Electrical Therapy vs Low Level Laser therapy in Terms of Pain Relief for Patients with Shoulder Impingement Syndrome

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Interdisciplinary Science

Introduction

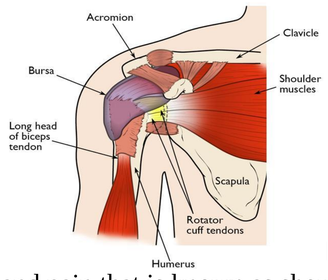
Shoulder impingement syndrome is the most common cause of shoulder pain with 44% to 65% all shoulder pain complaints (Creech,2020). This syndrome is common in both young athletes and middle-aged people. Shoulder impingement syndrome is the most common cause of shoulder pain. In relation to this pain which would be a good technique for pain management, low-level laser therapy or electrical stimulation. This is a significant because it helps to develop an understanding of which physical therapy technique helps with pain and the stiffness of the shoulder in impingement syndrome patients.

Anatomy of The Shoulder

The shoulder is made up of the clavicle, the rotor cuff, and the acromion.

- The clavicle is the bone is immediately below the skin and is what the rotor cuff sits under (Zelman, 2019).
- The rotor cuff is muscles and tendons that cover the head of the humerus and connects the scapula to the humerus and clavicle (Shoulder Impingement Syndrome: Symptoms, Treatments).
- The acromion is connected to the rotator cuff by a lubricating sac known as the bursa (Shoulder Impingement Syndrome: Symptoms, Treatments).
- The bursa allows the rotator cuff tendons to glide freely when the arm is in motion (Shoulder Impingement Syndrome: Symptoms, Treatments).

Shoulder Impingement Syndrome & Treatments

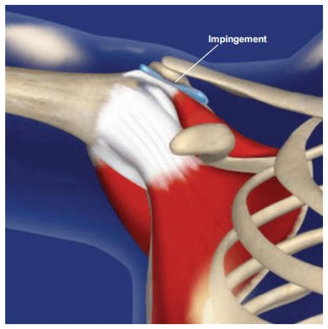


When raising the arm, no higher than shoulder height it causes the space between the acromion and rotator cuff to narrow. This narrowing can caus he tendon and bursa causing irritation and pain that is known as shoulder impingement (Armstrong, Fischer, & Wiater, 2011).

Shoulder impingement syndrome can be recognized by:

- Difficulty reaching up
- Reaching behind the back
- Pain when the arms are extended above the head
- Weakness in the shoulder

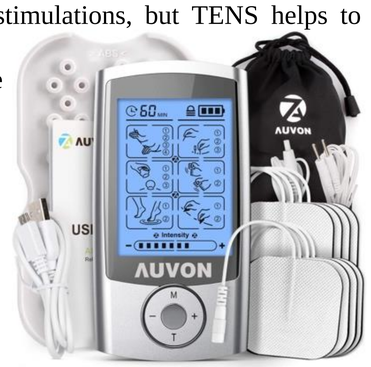
This syndrome can be treated surgically or non-surgically.



- Non-surgical treatment
  - Medications
  - steroid injections
  - physical therapy
    - Ultrasound
    - Laser light therapy
    - Electrical stimulation
    - Iontophoresis
    - Heat therapy and ice therapy
    - exercise therapy
  - at-home care
- Surgical treatment
  - Arthroscopic and Open surgical techniques

Electrical Stimulation

- Electrical stimulation uses a device to send gentle electrical pulses through the skin to a specific region of the body in order to help reduce pain.
- Electrical stimulation helps build strength and restore function and reduce edema. (Hoffman,2018).
- There are 6 types of electrical stimulations, but TENS helps to relive pain.
- TENS reduces pain because of the ability to interrupt pain signals that are being given off from the brain and due to the interruptions.
- TENS interrupt pain signals by using low voltage electrical current in order to not be in pain (WebMD).



Laser Light Therapy

- The technique of low-level laser therapy uses a laser light at very low levels in order to decrease pain or inflammation, increase healing of wounds, tissues and nerves and to help decrease tissues damage (Algar, 2017).

Research studies

Electrical Stimulation on Shoulder Impingement

- The study found that the DASH results show that there is no significant difference between the groups. This means that none of the physical therapy techniques used improve disability (Ucurum,2018).
- The VAS results showed no difference between the groups for a decrease in pain but showed a significant difference within each group for pre- and post-treatment and the post-operative third month results as a decrease in pain (Ucurum,2018).

Table 4

Pre-treatment, post-treatment and postoperative 3rd month DASH scores.

DASH scores	Group 1 (control) Mean ± SD	Group 2 (interferential current) Mean ± SD	Group 3 (TENS) Mean ± SD	Group 4 (ultrasound) Mean ± SD	p (intergroup comparisons)
Pre-treatment	58.28 ± 13.27	56.00 ± 15.53	51.78 ± 15.29	57.41 ± 17.52	0.346
Post-treatment	46.72 ± 18.60	43.12 ± 21.64	37.84 ± 16.33	45.96 ± 17.51	0.346
3rd month	39.88 ± 22.13	31.89 ± 21.53	38.21 ± 22.28	35.50 ± 21.48	0.346
p (intragroup comparisons)	0.001*	0.001*	0.001*	0.001*	

*p<0.01.

Table 2

Pre-treatment, post-treatment and postoperative 3rd month VAS scores.

VAS		Group 1 (control) Mean ± SD	Group 2 (interferential current) Mean ± SD	Group 3 (TENS) Mean ± SD	Group 4 (ultrasound) Mean ± SD	p (intergroup comparisons)
VAS at rest	Pre-treatment	3.05 ± 3.08	3.00 ± 2.79	1.25 ± 2.12	3.45 ± 3.14	0.001*
	Post-treatment	2.21 ± 2.86	1.40 ± 2.64	0.65 ± 1.46	2.20 ± 2.61	0.001*
	3rd month	1.58 ± 2.36	1.05 ± 1.85	0.35 ± 1.08	1.30 ± 2.51	0.056
	p (intragroup comparisons)	0.001*	0.001*	0.46	0.001*	
VAS during activity	Pre-treatment	7.84 ± 1.26	7.85 ± 1.56	7.45 ± 0.99	7.30 ± 1.69	0.999
	Post-treatment	5.84 ± 1.86	5.50 ± 2.31	5.00 ± 1.68	5.45 ± 2.04	0.999
	3rd month	4.58 ± 2.57	4.00 ± 2.67	4.60 ± 2.64	4.05 ± 2.37	0.999
	p (intragroup comparisons)	0.001*	0.001*	0.001*	0.001*	

*p<0.01.

Low-Level Laser Therapy on Shoulder Impingement Syndrome

- In the study by Yeldan found out that during treatment there was a significant difference between the before and after treatment for the groups separately for the ROM, VAS, DASH, constant and SDQ scores but not a statistical difference between the two groups.
- In the study by Yeldan the conclusion was that there is no difference between low-level laser therapy and placebo low-level laser therapy when supplementing an exercise program for rehabilitation.
- Kelle and Kozanoglu concluded that both low-level laser therapy and corticosteroid injection were more effective than the sham treatment.

Analysis

- I believe low-level laser therapy with a combination of exercise therapy has the better outcome for pain management in shoulder impingement syndrome. This is due to the multiple studies done with laser therapy and other physical therapy techniques which shows that most improvement with pain after treatment.
- Yeldan found that a significant difference between the before and after treatment for the groups for pain but found that there is no difference between low-level laser therapy and placebo low-level laser therapy when supplementing an exercise program for rehabilitation. So, this is evidence that both laser therapy and exercise therapy help to relieve pain and one doesn't not relieve more pain than another on its own.
- There is another study by Kelle and Kozanoglu that compared a corticosteroid injection or low-level laser therapy and they found out that there was a statistical difference between corticosteroid injection and sham laser treatment as well the sham laser treatment and the low-level laser treatment. This means that any type of treatment is better than no treatment and that low-level laser therapy is better than no laser treatment at all.

Conclusion

- The analysis revealed that the only true difference was between no treatment at all and a type of treatment.
- As a result of the analysis of whether low-level laser therapy and electrical stimulation help with the reduction or pain, and it turns out that they both do but low-level laser therapy has the best results when differing from the control.

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