EFFECTIVENESS OF SONICTENS IN THE MANAGEMENT OF SUPRASPINATUS TENDINITIS: AN INNOVATIVE APPROACH

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Abstract: -

Objectives:*To find out the effectivenessof an innovative approach in the form of SONICTENS (Modified TENS and Ultrasound Unit) in a male with Supraspinatus Tendinitis.*
Design:*Single case study design.*
Setting:*Tertiary care center.*
Participant: *A single individual with Supraspinatus Tendinitis participated in this study.*
Intervention: *An Innovative Electrotherapy approach called SONICTENS (Modified TENS and Ultrasound Unit) where Ultrasound Transducer head modified by creating a socket for TENS Electrode lead which then acted as both the Ultrasound Transducer and as metal electrode emitting both Sonic Waves and Simultaneous TENS. The Treatment was given on alternate Days for 2 weeks for 15 Minutes.*
Main outcome measures:*Pain relief in terms of Numerical Pain Rating scale (NPRS) and Active Shoulder Range of Motion(AROM).*
Results: *Pain was reduced by 5 Points on NPRS scale and active shoulder abduction increased by 40 degrees and external rotation by 30 degrees.*
Conclusion: *SONICTENS may be used for relief of pain and improvement in Active Range of Motion (AROM) in supraspinatus tendinitis. Acting as a combo therapy unit it saves time and accelerate the healing.*

Keywords: - *Shoulder pain, Electrotherapy, SONICTENS*

BACKGROUND AND PURPOSE:

Shoulder pain is a common musculoskeletal problem seen in day to day practice. Geriatric Group are vulnerable and frequently affected, and the most common cause of shoulder pain are the problems with rotator cuffs which are seen in primary care practice. The incidence of rotator cuff tear increases with advanced age and it has been estimated that the prevalence of shoulder pain in older patients ranges from 21% to 27%. As a frequency, females are more affected than males. As a

percentage, at the level of the rotator cuff, the most affected is the supraspinatus tendon (63%),followed by the subscapularis tendon (20%) and the infraspinatus tendon (7%). [(1)] Age has been shown to be a significant contributing factor as the incidence of rotator cuff injury increases dramatically from the forth decade onwards, affecting more than half of the elderly population. Furthermore, mechanical overuse is a significant contributor to rotator cuff disorders. [(2)]Tendinitisoccur when the muscle tendon undergoes inflammation due to any pathology. Supraspinatus tendinitis occur due to the inflammation of supraspinatus tendon which is closely related with the shoulder impingement syndrome.[(3)]

The condition proves to be disabling, causing a high level of pain and dysfunctionality, especially in exacerbations. Thus, in those moments, patients can no longer exercise their usual activities of daily living (ADL), relaxation and sports activities, which significantly diminishes their quality of life. The main goals in treating this kind of patients, are to relieve their felt pain and to solve the mechanical problem causing the shoulder functional impairment.[(1)]

Evidence till date report various Physiotherapy intervention to be effective in the management of Supraspinatus Tendinitis, which include Electrotherapy Modalities, Manual Therapy and Exercise therapy. Most Commonly used Electrotherapy Modalities are TENS and Ultrasound therapy which comes in Various Combo Therapy Unit.

Horal and Bovin et al. describes the application of two therapeutic modalities simultaneously and at the same site and referred it as combination therapy. The most widely used conservations are Ultrasound & TENS. The justification for the use of combination therapy is principally suggested because the beneficial effects of both modalities may be achieved at the same time. The use of combination therapy is to enhance the effect of one therapy upon the other making the combination more effective than either of the therapy alone.[(4)]

However, applying these modalities separately consumes time. Hence in this study, an attempt is made todetermine the effectiveness of SONICTENS(Modified TENS and Ultrasound Unit) an innovative approach used by the authors in a Male with Supraspinatus Tendinitis.

Case Description

The patient (Mr. AB) is a 24-year-old physiotherapy intern. He was referred for pain in anterior aspect of left shoulder along with difficulty in doing overhead activities. His Ultrasonography report details reveal that he has full thickness tear of supraspinatus tendon on left side.

Patient history: Mr. AB complained left shoulder pain since last onemonthwhich was aggravated by Overhead activities. He rated his pain as 8 on a 0–10 Numerical Pain Ratingscale and described it as severe at the time ofexamination. He noted that all Shoulder movements werepainful especially External Rotation and Abduction and more pain was perceived on Overhead Movements. He recalled nospecific injury to hisleftShoulder, Cervical Spine or Upper extremityand told the history of similar problem in thepast.

Physical Examination

Physical examination performed by the investigator revealed tender spot just below the acromion, painful restriction of active Shoulder abduction& external rotation, aggravation of symptoms on attempting Overhead activities. Ultrasonography showed Full thickness tear of Supraspinatus Muscle.

Treatment Methods

An Innovative Electrotherapy approach called SONICTENS (Modified TENS and Ultrasound Unit) where Ultrasound Transducer head modified by creating a socket for TENS Electrode lead which then acted as both the Ultrasound Transducer and as metal electrode emitting both Sonic Waves and Simultaneous TENS. The Treatment was given on alternate Days for 2 weeks for 15 Minutes.

The technique SONICTENS (Modified TENS and Ultrasound Unit) was used here on the basis of investigators experience in shoulder Pain due to Soft tissue injury where application of TENS and Ultrasound could alleviate the discomfort but since it is time consumingboth Units were Modified and tested here.

Main Outcome Measures:

Pain relief was marked using the Numerical Pain Rating Scale.

In Numerical Pain Rating Scale patients are asked to mark the number between 0-10. Zero denotes 'no pain at all' whereas ten represents 'the worst pain ever possible'.[(5)]

Active Shoulder Range of Motion (AROM) was assessed using the goniometer.

The universal goniometer or (international standard goniometer) is the most common method for determining range of motion of large joints like shoulder and hip. This goniometer comes in variety of sizes and the size has no bearing on accuracy of the measurement techniques. Pendulum goniometers,fluid goniometers and OrthoRanger are some of the other instruments available. None have proven to be trustworthy as the universal goniometer.[(6)]

Results

Pain was reduced by 5 Points on NPRS scale and active Shoulder abduction improved by 40 degree and External Rotation by 40 Degree.

Left side	Pretreatment ROM	Post treatment ROM
Flexion	$0\text{-}180^0$	$0\text{-}180^0$
Extension	$0\text{-}50^0$	$0\text{-}50^0$
Abduction	$0\text{-}140^0$	$0\text{-}180^0$
Adduction	0^0	0^0
Internal rotation	$0\text{-}90^0$	$0\text{-}90^0$
External rotation	$0\text{-}50^0$	$0\text{-}90^0$

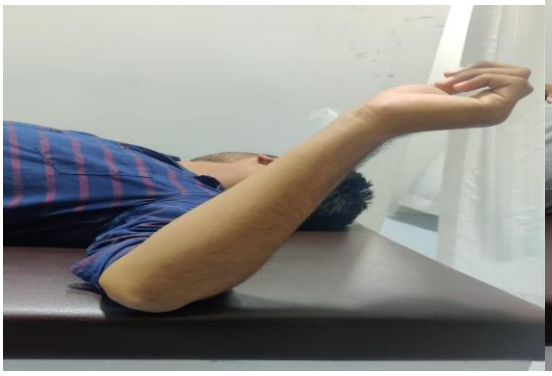

Figure No. 1

Figure No. 2

Discussion

The results of this study showed that a alternate sessions of SONICTENS may be useful in reliving the shoulder pain and Improving ROM in Supraspinatus Tendinitis. The author feels that this could be due to the activation of Pain Gate Mechanism, Localized increase in Blood flow and acceleration of healing. The present study also showed improvement in Shoulder range of motion in Shoulder External Rotation and Abduction this might a result of reduced Pain which was inhibiting these movements.

Electrotherapy modalities are different forms of physical therapy that is used to reduce pain and improve function through transmitting energy into the body.

Therapeutic Ultrasoundis most widely used modality in rehabilitation. The treatment parameters include frequency raging from 1-3MHz and intensity 0.1- $3W/cm^2$. Physiological effects of ultrasonic waves includeincreased temperature of tissue, increased local blood flow and improved extensibility of the tissue.[7]

On the other hand, TENS is a modality in which the electrical stimulation is delivered through the electrodes placed over the site of pain. It activates the underlying nerves. The most commonly used TENS of all types are the conventional TENS(high frequency and low intensity) and acupuncture like TENS (low frequency and high intensity).

TENS was developed on the base of 'Gate Control Theory' which suggests that the gating mechanism in the dorsal horn of spinal cord that controls the painful stimuli through small diameter afferent nerve fibers, can be regulated by stimulating the large diameter afferent nerve fibers using any other stimuli such as TENS and can ‘close the gate’ and reduce perception of pain.[8]

Since there is hardly any study with similar studydesign and interventions, the results could not be interpretedwith preceding literature. The obvious limitation of this study isgeneralization to other individuals or situations is difficult. Also,single subject participation in this study limits the conclusion ofstudy for specific person.

Conclusion

The results of this study suggest that SONICTENS may be used for relief of pain and Improvement in Active Range of Motion in Supraspinatus Tendinitis. Acting as a Combo therapy Unit it will save the time and accelerate the healing.

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