

## Subacromial Impingement: A Laser Therapy Case Study

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**Clinical History:** A 53 year old male presented with obvious signs of shoulder impingement. Symptoms gradually developed over a two-month period. The patient was unable to extend his arm forward without a jolt of pain. Abduction was cautious and slow from 0-90 degrees. He was unable to elevate or abduct beyond 90 degrees. External rotation was cautious without resistance and moderately to severely painful with any resistance. The patient was unable to move or resist his shoulder in any plane away from the body when pressure exceeded 5-10 lbs. X-rays were unremarkable for degeneration. The working diagnosis was subacromial bursitis and bicipital tendonitis.

**Treatment Protocol:** The treatment program included Class IV dual beam laser for the shoulder joint and shoulder girdle musculature for six visits and one axial decompression adjustment on the second visit to the T2-6 region of the spine. The KLASER 4D model laser was used in the treatment of this patient, using a total of 9 minutes laser therapy for the upper quarter. Technique followed a direct contact method of delivery in grid pattern. Trigger points in the shoulder girdle, rotator cuff, and posterior lower cervical intrinsics were treated on each visit. Contact was approximately 4-6 seconds per grid point in the symptomatic upper quarter areas. The estimated dose was 4-6 Joules of laser delivered at the skin surface per point.

**Results of Treatment:** The patient experienced dramatic reduction of pain on the first visit and was almost symptom free in three visits. On his sixth visit, the patient reported he only had very little pain but he had returned to full capacity manual labor. He has returned to normal activities without any signs of impingement. His only residual symptom at three months post treatment was a very mild tenderness in the lateral subacromial region on deep palpation. He has remained symptom free at this point for over a year.

**Discussion:** The healing mechanism of laser therapy is termed photobiostimulation. There are four categories of biological effects demonstrated to occur. The first is Thermal; class IV laser has a warming effect on tissues improving flexibility of joints. The second is Biochemical; this is seen on a cellular basis with increased nitric oxide production and increases in enzyme activity. The third effect is Bioelectric; this occurs with membrane electrical gradient shifts and generation reactive oxygen species. The fourth effect is Bioenergetic; with influence on acupuncture meridians and system-wide clinical effects such as increased or decreased fatigue. There are many studies in animals and cell cultures, which demonstrate physiological effects such as increasing ATP production, increasing vasodilatation, relaxing spasm, and reduction of pain. The mechanism of pain relief and return of shoulder function in this patient appears to be the result of thermal and biochemical effects.

Lasers are classified by their output strength and wavelength of light. Class I lasers are not regulated because their output is not strong enough to cause any tissue damage. Class II lasers operate at 1mw or less. These are commonly used in laser pointers and electronic equipment such as CD players. Class III lasers have an output below 500mw they are used in many low level lasers. Class IV lasers have an output above 500mw. An example is the KLASER an infrared dual-beam Class IV laser. This device has an output power ranging from 100mw-6000mw.

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