

## Role and Efficacy of TENS versus SWD in the management of periarthritis shoulder

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### ABSTRACT

**Introduction:** Painful shoulder syndrome is also called periarthritis humeroscapularis or PHS syndrome. The shoulder is the most mobile joint, pain and reduced function may be seen because of different inflammatory and degenerative changes in soft tissues of the shoulder. It is most common musculoskeletal disorder after low back pain and cervical pain. Many approaches have been used in the treatment of periarthritis shoulder pain, including local heat, cryotherapy, transcutaneous electrical nerve stimulation (TENS), short wave therapy (SWD), manipulation under anaesthesia, acupuncture and exercise. The purpose of this study is to compare the effectiveness of TENS and SWD in decrease pain and improvement in function in Periarthritis shoulder.

**Methodology:** A total of 40 patients coming in the year 2014 to the outpatient department with a confirmed diagnosis of periarthritis shoulder were included in this study. Two groups of 20 patients each were made. Group A: received SWD and Exercise therapy, whereas Group B received TENS and exercise therapy. Both the group of patients were assessed using the VAS scoring for pain and the Likert's scale for the functional outcome.

**Result:** Pain improved significantly in both the groups with more pain relief seen in group B as compared to group A. The functionality which was calculated using the Likert's scale showed significant improvement in both the groups with slightly more increase in the functionality in group A as compared to group B.

**Discussion:** The long term benefits are better achieved with the SWD as compared to the TENS whereas immediate pain relief is achieved with TENS much better than the SWD. Though this cannot be confirmed as firstly the sample size is very small and also a longer follow up may be required to assess long term functional outcome of both the treatment modalities.

**Conclusion:** This study concludes by accepting the alternate hypothesis that is application of TENS treatment along with exercise therapy will improve function and pain relief as compared to SWD therapy. Whereas long term functional result is better with SWD.

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### INTRODUCTION

Painful shoulder syndrome is also called periarthritis humeroscapularis or PHS syndrome. Shoulder pain is one of the most common peripheral joint disorders. The shoulder is the most mobile joint, pain and reduced function may be seen because of different inflammatory and degenerative changes in soft tissues of the shoulder. Periarthritis shoulder usually presents after 40 years of age and seen in both males and females<sup>[1]</sup>. The anatomy of the shoulder joint is complexed and allows tremendous range of motion. This wide range of motion permits precise positioning of the hand, distally, helpful in both gross and skilled movements. Shoulder pain may be caused by intrinsic diseases of shoulder joint or by pathology in the periarticular structures. Causes of shoulder pain include supraspinatus tendinitis,

bicipital tendinitis, adhesive capsulitis, rotator cuff tendinitis, impingement syndrome<sup>[2]</sup>.

It is most common musculoskeletal disorder after low back pain and cervical pain. Sometimes painful shoulder syndrome may present with no apparent cause<sup>[1]</sup>. The patient generally keeps the arm close to the body as even the smallest movements cause pain. Ultrasonography generally points towards a diagnosis whereas, MRI is diagnostic. In acute phase of the disease cryotherapy is usually helpful. The patient needs to place the arm away from the body, e.g. by placing a pillow between the chest and upper arm<sup>[3]</sup>. Along with this the analgesics and anti-inflammatory drugs may lead to decrease in pain and allow the patient to move the shoulder. Along with the systemic analgesics local methods like topical applications, ultrasound, laser, interferential therapy and exercises increase the mobility and also help in building the muscle strength<sup>[4]</sup>.

Many approaches have been used in the treatment of periarthritis shoulder pain, including local heat, cryotherapy, transcutaneous electrical nerve stimulation (TENS), short wave therapy (SWD), manipulation under anaesthesia, acupuncture and exercise. TENS, Ultrasound, and SDW are the electrotherapy modalities commonly used to control pain<sup>[5]</sup>.

Stretching exercises is a key component of exercise therapy for muskuloskel et al disorders. In addition, heat modalities, are frequently used as an adjuvant treatment to exercise therapy in order to help the patient regain ROM and restore function to the affected shoulder<sup>[6]</sup>. The purpose of this study is to compare the effectiveness of TENS and SWD in decrease pain and improvement in function in Periarthritis shoulder.

#### Aims & Objectives:

1. To study the effectiveness of TENS and exercise therapy in the treatment of Periarthritis Shoulder.
2. To study the effectiveness of SWD and exercise therapy in the treatment.
3. To compare the effectiveness of SWD and TENS in treatment of Periarthritis shoulder.

#### MATERIALS AND METHODS

A total of 40 patients coming in the year 2014 to the National Institute of Medical Sciences, Jaipur with a confirmed diagnosis of periarthritis shoulder were included in this study. The included patients were between the ages 30-50 years and only cases with acute shoulder periarthritis (less than 4 weeks of duration) with painful shoulder movement for at least 4 weeks duration were included in this study. Patients who were willing to attend physiotherapy every day for 6 weeks were included in this study.

All patients with other co-morbid conditions were excluded from the study, like patients suffering from diabetic mellitus, prolonged bed rest to surgery, psychiatric illness, any neurological disorder, patients with fracture, dislocation, or open wounds in and around the shoulder, inflammatory arthritis and so on. After an informed consent all the patients underwent MRI of the affected shoulder to rule out other causes of the shoulder pain like rotator cuff tear and biceps tendonitis. Two groups of 20 patients each were made by randomized selection of the patients. The patients were divided serially by assigning alternate patients to group A and remaining in group B. Group A: received SWD (Fig 1) and Exercise therapy, whereas Group B received TENS (Fig 2) and

exercise therapy. All the patients received painkillers for 1 week after which the painkillers were stopped. The treatment period comprised of physiotherapy every day for 6 weeks for both groups of patients.

Both the group of patients were assessed using the VAS scoring for pain and the Likert's<sup>[7]</sup> scale for the functional outcome

1. At the time of starting of the treatment.
2. After 3 weeks of the treatment.
3. At the end of the session of the treatment that is after 6<sup>th</sup> weeks.

Both the groups followed specific ROM exercises for the shoulder along with application of modalities, SWD in group A and TENS in group B. All patients were advised not to do any strenuous work with the affected upper limb. Patients were also advised to stop medication once the VAS score was below 2 and then take analgesics only if at any point of assessment or during the exercises the VAS score became more than 4. Both the VAS and the Likert scale were assessed to find out the treatment modality which was better in terms of immediate pain relief and also long term functional outcome.

#### RESULTS

Paired t test was used to analyse the pre and post test scores in group A and B. Unpaired t test was used to analyse the post test scores between groups A and B and the significance level of  $P < 0.05$  was fixed. The data analysis was done by SPSS17. In group A the mean age of presentation was 48 years with SD of 13.1064 whereas, the mean age of presentation in group B was 50 years with SD of 16.017. There were 65% (26 out of 40) male patients included in this study with 70% (14) in group A and 60% (12) in group B.

Pain improved significantly in both the groups with more pain relief seen in group B as compared to group A (Table 1,2 and 3). The functionality which was calculated using the Likert's scale showed significant improvement in both the groups with slightly more increase in the functionality in group A as compared to group B (Table 4, 5 and 6).

#### Group A

**Table 1: VAS score (Group A)**

Days	Paired Difference		T value	P value
	Mean	SD		
1 <sup>st</sup>	8.40	0.96	16.745	<0.05
21 <sup>st</sup> (3 weeks)	6.50	0.85		
42 <sup>nd</sup> (6 weeks)	3.90	0.74		

**Table 2: VAS Score (Group B)**

Days	Paired Difference Mean	Paired Difference SD	T value	P value
1 <sup>st</sup>	8.50	0.52	24.187	<0.05
21 <sup>st</sup> (3 weeks)	3.60	0.69		
42 <sup>nd</sup> (6 weeks)	2.0	0.47		

**Table 3: Comparison between VAS Score between the groups:**

Day	Group A	Group B	T value	P value
1 <sup>st</sup>	8.4 +0.96	8.5+0.52	-0.231	0.10
21 <sup>st</sup>	6.5+0.85	3.6+0.69	12.429	0.00
42 <sup>nd</sup>	3.9+0.74	2.0+0.47	8.143	0.00

**Table 4: Likert's scale (Group A)**

1 <sup>st</sup> day Mean & SD	42 <sup>nd</sup> day Mean & SD	T value	P value
5.5 & 0.53	3.5 & 0.53	13.416	<0.05

**Table 5: Likert's Score (Group B)**

1 <sup>st</sup> day Mean & SD	42 <sup>nd</sup> day Mean & SD	T value	P value
5.5 & 0.53	1.7 & 0.48	13.077	<0.05

**Table 6: Comparison between Likert's scoring**

Day	Group A	Group B	T value	P value
1 <sup>st</sup>	5.5 +0.5	5.5+0.5	0.00	1.0
42 <sup>nd</sup>	3.5+0.5	1.7+0.6	9.00	0.00

## DISCUSSION

In this study 40 patients were included and divided into 2 groups. All of them suffering from periarthritis shoulder. The 2 groups were made so as to evaluate two modalities of treatment for the pain relief and the functional recovery of the patient.

TENS (Transcutaneous electrical nerve stimulation) is one of the most commonly used forms of electro anesthesia, which causes nerve stimulation. The mechanism of the action is that the stimulation of the A fibres lead to the inhibition of the C fibres which are responsible for the transmission of pain. This stimulation is done in the form of electrical impulses of 75 – 125 Hz frequency and the duration of 0.8 ms<sup>[8]</sup>. It causes no invasion, avoids infection or disease spreading, causes no fear and costs very less with easy operation<sup>[9]</sup>. Short wave diathermy improves the range of motion. It increases the tissue temperature to 37.5 degrees and increases extensibility of deep collagen tissue decreasing the joint stiffness, relieving pain and muscle spasm causing the inflammation to go down<sup>[10]</sup>. This increase of temperature not only causes the inflammation to subside but also increases the blood supply to the affected tissues and causes increased healing<sup>[3]</sup>. The rationale behind treating by using SWD is that studies have shown that there is decrease

in the tensile stress in soft tissues when the temperature rises to 40 – 45 degrees from the room temperature of 25 degrees. This causes decrease in pain and increase in the mobility and hence is vital for the recovery in cases of periarthritis shoulder<sup>[4]</sup>.

The results in this study coincide with the properties of the 2 treatment modalities. TENS is associated with increased degree of pain relief which is associated with the type A fibres stimulation causing the diminution of transmission from the type C fibres (pain). The SWD is associated with the decrease in the muscle stress and increase in the range of motion of the shoulder hence, the good functional outcome. On a recent meta analysis in the Cochrane database it has been seen that there is very little evidence in the form of 6 studies found in the literature, all of which have shown that it is uncertain that TENS and SWD play an important role in the management of periarthritis shoulder<sup>[11]</sup>. There is very little level of evidence for the same and hence this study was conducted to evaluate the use of these modalities

Hence, it can be said that the long term benefits are better achieved with the SWD as compared to the TENS whereas immediate pain relief is achieved with TENS much better than the SWD. Though this cannot be confirmed as firstly the sample

size is very small and also a longer follow up may be required to assess long term functional outcome of both the treatment modalities.

## CONCLUSION

The TENS groups in the study showed more improvement in pain as measured by VAS scale and function measured by Likert' scale as compared to SWD treatment groups. Even though both the groups shows improvement in pain and function but experimental groups the improvement was more significant. There is very little evidence to support the use of either TENS or SWD in the search of literature.

Therefore, this study concludes by accepting the alternate hypothesis that is application of TENS treatment along with exercise therapy will improve function and pain relief as compared to SWD therapy. Whereas long term functional result is better with SWD.

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