

Effectiveness of Thoracic Screw Thrust Technique in T4 Syndrome

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Abstract

Symptoms of the upper extremity, sometimes, doesn't co-relate with cervical radiculopathy or with peripheral nerve involvement. When an ideal examination excludes the probable diagnosis, comparing the symptoms and its history could possibly lead to the striking remembrance of T4 syndrome. According to Grieve, mobilization of the T4 vertebra, reproduces or eliminates the symptoms. The patient was a 43-year-old lady teacher, presented to the physiotherapy outpatient department, with the chief complaint of neck pain and tingling sensation in the left hand for 6 months. Her pain got aggravated while writing on the blackboard and while lifting weights. And eased with hot water fermentation. No positive findings to rule out for any cervical pathology or peripheral nerve involvement. Thoracic screw thrust technique was adopted to relieve pain and to reduce tingling sensation in the left hand for a patient with T4 syndrome. Following 5 sessions of Thoracic screw thrust technique, her scores of NRS for blackboard writing was reduced from 7/10 to 3/10 and for weight lifting from 8/10 to 3/10. And score for Neck Disability Index reduced from 46% to 35% (Driving domain was excluded). This case report describes the successful application of Thoracic screw thrust technique in T4 syndrome. It will probably establish an evidence of this manual therapy technique in T4 syndrome. This report will possibly also emphasize on the differential diagnosis for neck pain and the requirement of an ideal examination for the same.

Keywords: Neck Pain; T4 Syndrome; Screw Thrust Manipulation.

Introduction

Discovering something out of the box is always challenging. This is exclusively true for thoracic spine. Misdiagnosis of the upper thoracic spine problems as that of cervical origin are common, since subjective and objective examinations of cervical spine can have similar signs and symptoms to that of the upper thoracic. As they are very closely related, with regards to cervical movements [1].

Posture is the key for erect spine. Poor posture, overuse and excessive bending, twisting and lifting can lead to have patients present with change of sensations in the upper extremity, either unilaterally

or bilaterally [2,3]. Sometimes, these symptoms don't co-relate with a cervical radiculopathy or with peripheral nerve involvement. Potential contributors to these symptoms could be due to the pathology of thoracic outlet syndrome (TOS) or due to autonomic dysfunction of the sympathetic nervous system. When an ideal examination excludes the probable diagnosis, comparing the symptoms and its history could possibly lead to the striking remembrance of T4 syndrome. Mechanism of the condition is unknown, but it is hypothesized that symptoms are of sympathetic origin [4].

The link between the sympathetic and the somatic nervous system is not clearly understood [2]. Possibly, extreme or persistent postures leads to relative arteriolar ischaemia [4]. This can produce repeated injury and repair, with formation of scar. It can also lead to chronic damage and remain as a potential threat to cause further tissue damage [3]. The sympathetic paravertebral ganglia in the thoracic spine are located near to the costovertebral joints. The sympathetic innervation of the head and the hands overlay at the T4 level. Because of the high mechanical sensitivity of the sympathetic ganglia in

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the thoracic spine, this area could be a responsible contributor for the head and hand symptoms [5].

The term T4 syndrome is a clinical pattern that involves upper extremity paraesthesia and pain in glove distribution in the hand/s, with or without symptoms in the head and/or neck or upper thorax. Complaint of altered sensation in his/her hands which could be related to the spinal levels T2 - T7 [4]. Thus, in 1997, Evans laid a recommendation to rename the T4 syndrome into "Upper Thoracic Syndrome". This syndrome is more common in women than men in a ratio of 4:1 and usually occurs above the age of 35 [3,4].

Probably, there are no authentic criteria/s to aid in diagnosis of T4 syndrome. Radiographs also do not assist in the diagnosis, rather they may help to rule out other conditions [6]. But, it has been suggested that mobilization of the T4 vertebra, reproduces or eliminates the symptoms [7]. The following case report describes the successful application of Screw thrust technique in T4 syndrome. It will probably establish an evidence of this manual therapy technique in T4 syndrome. This report will possibly also emphasize on the differential diagnosis for neck pain and the requirement of an ideal examination for the same.

Case Description

History

A 43-year-old female primary school teacher presented to the physiotherapy outpatient department, with the chief complaint of neck pain and tingling sensation in the left hand (not in dermatomal pattern), for 6 months. She is in service for past 23 years and is left handed by dominance. On the first onset of pain, she was advised for non-steroidal anti-inflammatory drugs for pain, by a local practitioner. Her symptoms subsided then. After the recurrence of pain, she visited an Orthopaedic, who prescribed her some medications and advised her for physiotherapy. She had dull aching pain in the neck and left periscapular region associated with tingling sensation in the left hand. Pain gets aggravated while writing on the blackboard and while lifting weights. And eased with hot water fermentation. Pain stopped her from lifting weights and to alter her sleeping position frequently. No other relevant past history or family history.

Physical Examination

Grade 2 tenderness along C4-T5 spinous process. Bilateral upper trapezius spasm. Tender spots along

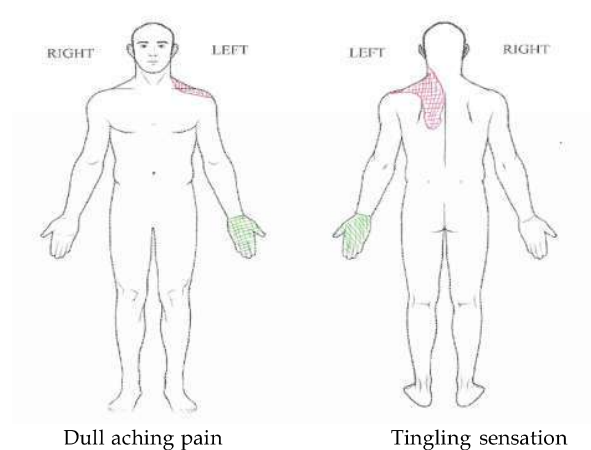


Fig. 1: Patient's Symptom distribution

left periscapular region. Painful and restricted cervical range of motion. Spurling's compression test was negative. ULTT for left ulnar, median and radial nerves were negative. No positive findings to rule out for thoracic outlet syndrome or carpal tunnel syndrome.

Investigation

Cervical spine X ray in anteroposterior and lateral views were taken in standing. It revealed a reduced cervical lordosis. No other significant findings were found.

Outcome Measures

The patient's pre-therapy scores of verbal numerical rating scale (NRS) for pain for blackboard writing was 7/10 and for weight lifting was 8/10. Neck Disability Index was 46% (Driving domain was excluded).

Consent

After examination, the therapist explained the findings, about the procedure and the requirement of the procedure. And took her consent in written.

Management

Patient position: Prone lying with pillow under the chest and both the hands held overhead and forehead was resting on the palm of the hands (Normal breathing was ensured).

Procedure

The treatment procedure was explained and her co-operation was requested for. The therapist stood on the right side of the patient. Base of hypothenar

eminence of the therapist's hands are placed just lateral to the spinous process of T4 vertebra (fingers of both the hands are directed in opposite direction). Sustaining a PA glide, therapist's hands are rotated with elbows in extension. Patient was instructed to do inspiration and expiration. And, at the end of expiration, the therapist applied a thoracic screw thrust and listened for a cracking sound during the manipulation. A second thrust was given.

The same procedure was repeated for 5 days, with a brief reassessment every day, before the start of the treatment. A complete reassessment was taken at the end of 5-day treatment. Then, she was given home exercise program for neck range of motion and strengthening exercises.

Post Therapy Scores

Scores of NRS for pain for blackboard writing was 3/10 and for weight lifting was 3/10. Neck Disability Index was 35% (Driving domain was excluded).



Fig. 2: Hand Placement for Thoracic Screw thrust mobilization (Arrows indicates the thrust direction)

Discussion

To the best of our knowledge, this case report is different from previous studies, as this is probably the first attempt to demonstrate the application of thoracic screw thrust technique in T4 syndrome. Also, the evidence concerning the management of T4 syndrome is probably limited. This case report is intended to aid in the resolution of upper limb symptoms experienced in the T4 syndrome through thoracic screw thrust technique.

Mrs. R showed substantial benefit in terms of pain and reduction in tingling sensation in the left hand. This might be due to activation of the descending pain inhibitory system projecting from the dorsal

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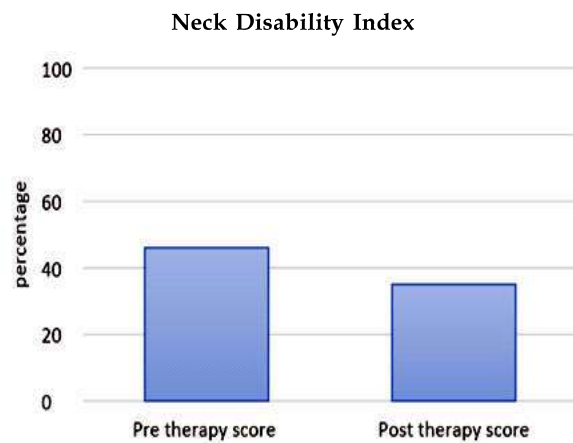


Fig. 3: Neck Disability Index: Reduction in the disability score

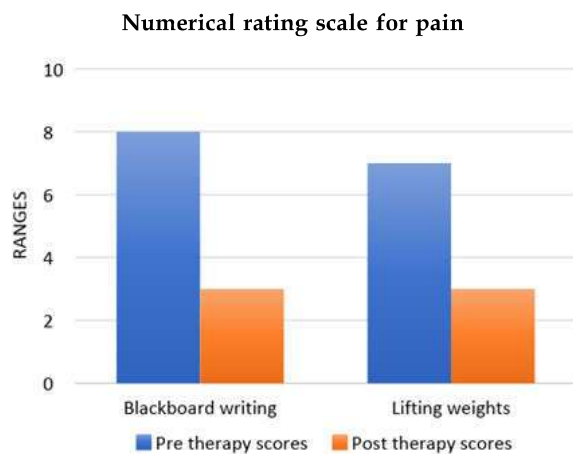


Fig. 4: Reduction in the NRS for Blackboard writing and Lifting weights

periaqueductal gray or by the process in the spinal cord via the gate control theory. It may be also due to the induced reflex inhibition of pain or reflex muscle relaxation by altering the discharge of proprioceptive group I and II afferents [8].

Symptom reduction, may perhaps, also be due to the change in the patient's autonomic activity towards parasympathetic functioning, which could have induced hypoalgesia. The complexity of SNS pathway and variability in symptoms suggest that a more sophisticated model might be required to explain its involvement [9].

But, since, there was pain relief and reduction in tingling sensation in the left hand, within a short span of days, it helped a lot in increasing the patient's confidence in the therapist. It strengthened the therapist- patient relationship and adherence of patient to the treatment.

Conclusion

This case report supports the clinical utility of thoracic screw thrust technique for the treatment of T4 syndrome associated with neck pain.

Limitations and Recommendations

Results of a case study cannot be generalised in a larger sample size. Further research is needed to explore the comparison of thoracic mobilisation and manipulation in T4 syndrome. Follow up of the patient was not done. Long term effectiveness could be studied to provide a better understanding of the treatment parameters.

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