

Physical Therapy Treatment for Subacromial Impingement Syndrome

Many people at all ages and stages of life can and do develop shoulder pain. A common condition causing significant pain seen in patients across the lifespan is called subacromial impingement syndrome. Impingement means something is pinched. Subacromial tells us that the something in question is located under the acromion. The acromion is a piece of bone that comes around from behind where it starts in the shoulder blade and curves over the top of the shoulder.

At first (stage I), there is swelling and even hemorrhage (bleeding) of the subacromial bursa and rotator cuff. The bursa is a cushion between the acromion and the head of the humerus (upper arm bone). Repetitive motions in younger adults (less than 25 years old) are linked with subacromial impingement syndrome.

The rotator cuff is always involved in shoulder impingement syndromes. It is made up of four tendons and their attached muscles. They enclose the entire shoulder like an envelope and give it support, stability, and functional movement. With subacromial impingement, the supraspinatus tendon of the rotator cuff is involved because it slips under the acromion and attaches into the greater tubercle, a bony bump on the humerus.

The supraspinatus abducts the arm (moves it away from the body). In someone with subacromial impingement syndrome, shoulder abduction and shoulder internal rotation cause severe pain. The supraspinatus muscle contracts to pull the arm away from the body at the same time, the head of the humerus slips up too far and bangs into the acromion. In the process, the supraspinatus tendon is pinched.

If nothing is done to stop this pattern of dysfunctional movement, fibrosis (fibrous scarring) and tendinopathy (irreversible tendon damage) develop leading to stage II of this condition. This occurs most often in adults between the ages of 25 and 40. As time goes by, and the shoulder continues to wear and tear from this syndrome, stage III impingement develops. By now the patient is 40 years old or older, and the rotator cuff is partially or completely torn through.

There are many ways to approach this problem. Some are based on what stage the patient presents with at the time of diagnosis. In the early stage, nonsteroidal antiinflammatories are often prescribed but studies don't really support their use. However, inflammation may be reduced with Physical Therapy modalities such as ultrasound or laser therapy.

In order to compare these two modalities, the authors divided patients with subacromial impingement syndrome into two groups and treated them for two weeks. Half the group received high-intensity laser therapy (HILT) to the soft tissues of the shoulder for five days each week. The other half had continuous ultrasound for 10 minutes over the shoulder joint. Ultrasound is used to heat the tissues deep in the shoulder to bring blood circulation to the area for healing.

High-intensity laser works by exposing the tissue to light energy. The light is absorbed and then stimulates tissue healing at the cellular level. The authors describe the exact waveform, wavelength, and impulse power delivered to the shoulder. The result is to decrease pain. Whether or not these effects are the same in shoulder tendinopathies has not been proven yet. This is the first study to compare the results of high-intensity laser with the results of ultrasound for subacromial impingement syndrome.

Before treatment began, patients in both groups were given several tests to measure pain, motion, strength, and function. The tests assessed activities of daily living, sleep, ability to work, and ability to participate in recreational activities.

At the time of the pretreatment tests, there were no significant differences between the two groups. The same tests were repeated after the two-week treatment period ended. Everyone was asked not to take pain relievers or antiinflammatories during the treatment. They were instructed to avoid doing any activities that would reproduce their symptoms and increase the pain.

After the treatment period was over, the patients were all retested using the same pre-treatment tests. The results were

and showed that the high-intensity laser was the more effective modality. Patients in that group had much better movement, improved strength, and greater decrease in pain.

The authors say their findings support what other studies have shown: 1) that ultrasound is not more effective than a placebo for treating subacromial impingement syndrome and 2) that high-intensity laser is more beneficial than a placebo for this condition. They feel confident that future studies will reproduce their results and confirm the effectiveness of high-intensity laser therapy.

Research can now move forward and take a look at optimal dosages and length of time for treatment with high-intensity laser. The results of this modality should be compared with other conservative treatments and/or placebo groups.

Andrea Santamato, MD, et al. Short-term Effects of High-Intensity Laser Therapy Versus Ultrasound Therapy in People with Subacromial Impingement Syndrome: A Randomized Clinical Trial. In *Physical Therapy*. July 2009. Vol. 89. No. 7. Pp. 643-652.