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Effect of Postisometric Relaxation Technique Versus Conventional Transcutaneous Electrical Nerve Stimulation with Passive Stretching in Reducing Pain in Myofascial Pain Syndrome of the Upper Trapezius

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Abstract:
Myofascial Pain Syndrome is characterized by myofascial trigger points in a palpable taut band of skeletal muscle and referred pain to a remote location. The prevalence of myofascial pain syndrome, a common musculoskeletal disorder, has been increasing dramatically in recent years. It is a pretest and posttest experimental study design 20 Patients of age between 20 to 40 years with myofascial pain syndrome were divided into two groups. Group A consists of 10 patients and received postisometric relaxation technique (PIR). Group B consist of 10 subjects and received conventional transcutaneous electrical nerve stimulation (TENS) with passive stretching. Treatment duration for both groups was twice a day, daily for one week. Pain was used as outcome measure and measured by visual analog scale (VAS). Pretest and posttest values were measured and analysed bySstudent 't' test. The results showed that there was no significant difference between the effect of postisometric relaxation technique and conventional transcutaneous electrical nerve stimulation (TENS) with passive stretching in reducing pain in myofascial pain syndrome of the upper trapezius. The study concluded that postisometric relaxation technique and conventional transcutaneous electrical nerve stimulation (TENS) with passive stretching were equally effective in reducing pain in myofascial pain syndrome of the upper trapezius.

Key words: *Myofascial pain syndrome, Trigger Points, Transcutaneous electrical nerve stimulation, Stretching, Muscle energy technique*

1. Introduction

Myofascial pain syndrome is defined as a condition in which the patient has "hyperirritable spots" (or) "trigger points" within taut bands of skeletal muscle (or) fascia that are painful on compression and can give rise to characteristic referred pain, tenderness and autonomic nervous system symptoms. Pain from myofascial pain syndrome can be described as deep and achy and it is occasionally accompanied by a sensation of burning (or) stinging. Patient may also report restricted range of motion in the area affected. Myofascial pain syndrome is limited to one area (or) quadrant of the body. Free calcium ions plus ATP leads to sustained contraction of fibers causing a hyper metabolic state focally and local vasoconstriction (possibly via sympathetic nervous system). Local constriction causes local ischemia, which, combined with increased energy demands. In addition to the tissue damage releases serotonin, histamine, and kinins, which also lead to local ischemia as well as nerve sensitization (Travell and Simons et al 1999). A muscle that is immobilized in the shortened position for prolonged periods tend to develop active trigger points. Active trigger points are found commonly in postural muscles of neck, shoulder and pelvic girdles and in the masticatory muscles. In addition, the upper trapezius, scalene, sternocleidomastoid, levator scapulae and quadratus lumborum muscles are very commonly involved (Travell 1955). The upper trapezius trigger point was clearly commonly identified in a survey of 200 healthy asymptomatic young adults (Sola et al 1955). Trigger points in the upper trapezius fibers characteristically refer pain and tenderness along the posterolateral aspect of the neck, behind the ear and to the temple (Travell and Simons et al 1999). Conventional TENS, stretching and postisometric relaxation technique (PIR), a type of muscle energy technique are methods of treatment for myofascial syndrome. The purpose of this study to compare the effect of postisometric relaxation technique and conventional transcutaneous electrical nerve stimulation (TENS) with passive stretching in reducing pain in myofascial pain syndrome of the upper trapezius.

2. Methodology

A pretest and posttest experimental study design was adopted in this study. The study was conducted at Department of Physical Medicine and Rehabilitation, Kovai Medical Center and Hospital, Coimbatore. Patients with myofascial pain in upper trapezius, age group varies from 20-40 years and both sexes were included. Patients with cervical radiculopathy, skin infections, cardiac pacemakers, cervical spine fracture, sensory deficits, tumours and tuberculosis of spine and shoulder, shoulder pathologies were

excluded. By Purposive sampling, 20 patients were selected and divided into Group A and Group B. Each group consists of 10 patients. Group A received postisometric relaxation technique (PIR) and Group B received conventional transcutaneous electrical nerve stimulation (TENS) with passive stretching. Treatment duration for both groups was twice a day, daily for one week. Pain was used as outcome measure and measured by visual analog scale (VAS). Pretest and posttest values were measured and analysed by Student 't' test.

2.1. Postisometric Relaxation Technique (PIR)

With patient in supine lying, therapist stands at head end of the treatment table. With arms crossed therapist fixes the patients shoulder from above with one hand and cupping the mastoid area of the same side of head with the other hand. Then sidebent the head and neck passively away from the affected side to the limit of restriction barrier. Therapist asks the patient to look, with the eyes only (i.e. not to turn the head) towards the affected side Therapist resist the patient's voluntary effort. So that slight isometric contraction develops and it is held for 10 seconds. After this effort, the patient is asked to relax the muscle completely. Then the therapist takes the muscle to its new restriction barrier without stretch. Starting from this new barrier, the same procedure is repeated two more times.

2.2. Conventional Transcutaneous Electrical Nerve Stimulation (TENS) With Passive Stretching

With patient in comfortable sitting position in a back well-supported chair. TENS was applied over trigger points in the upper trapezius with parameters of 20-100 microseconds, 50-200 Hz, intensity upto maximum tolerated tingling sensation for the duration of 30 minutes. Followed by passive stretching of upper trapezius muscle was given Therapist depresses the scapula with one hand and the stretch is then performed into neck flexion with side flexion away from and rotation toward the affected side with the other hand. The stretch is held for 30 seconds. Relax for 15 seconds and repeat this procedure for 2 more times.

3. Results and Analysis

Table I and Figure I shows the results of Paired 't' test analysis of pretest and posttest values for Group A. The result shows that there was a significant effect of postisometric relaxation technique in reducing pain in myofascial pain syndrome of the upper trapezius at 5% level of significance.

VAS	MEAN	SD	PAIRED 't' VALUE
Pretest	7.5	1.08	
Posttest	1.6	1.26	25.3 ($p < 0.05$)

Table 1

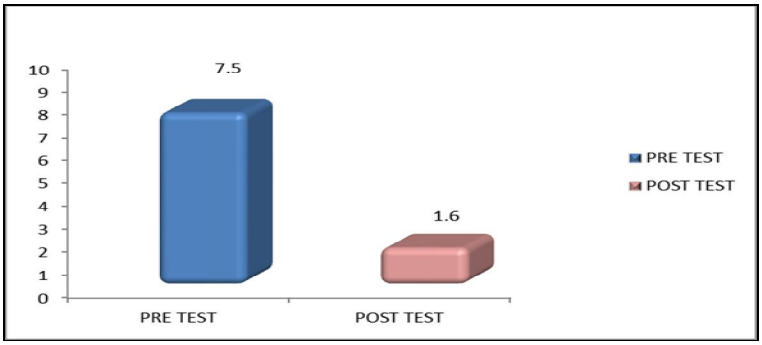

Figure 1

Table II and Figure II shows the results of Paired 't' test analysis of pretest and posttest values for Group B. The result shows that there was a significant effect of conventional transcutaneous electrical nerve stimulation (TENS) with passive stretching in reducing pain in myofascial pain syndrome of the upper trapezius at 5% level of significance.

VAS	MEAN	SD	PAIRED 't' VALUE
Pretest	7.6	1.07	
Posttest	1.5	1.08	26.1 ($p < 0.05$)

Table 2

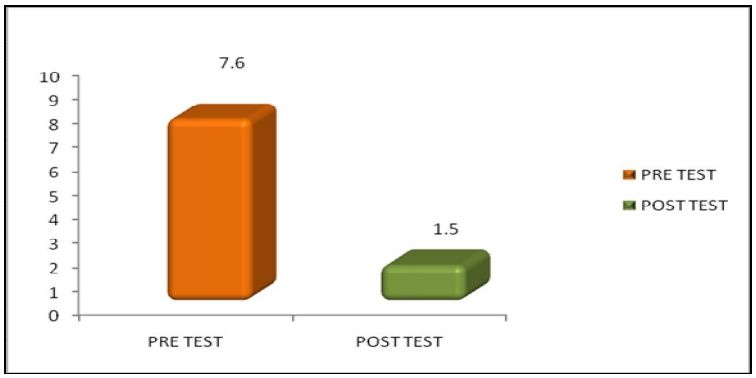

Figure 2

Table III and Figure III shows the results of Unpaired 't' test analysis of pretest values for Group A versus Group B. The result shows that there was no significant difference between pretest values of Group A and Group B at 5% level of significance.

GROUPS	MEAN	SD	UNPAIRED 't' VALUE
Group A	7.5	1.08	0.208 ($p > 0.05$)
Group B	7.6	1.07	

Table 3

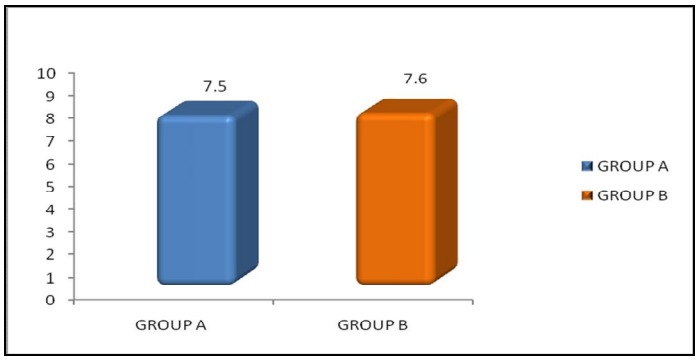

Figure 3

Table IV and Figure IV shows the results of Unpaired 't' test analysis of posttest values for Group A versus Group B. The result shows that there was no significant difference between the effect of Group A and Group B at 5% level of significance.

GROUPS	MEAN	SD	UNPAIRED 't' VALUE
Group A	1.6	1.26	0.190 ($p < 0.05$)
Group B	1.5	1.08	

Table 4

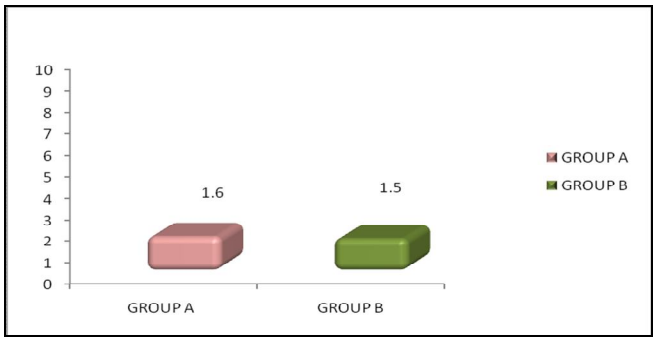

Figure 4

4. Discussion

This study was done to compare the effect of postisometric relaxation technique and conventional TENS with passive stretching in reducing pain in myofascial pain syndrome of the upper trapezius. In Paired 't' test, postisometric relaxation technique and conventional transcutaneous electrical nerve stimulation (TENS) with passive stretching showed significant effect in reducing pain in myofascial pain syndrome of the upper trapezius. Results of Unpaired 't' test for posttest values showed that there was no significant difference between the effect of postisometric relaxation technique and conventional transcutaneous electrical nerve stimulation (TENS) with passive stretching in reducing pain in myofascial pain syndrome of the upper trapezius. With low-intensity stimulation of transcutaneous electrical nerve stimulation (TENS), the low threshold large afferent fibers can be stimulated selectively, which can suppress the pain impulses from small nociceptive fibers through the gate control mechanism (Melzack and Wall 1965). The pain-reducing properties of transcutaneous electrical nerve stimulation (TENS) coupled with stretching would produce the desired effect of reducing pain and myofascial trigger point sensitivity (Radford et al 1989). Conventional transcutaneous electrical nerve stimulation (TENS) helped to relieve the spasm in the primary trigger points of sternocleidomastoid and trapezius and also in other associated muscles through its local effect by improving the circulation and removing the algogenic substances, while at the spinal level by closing the gate at substantia gelatinosa acting through A Beta fiber stimulation (Athama Prasanna 2002). Stretching of the muscles using either active (or) passive methods is useful in treating both the shortness and trigger point since this can reduce the contraction (taut band) as well as increasing circulation to the area (Lean Chaitow 1996). Myofascial trigger point sensitivity decreases in response to passive stretch as assessed by the pressure algometer and that trigger point sensitivity and intensity of referred pain are related (Jaeger and Reeves 1986).

Postisometric relaxation technique of 351 muscle groups in 244 patients and found that immediate relief of pain and tenderness on 330 muscles out of them (Karel Lewit 1984). Muscle energy techniques are osteopathic procedures which are used to mobilize joints in which movement is restricted, stretch tight muscles and fascia, improve local muscle circulation and balance neuromuscular relationships to alter muscle tone (Goodridge 1997). In achieving the Postisometric relaxation, the effect of sustained contraction on the Golgi tendon organ seems pivotal, since this response to such a contraction seems to set the tendon and the muscle to a new length by inhibiting it (Moritan et al 1987).

This study concluded that both postisometric relaxation technique and conventional transcutaneous electrical nerve stimulation (TENS) with passive stretching were equally effective in in reducing pain in myofascial pain syndrome of the upper trapezius.

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