

## **Treating Cervical Spine Pathologies With Laser Therapy**

By Fred Kahn, MD, FRCS(C) and David Kunashko, DC

Over the years, the neck is subjected to repeated stress, trauma, wear and tear. Often injuries may not cause pain at the time of the event; however, they become symptomatic many years later. Repeated injuries have a cumulative effect, eventually resulting in degeneration of the cervical spine components. The majority of cases of neck pain are secondary to degenerative change. The individual's overall physical condition often dictates how rapidly one can recover from an injury and whether the neck will become a chronic problem.

### **Recent Findings Regarding Neck Pain: Etiology, Treatment, Prognosis**

The treatment of cervical pain has long been overlooked by clinicians and researchers, particularly compared to low back pain. The Bone and Joint Decade 2000-2010 Task Force on Neck Pain and its Associated Disorders<sup>1</sup> clarified our understanding of this problem. This project involved seven years of work compiled from a database of more than 50 researchers from nine different countries and representing 19 specialized clinical and scientific disciplines.

Based on the Task Force's findings regarding epidemiology, risk factors, course prognosis, etc., treatment guidance was established. According to the Task Force: "Educational videos, mobilization, manual therapy, exercises, *low-level laser therapy*, and perhaps acupuncture appeared to have some benefit." (Emphasis added)

Over the course of any single year, the prevalence of neck pain in the general population ranges from 12.1-75.5 percent and when associated with disability, ranges from 1.7-11.5 percent. The number of people seeking care for whiplash-associated disorders (WAD) has been on the rise over the past three decades.

Based on this information, it is evident that neck pain and its associated symptoms, including headaches, radiation of pain to the extremities, numbness and tingling, etc., are more prevalent than previously recognized.

Neck pain is the end result of a variety of etiological factors, including the following, some of which are modifiable, i.e., high-level quantitative job demands, sedentary work positions and repetitive, precise working positions.

Non-modifiable risk factors include age, gender and genetics. There is a lack of evidence that workplace interventions are effective in decreasing the incidence of neck pain in the work force.

Most instances of neck pain are caused by disorders of the spine involving some type of mechanical derangement. Typically, the subjective sensation of pain is the result of muscle strain, spasm and/or ligamentous injury. Other sources include disc herniation, osteoarthritis, spinal / foraminal stenosis and degenerative disc disease (DDD).

The majority of individuals with chronic or acute neck pain do not experience a significant degree of resolution of symptoms with conventional therapeutic methods. In fact, between 50-85 percent of those affected experience recurrent neck pain between 1-5 years after diagnosis. The prognosis associated with this condition, along with increasing age, poor physical and often mental health, predicates a poor prognosis with regard to activity levels and quality of life.

### **Laser Therapy as a Treatment Option: Research Support**

More than 21 randomized, controlled clinical trials have investigated the efficacy of laser therapy in relation to neck pain. Chow, et al.,<sup>2</sup> performed a systematic review and meta-analysis of 16 randomized controlled clinical trials to assess the efficacy of laser therapy when utilized in the treatment of neck pain. Her ground-breaking research was published in *Lancet* in 2009. Dr. Chow concluded that laser therapy reduces pain immediately after treatment in acute cases and up to 22 weeks after completion of treatment in patients with chronic neck pain.

Konstantinovic, et al.,<sup>3</sup> reported that acute neck pain with radiculopathy treated with laser therapy provided effective short-term relief of pain in the arms and an increased range of neck extension compared to placebo procedures.

Ozdemir, et al.,<sup>4</sup> performed a double-blind, placebo-controlled study and concluded that laser therapy is successful in relieving pain and improving function in osteoarthritic disease.

At the cellular level, laser therapy demonstrates improvement in cellular metabolism, an increased production of ATP and collagen, enhanced neurological transmission and significant regeneration of the cellular components of the tissues. At the systemic level, there is stimulation of the immune response and increased production of endorphins and cortisol, the precursor of cortisone.

### **Case Profile: Laser Therapy for Disc Herniation**

*Diagnosis:* Disc herniation with right nerve-root irritation.

*History:* The patient is a 21-year-old pro golfer who injured his cervical spine performing exercises. This resulted in radiation of pain to the right scapular area, shoulder and lateral aspect of the arm. In addition, there was numbness and tingling in the extremity. The patient suffered from constant severe pain, had difficulty sleeping and was unable to engage in any meaningful physical activity for several weeks. An MRI revealed a right paracentral disc herniation at the C5-6 level. Prior to the patient receiving laser therapy, his pain continued to increase in severity and necessitated taking six or more Tylenol tablets each day.

*Physical Examination:* A moderate degree of tenderness was noted from C3-T1. Range of motion of the cervical spine with regard to flexion, extension, lateral rotation and lateral flexion was less than 10 percent of normal. Paracervical muscle spasm was pronounced. There was no evidence of gross motor impairment and no sensory deficit; however, reflexes on the right were hypoactive.

*Treatment Program:* Laser therapy was applied initially for five consecutive days and subsequently every 2-3 days over the succeeding three weeks, for a total of 13 treatments. The following parameters were used: 180 mW 830 nm laser diode, 750 mW 660 nm superluminous LED array and 1500 mW 840 nm superluminous LED array. Frequency of the wavelengths used varied from 50 to 100 Hz and duty cycle from 50-90 percent.

*Progress:* After five treatments, subjective improvement achieved was in excess of 80 percent. Range of motion of the cervical spine had increased to 50 percent of normal range and paracervical muscle spasm was minimal. After 13 treatments the patient was asymptomatic. Range of motion of the cervical spine was within normal limits. No tenderness was noted and the utilization of analgesics had been completely discontinued. The patient was fully functional.

Frequency and duration of treatment, along with correct positioning of the treatment arrays and probes, are critical to the process of achieving optimal therapeutic results. Indications are that the cervical spine is best treated in a relatively neutral position with the patient comfortably seated in a chair. Customization of protocols, as required, includes pulse frequency, duty cycle, wave form and duration. Based on our knowledge and experience, we recommend that laser therapy be utilized as one of the preferred treatments of choice in dealing with pathologies of the cervical spine.

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**Dr. Fred Kahn** is a graduate of the University of Toronto, Faculty of Medicine, a fellow of the Royal College of Surgeons of Canada and the diplomate of the American Board of Surgery. He is the founder of Meditech International, Inc.

Dr. David Kunashko received an honours bachelor's of science degree in molecular biology and molecular genetics from the University of Toronto. He then completed his chiropractic training at the Canadian Memorial Chiropractic College in Toronto, Ontario, as well as a diploma in acupuncture and traditional Chinese medicine. Dr. Kunashko has lectured extensively for several colleges including the Canadian College of Naturopathic Medicine and is involved in clinical education and research for Meditech International ([www.bioflexlaser.com](http://www.bioflexlaser.com)).



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