



# MLS THERAPY TREATMENT OF VARIOUS OSTEO/MUSCOLAR/TENDINOUS PATHOLOGIES.

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*This study aimed to investigate the effectiveness of MLS Therapy treatment on various osteo/muscular/tendinous pathologies. 128 patients aged between 18 and 82 were treated with MLS Therapy for shoulder pain, lumbago, lumbosciatica, carpal or metatarsal tunnel syndrome and tension headache. Following treatment, significant remission of the painful symptoms was observed in all cases treated. The results confirm the therapeutic validity of the new MLS Therapy, as long as certain fundamental criteria are respected when establishing the therapeutic protocol.*

## **Introduction**

Some osteo/muscular/tendinous pathologies are a source of considerable social costs due to their incidence amongst the population and their debilitating symptoms.

The extent of the phenomenon and its consequent economic impact increase with the prevalence of the pathology, especially in the workplace. In order to provide a clear picture of the extent of the problem, we have provided some information regarding the incidence of some of the pathologies covered by this study.

### *Chronic lumbago*

Chronic lumbago is a syndrome of variable etiology, second only to widespread respiratory diseases as the cause of time off work.

In Great Britain, 46% of a random sample of the general population claims to have suffered from lumbago at least once in their lives. This leads to an estimated cost of 620 million Euro/year. It is estimated that paid sick days due to back pain will increase to 106 million by 2002-2003 (Waddell G., 1996; Andersson G.B., 1999).

### *Lumbosciatica*

Lumbosciatica is also a syndrome of variable etiology, characterized by pain that spreads from the lumbar area to the buttocks and lower limbs, following a lateral or posterior course. The most widespread causes are a prolapsed intervertebral disc and contraction of the



Pathology	N° patients
Shoulder pain (PHS)	36
Lumbago	28
Lumbosciatica	32
Carpal tunnel syndrome	12
Metatarsal tunnel syndrome	10
Tension headache	10
	<b>128</b>

Table 1: Patient distribution by pathology.

ileopsoas muscles. The pathology strikes both sexes in the same way, affecting around 7% of Italian adults (Various Authors, 2003)

#### *Carpal tunnel syndrome*

Carpal tunnel syndrome is caused by compression of the median nerve at the height of the wrist, caused by enlargement of the tendon due to inflammation inside the tunnel. Compression of the median nerve causes pain, lack of feeling and tingling in the first three fingers of the hand. If the pathology is not treated early, it may lead to permanent disability. It is estimated that, in the United States, around 3-4% of the total population may develop the syndrome every year, with a consequent demand for treatment and temporary inability to work (Tanaka S. et al, 1994). Data regarding the Italian population is substantially similar (Mondelli M. et al, 2002).

#### *Tension headache*

Sporadic tension headaches occur in around 30 per cent of the general population, while 5% suffer from this problem recurrently (at least one episode per week). Prevalence varies from 34-65% in men to 36-86% in women. Typical neurological symptoms include painful pressure on head and neck muscles, the discovery of painful points corresponding to muscles during palpation, and contraction of the masseter and trapezius muscles. The intensity of the pain is slight-average and never completely disabling.

Its characteristics do not vary over time or according to age.

In its episodic form, the headache lasts from 30 minutes to seven days (less than one day in most cases). In its chronic form, the pain lasts from months to years and is only subject to one or two day interruptions. In 90 per cent of cases the pain is bilateral, strong, coercive and non-pulsating. The regions affected are usually the nape and the forehead. The pain may however extend to the occipital, parietal and frontal regions, and sometimes even to the shoulders. The accompanying symptoms include paracsis,



dizziness and slight neck stiffness (especially if the pain has spread to the neck). Pain is the only symptom in the episodic form, while chronic forms may be associated with photo/phonophobia, irritability, anorexia and nausea.

*Periarthritis humeroscapularis (shoulder pain)*

The term periarthritis humeroscapularis indicates a condition of periarticular inflammation that is really caused by a combination of different pathologies. It affects around 1-2% of the total population (van der Windt DA. et al, 1995). This pathology can also lead to painful, debilitating symptoms and considerable reduction of articular mobility, with consequent problems for the patient in performing even the simplest daily activities.

For all the above pathologies, pharmacological treatment targeted at reducing the painful symptoms and/or treating the inflammatory process may be more or less effective depending on the case and the pathological etiology. The problem of undesirable side effects, which are always present, is particularly significant in specific patient categories, such as the elderly, who may be less tolerant to pharmacological treatment, making this type of approach more problematic.

Clinical practice has recognized Laser therapy as a possible alternative or adjuvant. In fact, the effectiveness of Laser radiation, with suitable emission parameters, has been demonstrated in inducing analgesia, reducing the inflammation and reducing oedema. Clinical evidence on the subject (Tuner J. and Hode L, 2002) leads us to surmise that certain wavelengths and emission methods are able to provide specific therapeutic effects. Approaches that combine different infrared emissions and different emission modes (continuous and pulsed) are particularly interesting.



Clinical protocol	
N° sessions: 6	Shoulder pain Tension headache Carpal and metatarsal tunnel
N° sessions: 8	Lumbago Lumbosciatica
Standard treatment protocol (fixed duty cycle)	
Shoulder pain (PHS)	2 min <i>point app. duration</i> 900 Hz <i>pulse rep. frequency</i> 2.16 J/cm <sup>2</sup> <i>dose supplied</i>
Lumbago Lumbosciatica	3 min <i>point app. duration</i> 900 Hz <i>pulse rep. frequency</i> 3.24 J/cm <sup>2</sup> <i>dose supplied</i>
Carpal tunnel syndrome	2 min <i>point app. duration</i> 900 Hz <i>pulse rep. frequency</i> 2.16 J/cm <sup>2</sup> <i>dose supplied</i>
Metatarsal tunnel syndrome	2 min <i>point app. duration</i> 900 Hz <i>pulse rep. frequency</i> 2.16 J/cm <sup>2</sup> <i>dose supplied</i>
Tension headache	2 min <i>point app. duration</i> 400 Hz <i>pulse rep. frequency</i> 1.81 J/cm <sup>2</sup> <i>dose supplied</i>
Analgesic treatment protocol (variable duty cycle) - very acute/acute stage	
All	1-5 min <i>point app. duration</i> 5 Hz <i>pulse rep. frequency</i> 0.085-0.423 J/cm <sup>2</sup> <i>dose supplied</i>
Treatment protocol for pathologies in chronic or ingrained stage	
All	1 min <i>point app. duration</i> CW (continuous wave) 2.23 J/cm <sup>2</sup> <i>dose supplied</i>

Table 2: Clinical protocol and treatment parameters.

These approaches have demonstrated (Corti L. et al, 2003) interesting biostimulation properties, already suggested by previous in vitro and in vivo studies (Gigo Benato D. et al, 2003; Squizzato F. et al, in press).

Innovative MLS Therapy appears to be particularly promising. In fact, in addition to combining specific continuous and pulsed infrared Laser emissions, it synchronizes them using a specific patented system, thereby creating a characteristic energy emission temporal pattern. The previous clinical results described in this report, together with those obtained in other centres where MLS Therapy is used on a regular basis, indicate that in the treatment of certain common pathologies affecting the muscular system, this synchronization synergizes the therapeutic analgesic and anti-inflammatory/anti-oedema effects, reducing treatment times and increasing the effectiveness of the therapy.

The scope of this study is therefore to investigate the effectiveness of MLS Therapy on some common pathologies, and, in the event of a positive result, to identify the optimal treatment parameters on the basis of the phase of the pathology (very acute/acute or chronic/ingrained).

### Population and Methodology

128 patients aged between 18 and 82 (average age 40), including 62 men and 66 women, suffering from the pathologies indicated in table 1, were treated with MLS Therapy using the MIX5 device (ASA srl, Arcugnano, Italy).

The effectiveness of the treatment was assessed by means of a subjective examination (VAS scale) at the end of each session.



The treatment was administered to each patient on a daily basis, on weekdays. The number of treatments varied depending on the pathology being treated (from a minimum of 6 to a maximum of 8 sessions, see table 2). The patients were normally treated using standard treatment parameters (pre-set in the device) established on the basis of the available clinical literature (Bjordal J.M., 2003; Tuner J. and Hode L, 2002). The therapy was only adapted to the individual patient's response if necessary (reduction of the VAS during the first two sessions to below 1.5), depending on the phase of the pathology (very acute/acute or chronic/ingrained), respectively opting for more marked analgesic treatment targeted at direct action on the pain transmission mechanism or more aggressive treatment in order to facilitate the resolution of more ingrained pathologies.

The author, being experienced in acupuncture, optionally performed the treatment also on acupuncture points.

In patients suffering from an acute or very acute stage of the pathology, we decided to apply MLS Therapy following a protocol based on the administration of low energy doses at a low frequency. This was possible because the device in question allows the operator to modify the duty cycle from fixed to variable, making the dose dependent on the pulse repetition frequency. In the case of pathologies in a chronic or ingrained stage, we applied a protocol based on the administration of energy doses similar to those applied in standard protocols, supplied in a shorter space of time.

The treatment parameters used in the various cases are indicated in table 2. A brief description follows of the practical treatment method using the multidiode applicator supplied with the MIX5 device.

Before each application, the skin in the area in question was cleaned thoroughly using a bland disinfectant solution.

#### *Shoulder pain.*

Application in front of and behind the joint, with particular attention to painful points detected during the check-up, focusing on active



trigger points. The applicator was positioned at the centre of the local pain. As a reference, the anterior points of acupuncture IC 14, 15, 16; TR 14 and the posterior points IT 9, 10, 11, 12, 13 were taken into account.

#### *Lumbago.*

Treatment of the lumbar region, on both sides of the spinal column, especially at the level of the lower margins of the spinal apophyses of L2-L5 and to the sides of the sacrum. Treatment of four additional points per side, two in a distal direction starting from the articulation between L3 and L4 and two in a distal direction starting from the articulation between L5 and S1.

#### *Lumbosciatica.*

Treatment on points corresponding to the lower margins of the spinal apophyses from L1 to S1, to the right or left of the spine depending on the sciatic nerve involved. Application to 8 points along the sciatic nerve (with reference to the acupuncture points V36, 37, 40, 55, 56, 57, 60).

#### *Carpal tunnel.*

Treatment on two points above the plica of the wrist, on the plica, and on two points at the level of the palm of the hand (reference to points MC5-8).

#### *Metatarsal tunnel.*

Treatment at the level of the metatarsus with reference to acupuncture points F3-4, VB 40-41.

#### *Tension headache.*

Treatment of the active trigger points on the trapezius muscle and the masseters.



Pathology	Initial VAS	Final VAS
Shoulder pain (PHS)	8.50	2.00
Lumbago	6.50	2.00
Lumbosciatica	7.50	2.00
Carpal tunnel syndrome	6.00	2.00
Metatarsal tunnel syndrome	6.50	2.00
Tension headache	8.50	2.00
	<b>7.63</b>	<b>2.00</b>

Table 3: Initial and final VAS scores in relation to the pathology in question, and overall averages before and after treatment. The overall averages (in bold) are pondered averages for the number of patients in each class.

The average VAS scores relative to each group of patients (for each specific pathology) were calculated before starting MLS treatment and after completion of the entire therapy cycle. These values were compared using t tests and ANOVA when necessary.

## Results

At the end of the treatment sessions, a significant reduction ( $p < 0.0001$ ) in the VAS score was observed in all patients, from an average of 7.63 to an average of 2.00 (Figure 1). In the case of some pathologies (shoulder pain, tension headache), the reduction - in terms of absolute difference - was even more significant (see table 3).

In 70% of patients, independently of the pathology, we also observed a reduction in the VAS score from the initial value to what would be the final post-treatment score by the end of the fourth session. For these patients, the treatment was continued for a further 2-4 sessions in order to keep the trial conditions homogenous, but it is unlikely that stopping treatment would have led to a fresh outbreak of the symptoms.

## Discussion

The results of this study extend the indications for MLS Therapy and suggest its general validity for many other osteo/muscular/tendinous pathologies.

In fact, MLS Therapy proved itself to be particularly effective in the treatment of all the pathologies considered, using the protocols initially established on the basis of earlier clinical experience.

These protocols guaranteed an excellent result in the majority of cases treated.



The fact that some patients suffering from particularly intense painful symptoms, especially deriving from pathologies at an acute stage, found particular relief when the treatment parameters were modified in order to provide an MLS Therapy protocol with a marked analgesic effect (changing duty cycle from fixed to variable and reducing the pulse repetition frequency), demonstrates how important it is to be able to adapt the therapy to the individual patient’s response and also on the basis of the neurogenic pain component.

It is therefore important that the MLS Therapy tool employed, as is the case of the one used in this trial, makes it possible to cater for this requirement in cases where it is necessary to apply this type of protocol.

Although this trial was performed on a limited number of patients, the results lead us to believe that MLS Therapy is an extremely valid approach for treating the pathologies in question, in terms of ease of application, absence of side effects, effectiveness and speed in reducing the painful symptoms.

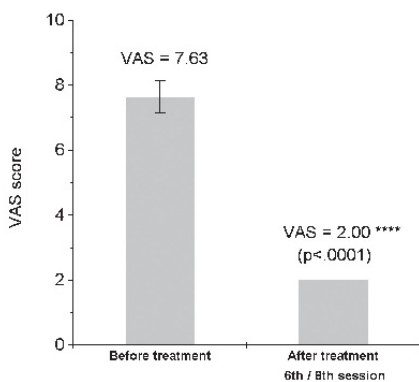


Fig. 1: Average VAS scores before start of treatment and after completion of treatment with MLS therapy.





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