Class 4 Cold Laser research

**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

**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)

**LASER THERAPY IMPROVED SPATIAL PERCEPTION, IMPROVED NERVE FUNCTION, IMPROVED EMG STUDY OUTCOMES.**
Laser can regenerate nerve tissue.
Peric Z, Srp Arh Celok Lek 2007 May-Jun; 135 (5-6): 257-63

**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

**CARPAL TUNNEL BETTER WITH LASER**
LLL better than splinting
Clinical Rheumatology (2009 Sep;28 (9):1059-65

**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.

**MUSCLE PERFORMANCE BETTER WITH LASER**
Laser increases strength of muscles during exercise
Lasers Med Sci. 2010 Nov 18

**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.

**NERVE GROWTH STIMULATION**
Contolled trial showed regeneraton of sciatic nerve and myelination in rat.
Rochkind. Photomed & Laser Surg. 2007, 25(3): 137-143.

**MITOCHONDRAL FUNCTION IMPROVED**
Improves oxygen production, promoting cellular survival, Increased Cytochrome c oxidase – terminal enzyme of the electron transport chain and a strong photacceptor and other mitochondral enzymes
J Photochem Photobiol B. 2006 Nov 17

**TENDINITIS AND MYOFASCIAL PAIN BENEFITS**
Acute tendinitis had the best response
Logdberg-Anersson et al, Laser Therapy 1997 (9) pp 79-86

**TREATMENT OF THE STELLATE GANGLION POSITIVELY AFFECTS THE SYMPATHETIC NERVOUS SYSTEM**
Kemmotsu. Laser Therapy 1997 (9) pp 5-6

**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

**TENDINOPAYTH BENEFITS**
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

**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

**NERVE HEALING**
Desensitizes C-fibers
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

**NON-STEROIDALS: COMPARABLE EFFECTS**
Laser as effective as NSAIDs
Bjordahl J, Photomed Laser Surg. 2006 Jun; 24 (2):158-168

**BLOOD PRESSURE LOWERED WITH LASER**
Laser applied to acupoints lowered blood pressure
J of Chiro Med, 2008 Dec; 7 (4):134-9

**CANCER RISK NOT INCREASED WITH LOW LEVEL LASERS**
A 25 year follow up showed no increase in mortality when cancer patients were treated with low level lasers
Vopr Kurortol Fizioter Lech Fiz Kult. 2009 Nov-Dec; (6):49-52

**TEMPORMANDIBULAR JOINT (TMJ)**
Decreased of pain and anti-inflammatory effects; Confirmed by thermographic examination.
Photomed Laser Surg. 2006 Aug;24 (4):522-7

**CORTISONE HAS SIMILAR EFFECTS AS LASER**
Animal study; 810-nm laser was almost as good as cortisone at reducing swelling. Higher doses showed most benefit.  Laser therapy reduced joint swelling and correlated with decreased serum prostaglandins
Castano AP, Lasers Surg Med 2007 Jul;39(6):543-50

**ULTRASOUND vs. LASER**
Animal study; laser treatment provided a much greater increase in the wound strength than ultrasound.
J Rehab Res & Dev, Volume 41 Number 5, September/October 2004

**LOW-LEVEL LASER THERAPY VS LOW-INTENSITY PULSED ULTRASOUND (LIPUS)**
LIPUS enhanced bone repair by promoting bone resorption; LLLT accelerated this process through bone formation.
Photomed Laser Surg. 2006 Dec; 24 (6):735-40

**PSYCHIATRIC DISORDERS IMPROVED**
LLL applied to skull decreased depression and anxiety.
Behavioral and Brain Functions, 2009, 5:46, 8 December 2009

**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

**CELLULAR BENEFITS**
INCREASES: mitochondria and ATP production, cytochrome oxiase 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

**FRACTURES**
Laser creates an increase in Osteoblasts & Calcium
Pinheiro L, Photomed Laser Surg. 2006 Jun;24 (2):169-171

**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.

http://www.drjsteinchiropractor.com/Class\_4\_Cold\_Laser\_Research.html