

Comparison of the long - term effectiveness of physiotherapy programs with low - level laser therapy and pulsed magnetic field in patients with carpal tunnel syndrome

Dakowicz A¹, Kuryliszyn-Moskal A^{1*}, Koszyła – Hojna B², Moskal D², Latosiewicz R³

¹ Department of Rehabilitation, Medical University of Białystok, Białystok, Poland

² Department of Clinical Phonoaudiology and Logopedics, Medical University of Białystok, Białystok, Poland

³ Department of Rehabilitation, Medical University of Lublin, Białystok, Poland

*** CORRESPONDING AUTHOR:**

Department of Rehabilitation,
Medical University of Białystok,
M. Skłodowskiej-Curie Street 24 A
15-274 Białystok, Poland
Tel/Fax: +48 85 746 8315
e-mail: akuryl@umwb.edu.pl (Anna Kuryliszyn-Moskal)

Received 27.10.2010
Accepted 25.07.2011
Advances in Medical Sciences
Vol. 56 · 2011 · pp 270-274
DOI: 10.2478/v10039-011-0041-z
© Medical University of Białystok, Poland

ABSTRACT

Purpose: The aim of the study was to compare the long term effects of low - level laser therapy (LLLT) and pulsed magnetic field (PMF) in the rehabilitation of patients with carpal tunnel syndrome (CTS).

Methods: The study included 38 patients with idiopathic CTS, confirmed by electroneurographic (ENG) examination. All patients were randomly assigned to 2 groups: group L (18 patients) treated with LLLT and group M (20 patients) with PMF therapy. Clinical assessment, including day and night pain, the presence of paresthesia, functional tests (Phalen, Tinel, armband tests) and pain severity according to the Visual Analogue Scale (VAS) was conducted before treatment, after the first series of 10 sessions, after a two-week break, after the second series of 10 sessions and six months after the last series.

Results: After LLLT a significant reduction of day and night pain was observed at each stage of treatment and 6 months after the last series ($p < 0.05$). However, in group M, a significant reduction of both day and night pain was demonstrated only after the second series ($p < 0.05$). A reduction of the incidence of Phalen's symptoms were noticed in both groups, however, only in group L the improvement was significant ($p < 0.05$). In groups L and M a significant reduction of pain intensity was observed at every stage of treatment ($p < 0.05$).

Conclusions: Although after LLL as well as PMF therapy clinical improvement was observed, the most significant differences were registered after the second series and persisted for up to 6 months in both groups.

Key words: low - level laser therapy, pulsed magnetic field, carpal tunnel syndrome, physiotherapy

INTRODUCTION

Carpal tunnel syndrome (CTS) is considered the most common compression neuropathy of the upper extremity with a 10% lifetime risk of development [1]. CTS as a leading cause of work disability and functional impairment is a serious problem for relatively young and healthy population of people over thirty, with a prevalence ranging from 2% to 4% in men and 3% to 5% in women, rising with age [2]. The results of epidemiological studies confirm the role of risk factors, such as mechanical load of the wrists, rheumatoid arthritis, osteoarthritis, obesity metabolic syndrome and diabetes in the involvement of CTS [3-5].

The etiopathogenesis of the syndrome is associated with compression of the median nerve in the carpal canal, which leads to aggravated venous blood flow, edema, microcirculation disturbance, and consequently – segmental hypoxia axons of the nerve cells that cause a number of disorders of metabolic processes [6].

Low - level laser therapy (LLLT) and pulsed magnetic field (PMF) due to their antiedematous, analgetic and anti-inflammatory effects, belong to the most commonly recommended physiotherapeutic methods of CTS treatment [7, 8, 9]. At the tissular level the LLLT radiation significantly increases microcirculation, activates angiogenesis, stimulates

Table 1. Clinical characteristics of patients with carpal tunnel syndrome treated with low - level laser (group L) and pulsed magnetic field (group M).

Characteristics	Group L(n=18)	Group M(n=20)
Age, years (mean $\pm$ SD)	53.1 $\pm$ 9.1	48.5 $\pm$ 11.8
Female/Males	17/1	18/2
Number of treated wrist	27	34
Disease duration (mean $\pm$ SD)	22.5 $\pm$ 20.1	32.4 $\pm$ 21.9

immunological processes and nerve regeneration. Moreover, it is analgetically active through the growth of endorphins [10].

The aim of this study was to compare the efficiency of long - term rehabilitation with the use of low - level laser therapy and pulsed magnetic field in CTS treatment.

MATERIAL AND METHODS

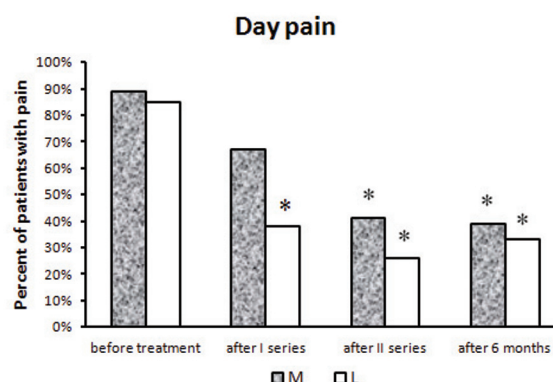
The study included 38 patients (35 females and 3 males), aged between 20 and 74 years (mean 50.8 $\pm$ 10.3), with diagnosed idiopathic carpal tunnel syndrome, confirmed by electroneurographic (ENG) examination. The patients were treated in the Department of Rehabilitation of the Medical University of Białystok with the consent of the Bioethics Committee. Informed consent was obtained from all the participants. All CTS patients were classified into two groups: the first group was treated with low - level laser (18 persons) and the second group was treated with pulsed electromagnetic field (20 persons). The detailed clinical characteristics of both groups are presented in Tab. 1.

Patients with a history of double crush syndrome, distal radius fracture, wrist fracture cervical radiculopathy, fibromyalgia, diabetes mellitus, and inflammatory rheumatic diseases in the course of which carpal tunnel syndrome might develop were excluded from the study. The CTS diagnosis was based on characteristics symptoms such as: day and night pain, the presence of paresthesia, pain severity rating on the Visual Analogue Scale (VAS) and physical examination including functional tests such as Phalen's, Tinel's and the armband test. Moreover, the diagnosis was confirmed with ENG examination and the patients were classified as mild or moderate CTS according to the American Association of Electrodiagnostic Medicine guidelines [11]. Patients with chronic CTS were included in the study according to Rosenbaum classification [12].

Clinical assessment was conducted in the following stages: before treatment, after the first series consisting of 10 sessions, after a two-weeks break between the series, after the second series of 10 sessions, and six months after the last series. Both series of sessions were performed daily with one weekend break.

All patients were randomly assigned to 2 groups: group L (18 patients) was treated with low - level laser, and group M (20 patients) had pulsed magnetic field therapy. LLLT

Figure 1. Percentage of CTS patients with day pain before and after treatment with low - level laser (group L) and pulsed magnetic field (group M).



Significance of differences between percent of patients with day pain before and after treatment is expressed as: * $p < 0.05$

was performed using Ga-As (Galium Arsenide) laser device Physioter D-50 (ZEM MARP Electronic Krakow, Poland), beam class 3B with the following parameters: pulsed emission (200 ns), wave length 904 nm, power density 150 mW, frequency 10 000 Hz. The average diode power of laser applicator LAI-71 was 75 W. The total energy per treatment was 50 J, dose per point - 6.0 J/cm², and the duration of one session was 5 minutes and 33 seconds, according to the manufacturer's instruction.

The patients in group M received in one session 15 minutes of the PMF therapy with the use of device Magnetronic MF-10 (Elektronika i Elektromedycyna Otwock, Poland) with the use of sinusoidal field with low frequency of 10 – 40 Hz, induction 1.0 - 5.0 mTesla – mT.

In the statistical analysis, Student's t-test was used and p values < 0.05 were considered statistically significant.

RESULTS

Day and night paresthesia. Although a reduction of day and night paresthesia after each series of treatment and six months after the last series was observed in both groups of patients, statistically significant differences were found only in the group treated with the magnetic field (group M) after two weeks of treatment and six months after therapy ($p < 0.05$).

Day and night pain. After LLLT a significant reduction of day and night pain was observed at each stage of treatment and 6 months after the last series ($p < 0.05$). However, in group M, a significant reduction of both day and night pain was demonstrated after the second series and a decrease only in day pain was registered 6 months after the last series ($p < 0.05$) (Fig. 1, Fig. 2).

Moreover, a significant improvement referring to night pain was observed after 2 weeks of PMF therapy ($p < 0.05$) (Fig. 2).

Download English Version:

<https://daneshyari.com/en/article/2032177>

Download Persian Version:

<https://daneshyari.com/article/2032177>

[Daneshyari.com](https://daneshyari.com)