



Effect of offloading using rigid tape in unilateral trapezitis

¹Khushboo Chelani, ²Dr. Keerthi Rao (PT), ³Brinda Shah, ⁴Ruchita Shah, ⁵Prachi Borawake

^{1, 3, 4, 5}Physiotherapy Intern, Dr. A.P.J. Abdul Kalam College of Physiotherapy (PIMS), Loni, Maharashtra, India

²Associate Professor, Department of Musculo-skeletal Physiotherapy and Vice Principal, Dr. A.P.J. Abdul Kalam College of Physiotherapy, PIMS Loni, Maharashtra, India

Abstract

Background: McConnell tapping is the concept which was introduced by Jenny McConnell (PT) from Australia. She used rigid, adhesive tape for reducing the pain in knee. Trapezitis pain is a classic stress pain. So the study is carried out to know its effect on pain, tenderness and cervical range of motion in patients with trapezitis.

Materials and Methods: The study included 30 participants. Offloading was done on all the participants. Then the subjects were assessed for their pain, tenderness and range of motion using NPRS, Algometer and Goniometer respectively.

Result: Effect of offloading using rigid tape in patients with unilateral trapezitis was highly significant on pain, tenderness and range of motion.

Conclusion: The study concluded that there was highly significant improvement in pain, tenderness and cervical range of motion in patients with unilateral trapezitis with the use of offloading of upper trapezius muscle by using rigid tape.

Keywords: taping, offloading, trapezitis, pain, tenderness, cervical range of motion

Introduction

The trapezius muscle is a large paired surface muscle of the back. It extends longitudinally from the occipital bone to the lower thoracic vertebrae of the spine laterally to the spine of the scapula^[1]. Neck pain associated with the involvement of upper trapezius muscle is very common. About two thirds of people experience neck pain at some point in their lives, prevalence being highest in the middle age and common in women comparatively. Neck pain prevalence varies widely in different studies, with a mean point prevalence of 13 % (range 5.9%–38.7 %) and mean lifetime prevalence of 50 % (range 14.2%–71.0 %) ^[2].

Trapezitis pain is a classic stress pain, which is very common and recurrent in nature. This condition is classified as acute (less than one month), sub acute (1-3 month) and chronic (3 or more than 3 months) based on period of time it occurs^[3]. It is an inflammatory pain arising from the trapezius muscle leading to severe muscle spasm, neck pain/stiffness around the neck and shoulder/upper back region, tenderness of trapezius muscle and affects the cervical range of motion (mainly ipsilateral side flexion and contra lateral rotation). The decrease in motion is caused due to tightness and it negatively affects the mobility of the cervical joints with an ensuing pain-spasm cycle which can be difficult to break^[4]. It affects the patient's activities of daily living^[2].

Trapezitis as the name suggests involves the trapezius muscle, which is designated as postural muscle and it is highly susceptible to overuse. The other causes may include constant stress /strain and fatigue of the muscle, poor ergonomics adopted by individuals which creates shortness in the muscle and prolonged bad posture being the commonest^[4, 5].

Trapezius pain or spasm is also activated by stressful thoughts and feelings or abnormal breathing pattern^[5]. As the trapezius muscle works to move the neck in various directions, any position which places trapezius in a shortened state for a period of time without rest may shorten the fibers and lead to dysfunction and restricted movements of neck^[5, 6]. Low level activity of the upper trapezius is found during sitting and standing which is related to posture of the head and is a source of tension and neck pain especially in people who work at a desk and computers or who spend many hours driving^[7]. Symptoms include aching shoulder, a feeling of neck hurting which is deep and painful in character and also sometimes headache and burning sensation between the shoulder blades^[3].

Trapezitis will have a gradual effect on a patient's activity, even though the patient tends to be ignorant at first; the patient is bound to come for it over a period of time. There are various interventions used to treat trapezitis that include pharmacological intervention and physiotherapy. The physiotherapy approach include various manual therapies such as stretching, ischemic compression, transverse friction massage, myofascial release technique, muscle energy technique and positional release technique, spray and stretch technique. Other pain eliminating modalities used are cryotherapy in acute cases and hydro collar packs in chronic cases, transcutaneous electrical nerve stimulator, etc.^[8].

The concept of minimizing the aggravation of inflamed tissues is the central plan of intervention. One can effectively minimize pain and aggravation of inflamed tissue by unloading or offloading painful or inflamed structures. Unloading the structures helps to break the endless cycle of

increased pain, decreased activity, improves range of motion, minimizes and eliminates tenderness along with improvement of muscle imbalance. We can simply say that the principle of unloading is based on the premise that inflamed soft tissue does not respond to stretch but unloading^[8].

Mechanically, if taping is applied in such a fashion that muscle is held in a shortened position, there will be a shift of the length-tension curve to the left, and greater force will be developed in the inner range through optimized actin-myosin overlap during cross-bridge cycle. Tape applied firmly across the fibres of a muscle has been proposed to decrease the activity of a muscle^[9]. It is also used for treating trigger points associated with trapezitis^[10]. Tape could be seen as serving to partially or wholly “correct” the underlying muscle imbalance giving symptomatic resolution and/or subjective benefit for the patient¹¹. It has a beneficial effect in alleviating pain as well as increasing pain sensitivity. It is also effective in reducing bioelectrical activity which is due to the inhibitory activity on application of tape^[12].

It must be clearly known that taping is not a substitute for treatment and rehabilitation, but it is an adjunct to it. Taping continues to be a significant part of a physiotherapist’s armamentarium in stages of rehabilitation after injury. Indeed, physiotherapists perform taping religiously^[8].

Material and Methodology

Study Design: Interventional Study (Pre and Post)

Source of Data: The sources of data are undergraduate students having unilateral trapezitis of Pravara Institute of Medical Sciences (DU), Loni. Taluka- Rahata. District- Ahemdagar-413736, and Maharashtra.

Type of Data: The data was primary which was collected by the principal investigator.

Study setting: Orthopedic department of Dr. A.P.J Abdul Kalam College of Physiotherapy; Pravara Institute of Medical Sciences (DU)

Sample size: 30

Target Population: Students in the age group of 18-23 having unilateral trapezitis

Sampling Method: Convenient Sampling

Study Duration: 4 months (August 2017 – November 2017)

Selection Criteria

1. Participants who are students of Pravara Institute suffering from unilateral trapezitis between 18-23 years, of both gender and those with acute (0-3 weeks) trapezitis were included in the study.
2. Participants having any neurological involvement, other musculoskeletal condition such as cervical spondylitis, thoracic outlet syndrome and any referred dental, head and ear pain, any systemic infection; those diagnosed with any kind of skin infection, open wounds, and those allergic to tape were excluded in the study.

Procedure

The study received ethical approval from Institutional Ethical Committee of Dr. APJ Abdul Kalam College of Physiotherapy, Loni.

The participants were screened and after finding suitability according to the inclusion and exclusion criteria, they were

requested to participate in the study. They were explained about the study and the intervention.

The participants were briefed about the nature of the study; the duration of intervention and the intervention being used were explained in the language best understood by the participants. They were encouraged to clarify queries regarding the study, if any. An informed written consent form, approved by ethical committee was given to the participant’s. The demographic data was obtained and a detailed assessment was done.

The sample size for the study was 30 participants. The participant were assessed on the first day for the severity of pain, tenderness and cervical range of motion (ipsilateral side flexion) with NPRS, algometer and goniometer respectively. Each participant was given offloading by tape every alternate day for 6 days i.e. 3 sessions per participant.

Procedure for offloading of upper trapezius in trapezitis

Position of the patient: Sitting

Position of the therapist: Behind the affected side.

Position of scapula: Neutral scapular posture

Application:

The hypoallergenic tape is applied first without any tension, as follows:

1. Anteriorly, just above the mid clavicle, with the medial border of the tape adjacent to the angle of the neck
 2. Posteriorly, over the shoulder and attaching as far down to the level of T7, medial to the medial border of the scapula.
1. The zinc oxide or rigid tape is then applied over the hypoallergenic tape with minimal tension:
 2. While applying the rigid tape offload the trapezius muscle by taking up the slack.
 3. Apply a minimal postero-inferior force with the rigid tape to bunch the upper trapezius fibres.
 4. Continue the postero-inferior force as the rest of the tape is laid down.

After the 6th day the participants were reassessed for the parameters of pain, tenderness and cervical range of motion (ipsilateral side flexion) using NPRS, algometer and goniometer respectively. Then the previously obtained data was compared to that of achieved after offloading with tape.

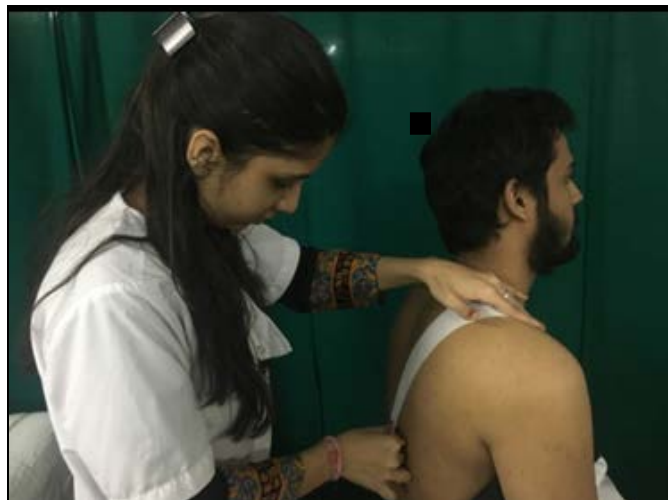


Fig 1: Therapist applying hypoallergenic



Fig 2: Therapist applying rigid tape while offloading the upper trapezius muscle



Fig 3: Posterior view



Fig 4: Anterior view Data Analysis, Interpretation and Result

Table 1: Data presentation of Pain on Numerical pain rating scale (PRE –POST)

Parameters	Pre (MEAN ± SD)	Post (MEAN ± SD)	t Value	p VALUE
PAIN	6.33 ± 1.56	3.16 ± 1.17	9.15	<0.001, which is considered highly significant

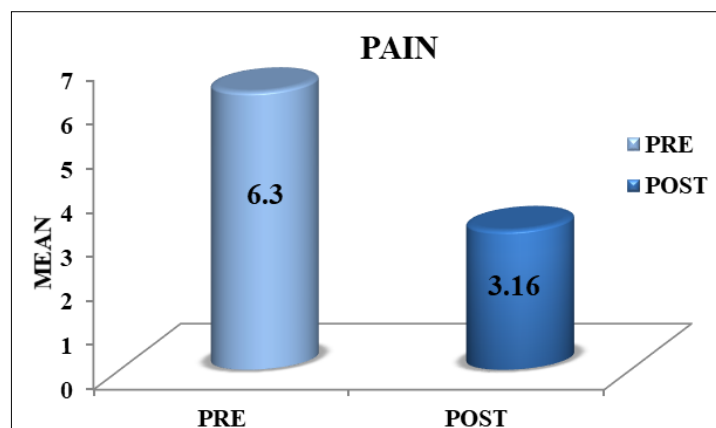


Fig 5: Represents pre and post readings of pain (ON NPRS)

Result no. 1: The above Fig 5 shows the comparison of mean value of pre and post pain (NPRS), t value was 9.15, and $p < 0.0001$ using student paired t' test within the group which shows extremely significant difference.

Table 2: Data presentation of tenderness In Lbs (PRE –POST)

Parameter	Pre (MEAN ± SD)	Post (MEAN ± SD)	t Value	p Value
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Tenderness (In lbs)	7.3 ± 4.3	12.0 ± 3.58	10.45	<0.001, which is considered highly significant
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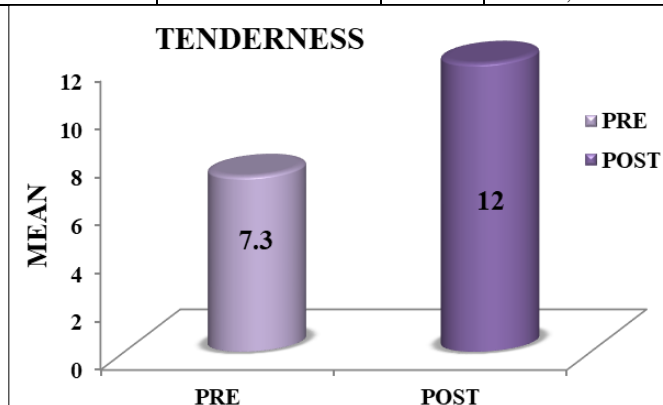


Fig 6: Represents pre and post readings of tenderness (In lbs)

Result No. 02: The above Fig 6 shows the comparison of mean value of pre and post tenderness, t value was 10.45, and $p < 0.0001$ using student paired t' test within the group which shows extremely significant difference.

Table 3: Data presentation of Range Of Motion (In degrees) (PRE – POST)

Parameter	Pre (MEAN ± SD)	Post (MEAN ± SD)	t Value	p Value
Range Of Motion	36.53 ± 3.4	41.9 ± 2.12	14.71	<0.0001 which is considered highly significant.

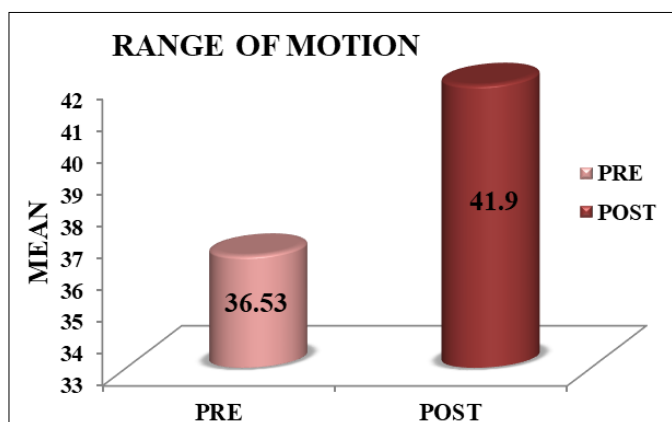


Fig 7: Represents pre and post readings of Cervical Range of motion- Ipsilateral Side flexion (In Degrees)

Result No. 03: The above Fig 7 shows the comparison of mean value of pre and post range of motion, t value was 14.71, and $p < 0.0001$ using student paired t' test within the group which shows extremely significant difference.

Discussion

The study evaluated the effect of offloading using rigid tape on undergraduate students of Pravara Institute of Medical Sciences having unilateral trapezititis. This interventional study consisted of 30 participants and had duration of 1 week per patient and each patient received 3 sessions of taping every alternate day for a week. The result of this study showed that there were extremely significant changes in the pain, tenderness and range of motion.

Trapezititis is pain arising from the trapezius muscle due to inflammation leading to severe muscle spasm. It results as neck pain, stiffness around the neck and shoulder/upper back region, tenderness of trapezius muscle and affects the cervical range of motion mainly ipsilateral side flexion [4]. It also

affects the patient’s activities of daily living [2]. Taping when applied in such a fashion that muscle is held in a shortened position has been proposed to decrease and/ inhibit the activity of a muscle and will produce a shift of the length-tension curve to the left, and a greater force will be developed in the inner range through optimized actin-myosin overlap during cross-bridge cycle. Inhibitory or unloading effect is demonstrated as soon as the tape is applied [9]. As there is offloading of the muscle which stops the activity of the inflamed muscle; this inhibitory action gives some time for the inflammation to subside and muscle to heal. This inhibition indirectly seizes the inflammation and the symptoms from aggravating. This not only helps with the control of inflammation but also breaks the endless cycle of pain. Once the inflammation of the muscle is eliminated or even under control it is easy to work with the pain, tenderness and range of motion and further taping sessions are done so as to eliminate the pain, tenderness and increase the range of motion simultaneously with control of inflammation and correction of muscle imbalance.

The preliminary study carried out by Kuba Ptaszkowski, Lucyna Slupska was, Comparison of the Short-Term Outcomes after Postisometric Muscle Relaxation or Kinesio Taping Application for Normalization of the Upper Trapezius Muscle Tone and the Pain Relief. On using the postisometric muscle relaxation technique there was decrease in tonus which may be due to desensitization of the muscle fibers within the muscle, but it had no role in relieving pain. On the other hand Kinesio taping had a beneficial effect in alleviating pain and increasing pain sensitivity and also proved to be effective in reducing bioelectrical activity which happened to be due to the analgesic effect its application across the involved muscle. Therefore the study concluded to support Kinesio taping as compared to postisometric relaxation technique [2]. The research conducted by Tomasz Halski, Kuba Ptaszkowski, studied Short-Term Effects of Kinesio Taping

and Cross Taping Application in the Treatment of Latent Upper Trapezius Trigger Points: A Prospective, Single-Blind, Randomized, Sham-Controlled Trial. In this study they stated that the KT taping worked so as to reduce the pain significantly but not improve range of motion. It is said to be due to the probable analgesic effect of the tape as the gate control theory seems to be the most fundamental approach, in which the cutaneous stretch and fascial mechanoreceptors, activated by the KT interferes with the nociceptive stimuli reaching the central nervous system and thus inhibits the pain and improves muscle excitability. It is also stated that KT increases blood and lymphatic fluid circulation under the taped area in a consequence of a lifting effect, which develops a wider space between the underlying skin and the muscle which may affect the functions of the muscle and result in reduction of pain¹⁰.

There are few studies showing effect of offloading in various conditions but no study showing effect of offloading using rigid tape in patients having trapezitis. Hence, according to the positive results of the study it would be beneficial to use offloading using rigid tape in patients having trapezitis.

Conclusion

The study concluded that offloading using rigid was given every alternate day for 6 days i.e. 3 sessions per participant was highly effective on participants having unilateral trapezitis. As this intervention constituted of the offloading concept of treatment which helped unloading and resolution of the inflammatory structure, which eventually helped faster recovery and showed significant improvement in pain, tenderness and cervical range of motion (ipsilateral side flexion).

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