

# Class IV Laser Research

## Research Table of Contents:

1. nerve pain, neuropathy, carpal tunnel, trigeminal neuralgia, nerve damage, stroke, parkison's
2. low back pain, arthritis, joint pain, cartilage repair, muscle strength, frozen shoulder, soft tissue injuries
3. cellular function, wound healing, cellular reproduction increase, thyroid function

## **Section 1. nerve pain, neuropathy, carpal tunnel, trigeminal neuralgia, nerve regeneration**

### **PERIPHERAL NEUROPATHY**

After treatment, there was an improvement of 71%. Only 43% continued to have loss of protective sensation. Light treatment associated with a reduced incidence of diabetic foot wounds and amputations

*J Am Podiatr Med Assoc. 2005 Mar-Apr; 95 (2)*

### **NERVE GROWTH OKIMULATION**

Contolled trial showed regeneraton of sciatic nerve and myelination in rat.

*Rochkind. Photomed & Laser Surg. 2007, 25(3): 137-143.*

### **LASER THERAPY IMPROVED SPATIAL PERCEPTION, IMPROVED NERVE FUNCTION, IMPROVED EMG OKUDY OUTCOMES.**

Laser causes regeneration of nerve tissue

*Peric Z, Srp Arh Celok Lek 2007 May-Jun; 135 (5-6): 257-63*

### **CARPAL TUNNEL BETTER WITH LASER**

LLL better than splinting

*Clinical Rheumatology (2009 Sep;28 (9):1059-65*

### **TRIGEMINAL NEURALGIA BENEFITS**

Statistically significant difference to pain relief with reduced consumption of analgesics in 60% of pts whose treatment was successful was maintained at 1 year follow up

*Eckerdal & Bastian Laser Therapy 1996 (8) pp 247-52*

## **NERVE HEALING**

Desensitizes C-fibers-(nerves that transmit pain)

INCREASED: Conduction latency, Schwann cell product, Nerve cell metabolism, Nerve process sprouting

DECREASED: Neural scarring and nerve microtubules, Retrograde posttraumatic degeneration, Multiple nerve discharge

Rochkind S, Photomed Laser Surg. 2006 Jun;24 (2):121-128

6% OF PHOTONS REACH SPINAL CORD

Applied directly to AP of porcine subjects; 6% of photons reached cord and increased CGRP/mRNA

*Kimberly Byrnes, PhD, NAALT, 2003/2004*

## **OKROKE HELPED WITH LASER**

Laser applied to skull improves brain following stroke

*Curr Cardiol Rep. 2010 Jan; 12 (1):29-33*

## **OKROKE**

Animal study; Neurological deficits improved

*Lasers Surg Med. 2006 Jan;38 (1):70-3.*

*Stroks. 2006 Oct;37 (10):2620-4.*

## **PARKINSON'S IMPROVED WITH LASER**

LLL improves nerve function with Parkinson's

*Molecular Degen 2009 Jun 17;4:26*

## **DEPRESSION AND ANXIETY DISORDERS IMPROVED**

LLL applied to skull decreased depression and anxiety.

*Behavioral and Brain Functions, 2009, 5:46, 8 December 2009*

## **TREATMENT OF THE OKELLATE GANGLION POSITIVELY AFFECTS THE SYMPATHETIC NERVOUS SYOKEM**

*Kemmotsu. Laser Therapy 1997 (9) pp 5-6*

**Section 2: low back pain, neck pain, shoulder pain, arthritis, joint pain, cartilage repair, frozen shoulder, soft tissue injuries**

## **LOW BACK PAIN**

83% of patients report "positive report" in reduction of pain with laser therapy  
*A. Venturin, M. Ortolani MLS Laser Scientific Report, pp 37-38*

## **NECK PAIN AND MOBILITY**

Reduced pain and increased joint mobility following 10 laser treatments.  
Most result noticed after 5 treatments.  
*Corti Luigi, Maccari Monica, MLS Laser Scientific Report, pp 42-47*

## **95% EFFECTIVENESS AT RELIEF OF NECK PAIN; RECURRENCE OF PAIN 58% IN PLACEBO GROUP, BUT ONLY 14% IN LASER TREATED GROUP**

*Soriano et al, Laser Therapy, 1996 (8) pp 149-154*

## **FROZEN SHOULDER BENEFITS**

A significant improvement in laser therapy compared to the control group. The treatment group experienced significantly less pain and significantly improved disability scores. Range of motion in the treatment group was better than placebo.  
*Photomed Laser Surg. 2008 Mar 16.*

## **SHOULDER PAIN**

84% success rate in treating shoulder pain.  
*Luigi Corti, MLS Scientific Report, pp 62-67*

## **CARDIAC MUSCLE BENEFITS**

Laser doubles the rate of muscle regeneration in ischemia reperfusion injuries. Laser reduced scar tissue post MI by 70%; Dramatic stimulation of satellite and stem cells. Increased Heat Shock Prot and anti-oxidants  
*Oron U. Photomed Las Surg. 2006; 24 (2):111-*

## **MUSCLE PERFORMANCE BETTER WITH LASER**

Laser increases strength of muscles during exercise  
*Lasers Med Sci. 2010 Nov 18*

## **CARTILAGE REGENERATION**

Laser therapy significantly enhanced the stiffness of the cartilage after

approximately 8 weeks of treatment. Laser therapy has ability to regenerate damaged cartilage.

### **TENDINITIS AND MYOFASCIAL PAIN BENEFITS**

Acute tendinitis had the best response

*Logdberg-Anersson et al, Laser Therapy 1997 (9) pp 79-86*

### **TENDON HEALING**

Treatment affects degenerative changes in tendon matrix/collagen production and inflammation. The mean effect over placebo was 32%.

Optimal treatment intervals: daily or every other day for 2-4 weeks

*Bjordal et al, Physical Therapy Reviews 2001*

### **ACHILLES TENDINITIS**

Prostaglandin E2 concentrations were significantly reduced. Pressure pain threshold had increased significantly and reduced inflammation and pain

*Br J Sports Med. 2006 Jan;40 (1):76-80; discussion 76-80.*

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*Jia YL and Guo ZY. Effect of low-power He-Ne laser irradiation on rabbit articular chondrocytes in vitro. Lasers in Surgery and Medicine. 2004. 34(4): 323-328.*

### **MUSCLE PERFORMANCE BETTER WITH LASER**

Laser increases strength of muscles during exercise

*Lasers Med Sci. 2010 Nov 18*

### **FRACTURES**

Laser creates an increase in Osteoblasts & Calcium

*Pinheiro L, Photomed Laser Surg. 2006 Jun;24 (2):169-171*

## **Section 3: cellular healing and function**

### **BONE REGENERATION IN DENTISTRY AND MEDICINE**

Laser improves osteoblastic formation, bone strength in fractures, implant stability, and can improve osteonecrosis of the jaw.

*Lasers Med Sci. 2010 Jul; 25(4): 559-69). Photomed Laser Surg. 2010 Jun; 28(3): 365-9 Lasers Surg Med 2009 Apr;41(4):298-304  
J Orthop Surg Res. 2010 Jan 4;5(1):1*

### **CELLULAR BENEFITS**

INCREASES: mitochondria and ATP production, cytochrome oxidase and singlet oxygen, tissue regeneration genes and motor proteins, RNA DNA synthesis, growth factors, cell metabolism, angiogenesis, and mitosis

*Desmet K, et al. Photomed Laser Surg. 2006 Jun; 24 (2):121-128*

### **PHYSIOLOGICAL BENEFITS**

INCREASES: cell proliferation, cell division, cell maturation, secretion of growth factors, wound healing, collagen production, wound strength, wound closer, fibroblasts, myofibroblasts, chondrocytes, epithelialization, skin circulation, oxygen supply, activity satellite cell cultures (stem cells)

DECREASES: Prostaglandin E2, substance P, cyclooxygenase 2 (Cox 2), muscle tension

*J Clin Las Med Surg 2004; 22 (2) 141-150*

### **THYROID FUNCTION IMPROVES**

Laser improves the function of the thyroid based on lab values with chronic autoimmune thyroiditis.

*Lasers Surg Med. 2010 Aug;42 (6):589-96*

### **Asthma, BRONCHITIS, PULMONARY FUNCTION**

There have been at least 20 studies on asthma and other pulmonary conditions. Here is link to those

studies. <http://www.lt4pain.com/uploads/respiratory.pdf>

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Improvement of 71% with reduced incidence of diabetic foot wounds and amputations ~ J Am Podiatry Med Assoc. 2005 Mar-Apr; 95 (2).

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FROZEN SHOULDER SYNDROME (Adhesive Capsulitis) – Class IV Laser Treatment: Significant improvement in pain reduction and range of motion ~ Photomed Laser Surg. 2008 Mar 16

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Jia YL and Guo ZY. Effect of low-power He-Ne laser irradiation on rabbit articular chondrocytes in vitro. Lasers in Surgery and Medicine. 2004. 34(4): 323-328. The present study showed that a particular laser irradiation stimulates articular chondrocytes proliferation and secretion.

These findings might be clinically relevant, indicating that low-power laser irradiation treatment is likely to achieve the repair of articular cartilage in clinic. Lasers Surg. Med. 34:323–328, 2004. © 2004 Wiley-Liss, Inc.

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