

Hilterapia® efficiency in handling the post surgical pain after the release of the carpal tunnel.

DESCRIPTIVE OBSERVATIONAL STUDY.

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ABSTRACT

A descriptive observational study was made to evaluate the efficiency of a new option of treatment, the high power laser therapy (Hilterapia®) in handling a frequent pathology as the pain in the palm of the hand after the open release of the carpal tunnel (pillar pin).

Pillar pain is a painful condition present in early stages in up to 41% of the patients after the transverse ligament release. This percentage diminishes with time, but has not yet had a therapeutic, efficient and non invasive treatment.

Thirteen patients were evaluated after being operated by three different surgeons with a standard open carpal release technique. After six months of surgery, they still presented a persistent and incapacitating pain that could be attributed to a pillar pain. All patients were summated to eight sessions of Hilterapia® treatment with the HIRO 3 equipment (ASA S.r.l., Vicenza, Italy). The energy applied in the painful area of the hand was 600 Joules. Two different parameters were evaluated: pain scale and grip strength, both affected by the pathology of pillar pain.

The study shows a tendency to diminish the pain and to improve the grip strength and the hand functioning. This can be

attributed to the use of Hilterapia®, which opens a therapeutic way to its use in this type of condition.

INTRODUCTION

Carpal tunnel syndrome is the most common entrapment neuropathy [1,2,3]. It is estimated to occur in 1% to 4% of the general population with a higher prevalence in women (3% to 5.6%) than men (0.6% to 2.8%) [2,3,4,5]. Although it is accepted that surgical decompression of the carpal canal is the treatment of choice in moderate to severe cases, or in those patients in whom non-operative treatment has failed to eliminate their symptoms, it is well known that this surgery sometimes fails to bring relief of symptoms to the patient [6,1,2,7,8]. Paresthesias and scar tenderness are common in the subacute recovery phase following carpal tunnel release [6,8,9]. An aggravation of symptoms is common in the period of two to six weeks after surgery. Several different situations may contribute, including the following: -Normal scar tenderness with anxiety and awareness after the surgery. - Normal scar adhesions to the perineural tissues. This may result in a sudden, brief electrical paresthesia. It may occur while reaching, gripping, or at rest. - Pillar

pain: tenderness adjacent to the actual ligament release, where the prominences of the trapezial ridge and the hook of the hamate are closest to the skin. The transverse retinacular ligament, divided during carpal tunnel release, attaches to these structures, and the inflammatory reaction of normal wound healing is most obvious at these points, often more than the central area of the actual release. -Reinnervation hypersensitivity: most often occurs if there was constant tingling, numbness or altered sensibility than before surgery. - Reflex sympathetic dystrophy. - Direct nerve irritation of one of the palmar cutaneous sensory branches to the palm or of the median nerve itself [6,1,2,3,7,8,10,11].

Pillar pain is a well known complication after carpal tunnel release. It is defined as tenderness on the base of the palm superficial to the carpal tunnel, which is not a spontaneous pain, sometimes concurrent with swelling and without sensory disturbance. The etiology of postoperative "pillar pain" remains controversial. If its cause is because of alterations in the carpal arch or in the origin of the hypothenar and thenar musculature that occur after transection of the transverse carpal ligament, one would expect this manifestation, regardless of the size of the incision. An alternate theory is that violating the palmar skin, cutaneous nerves, and underlying palmar fascia is responsible for this phenomenon [10,11,12]. Povlsen and Tegnell found that 41% of patients experience pain at 1 month after surgery, 25% at 3 months, and 6% at 12 months [9]. Despite its prevalence, postoperative "pillar pain" remains a perplexing problem that has no reliable treatment other than the tincture of time, or the minimally invasive technique in some cases, with the infiltration of local anaesthetic for neuromodulation [1,10]. In this observational study, we evaluated the efficiency of a new option of treatment, the high power laser therapy (Hilterapia®), in handling the pain in the palm of the hand after the open release of the carpal tunnel.

METHODS AND MATERIALS

Patients. The patients included in the study had to have a minimum of six months of post surgical treatment, with a painful hand attributable to a diagnosis of pillar pain. They were all sent by the hand surgeons that proceeded with a conventional open technique. Patients with diabetic neuropathy, rheumatoid arthritis, gout, thyroidal dysfunction or previous fractures of the carpal area were excluded.

The patients treated were distributed between the ages of 26 and 61 years old (average of 45). The gender distribution was of 30% male (4) and 70% female (9). The time average after surgery for the treated patients was 7.6 +/- 1.2 months; this time period is necessary because during the first months after surgery a spontaneous improvement of the pain can occur.

Two main variables were evaluated before and after Hilterapia® : pain and grip strength. Pain was graded through graphics and punctuation by the patients in a visual analog scale (VAS). Grip strength was measured by density resistant balls (theraballs), asking the patient in his first visit to compress each ball during three seconds, starting with the least resistant (15% pink), continuing with an intermediate resistance (25% green), and ending with the one with highest resistance (35% black). After the last laser session (8 sessions), the patients were asked to do the same exercise, and then compare the results. "A" was graded if the patient could only compress the pink ball. "B" was graded if the patient could compress both the pink and the green, and "C" if the patient could compress all the pink, the green, and the black balls.

Instruments. The only treatment applied to the 13 patients was the Hilterapia® with the HIRO 3 equipment by (ASA S.r.l., Vicenza, Italy), which is a high intensity Nd: YAG pulsed laser, with the standard hand piece for the pain therapy.

Methodology. During each session the following parameters were used:

- Initial phase with fast scanning, applying a total energy of 300 Joules

directed over the thenar and hypothenar eminences of the hand (3 sub phases: phase 1 with a fluency of 360mJ/cm² and frequency of 30Hz, phase 2 with fluency of 510mJ/cm² and frequency of 25Hz, and phase 3 with a fluency of 610mJ/cm² and a frequency of 20Hz).

- In the intermediate phase the laser was applied over the painful points on the palmar area of the hand with a maximum of four applications with the following parameters: fluency 510mJ/cm² and frequency of 15Hz for a total of 8 Joules per point.
- The final phase was applied with a slow scan with the same chosen parameters from the initial phase.

Eight sessions were performed on each patient, one every day during the first five days. In the second week of the treatment, the last 3 sessions were applied in alternating days.

RESULTS

After treating all thirteen patients, with eight sessions of Hilterapia® each, and with the parameters explained above, the following results were found:

The average by which the patients graded the pain before and after the treatment were as follows: before the treatment 7.53 +/- 0.96, and after the treatment 2.33 +/- 1.07; the

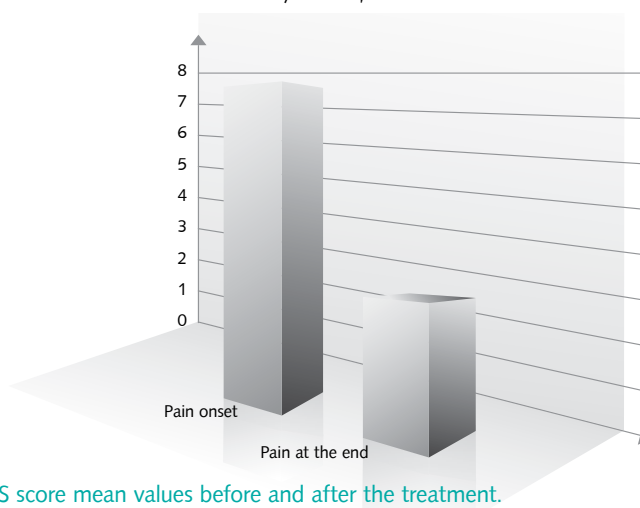


Figure 1: VAS score mean values before and after the treatment.

average variation was of 5.2 (Figure 1).

The grip strength average before the treatment was of 1.3 +/- 0.48, increasing to 2.15 +/- 0.55

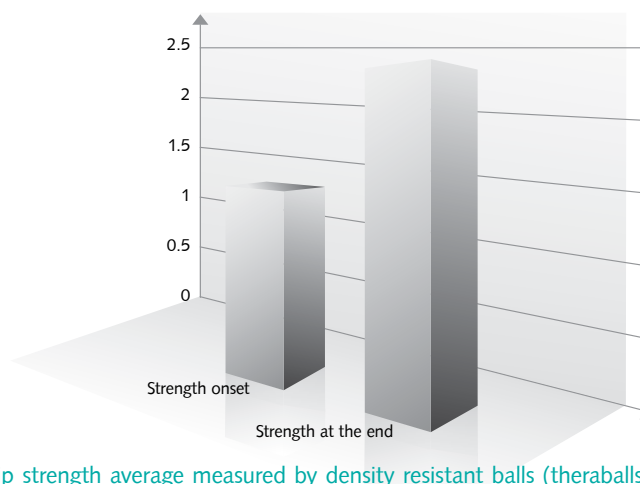


Figure 2: Grip strength average measured by density resistant balls (theraballs) before and after the treatment.

after the eighth session treatment, with an average variation of 0.85 (Figure 2). The following pictures show the change in parameters of pain and grip strength respectively, in each patient before and after the entire treatment with the Hilterapia®

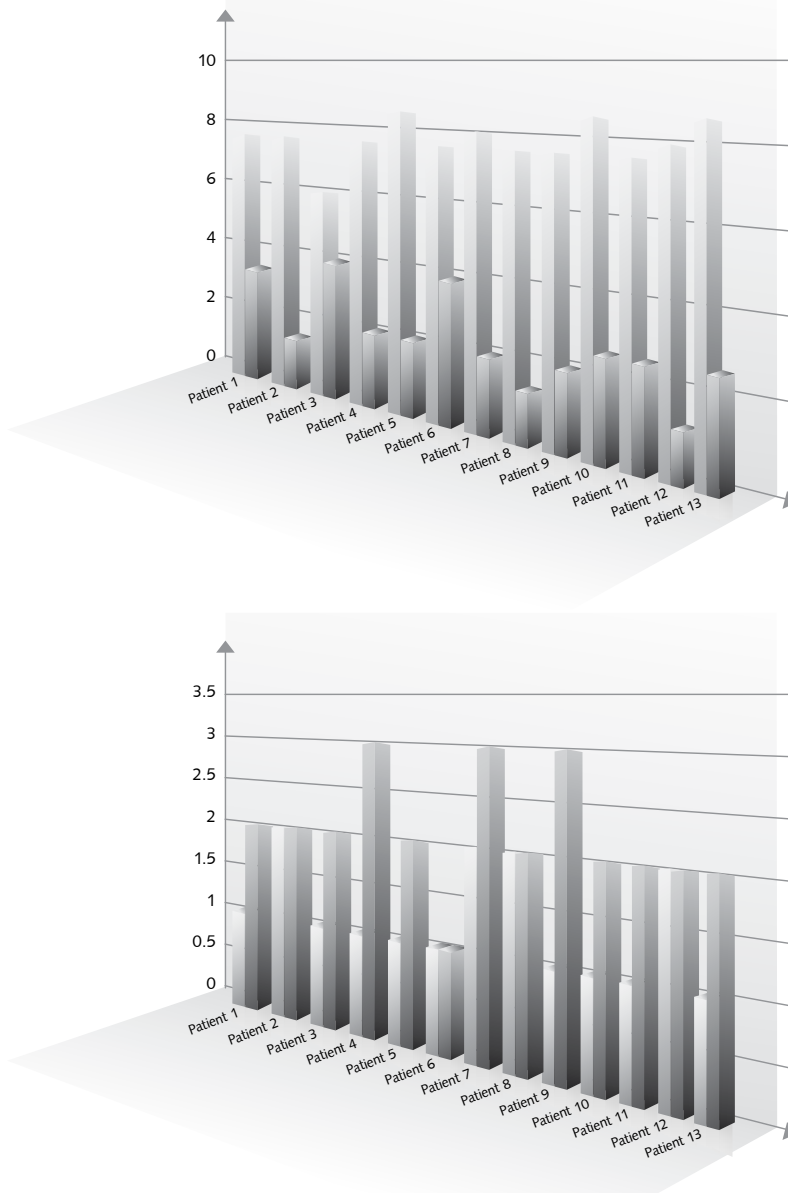


Figure 3: Pain and grip strength, in each patient, before and after the entire treatment with the Hilterapia®.

(Figure 3).

DISCUSSION

The release of the carpal tunnel is one of the most frequent surgical procedures. The open technique is the most used, due to its easiness and effectiveness. Nevertheless, a significant number of these patients remain with a hand pain, which incapacitate them from their diary activities. In the actuality, there is not an efficient treatment to this post surgical pain. That is why the efficiency of the Hilterapia® was evaluated, due to its

known effects in the control of pain and inflammatory processes.[13,14].

The group of treated patients was exposed just to eight sessions of laser therapy with Hilterapia® in a period of two weeks. They were all irradiated with the same energy of 600 Joules over the painful palmar hand area.

The results of this study lead us to believe that this treatment could help in the handling of this post surgical pain.

CONCLUSION

This study shows the preliminary results of the thirteen patients treated with Hilterapia® after undergoing the release of the carpal tunnel surgical procedure, and presented pillar pain.

As can be seen in these series of cases, Hilterapia® improves both the post surgical pain after six months of proceeded and the grip strength in all patients.

In conclusion, this study shows that it is worthwhile to perform future tests with a stronger epidemiological background to corroborate this new type of treatment.

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REFERENCES

- 1) Edgell SE, McCabe SJ, Breidenbach WC, et al. Predicting the outcome of carpal tunnel release. *J Hand Surg*, 2003, 28A: 255-261.
- 2) Geere J, Chester R, Kale S, Jerosch-Herold C. Power grip, pinch grip, manual muscle testing or thenar atrophy-which should be assessed as a motor outcome after carpal tunnel decompression? A systematic review. *BMC Musculoskeletal Disorders*, 2007, 8: 114.
- 3) Graham RA. Carpal tunnel syndrome. A statistical analysis of 214 cases. *Orthopaedics*, 1983, 6: 1283-1287.
- 4) Levine DW, Simmons BP, Koris MJ, et al. A self-administered questionnaire for the assessment of symptoms and functional status in carpal tunnel syndrome. *J Bone Joint Surg Am.*, 1993, 75: 1585-1592.
- 5) Rodner CM, Katarincic J. Open carpal tunnel release. *Techniques in orthopaedics*, 2006, 21(1): 3-11.
- 6) Atroshi I, Larsson GU, Ornstein E, et al. Outcome of endoscopic surgery compared with open surgery for carpal tunnel syndrome among employed patients: randomised controlled trial. *BMJ*, 2006, doi: 10.1136/bmj.38863.632789.1F
- 7) Kulick MI, Gordillo G, Javidi T, et al. Long term analysis of patients having surgical treatment for carpal tunnel syndrome. *J Hand Surg.*, 1986, 11(1): 59-66.
- 8) Mallick A, Clarke M, Kershaw CJ. Comparing the outcome of a carpal tunnel decompression at 2 weeks and 6 months. *J Hand Surg.*, 2007, 32(8): 1154-8.
- 9) Povlsen B, Tegnell I. Incidence and natural history of touch allodynia after open carpal tunnel release. *Scand J Plast Reconstr Surg Hand Surg*, 1996, 30: 221-5.
- 10) Monacelli G, Rizzo MI, Spagnoli AM, et al. The pillar pain in the carpal tunnel's surgery. Neurogenic inflammation? A new therapeutic approach with local anaesthetic. *J Neurosurg Sci.*, 2008, 52(1): 11-5.
- 11) Prick JJ, Blaauw G, Vredevelde JW, Oosterloo SJ. Results of carpal tunnel release. *Eur J Neurol*, 2003, 10: 733-736
- 12) Wilson JN. Profiles of the carpal canal. *J Bone Joint Surg Am.*, 1954, 36: 127-132.
- 13) Bodini G, Croce AM. Carpal tunnel syndrome: HILT therapy treatment. *Spera Medical Journal*, 2007, 5: 16-20.
- 14) Herbert R, Gerr F, Dropkin J. Clinical evaluation and management of work-related carpal tunnel syndrome. *Am Journal of industrial Medicine*, 2000,