

Effect of Sustained Natural Apophyseal Glides (SNAGs) on Thoracic Spine and Strengthening of Rhomboids in the Management of Scapular Pain in Computer Professional - A Case Report

Farzana Alam

BPT, COMT, Physiotherapist, Almedica Clinic, Kolkata, India

Abstract: *Introduction-Injuries or disorders of musculoskeletal tissue around the scapular region are common amongst computer professionals due to workplace risk factors like poor posture, repetitive strain or overuse injuries. This study evaluated the effect of physiotherapy in the management of scapular pain in a computer professional using a single case study. Following six sessions of physiotherapy the pain and functional impairment reduced as evaluated by Visual Analogue Scale and Patient Specific Functional Questionnaire.*

Keywords: Physiotherapy, Scapular Pain, Sustained Natural Apophyseal Glide (SNAG), Thoracic Spine, Rhomboids

1. Introduction

Musculoskeletal symptoms are common among computer users with a high incidence of symptoms, especially in the neck-shoulder region, and the costs and impact on quality of life due to these symptoms are considerable. [1, 2, 3] Factors related to the individual (e.g. age and gender), working technique, working postures, muscular rest and perceived muscle tension as well as factors related to the work place or work organization, such as workplace layout, repetitive and constrained work and psychosocial working conditions, may be potential risk factors. [4]

Excessive or abnormal muscle tension, required when inefficient or abnormal postures are maintained over time, can lead to muscle spasm, pain and stiffness.[5] Poor posture is commonly seen in computer professionals. The slouched posture of the trunk effects the position of the scapula on the thorax, influences the resting position and status of muscles having attachments both to the cervical spine and the shoulder complex causing reduced spinal range of motion.[5] Pain in the thoracic region of the spine is a common complaint, which can be as disabling as cervical and lumbar pain. [6] Changes in the direction of muscle pull, as a result of alterations in scapular position, can affect the amount of muscle tension required to maintain a static position. Maintaining a chronic position of scapula protraction can create weakness in the scapula musculature and reduce the proximal support and stability needed for good upper-quadrant posture.[5]

There are a wide variety of manual therapy procedures available to the physiotherapist to treat thoracic pain. It is claimed that more often than not these problems respond to mobilization or manipulation procedures.[7] Mulligan's mobilization-with-movement(MWM) treatment techniques are used in several musculoskeletal conditions.

Sustained Natural Apophyseal Glides (SNAGs) are described by Mulligan as useful techniques for treatment of the spinal

column. [8] SNAG involves the application of an accessory passive glide to vertebrae while the patient simultaneously performs an active movement. [8] The direction of the glide is along the plane of the facet joints and the technique is performed in a weight-bearing position (i.e. sitting, standing).[8]

Over the years, several models have been developed in an attempt to identify and explain possible links between different exposures, early signs of incipient musculoskeletal pain conditions and more manifest musculoskeletal outcome.[9] A cross sectional study among call center workers has shown an association between poor work place comfort (including lighting conditions, noise, temperature etc.) and a higher prevalence of neck and upper extremity symptoms. [10, 11, 12] A recent study has shown that the thoracic spine is ideally suited to SNAGS and therefore may be the treatment of choice in acute presentations of thoracic pain when the zygapophyseal joints are implicated. Rather than just using SNAGS to improve end range of motion, they may also have a role in correcting acute postural deformity. [13]

2. Methodology

The case: A 45 year old female computer professional presented with localised pain in the right scapular region since three weeks which would get aggravated within an hour of continuous computer usage. Her job demands her to use the computer for 6-8 hours per day. She had experienced similar symptoms twice in the past one year and the pain would subside with over-the-counter pain relievers and rest for a day or two. However, on this occasion the symptoms persisted.

Assessment: Observation in standing revealed the posture of the head to be slightly forward with protracted shoulder girdle and the patient assumed a slouched sitting posture. On palpation there was tenderness over the mid-segment of the inter-scapular region on the right side. Resisted isometric

contraction of the rhomboids on the right side was painful with the rhomboids having grade 3 muscle power, being able to lift off arm against no resistance, which was abducted and internally rotated across the back, tested in prone. On segmental assessment of the spine, there was decreased thoracic mobility at the thoracic segment T4-T7. There was no other abnormality in terms of cervical and shoulder mobility or other associated muscular functions on both sides.

Data collection: Data was collected for pain using Numeric Pain Rating Scale and functional evaluation was done by the Patient-Specific Functional Scale at baseline and after the sixth treatment session.

Intervention: A physiotherapy programme of manual therapy and strengthening for six sessions was planned. Central Sustained Natural Apophyseal Glide (SNAG) was performed at spinal level T4-T7. The patient was seated comfortably on a plinth and therapist stands postero-lateral to the patient. The therapist grasps the patient's torso just above the level of mobilization with one arm and with the hypothenar eminence of the other hand hooks the spinous process of the desired vertebra. The glide was applied and sustained in the direction parallel to the treatment plane as described by Mulligan [8] with the patient performing thoracic flexion. (Figure 1 a and b) Three sets of 6 repetitions were performed. With the patient in sitting position, strengthening of the rhomboids was performed by retraction of the scapula with the elbow at the side of the body (Figure 2). Three sets of ten repetitions were performed, with 1 minute of rest between sets. [14] All exercises were demonstrated prior the intervention to familiarize the patient with the technique and ergonomic advice was given to improve posture at work.



Figure 1a Figure 1b
Figure 1: Central SNAG of Thoracic Spine (a) with Thoracic Flexion (b)



Figure 2: Strengthening of Rhomboids muscle

3. Result

Pain perception which was at 8/10 on the Numeric Pain Rating Scale at baseline was reduced to 4/10 at the end of the sixth treatment session and there was significant improvement in functional status as evaluated by the Patient Specific Functional Scale.

4. Discussion

Rhomboids are a muscle which plays a vital role in the stability of the scapula on the thorax and thus supports the appendicular skeleton on the axial skeleton. With continuous computer work and improper ergonomic care the scapula remains in a protracted and upward position which puts stress on the muscles of the scapula. Generally, many clinicians focus on the upper trapezius for treatment of shoulder and scapular pain in computer workers. [15] However, continuous computer work could produce much more pain in the levator scapular and rhomboid muscles than in the upper trapezius. [16] In this case it was the rhomboids that was effected.

SNAG's effectiveness is based on a mechanical model related to minor positional faults that occur secondary to injury and that lead to maltracking of the joint, resulting in symptoms such as pain, stiffness, or weakness. The cause of positional faults has been suggested as changes in the shape of articular surfaces, thickness of cartilage, orientation of fibers of ligaments and capsules, or the direction and pull of muscles and tendons. MWMs correct this by repositioning the joint, causing it to track normally. Subsequent research to date also suggests that the mechanisms behind the effectiveness of MWMs are based on mechanical dysfunction and therefore positional fault correction. [17] Poor posture causes altered muscle orientation which may cause intervertebral joint and zygapophyseal joint maltracking. When Sustained Natural Apophyseal Glide is performed and synchronized with the offending movement it corrects malpositioning of the joint and provides symptomatic relief.

Adequate muscle strength is a key factor to perform various functional activities and thus strengthening of the rhomboids plays a vital role in scapular stabilization which gets compromised by poor posture.

5. Conclusion

SNAG of the thoracic vertebrae, strengthening exercise of rhomboids and ergonomic care had a significant effect in the reduction of pain and functional impairment in a case of right scapular pain in a computer professional.

6. Acknowledgement

The author thanks Dr. M. M. Alam (Orthopaedician) for his valuable advice.

References

- [1] Bernaards CM, Ariens GA et al. The (cost-) effectiveness of a lifestyle physical activity intervention in addition to a work style intervention on the recovery from neck and upper limb symptoms in computer workers. *BMC Musculoskeletal Disorders*. 2006; 7:80.
- [2] Barbe MF, Barr AE. Inflammation and the pathophysiology of work-related musculoskeletal disorders. *Brain Behaviour Immunity*. 2006; 20(5):423–29.
- [3] Blangsted AK, Sogaard K et al. One-year randomized controlled trial with different physical-activity programs to reduce musculoskeletal symptoms in the neck and shoulders among office workers. *Scandinavian Journal Work Environment Health*. 2008; 34:55-65.
- [4] Andersen JH, Haahr JP et al. Risk factors for more severe regional musculoskeletal symptoms: a two-year prospective study of a general working population. *Arthritis Rheumatism*. 2007;56(4):1355-64.
- [5] Braun BL, Amundson LR. Quantitative assessment of head and shoulder posture. *Archives Physical Medicine Rehabilitation*. 1989; 70(4):322-9.
- [6] Edmondston SJ, Singer KP. Thoracic spine: anatomical and biomechanical considerations for manual therapy. *Manual Therapy*. 1997;2(3): 132–43.
- [7] Horton SJ. Acute locked thoracic spine: treatment with a modified SNAG. *Manual Therapy*. 2002;7(2):103-07.
- [8] Mulligan BR. 2004. *Manual Therapy ‘NAGS’, ‘SNAGS’, MWMs*. 4th edition. New Zealand: Wellington.
- [9] Lindegard A, Wahlstrom J et al. Perceived exertion, comfort and working technique in professional computer users and associations with the incidence of neck and upper extremity symptoms. *BMC Musculoskeletal Disorders*. 2012; 13:38
- [10] Sauter SL, Swanson NG. An ecological model of musculoskeletal disorders in office work. In *Beyond biomechanics: Psychosocial aspects of musculoskeletal disorders in office work*. Edited by: Moon SD, Sauter SL. Taylor Francis. 1996; 3-21.
- [11] Wahlstrom J. Ergonomics, musculoskeletal disorders and computer work. *Occupational Medicine* 2005; 55(3):168-76.
- [12] Norman K, Floderus B et al. Musculoskeletal symptoms in relation to work exposures at call centre companies in Sweden. *Work*. 2008; 30(2):201-214.
- [13] Kaur I, Arunmozhi R et al. Effect of Maitland vs Mulligan mobilization technique on upper thoracic spine in patients with non-specific pain-a comparative study. *International Journal Physiotherapy Research*. 2013;1(5):214-18
- [14] Camargo PR, Haik MN et al. Effects of strengthening and stretching exercises applied during working hours on pain and physical impairment in workers with subacromial impingement syndrome. *Physiotherapy Theory Practice*. 2009;25(7):463-75
- [15] Szeto GP, Straker L et al. A field comparison of neck and shoulder postures in symptomatic and asymptomatic office workers. *Applied Ergonomics*. 2002; 33(1): 75–84.
- [16] Won-Gyu Yoo. Changes in pressure pain threshold of the upper trapezius, levator scapular and rhomboid muscles during continuous computer work. *Journal Physical Therapy Science*. 2013; 25(8):1021-22
- [17] Vicenzino B, Paungmali A et al. Mulligan’s mobilization-with-movement, positional faults and pain relief: current concepts from a critical review of literature. *Manual Therapy*. 2007;12(2):98-108.