To Compare the Effect of Sternocleidomastoid Muscle Release and Upper Trapezius Muscle Release in Smart Phone Users in Neck Pain: Randomized Comparative Study

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***Abstract*- BACKGROUND: Neck pain is a high-risk lifestyle disorder leading to postural disabilities related to use of small size mobile screen, neck pain was reported very commonly in a person who uses mobile gadgets for long time in all over the world. Moreover, various treatment techniques are being used globally to precise neck posture and pain.**

OBJECTIVES: To check the effect of soft tissue release on sternocleidomastoid and trapezius muscle in smartphone user suffering from neck pain.

METHODS: There were total 30 subjects which were divided into two groups. Group A has 15 subjects which were treated by sternocleidomastoid muscle release and group B has 15 subjects which were treated by upper trapezius muscle release for 3 weeks. Whereas, each muscle has same innervations i.e., accessory nerve 11th cranial nerve.

RESULTS: The result showed that sternocleidomastoid release has more significant effect in relieving neck pain than upper trapezius muscle release. Prediction for pain severity that gender (p=0.215) and age (p= 0.019) were significantly associated with the severity of neck pain. The sternocleidomastoid muscle release has more significant NPRS (p=0.17), NDI (P=0.001) than upper trapezius muscle release NPRS (p=0.001), NDI (p=0.001).

CONCLUSION: This study demonstrate that sternocleidomastoid muscle release has a positive result in improving neck pain in smart phone users in adult generation. Furthermore, the health of a person also hindered by increased severity of smart phone use.

***Keywords*: Smartphone, Neck pain, Neck Pain Rating Scale, Neck Disability Index.**

I. INTRODUCTION

Cervical neck pain is very common that is 4th number in world's disabilities and it effects women more than men or acute neck pain is also related to neck stiffness, soft tissue injuries and many other conditions [1]. Neck musculature becomes tender because of long and stationary flexed position during smartphone usage and it causes neck pain that alter activity of daily living [2]. Mobile phones are one of the most commonly used devices in today's scenario. Smartphone is a versatile gadget that serves media, communication, education, leisure, society and worldwide information in one small computing apparatus [3]. Improper sitting posture and lifestyle changes affect students from Various studies showed that Improper sitting posture and lifestyle changes affect students psychologically as well as physically and push them towards high risk of physical morbidness in the cervical spine [4]. Watching at screen of the Smartphone or computer for long time duration in an unnatural posture indicates several musculoskeletal morbidities in neck region and it was found in earlier studies that muscle fatigue of Rt. upper trapezius and Lt. upper trapezius muscle were highest when cervical flexion angle was 50 degree and lowest when 30 degree [5].

Elham et. al. In 2019, stated that neck pain is a threatened problem in the world that is ranging between 0.4 to 86.8% and the seat height, pan inclination of desk along with number of hours spent with neck bending posture while doing homework were the factors associated with incidence of neck pain in school going students [6]. Smartphone is a modern technology appliance and it is set, as a prime device for world and due to its excessive use, it impacts on

people's life in a negative way as it leads to increased cervical spine curve, muscle soreness, neck and upper back pain [7].

Most of people were grab themselves to do work on Smartphone in a static cervical neck flexion in forward position that enhances the pressure load and creep response on cervical soft tissues and leading to deteriorate function of cervical spine or neck movements that contribute to neck pain [8]. Anatomically, primarily effected muscles while using smartphone are upper trapezius and erector spine with some part of sternocleidomastoid muscles and in previous studies it was found that during the use of cell phone at 0 to 15 degree it will decrease the muscle activity of upper trapezius in neck pain [9]. In previous studies, it was found that the technique Myofascial release that is performed on muscle fascia with low pressure but for long duration stretch on soft tissues was most effective to reduce neck pain and increase range of motion because it helps in reducing soft tissue adhesion [10,11].

Vikram Khanna et. al stated that while holding the smartphone in one or both hands and the position is just below the eye level that will develop a bad forward neck flexion posture thus it will increase craniovertebral angle and also generate many other neck, hand and shoulder disorders [12]. Individuals that were suffering from neck pain have late deep neck flexors activations which shows that there is a significant lack of flexors group control on cervical vertebral spine [13]. Myofascial release technique was first given by Andrew Taylor Still. He described about direct and indirect release technique in which a constant pressure stretch is applying to release spasm, stiffness and gain a very fine free movement because the main purpose of MFR is to gain normal ranges of neck, reducing neck pain and increasing blood circulation in any type of spasmodic muscles [14]. NPRS was used for measuring pain intensity rest, during myofascial release and after completion of myofascial release of cervical muscles [15]. NDI is a modification of Oswestry low back pain index. It is a 10-item scaled questionnaire used for neck pain [16]. Kim.et.al in a previous study compared sternocleidomastoid, sub occipital release and showed the results of pain pressure threshold in subjects with latent myofascial trigger points in upper trapezius muscle because of overtime use of mobile phones, but not considering the neck pain due to the Sternocleidomastoid muscles, whereas both having same spinal accessory nerve innervations that is 11th cranial nerve [17].

Hence, this study divulges the comparison of Sternocleidomastoid and upper trapezius muscle release by using myofascial release technique in neck pain condition in Smartphone addicted students of middle age adults.

II. METHODOLOGY

A. STUDY DESIGN AND DATA COLLECTION: The study design was randomized comparative study approved by the institutional Review Board of Gurugram University. A total of 30 adult participants were included from the Gurugram University and NCR, Delhi area. The data collected in the duration from September 15th, 2022 and October 15th, 2022. Students were selected randomly in this study. This study included participants of age group between 20-30 year, had their own smart phone, had no surgical history and had no radiating pain. Those students who were using any pharmacological treatment for neck pain and students having orthopedic problems affecting upper extremities and neck were excluded in this study.

A self-administrative questionnaire was distributed to students in their classes as a paper work. First part of questionnaire contains demographic data which included age, gender and affected muscle. Second part contains clinico-etiological profile of participants and last part included the numerical pain rating scale (NPRS) for evaluating the severity of neck pain and neck disability index (NDI) for postural disabilities. NPRS had 0-10 points, mild, moderate and severe categories. Students had to mark their pain rate on the questionnaire where 0 indicate "no pain" and 10 indicate "worst pain".

B. PROCEDURE: For sternocleidomastoid muscle myofascial release, starting position of subject was supine lying with neck rotation and flexes position in opposite direction. The therapist stands on the back side of the subject. For upper trapezius myofascial releases, patient was in supine lying comfortable position on the couch. Apply petroleum jelly over the area to be treated and move fingers in circular manner to release the trigger points over the muscle belly. Time of myofascial release was 3 minutes. Petroleum

jelly spread over the area to be treated. Therapist move first finger and thumb over muscle belly to release trigger points. The treatment session was for 3 times per weeks.

C. STATISTICAL ANALYSIS: The data entry was done in the Microsoft excel spreadsheet and the final analysis was done with the use of statistical package for social sciences (SPSS) software, IBM manufacturer, Chicago, USA, ver. 25.0. The data normality was checked by using Kolmogorov-Smirnov test. Wilcoxon signed-rank test and Mann Whitney test were used for comparison between two groups. For statistical significance, p value of less than 0.05 was considered statistically significant.

III. RESULTS

A. DEMOGRAPHIC DATA

Table No. 1: Distribution of age (years) of study subjects.

Age(years)	Frequency	Percentage
20-25	16	53.33%
26-30	14	46.67%
Mean ± SD	25.27 ± 2.6	
Median (25th-75th percentile)	25(24.25-27)	
Range	20-30	

Table No. 2: Distribution of gender of study subjects.

Gender	Frequency	Percentage
Female	22	73.33%
Male	8	26.67%
Total	30	100.00%

B. SCALES

Table No. 3. Comparison of Pre and post treatment distribution of sternocleidomastoid and upper trapezius muscle release for Numerical pain rating scale (NPRS)

NPRS	Sternocleidomastoid muscle(n=15)	Upper trapezius muscle(n=15)	Total	P value
Pre treatment NPRS				
Mean ± SD	6.67 ± 1.11	6.07 ± 1.03	6.37 ± 1.1	0.173‡
Median (25th-75th percentile)	7(6-7)	6(5.5-7)	6(6-7)	
Range	5-9	4-8	4-9	
Post treatment NPRS				
Mean ± SD	0.6 ± 0.74	2.13 ± 1.25	1.37 ± 1.27	0.0007‡
Median (25th-75th percentile)	0(0-1)	2(1-3)	1(0-2)	
Range	0-2	0-4	0-4	
Intra group p value	0.001*	0.001*	-	-

‡ Mann Whitney test, * Wilcoxon Signed Ranks Test

Table No. 4: Comparison of NDI score between sternocleidomastoid muscle and upper trapezius muscle.

NDI score	Sternocleidomastoid muscle(n=15)	Upper trapezius muscle(n=15)	Total	P value
Pre treatment NDI score				
Mean ± SD	26.27 ± 5.78	25.53 ± 6.38	25.9 ± 5.99	0.693‡
Median (25th-75th percentile)	25(23-28.5)	25(20.5-30)	25(21.25-29.75)	
Range	18-38	17-39	17-39	
Post treatment NDI score				
Mean ± SD	3.6 ± 1.24	6.33 ± 2.74	4.97 ± 2.51	0.002‡
Median (25th-75th percentile)	3(3-4.5)	6(4-7.5)	4(3-6)	
Range	1-6	3-12	1-12	
Intra group p value	0.001*	0.001*	-	-

‡ Mann Whitney test, * Wilcoxon Signed Ranks Test

IV. DISCUSSION

Kim.et.al (2019) [17] in a previous study compared sternocleidomastoid, sub occipital release and showed the results of pain pressure threshold in subjects with latent myofascial trigger points in upper trapezius muscle because of overtime use of mobile phones, but not considering neck pain due to Sternocleidomastoid muscles. Where is in present study showed that sternocleidomastoid muscle release exhibited a greater reduction in neck pain than those in subjects were treated by Upper trapezius muscle release.

Current study provided evidence that female use smartphone (73.33%) significantly more than males. Similar findings were found in the study conducted by Al-Hadidi F et.al (2019) [15]. In literature, neck and shoulders pain was more frequently reported amongst females. This can be due to the general trend of females experiencing more musculoskeletal pain and more chronic pain conditions than males, which can be attributed to a lower pain threshold in women in comparison with men, similar findings.

The post treatment values were noted from the subjects in all groups at the conclusion of the three weeks of treatment the numerical pain rating scale (NPRS) and the neck disability index (NDI). The results demonstrated that all treatment techniques were successful in the treatment of neck pain in smartphone user. However, when both groups A and B were compared than subjects in group A subjects undergo sternocleidomastoid muscle release exhibited a greater reduction in neck pain than those in group B subjects were treated by upper trapezius muscle release.

V. CONCLUSION

When it came to lowering neck pain in smartphone user that was mostly seen in adults, sternocleidomastoid muscle release was proven to be more helpful than myofascial release of upper trapezius muscle in the age group of people between 20-30 year. The statistical findings obtained by the "Mann Whitney test" revealed considerable improvement in all groups, A and B. However, group A showed more significant improvement than group B.

VI. LIMITATION

Sample size and study duration were too small.

VII. SUGGESTION

- This study might be expanded to include more samples and run for a longer period of time.
- A follow – up evaluation is required to determine the effectiveness of pain management and functional outcomes.
- Other muscles groups can be worked on.

REFERENCE

[1] Choi AR, Shin JS, Lee J, Lee YJ, Kim MR, Oh MS, Lee EJ, Kim S, Kim M, Ha IH. Current practice and usual care of major cervical disorders in Korea: a cross-sectional study of Korean health insurance review and assessment service national patient sample data. Medicine. 2017 Nov;96(46).

[2] Kompal R, Jabeen Z, Kashif M. Comparison between immediate effects of soft tissue mobilization along with stretching exercises and without stretching exercises in patients with mechanical neck pain. Methodology. 2017 Apr.

[3] Deng T, Kanthawala S, Meng J, Peng W, Kononova A, Hao Q, Zhang Q, David P. Measuring smartphone usage and task switching with log tracking and self-reports. Mobile Media & Communication. 2019 Jan;7(1):3-23.

[4] Cha SS, Seo BK. Smartphone use and smartphone addiction in middle school students in Korea: Prevalence, social networking service, and game use. Health psychology open. 2018 Feb;5(1):2055102918755046.

[5] Lee S, Lee D, Park J. Effect of the cervical flexion angle during smart phone use on muscle fatigue of the cervical erector spinae and upper trapezius. Journal of physical therapy science. 2015;27(6):1847-9.

[6] Gheysvandi E, Dianat I, Heidarimoghadam R, Tapak L, Karimi-Shahanjarini A, Rezapur-Shahkolai F. Neck and shoulder pain among elementary school students: prevalence and its risk factors. BMC public health. 2019 Dec;19(1):1-1.

[7] Rai S, Saroshe S, Khatri A, Sirohi S, Dixit S. A cross sectional study to assess the effects of excessive use of smartphones among professional college going students. International Journal of

Community Medicine and Public Health. 2016 Mar;3(3):758-63.

[8] Bau JG, Wu SK, Huang BW, Lin TT, Huang SC. Myofascial Treatment for Microcirculation in Patients with Postural Neck and Shoulder Pain. Diagnostics. 2021 Nov 29;11(12):2226.

[9] Gattie ER, Cleland JA, Snodgrass SJ. Dry needling for patients with neck pain: protocol of a randomized clinical trial. JMIR research protocols. 2017 Nov 22;6(11):e7980.

[10] Kim JH, Lee HS, Park SW. Effects of the active release technique on pain and range of motion of patients with chronic neck pain. Journal of physical therapy science. 2015;27(8):2461-4.

[11] Ajimsha MS, Al-Mudahka NR, Al-Madzhar JA. Effectiveness of myofascial release: systematic review of randomized controlled trials. Journal of bodywork and movement therapies. 2015 Jan 1;19(1):102-12.

[12] Khanna V, Khanna HC. Musculoskeletal disorders following excessive smartphone usage-a review article. MOJ Orthop Rheumatol. 2020;12(4):92-4.

[13] Alshahrani A, Samy Abdrabo M, Aly SM, Alshahrani MS, Alqhtani RS, Asiri F, Ahmad I. Effect of smartphone usage on neck muscle endurance, hand grip and pinch strength among healthy college students: A cross-sectional study. International Journal of Environmental Research and Public Health. 2021 Jun 10;18(12):6290.

[14] Boyajian-O'Neill LA, Cardone DA. Practical Application of Osteopathic Manipulation in Sports Medicine. The Sports Medicine Resource Manual. DOI. 2008;10:B978-141603197.

[15] Al-Hadidi F, Bsisu I, AlRyalat SA, Al-Zu'bi B, Bsisu R, Hamdan M, Kanaan T, Yasin M, Samarah O. Association between mobile phone use and neck pain in university students: A cross-sectional study using numeric rating scale for evaluation of neck pain. PloS one. 2019 May 20;14(5):e0217231.

[16] Vernon H, Mior S. The Neck Disability Index: a study of reliability and validity. Journal of manipulative and physiological therapeutics. 1991 Sep.

[17] Kim SJ, Lee JH. Effects of sternocleidomastoid muscle and suboccipital muscle soft tissue release on muscle hardness and pressure pain of the sternocleidomastoid muscle and upper trapezius muscle in smartphone users with latent trigger points. Medicine. 2018 Sep;97(36).