



WHIPLASH / NECK PAIN

## Class 4 Laser Therapy for Neck Pain: A Case Study

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Chronic neck pain is a prevalent musculoskeletal condition that significantly impacts the quality of life of affected individuals.<sup>1</sup> Neck pain is the fourth leading cause of disability, with an annual prevalence rate exceeding 30%.<sup>2</sup> Emerging modalities such as photobiomodulation via class 4 laser therapy<sup>3</sup> have gained attention for their potential to alleviate pain and promote tissue healing.

This case study explores the application of class 4 laser therapy in treating a patient with chronic neck pain, detailing the treatment protocol, outcomes, and relevant research. The study aims to contribute to the growing body of evidence on the effectiveness of class 4 laser therapy as a non-invasive and safe option for managing neck pain.

### Background

Neck pain is a common complaint affecting a substantial portion of the population worldwide. It can result from various causes such as poor posture, muscle strain, herniated discs, and degenerative changes in the cervical spine.<sup>4</sup> Conventional treatment approaches include medication, physical therapy, and surgical interventions. However, these approaches may not always provide satisfactory relief, and there is a growing interest in alternative and complementary therapies.

Photobiomodulation with a class 4 therapy laser is a non-invasive treatment that uses red and infrared wavelengths of laser light to stimulate tissue repair and reduce pain. The photons of light are absorbed by the mitochondria and other chromophores within cells, leading to increased adenosine triphosphate (ATP) production, improved cellular metabolism, and reduced inflammation.<sup>5</sup> Class 4 lasers are used to deliver more photons to larger treatment areas, thus positively affecting greater volumes of tissue in the patient.<sup>6</sup>

## The Case Study

The patient, a 45-year-old female office worker, presented with complaints of chronic neck pain that had persisted for over two years. The pain was localized to the cervical region and was described as a constant dull ache, with intermittent episodes of sharp pain exacerbated by prolonged sitting and computer work. Physical examination revealed moderate tenderness in the trapezius and levator scapulae muscles, reduced range of motion, and muscle stiffness.

The patient had previously undergone conventional treatments including physical therapy, chiropractic adjustments and pain medications, with only temporary relief. Due to concerns about potential side effects of long-term medication use, she sought alternative options and expressed interest in class 4 laser therapy.

The patient underwent a comprehensive evaluation, including a review of medical history and imaging studies. After discussing the potential benefits and risks of class 4 laser therapy, a treatment plan was developed. The therapy protocol consisted of 12 sessions scheduled over a six-week period, with each session lasting approximately 12 minutes.

A class 4 laser device with wavelengths of 650, 810, 915 and 980 nanometers (nm) delivering the laser light in continuous wave mode, in addition to pulse frequencies ranging from 10-5,000 Hz, was used for treatments. The average power was 8 watts (W), and 3,600 joules of energy were applied over an area of 400 cm<sup>2</sup> giving a superficial dosage of 9 J/cm<sup>2</sup>.

The patient was positioned comfortably, and protective eyewear was provided. The laser technician applied the laser directly to the cervical spinal area and affected muscles, targeting the trapezius and levator scapulae regions. The laser was moved in a slow, sweeping motion to ensure even coverage of the treatment area.

Following the completion of the 12-session protocol, the patient reported a noticeable reduction in pain intensity. The constant dull ache had diminished and the frequency of sharp pain episodes had significantly decreased. The patient noted that the pain no longer interfered with her work and daily activities.

Objective measures demonstrated an improvement in the patient's cervical range of motion. Flexion, extension, rotation, and lateral bending had all increased compared to baseline assessments. The patient reported a substantial reduction in muscle tension and stiffness in the treated area. This was supported by palpation findings, which indicated a decrease in tenderness and tightness in the trapezius and levator scapulae muscles.

The patient's self-reported quality of life showed significant enhancement. She reported being able to perform her daily tasks with greater ease and without the constant distraction of pain. Additionally, her mood and overall well-being appeared to have improved.

## Research Support / Takeaway

The outcomes observed in this case study align with the growing body of research that suggests the potential benefits of class 4 laser therapy for managing chronic neck pain. The therapy's mechanism of action, involving cellular-level effects on mitochondria and tissue repair processes, provides a rationale for its effectiveness in pain reduction and tissue healing.

Numerous studies have investigated the use of photobiomodulation for various musculoskeletal conditions, including neck pain. A randomized, controlled trial demonstrated the effectiveness of

laser therapy in reducing pain and improving functional outcomes in patients with chronic neck pain.<sup>7</sup> Another study found that laser therapy was superior to conventional physical therapy in terms of pain reduction and range of motion improvement in patients with cervical spondylosis.<sup>8</sup>

This case study presents a successful application of class 4 laser therapy in the management of chronic neck pain. The patient experienced notable pain reduction, improved range of motion, decreased muscle tension, and enhanced quality of life following a 12-session treatment protocol. The outcomes align with existing research on the effectiveness of laser therapy for musculoskeletal conditions, including neck pain.

While class 4 laser therapy shows promise as a non-invasive and safe option for neck pain management, further research is warranted to explore its long-term effects, optimal treatment parameters and comparative effectiveness against other interventions. As the understanding of laser therapy mechanisms deepens and technology advances, it is likely that laser therapy will continue to evolve as a viable therapeutic modality for individuals suffering from chronic neck pain and other musculoskeletal ailments.

### References

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