

Effect of MLS® Laser Therapy on Pain and Satisfaction for Musculoskeletal Conditions: A Retrospective Study

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ABSTRACT

What most often runs in parallel with injuries, chronic joint damage, and post-operative wounds is pain. Pain management is a duty that physicians must assist patients with on a daily basis. There is an abundance of pain-reducing techniques used in clinics today, including opiate pain medications and steroid injections, with new medications and technologies continuing to be developed. MLS® Laser Therapy is a growing pain-reducing technique that utilizes light to produce anti-inflammatory and analgesic effects. This retrospective chart analysis study was designed to evaluate patient pain and satisfaction for a variety of musculoskeletal conditions before and after treatments with MLS® Laser Therapy. The study included post-hoc charts available at a laser pain center in Sedalia, Missouri, United States. The average decrease in reported pain was 46% at (or after) three treatment sessions and 55% at (or after) six treatment sessions. The average patient satisfaction for all 11

conditions was 71% satisfied or better, while the average doctor-reported improvement for all conditions was 67%. Results indicate MLS® Therapy Laser as a pain free, noninvasive alternative to reducing pain and increasing satisfaction for a variety of musculoskeletal conditions.

INTRODUCTION

Pain caused by musculoskeletal conditions is a worldwide commonality that transverse age and demographics. These conditions do not only affect older populations but also impact individuals throughout the age spectrum. Musculoskeletal conditions are the second largest contributor to disability worldwide with persistent pain conditions accounted largely for by musculoskeletal conditions [1]. Commonly, patients with musculoskeletal pain will seek medical treatment, and one such noninvasive treatment option is laser therapy.

Light Amplification via Stimulated Emission of Radiation (LASER) is a device that, by design,

amplifies photons to create and emit a beam of light that is classified by its wavelength within the electromagnetic spectrum. This wavelength, measured in nanometers (nm), dictates the nature and intended purpose of the laser. Therapy lasers, with wavelengths ranging from 600nm to 1000nm, penetrate skin and tissue as photons are not strongly absorbed by hemoglobin or water in the body [2].

Lasers for Low Level Light Therapy (LLLT) have been designed with low emission to ensure the treated tissue temperature does not rise more than a few degrees above normal body temperature [2]. LLLT treatments have demonstrated significant and effective results in decreasing muscle fatigue in elderly women [3], as well as improving circulation in treated areas and reducing pain in knee osteoarthritis [4].

The Multiwave Locked System (MLS®), a type of LLLT laser, has been shown to decrease inflammation and increase the biostimulation effect on tendons [5], increase functionality of ligaments by decreasing thickness and decreasing patient pain [6], and increase myoblast function thus increasing recovery of damaged muscle tissue [7]. MLS® Laser Therapy has also shown significant clinical improvement in vascular conditions such as Raynaud's Phenomenon [8].

The MLS® M6 Therapy Laser emission precisely synchronizes dual wavelengths consisting of 808nm and 905nm, as well as combining continuous and pulsed emissions, resulting in optimum clinical effectiveness [7]. The MLS® emission provides more efficient results while using less energy in considerably reduced times compared to traditional LLLT [9].

MLS® is being utilized by many medical practitioners in the United States and Europe to reduce pain and inflammation in a variety of patients. Many patient success stories have been a result of treatments with MLS®, including in orthopedic practices. This retrospective chart review analyzed 235 charts who received MLS® Laser Therapy at a single medical facility with the purpose to identify

the reported patient pain and satisfaction following treatment sessions. Eleven pre-determined orthopedic conditions were identified to review.

METHODS

Chart Selection

Medical diagnoses were assigned to each patient by an orthopedic medical doctor prior to laser therapy. The 11 conditions identified for this study were based on commonality and available resources: knee arthritis, lumbar pain, shoulder arthritis/pain, post-operative total knee replacement (TKR)/ post-operative total hip replacement (THR), neck pain, plantar fasciitis, wound, hip arthritis/pain, contusion/sprain, tendonitis, and post fracture/ joint jam. Only charts representing one of these 11 conditions were selected for review and analysis.

Since MLS® Laser Therapy is cumulative in effectiveness, multiple treatment sessions were recommended to patients. Due to incongruencies in number of completed treatment sessions across conditions, the time points chosen to analyze during this chart review were after the 3rd treatment session and after the 6th treatment session.

Inclusion criteria included: diagnosis and treatment for knee arthritis, lumbar pain, shoulder arthritis/pain, TKR/THR, neck pain, plantar fasciitis, wound, hip arthritis/pain, contusion/sprain, tendonitis, or post fracture/ joint jam and at least 3 MLS® Laser Therapy treatment sessions. The energy density (fluence) was in the range at 3.6-7.0 J/cm². Charts were excluded if the condition was outside the 11 specified, did not complete at least 3 treatment sessions, or did not have Visual Analogue Scale (VAS) recorded.

Procedures

Each chart was analyzed to determine the decrease in pain (from Treatment Visit 1 to Treatment Visit 3 and again from Treatment Visit 1 to Treatment Visit 6), the overall patient-reported satisfaction (satisfied with MLS® outcome or not satisfied with MLS® outcome), and post-hoc doctor reported

improvement (Poor, Fair, Good, or Excellent). Doctor-reported improvement was based upon the patients' reports on VAS for pain at the time of treatment sessions (see Table I). In addition, the various settings of the laser, including frequency, duration of administration, and intensity were recorded. For all post-hoc analysis, a single study team member reviewed all charts and recorded necessary information on case report forms.

RESULTS

The percent decrease in pain were calculated for each selected condition. These results were averaged in Table II. The averages are

Table I - Criteria for Pain Improvement

Average VAS Pain Improvement	Doctor Rating
<0%	Poor
0% to 30%	Fair
30% to 60%	Good
60% to 100%	Excellent

represented across top with conditions along the side. In each, "n" represents number of charts available for that analysis.

Table II - Decrease in Pain, Reported Satisfaction, and Reported Improvement for All Conditions

Condition Reported	Average % decrease in pain in or after 3 treatments	Average % decrease in pain after 6 treatments ¹	Overall patient satisfaction (in average %)	Overall doctor reported improvement (based on individual assessment of pain improvement; measured in average %)
Knee Arthritis	51 n= 14	66 n=2	86 satisfied or better	86 good or better
Lumbar	49 n= 26	53 n=10	71 satisfied or better	64 good or better
Shoulder Arthritis/ Pain	39 n= 30	47 n=4	60 satisfied or better	53 good or better
Post Op TKR/THR	57 n=38	87 n=11	76 satisfied or better	76 good or better
Neck Pain	47 n=19	74 n=3	63 satisfied or better	63 good or better
Plantar Fasciitis	78 n=6	0 ² n=1	100 satisfied or better	100 good or better
Wound	13 n=7	N=0	25 satisfied or better	25 good or better
Hip Arthritis/ Pain	48 n=7	25 n=1	71 satisfied or better	57 good or better
Contusion/Sprain	51 n=18	77 n=3	80 satisfied or better	75 good or better
Tendonitis (Ankle, Wrist, Fingers, Elbow, Shoulder)	45 n= 46	48 n=4	77 satisfied or better	71 good or better
Post Fracture/ Jam	34 n= 27	75 n=2	70 satisfied or better	66 good or better

¹ Most patients did not receive 6 or more treatments

² Only one patient had more than 3 treatments for Plantar Fasciitis. For this patient: after 6 treatments there was no decrease in pain and at the conclusion of all treatments (22) pain was 75% improved.

Patients with plantar fasciitis, when treated with MLS® Laser Therapy, reported the largest average decrease in pain (78%) and overall were the most satisfied with their results (100%). Patients receiving treatment after total knee or hip replacements reported the second largest average decrease in pain by 57% at (or after) 3 treatments (e.g. pre-treatment VAS score of 8 to post treatments

VAS score of 3.5). The top 4 conditions in order of improvement are listed in Table III. The top 4 conditions in order of satisfaction are listed in Table IV. Average overall patient satisfaction for all 11 conditions was 71% satisfied or better (range 100% to 25%). Average overall doctor reported improvement for all conditions was 67% (range 100% to 25%).

DISCUSSION

Of the 235 total patient charts analyzed, none experienced pain during or after laser therapy as a direct result of treatment. Few possible side effects were noted but all resolved quickly with no lasting effects.

Overall, among the 11 conditions analyzed, the average decrease in reported pain was 46% at (or after) 3 treatment sessions. This equates to a patient having a pain reported at 8 out of 10 prior to MLS® Laser Therapy and at (or after) 3 treatments having a pain level of 4.32 out of 10. At (or after) 6 treatment sessions, the average decrease in reported pain was 55%, thus equating in pretreatment pain of 8 out of 10 and resulting in pain of 3.6 out of 10.

When reviewing the data, it's noted that most patients did not receive 6 or more treatment sessions. It can be estimated that results may continue to trend in the same direction if more treatments occurred since MLS® is cumulative in effectiveness.

Since pain is universally consistent with injuries, chronic joint damage, and post-operative wounds, pain management options for patients are essential. Results of this study indicate MLS® Therapy Laser as a possible pain-free, noninvasive alternative to reducing pain for a variety of musculoskeletal conditions.

Table III - Condition in Order of Improvement in or After 3 Treatments

Plantar Fasciitis
Post-Op TKR/THR
Contusion Sprain
Knee Arthritis

Table IV - Overall Satisfaction at Conclusion of Treatment

Plantar Fasciitis
Knee Arthritis
Contusion Sprain
Tendonitis

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