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Study of Efficacy of Self Myofascial Release Technique on Text Neck Syndrome in Young Adults

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ABSTRACT

Background: Text Neck Syndrome (TNS) is a growing musculoskeletal issue caused by prolonged forward head posture due to excessive smartphone use. It leads to symptoms such as neck pain, muscle stiffness, postural misalignment, and functional limitations. While various physiotherapy techniques have been studied for TNS, there is limited evidence on the effectiveness of Self-Myofascial Release (SMR) as a treatment.

Methodology: A quasi-experimental study was conducted on 85 young adults (aged 18-25 years) diagnosed with TNS. Participants underwent a structured three-week SMR intervention using a tennis ball, targeting the trapezius and cervical muscles. Pre- and post-intervention assessments included the Numeric Pain Rating Scale (NPRS) for pain, Neck Disability Index (NDI) for functional limitations, and Craniovertebral Angle (CVA) for postural alignment. Statistical analysis was conducted using paired t-tests.

Results: The study revealed significant improvements post-intervention. NPRS scores at rest decreased from 6.11 to 2.39 ($p < 0.05$), and during movement, from 8.07 to 3.85 ($p < 0.05$). NDI scores significantly reduced from 33.45 to 15.99 ($p < 0.05$), indicating improved functional ability. CVA improved from 44.55° to 48.56° ($p < 0.05$), suggesting enhanced postural alignment.

Conclusion: Self-myofascial release is an effective, accessible, and cost-efficient intervention for managing TNS in young adults. It significantly reduces pain, improves functional ability and enhances postural alignment. Given the increasing prevalence of TNS, SMR can serve as a valuable self-management tool.

Keywords: *Neck, text, syndrome, adults, myofascial*

1. INTRODUCTION

Cervical repetitive spine flexion or extension while gazing at mobile phone or any other electronic device can cause stress injury of cervical spine leading to an condition called text neck syndrome [1] .According to a recent study between the age of 18-44,79% of population have their cell phones almost all the time of the day[2] basically, leading to soreness of neck muscles and neck pain and even further we can see upper back pain consisting of upper back muscle spasm or ragging pain and may be more severe in further cases [1]. Text neck syndrome can cause adverse postural changes like muscular imbalance, biomechanical changes in the cervical and thoracic spine, and postural compensations, leading to muscular overuse and fatigue [3]. Statistically, texting has increased according to wireless association, leading to forward neck posture contributing in text neck syndrome. The term text neck was first coined by an US chiropractor Dr. Dean L Fishman this term is preferred to describe neck stress injury and upper back muscles discomfort due to flexion of neck in various angles while gazing the mobile phone [2].

In today's world usage of mobile phone, electronic gadgets are more as people spend more hours on the advanced technologies as handheld devices are not solely used for communication but rather are used for entertainment, for getting new updates, for work, e- reading etc. leading to prolonged flexion or extension of head leading to text neck pain. people modern lifestyle and much usage of handheld devices induces text neck and effects a world – wide health as currently [1,4].

Repeated stress injury and pain due to neck flexion can cause various symptoms like neck pain, shoulder pain, chronic headaches. prolonged forward head postures can be seen in the people who overuse mobile looking down at the screens it has been recorded that prevalence of text neck syndrome is 16.7 percent to 93.2 percent and this phenomenon is more in young adults as usage of smartphones and computers is more in leisure times also effecting not only the neck ,head and shoulder pain but also leading to spinal pain and also we can see there is reduction in physical activities lack of movement and maintenance of static posture [1 ,2 ,5].

Text neck directly affects the spine while flexing the head forward at varying degrees -when the head tilts forward at 15 degrees, the forces on the neck surge to 27 pounds, at 30

degrees 40 pounds, at 45 degrees 49 pounds and at 60 degrees 60 pounds, then at 90 degrees the model prediction was not reliable [1].

Head sizes are more compared to body sizes. And untreated text neck syndrome can lead to the major issues as of occupational injury changing the cervical spine. In upright posture, when the ears are aligned with the center of your shoulders, the weight of the average head experts approximately 10-12 lbs of force through the muscles of neck but when the position of head is changed from neutral position even by one inch in flexion or extension it can cause approximately 6 times force can be generated of 8-year-old baby [1]. Some common symptoms are Stiff Neck, Sharp Pain, General Soreness, Radiating Pain, Weakness and numbness, Headaches.

In recent, years texting has been increased more and usage of mobile as well, so in the recent studies it has been found that the young adults and teenagers are more addicted to the technology and smartphone leading to neck pain, headaches, shoulder pain etc. resulting to the forward head postures effecting the work and it is one of the common poor postures seen in the sagittal planes causes shortening of muscular fibres and overstretching of muscles. If text neck syndrome is not treated or corrected in time it can lead to permanent damage and can result into overuse syndrome. It may also lead to some serious damage, such as flattening of the spinal curve, onset of early arthritis, spinal misalignment, spinal degeneration, disc compression, disc herniation, excessive posterior curve in the upper thoracic vertebrae to maintain balance, placing stresses on the cervical spine and neck muscles. It may also result in nerve damage, muscle damage, stiff neck, sharp pain, radiating pain, general soreness, weakness and numbness. Studies show that there is increase in use of smartphones and people spend long hours on these devices which leads to various musculoskeletal discomforts. Presently less research has been done on "Text Neck Syndrome" so thus the purpose of the above study was to find prevalence of text neck syndrome in young adult population [6].

2. MATERIALS AND METHODOLOGY

The study protocol was presented for approval in front of institutional ethical committee and a Protocol committee of D.Y. Patil University Kolhapur. 85 subjects were selected according to inclusion criteria for the study.

Inclusion Criteria Male and female participants belonging to the 18-24 age group having screen time for more than 3 hours. **Exclusion Criteria** Participants having any history of cervical or upper extremity fractures, Skin infections, any cervical pathology, Any postural deformities in lumbar region.

The procedure was explained to the subject. A written consent was taken from the subjects who were to participate. The subjects were assessed for craniovertebral angle using Kinovea software. Then Neck Disability Index score was taken on Neck Disability Index Scale in which the score was more than 20 and later NPRS was recorded on rest and on movement were the score was more than 5. Screen time consideration was taken and the screen time should be more than 3 hours. Then the selected subjects were given 3 weeks of protocol thrice a week for 3-5 minutes per session where a firm Tennis ball was used, subject was supposed to stand against the wall placing the tennis ball between the wall and upper back. Here the trapezius muscle was focused so the ball was rolled from upper back to cervical in downwards and upwards direction as well in the sideways. After the completion of three weeks again the post assessment and scores were taken and recorded using NDI Scale, CVA using Kinovea software and NPRS.

Numeric Pain Rating Scale

The patient was asked to make three pain ratings, corresponding to current, best and worst pain experienced over the past 24 hours. The average of the 3 ratings was used to represent the patient's level of pain over the previous 24 hours.

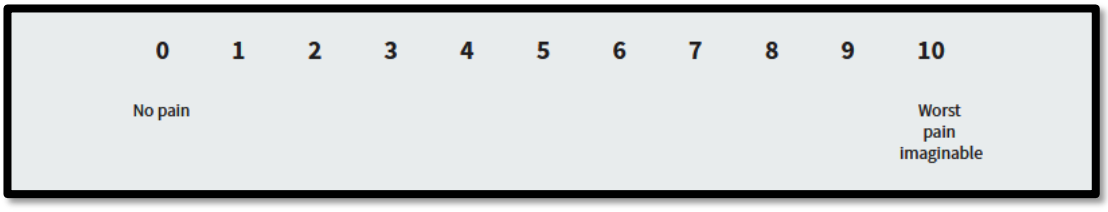

Fig 1: Numeric Pain Rating Scale

Zdrav Vestn. 2021;90(9–10):512–20. doi:10.6016/ZdravVestn.3108.

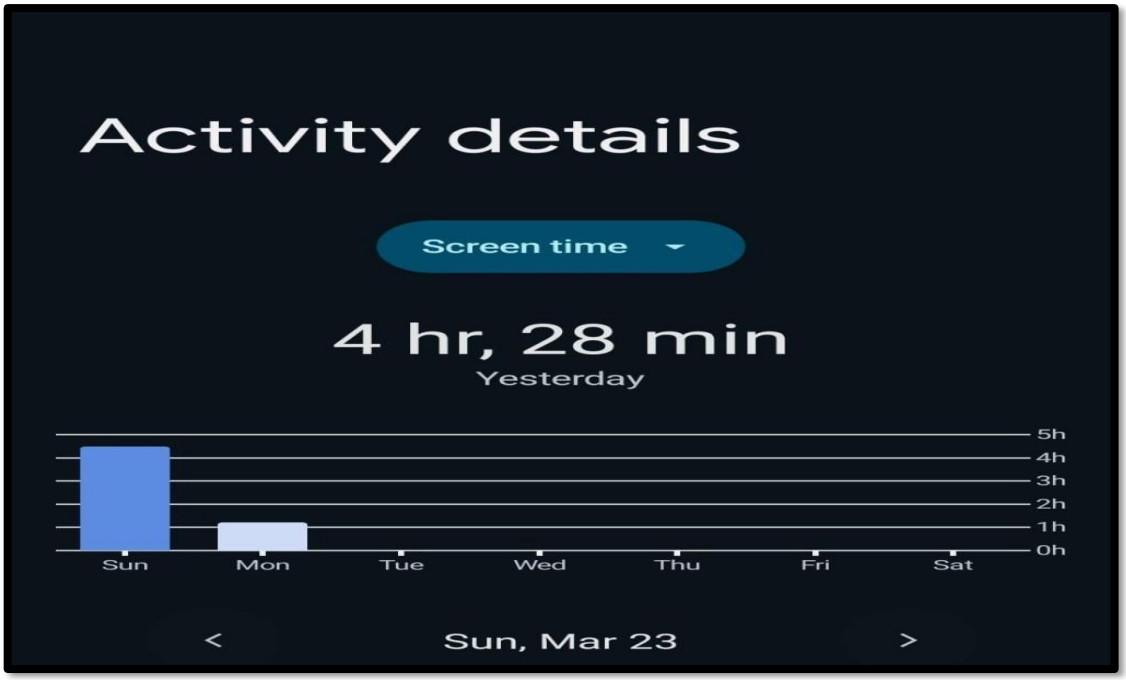

Fig 2: Daily Screen time of Handheld Device

3. RESULT

Table 1: Gender distribution

Gender	Frequency	Percentage
Male	52	61.18%
Female	33	38.82%
Total	85	100.00%

The study included 85 participants, with a gender distribution of 61.18% males (52 individuals) and 38.82% females (33 individuals). This gender split suggests a higher representation of males in the sample.

Table 2: Mean values of age and daily screen time

Variable	Mean	S.D.
Age	22.05	1.99
Daily screen time in hours	5.72	1.01

The mean age of participants was 22.05 years, with a standard deviation (S.D.) of 1.99, indicating a relatively young and homogeneous age group.

Table 3: Pre and post mean comparison of outcome measures

Variable	Time Point	Mean	S.D.	P -Value
Numeric pain rating scale on rest	Pre	6.11	0.80	3.96E-46*
	Post	2.39	0.82	
Numeric pain rating scale on movement	Pre	8.07	0.81	1.27E-49*
	Post	3.85	0.94	
Neck Disability Index	Pre	33.45	6.16	2.53E-37*
	Post	15.99	4.81	
Cervico-vertebral angle	Pre	44.55	1.76	3.53E-29*
	Post	48.56	1.90	

(* indicates p-value (<0.05) is significant)

A paired t-test was conducted to compare various health parameters before and after an intervention. The results show significant improvements across all measured variables, as indicated by the p-values < 0.05.

1. Numeric Pain Rating Scale (NPRS)

Pain at Rest

Pre-intervention: Mean = 6.11, S.D. = 0.80 Post-intervention: Mean = 2.39, S.D. = 0.82 P-value = 3.96E-46 (statistically significant) Pain During Movement

Pre-intervention: Mean = 8.07, S.D. = 0.81 Post-intervention: Mean = 3.85, S.D. = 0.94 P-value = 1.27E-49 (statistically significant)

Interpretation: There was a notable reduction in pain levels, both at rest and during movement, following the intervention

2. Neck Disability Index (NDI)

Pre-intervention: Mean = 33.45, S.D. = 6.16 Post-intervention: Mean = 15.99, S.D. = 4.81 P-value = 2.53E-37 (statistically significant)

Interpretation: The reduction in the Neck Disability Index suggests improved functional ability and reduced neck-related disability after the intervention.

4. DISCUSSION

The above study aimed to assess the effectiveness of self-myofascial release (SMR) in managing Text Neck Syndrome (TNS) among young adults. The study was conducted on 85 participants aged 18-25 years, using a structured intervention protocol involving self- myofascial release with a tennis ball for a period of three weeks. Various outcome measures, including the Numeric Pain Rating Scale (NPRS), Neck Disability Index (NDI), and Craniovertebral Angle (CVA), were recorded before and after the intervention.

The results demonstrated a statistically significant improvement in all outcome measures post- intervention. There was a marked reduction in pain levels, an increase in functional ability, and an improvement in posture, as reflected by a greater craniovertebral angle. These findings strongly suggest that SMR is an effective intervention for alleviating the symptoms of text neck syndrome in young adults.

Effectiveness of Self-Myofascial Release in Pain Reduction

Pain is one of the most debilitating symptoms of text neck syndrome, often affecting daily activities and work efficiency. The study findings revealed that the mean NPRS score at rest decreased from 6.11 ± 0.80 to 2.39 ± 0.82, while the NPRS score during movement decreased from 8.07 ± 0.81 to 3.85 ± 0.94. The reduction in pain scores was statistically significant ($p < 0.05$) and indicated that self-myofascial release played a key role in alleviating muscle tension, improving blood circulation, and reducing pain perception.

This aligns with previous research by Beardsley and Škarabot (2015) [7], who found that self- myofascial release reduces

pain by enhancing neuromuscular function and increasing tissue elasticity. Studies suggest that the reduction in pain may be attributed to increased hydration of fascial layers, reduced trigger point sensitivity, and decreased muscle stiffness.

Improvement in Functional Disability (NDI Scores)

The Neck Disability Index (NDI) was used to measure the functional impact of text neck syndrome on daily activities. The study showed a significant reduction in NDI scores, from 33.45 ± 6.16 to 15.99 ± 4.81 ($p < 0.05$), indicating a notable improvement in functional capacity and reduction in neck-related disability.

This result is in line with findings from Shinde & Bhende (2023) [5], who emphasized that interventions like manual therapy, stretching exercises, and postural correction significantly improve functional scores in TNS patients. Additionally, Behm & Wilke (2019) [8] highlighted that SMR enhances muscle flexibility, range of motion, and circulation, which might explain the improvements in NDI scores seen in this study.

Impact on Postural Alignment (Craniovertebral Angle)

Postural misalignment is a hallmark feature of text neck syndrome, with excessive forward head posture leading to cervical spine stress, muscle imbalances, and joint overload. The craniovertebral angle (CVA), an indicator of head posture, improved significantly after the intervention. The mean CVA increased from 44.55 ± 1.76 degrees to 48.56 ± 1.90 degrees ($p < 0.05$), indicating that participants developed a more neutral head posture after SMR intervention.

The observed improvement in postural alignment may be attributed to the release of myofascial restrictions and enhanced activation of postural stabilizers. Studies by Tsantili, Chrysikos & Troupis (2022) [9] have reported similar findings, showing that postural correction exercises and myofascial release techniques improve cervical alignment and reduce muscle strain.

Furthermore, Kumari et al. (2021) [2] highlighted that increased awareness of posture, coupled with self-myofascial release, contributes to long-term postural corrections, reducing forward head posture.

Comparison with Other Treatment Approaches

Traditional approaches to managing text neck syndrome include stretching, strengthening exercises, ergonomic modifications, and manual therapy techniques. While therapist- administered myofascial release has shown promising results, self-myofascial release is emerging as a cost-effective, accessible alternative.

A systematic review by Schroeder & Best (2015) [10] suggested that self-myofascial release provides benefits similar to those of professionally administered techniques, with advantages of affordability and ease of use. The ability to perform SMR at home enables patients to self- manage symptoms, reduce dependency on healthcare professionals, and incorporate treatment into daily routines.

5. CONCLUSION

The study findings suggest that self-myofascial release is an effective intervention for reducing pain, improving functional ability, and enhancing postural alignment in young adults with text neck syndrome. The significant reduction in NPRS, NDI scores, and improvement in CVA indicates that SMR can be an important self-management tool for individuals experiencing symptoms of TNS.

Given the increasing prevalence of text neck syndrome due to prolonged smartphone usage, self-myofascial release may serve as a practical, cost-effective, and accessible intervention for both prevention and management. Future research should focus on long-term effectiveness, comparisons with other treatment approaches, and further exploration of its biomechanical benefits.

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