chronic, painful condition with a reported prevalence and incidence of 10% and 1–3%, respectively.[1] It is apparently caused by overuse of the extensor muscles of the forearm or by direct trauma to the common extensor origin. Different treatments are offered, low-level laser therapy (LLLT) being one frequently used by physiotherapists. The efficacy of LLLT is dubious, with reports claiming therapeutic success[2–4] as well as the lack of it.[5–7] Haker,[2] using a combination of gallium aluminium arsenide and helium–neon lasers, has reported that LLLT delivered by the contact method to the painful site is beneficial. Improved grip strength and ability to lift weights were reported in this study, although there was no mention of the patients' own perception of changes in symptoms. Since pain is the predominant symptom of tennis elbow, the present authors suggest that assessment of pain before and after treatment is a prerequisite for a therapeutic study. The aim of this study was to assess the effects of LLLT on painful elbows using two different methods of pain assessment in a randomized, double-blind, controlled study.

Materials and methods

Twenty-nine patients with lateral humeral epicondylitis (31 elbows: two patients had bilateral tennis elbow) were recruited consecutively from

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rheumatology and physiotherapy outpatient services. Patients with neck symptoms, arthropathy, other serious conditions and pregnancy were excluded. The demographic data are presented in Table 1. A gallium aluminium arsenide laser unit (3ML Omega Biotherapy, Omega Universal Technologies, London, UK) with two identical probes, one of which had been electrically disabled, was used. The probes were covered and coded by the manufacturer to enable the study to be carried out in double-blind fashion. Infrared laser energy was applied through the active single-point probe, the laser parameters being wavelength 820 nm, average power 50 mW, power density 0.4 W/cm^2, frequency 5 KHz and pulse duration 160 nanoseconds, as advised by the manufacturer. Patients were randomly allocated to active or matched placebo groups and the treatment was double-blind, neither patient nor operator being aware whether active or sham LLLT was being administered.

The most tender spot was determined by palpation and treatment applied for 60 seconds by a single observer (EP). Patients were treated thrice weekly for two weeks. Pain was assessed using a 10 cm visual analogue score (VAS) and a Marcy Wedge Pro exerciser.[8,9] Patients were asked to exercise the forearm extensor muscles but to stop immediately if pain was experienced. All measurements were made at the first, fourth and sixth visits.

The data were analysed using nonparametric and parametric methods for the Marcy and for the VAS measurements, respectively, depending on whether the distribution was skewed or normal.

Results

All 29 patients completed the study. There were no significant differences between the two groups in either VAS or Marcy Wedge Pro measurements as illustrated in Figures 1(a) and 1(b) respectively. Patients in the placebo group had less pain at visits three ($p = 0.032$) and six (follow-up) ($p = 0.045$) as shown in Figure 1(a). This finding may be due to lower pain scores in the placebo group at the onset of the study which occurred due to chance.

Table 1 Demographic data of patients in the study

Variables	All subjects (n = 29; 31 elbows) Mean (±) 1SD	Laser group (n = 14; 15 elbows) Mean (±) 1SD	Placebo group (n = 15; 16 elbows) Mean (±) 1SD
Age (years)	45.3 (±) 5.1	44 (±) 6.5	46.2 (±) 3.1
Sex			
No. of male elbows	10	7	3
No. of female elbows	21	8	13
Duration of symptoms (weeks)	25 (±) 19.9	28 (±) 23.4	22 (±) 16.2
Dominant hand			
Left	2	2	0
Right	28	13	15
Previous treatment			
Steroid injections	21	11	12
NSAIDs[a]	5	3	2
Physiotherapy	10	6	4
Surgery	1	1	0
Type of onset			
Gradual	14	6	9
Sudden	12	8	5
Traumatic	2	2	0
Not known	1	0	1

[a]Nonsteroidal anti-inflammatory drugs.
SD, standard deviation.

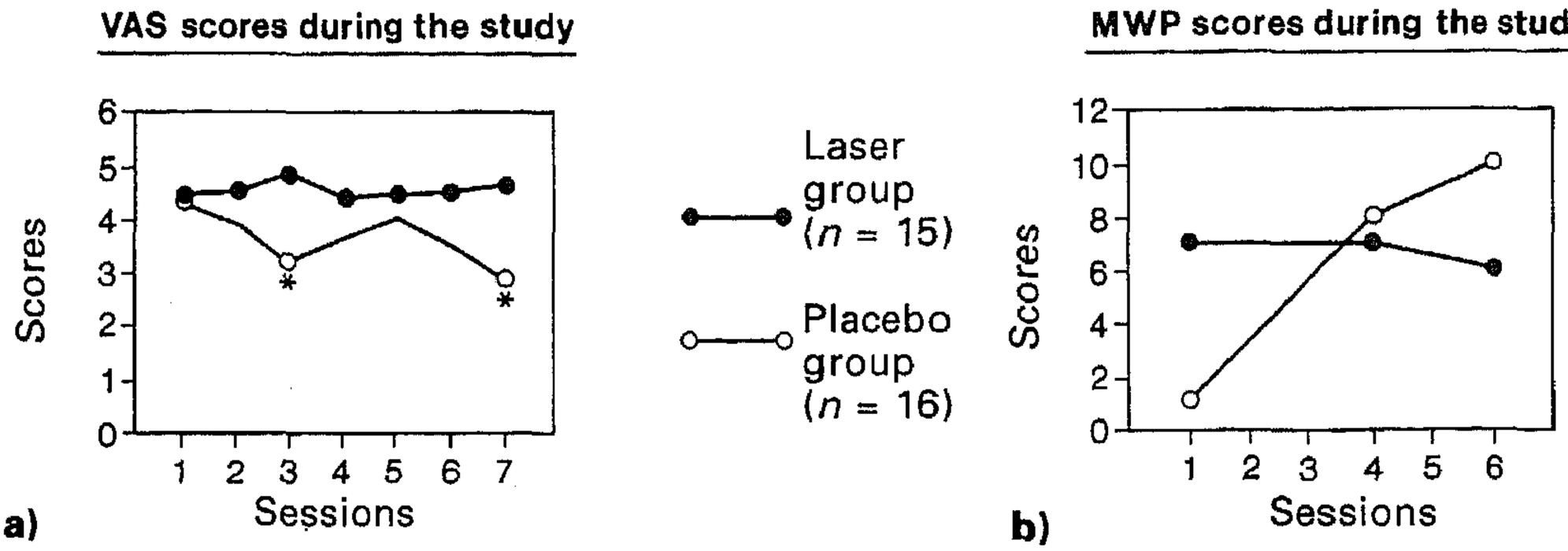

Figure 1 Measurement of pain during the study. **(a)** Visual analogue scores; **(b)** Marcy Wedge Pro scores. (*3 $p = 0.032$; *7 $p \approx 0.045$.)

Discussion

This double-blind, randomized, controlled study suggests that LLLT at the dosage and duration used in this study is without benefit in the short-term management of tennis elbow. The significantly lower pain scores in the placebo group may be due to a lower severity at the onset of the study. Alternatively, these findings may indicate that LLLT delays spontaneous remission.

The interaction of optical (laser) radiation with soft tissue and nerve fibres is complex and falls outside the scope of this paper. From a practical, clinical viewpoint, the study failed to demonstrate an indication for the use of the LLLT technique in the treatment of tennis elbow.

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