MLS LASER THERAPY TREATMENT OF SHOULDER PAIN: A CONTROLLED COMPARATIVE STUDY.

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Shoulder pain (periarthritis humeroscapularis) is a widespread problem that is difficult to resolve, as well as having a varied etiology. This trial evaluated the effectiveness of treating this pathology with MLS Therapy, applied as a monotherapy, comparing the results with those obtained using traditional contact Laser therapy, in the presence of a suitable control group.
The results demonstrated that MLS Therapy is highly effective in inducing a fast reduction of painful symptoms and that this effect is greater than that obtained using traditional Laser therapy.

Introduction

The term "periarthritis" is commonly used to describe a range of painful situations in the shoulder region, including the impingement syndrome, acute and chronic calcific tendonitis, subacromial bursitis and adhesive capsulitis.
These are complex and multifactorial clinical scenarios, which cause pain and reduced mobility.
These pathologies are most commonly found in classic cases where the limb is subjected to excessive strain, either during work or following intense physical activity. Periarthritis is a strain-related pathology that affects the extra rotary muscles of the upper limb (supraspinatus, infraspinatus, teres minor) or the synovial bursae (subacromial, subcoracoid and subscapular). In some athletes, the shoulder is put through considerable strain and may be subject to repeated micro traumas. In the long term, these may determine a painful syndrome that is often the cause of a suspension of sports or work activity. The pain is frequently localized on the anterior/lateral face of the shoulder, tending to spread along the front face of the arm. Following the application of pressure, a strong pain in correspondence to the bicipital groove may arise. The painful symptoms also worsen when the joint is moved. In order to understand how the different clinical scenarios develop, we need to bear in mind some important anatomical/functional aspects. Firstly, there is a zone of greater wear in correspondence to the insertion of

the supraspinatus muscle, which is particularly delicate due to repeated trauma of the humerus head against the front margin of the acromion when raising and lowering the arm.
This trauma is responsible for lots of local painful situations ("impingement symptoms"). The long head of the biceps tendon is subjected to considerable wear, especially in proximity to the greater tuberosity and at the point where it enters the bicipital groove. There are also zones of precarious vascularization in correspondence to the supraspinatus tendons and the long head of the biceps. The so-called "critical zone", a portion of the supraspinatus tendon situated around 1 cm away from the insertion of the greater tuberosity, is very vulnerable.
This poorly vascularized zone may become ischaemic during movement when subjected to anomalous pressure.
Complex mechanisms may also lead to the occurrence of calcification, which frequently affects the supraspinatus tendon, followed by the infraspinatus, the teres minor and the subscapular in that order. Calcification may increase in volume, infiltrating the fibres of the nearby tendons and raising the floor of the subacromial bursa. The tendon may therefore break under the floor of the bursa or inside the bursa itself. This creates communication between the bursa and the articular cavity, which can be clearly seen in arthrography. At the same time, alterations may affect the adjacent bone structures, which may be subject to sclerosis, osteophytosis and atrophy.
The standard treatment for shoulder periarthritis, at least in the early stages, is essentially conservative and involves reduction of physical activity, pharmacological therapy with FANS, either generally or locally, and physiotherapy (Laser therapy, ionophoresis, T.E.N.S. or diadynamic currents, ultrasound therapy). Kinesitherapy is targeted at restoring joint mobility, especially in the clinical forms of frozen shoulder; restoring mobility makes it possible to reinforce the results achieved by medical and physical therapy while muscular

strengthening exercises aim to strengthen the weakened muscular groups. In our last study we highlighted the effectiveness of traditional Laser therapy in treating shoulder periarthritis, both through point treatment and by scanning the zone to be treated. Some recent studies, including those featured in this scientific report, have highlighted the effectiveness of MLS Therapy in treating various osteo/muscular/tendinous pathologies.
In particular, its greater effectiveness in terms of pain relieving speed has been highlighted in comparison to that of traditional Laser therapy for the treatment of cervicalgia caused by whiplash.
We wanted to extend the comparison of the effectiveness of MLS Therapy and traditional Laser therapy to the treatment of periarthritis humeroscapularis, another pathology that is difficult to resolve.

Patients and methods

72 patients suffering from shoulder pain due to strain, including 38 men and 34 women, were randomly divided into 3 groups of 24 patients each. These groups were respectively treated with traditional contact Laser therapy, traditional scanning Laser therapy and MLS Therapy. Each patient underwent ten treatment sessions, whatever the therapy type (one application per day for 10 consecutive days). The painful symptoms were assessed using the VAS scale (visual analogue scale) at the end of each session.
The dimension of the calcifications was assessed using ultrasound (probe for small parts at 7.5 – 10 MHz).
The point therapy was performed using the IDEA TS device (ASA Srl, Arcugnano, Italy) equipped with a continuous emission hand piece, 808 nm, P_{max} 500 mW. The treatment was performed on local points of pain and any active trigger points identified by means of palpation.

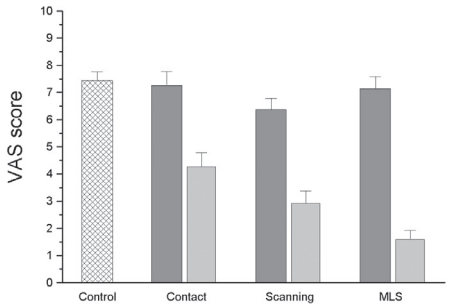
Device	IDEA TS	COMBY TS D	MIX5
Therapy	Contact	Scanning	MLS
Wavelength	808	808+905	MLS Pulse
Time (mm:ss)	00:10	02:53	01:14
Frequency (Hz)	700	700	700
Dose (J/cm^2)	1.2	1.2	1.2

Table 1: Emission features of the devices used and treatment parameters.

The scanning treatment was administered using the Laser COMBY TS model D system (ASA Srl, Arcugnano, Italy), evenly covering the anterior and posterior region of the shoulder. Finally, MLS Therapy was performed using the MIX5 system (ASA Srl, Arcugnano, Italy), administering the energy in the front zone and in the rear zone of the joint.
The same energy dose was supplied in all 3 cases (1.2 J/cm^2) and the same Laser pulse repetition frequency was used (700 Hz).
The emission characteristics of the devices and the application parameters are described in table 1.
All three therapeutic methods were applied as monotherapies, without the aid of pharmacological treatment or physio/kinesitherapy.
A second control group was also recruited, involving the same number of patients (72), age distribution, sex, and initial average pain intensity as assessed using the VAS scale. This group was subjected to objective painful symptom examinations at the same time as the first group and was then treated with MLS Therapy after 10 days had passed, when treatment on the first group had come to an end. This was done in order to monitor variations in the course of the painful symptoms due to the natural evolution of the disease. The treatment methods and parameters were the same as those described for the study group.
The painful symptoms of each group were assessed using the VAS scale at 15, 30 and 60 days from the end of treatment.

Results

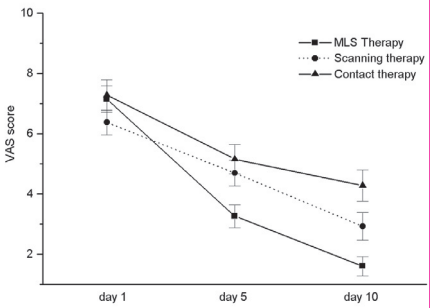
Painful symptoms
All three therapeutic methods proved to be effective with respect to the control group, guaranteeing statistically significant pain relief (see figure 1 and table 2). The two traditional techniques (contact/scanning) were not found to be equally effective. In fact,



(Fig. 1)

Therapy	Day 1	Day 5	Day 10
Control group	7.29±0.45	7.37±0.41	7.45±0.32
Contact	7.27±0.51	5.15±0.49	4.27±0.52
Scanning	6.37±0.41	4.69±0.43	2.92±0.46
MLS	7.14±0.44	3.26±0.38	1.60±0.32

Table 2: Average VAS score measured at day1, day 5, day 10 of treatment



(Fig. 2)

scanning with the combined emission was found to be slightly more effective in terms of pain relief speed compared to the contact Laser therapy (figure 2). However, the increase in pain relief speed obtained using MLS Therapy was highly significant and much faster than the traditional treatments. The percentage of patients for whom MLS therapy was effective was particularly high (84%).
The follow up at 15, 30 and 60 days confirms that the results are long-lasting.

Calcification dimensions
As far as regards the calcification dimensions, all three types of Laser treatment led to a significant reduction of approximately the same entity.

Conclusions

This study demonstrates that the new MLS Therapy is a valid tool for treating shoulder pain, since it makes it possible to reduce painful symptoms within a shorter space of time than traditional contact or scanning Laser therapy. The results obtained in the follow up at 15, 30 and 60 days from the end of the treatment confirm that the results obtained are long lasting and not due to a transitory effect of temporary analgesia. The success rate (84%) appears to be particularly important in consideration of the fact that MLS Therapy was not associated with other types of physical, pharmacological or manipulative treatment.