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Comparison of Development of Upper Trapezius Trigger Point in Computer Operators with or without Fore arm support

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ABSTRACT

Background: Computer work often involves both physical and mental demands. The physical demands are characterized by low-force exertions and static postures that are sustained for long durations. Elevated shoulder postures, prolonged static contractions and the task duration have been identified as computer-related risk factors for neck and shoulderproblems, so this is responsible for development of trigger points particularly in the upper trapezius muscles in forearm-unsupported computer operators as compared to forearm-supported.The upper trapezius (UT)is designated as a postural muscle and is highly suspected ofoveruse because it works constantly against gravity to maintain an erect head and neck position. This studyaims to identify upper trapezius trigger points (TrPs) developed with or without forearm support (FS) in computer operators.

Materials and Methods: The study took place in the worksite of computer operators in Nagpur,Maharashtra for 1.5 year. With a power of 90 and significance error of 1%, a total of 40 patients were taken according to the convenient sampling and divided into two categories computer operators Group A: with FS and Group B: without FS, following signs and symptoms like Trigger point,posterolateral neck and upper back painmost common in which groupassessed by using, VAS (Visual Analogue Scale) for measuring pain intensity, Trigger Point Rating Scale is used for myofascial screening. Neck Disability Index for assessing the neck-related disability due to pain taken.

Result: The study was conducted on 40 people, in which 20 people with forearm support and 20 people with forearm unsupported. The result is that forearm support reduces the load on the UTand also reduces the risk of development of upper trapezius TrPs as compared to the forearm unsupported.

Conclusion: Based on the results of these studies, it has been concluded that the development of UT TrPsin computer operators without FS is more common as compared to FS.

Keywords: MTrPs (Myofascial trigger point), Trigger point rating scale, VAS (Visual analogue scale), NDI (Neck disability index)

INTRODUCTION

Myofascial Trigger Point MTrPs (Clinical definition of a Central trigger point): A hyperirritable spot in skeletal muscle that is associated with a hypersensitive palpable nodule in a taut band. The spot is painful on compression and gives rise tocharacteristics of referred pain, referred tenderness, motor dysfunction and autonomic phenomena.[1]

TrPsare divided into two categories: Active and latent Trigger points. Latent TrPsdo not cause local or referred pain until direct pressure is applied. They do not cause persistent Pain; however, they restrict movement, induce early Fatigue and cause loss of tissue. Active TrpsCause persistent pain even without direct manual pressure. It can result in movement

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restriction and in turns may reduce muscle strength, activity and tonocity. Latent TrPs may spontaneously beme active.

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Jump sign: A general pain response of the patient, who winces, may cry out, and may withdraw in response to pressure applied on a trigger point. This term has been used erroneously to describe the local twitch response of muscle fibres to trigger stimulation.[1]

Simons et al 2 hypothesised that palpable taut bands in the affected muscles are due to excessive acetylcholine release at the neuromuscular junction (motor endplate). In this situation, continuous contraction of the muscle fibres, which is accompanied by increased metabolism and local ischaemia leads to increased secretion of sensitising substances and can subsequently cause pain and autonomic reactions such as increased sweating, vasoconstriction or vasodilation, and pilomotor activity in the muscle.[3,4]

Some chemical changes, such asincreased levels of bradykinin, substance P, and calcitonin gene-related peptide and lowered pH, have been reported in MTrPs. Investigators established that the local oxygen saturation at an MTrP site is less than 5% of normal. Hypoxia leads to a drop in tissue pH and the release of Several nociceptive chemicals, including bradykinin, calcitonin gene-related peptide, and substance P. Local tenderness and referred pain is common with MTrPs as muscle nociceptors are stimulated in response to reduced oxygen levels lowered pH and increased inflammatory chemicals. Histologic studies have confirmed the presence of extreme sarcomere contractions, resulting in localized tissue hypoxia.[5,6]

MTrPs are most commonly found in the upper trapezius (UT) muscle.[7]

UT is designated as a postural muscle and is highly suspected ofoveruse[8] because it works constantly against gravity to maintain an erect head and neck position.[9] Any TrPs in the upper trapezius can cause neck stiffness, restricted cervical rotation and lateral flexion, shoulder elevation, neck pain and headache.[10]

Computer work involves physical demands, and physical demands of a job increase sustained muscle tension, particularly in the trapezius muscles such as developed myofascial pain syndrome.[11]

While doing work with the forearm support it generally reduces the load on the trapezius muscle, whichdecreases the risk of development of UT TrPs. While doing work with forearm un-support it enhances the risk of development of upper trapezius TrPs.[12]

Upper trapezius TrPs consistently refer pain unilaterally upward along the posterolateral aspect of the neck to the mastoid process and are a major source of “tension neckache”. When referred pain from upper trapezius TrPs in other muscles (namely the sternocleidomastoid, Suboccipital and temporalis muscles), the resulting overlap can produce a typical tension-type headache.[1]

MATERIALS AND METHOD

The study took place in the worksite of computer operators in Nagpur, Maharashtra for 1.5 year. With a power of 90 and a significance error of 1%,a total of 40 patients were taken according to the convenient sampling and divided into two categories of computer operators Group A: with FSand Group B: without FS.

Inclusion criteria: Patients do work for >6 hours,work with forearm support and unsupport and those who work for prolongedperiods without an interval.

Exclusion criteria:patients who recently got soft tissue injury due to trauma or another cause, have hypersensitive skin, are not willing to participate and have working experience of <6 months.

Following signs and symptoms like Trigger point, posterolateral neck and upper back pain most common in which groups for thesethe outcome measure used wasthe Visual analogue scale [ICC = 0.97(0.96 to 0.98)] [13]for measuring intensity of pain, Trigger point rating scale [ICC = 0.7 to 0.96] [11]is used for myofascial screening and neck disability index [ICC = 0.88; (0.63 to 0.95)] [14]for assessing the neck-related disability due to pain.

FINDING

The study was conducted on 40 people, of which 20 peoplewere of forearm support and 20 of forearm unsupported (FUS) computer operators. The result shows that forearm support (FS) reduces the load on the UT and also reduces the risk of development of upper trapezius TrPsas compared to the forearm unsupported.

The evaluation is done by using the Trigger Point Rating Scale, Visual Analogue Scale and Neck Disability Index.

When we compared Table 1 and Table 2 Trigger Point Rating Scale of forearm support versus forearm unsupported,the minimum value recorded was 0.0 score in forearm support and 0.1 score in forearm unsupported while the maximum score recorded 5.0 in both the parameters. When we compared with the statistical analysis by using an unpaired T-test mean value of the Trigger Point Rating Scale versus forearm support was noted to be 1.2±1.3 while in the forearm unsupported it was 3.4±1.1, When it said the statistically significant difference was observed with the P value = <0.0001 hence it is statistically significant. It is noted that the Trigger Point Rating Scale value has increased in Forearm unsupported significantly as compared to forearm support,as shown in Table 1 and Table 2.

Table 1: Data of forearm-supported computer operators

Forearm Support						
	Age	**working hours**	**work experience**	**trigger point rating scale**	**VAS**	**NDI**
Number of values	20	20	20	20	20	20
Minimum	23	8.0	2.0	0.0	0.0	0.0
25% Percentile	31	8.0	5.3	0.0	0.0	0.0
Median	37	8.0	8.5	1.0	2.0	0.0
75% Percentile	55	9.8	26	1.8	3.8	3.0
Maximum	60	13	39	5.0	7.0	17
Mean	41	9.0	14	1.2	2.3	2.5
Std. Deviation	12	1.6	12	1.3	2.1	4.5
Std. Error	2.7	0.36	2.8	0.29	0.48	1.0

Table 2: Data of forearm unsupported computer operators

Forearm Unsupported						
	Age	**working hours**	**work experience**	**trigger point rating scale**	**VAS**	**NDI**
Number of values	20	20	20	20	20	20
Minimum	19	6.0	2.0	1.0	0.0	1.0
25% Percentile	34	8.0	6.3	3.0	5.0	2.0
Median	39	8.0	9.5	3.5	5.0	7.0
75% Percentile	43	8.8	18	4.0	7.8	11
Maximum	58	13	33	5.0	8.0	19
Mean	39	8.3	13	3.4	5.7	7.1
Std. Deviation	9.5	1.5	9.6	1.1	2.0	5.3
Std. Error	2.1	0.33	2.2	0.26	0.45	1.2

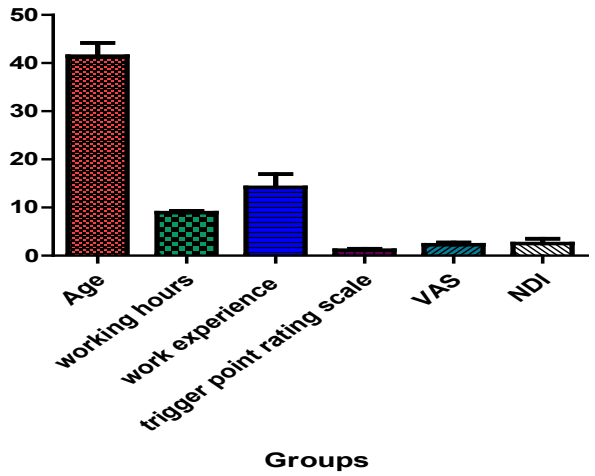

Fig 1: Graphical representation of fore arm-supported computer operators based on outcome measures

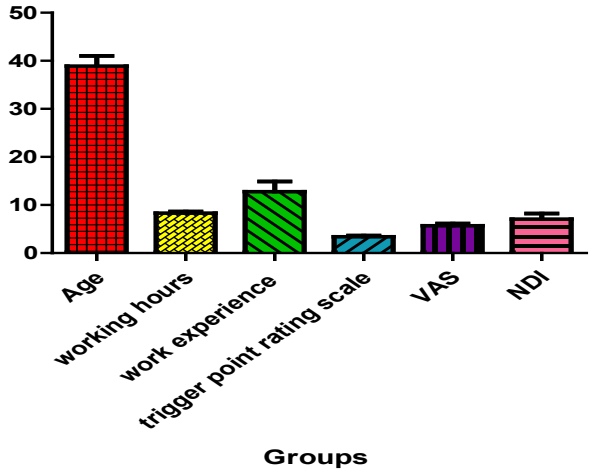

Fig 2: Graphicalrepresentation of forearm un-supported computer operators based on outcome measures.

Table 1shows that forearm-supported computer operators are evaluated with a mean age of 41±12 years, with mean working hours of 9±1.6 hours and the mean work experience of 14±12 years. Table 2shows that forearm-unsupported operators are evaluated with a mean age of 39±9.5 years, with mean working hours of 8.3±1.5 hours and a mean work experience of 13±9.6 years.

DISCUSSION

This study showed that TrPs can develop in the UT during the type of low exertions found in computer work. It was expected that high postural demands would lead to the development of trigger points due to working tasks that involve continuous arm movements always generating a static load component on these muscles, the principal muscle to carry this load is the trapezius [11]. The result shows that the development of upper trapezius trigger point in computer operators in forearm unsupported is common as compared to forearm support. However, the unsupported condition increases the load on the upper trapezius muscle, which can lead to a sustained increase in tension or over-contraction of the upper trapezius muscles. In the supported condition there is reduces the load on the upper trapezius muscles also reduces the discomfort.

The aetiology of myofascial trigger pointsare discussed with a detailed and comprehensive review of the most common mechanics, including low-level muscle contractions, uneven intramuscular pressure distribution, direct trauma, unaccustomed eccentric contractions, eccentric contractions in unconditioned muscle and maximal or submaximal concentric contractions.[15]

The evaluation of trigger points by using the Trigger Point Rating Scale, pain threshold by Visual Analogue Scale and Neck Disability Index to find out whether there is a presence of neck disability due to trigger point.

The studies found in the literature did not investigate the development of upper trapezius trigger points in computer operators without forearm support. Besides this, few studies have examined muscle activity at different angles of arm flexion and abduction. Some studies identified increased muscle activity in the upper trapezius and anterior deltoid muscles due to the increased angles in unsupported conditions and other studies also identified effect of forearm support and shoulder posture on the upper trapezius and anterior deltoid activity.

Some studies assessed muscle activity while using the forearm support and wrist in computer users and also showed decreased activation with the use of forearm support.

The result of this study indicates that the forearm support decreased the upper trapezius

load and also reduced the risk of development of the upper trapezius trigger point.

These results highlight the importance of ergonomic interventions to minimize neck/ shoulder muscle activation. In addition, the result allows us to suggest the design of future studies, with a longitudinal design, with the evaluation of the use of forearm support during the work to verify its effect on reducing the risk of musculoskeletal disorders and also design future studies on the importance of the ergonomic advice in the same condition[16].

Thus, a practical and ergonomic suggestion to reduce muscle work for people while keeping your arm close by your side. Hold your elbow at 100° to 110° angle. Keep your wrist in a straight or neutral position. Light supporting your forearm on your desk

CONCLUSION

Based on the results of these studies it has been concluded that the development of upper trapezius trigger points in computer operators without forearm support is more common as compared to forearm support.

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Ethical Clearance: Taken from the ethics committee for research related to human beings of the center where the investigation was conducted.

REFERENCES

1. Travell JG, Simons DG. Myofascial pain and dysfunction: the trigger point manual. Lippincott Williams & Wilkins; 1992.
2. Mohamadi M, Piroozi S, Rashidi I, Hosseinifard S. Friction massage versus kinesiotaping for short-term management of latent trigger points in the upper trapezius: a randomized controlled trial. Chiropr Man Therap. 2017;25:25.
3. Dommerholt J, Huijbregts P. Myofascial Trigger Points: Pathophysiology and Evidence-Informed Diagnosis and Management: Pathophysiology and Evidence-Informed Diagnosis and Management. Jones & Bartlett Publishers; 2009 Dec 4.
4. Ge HY, Fernández-de-las-Peñas C, Arendt-Nielsen L. Sympathetic facilitation of hyperalgesia evoked from myofascial tender and trigger points in patients with unilateral shoulder pain. Clinical Neurophysiology. 2006 Jul 1;117(7):1545-50.
5. Shah JP. Integrating dry needling with new concepts of myofascial pain, muscle physiology, and sensitization. Integrative Pain Medicine: The Science and Practice of Complementary and Alternative Medicine in Pain Management. 2008:107-21.
6. Dommerholt J. Dry needling in orthopedic physical therapy practice. Orthop Phys Ther Pract. 2004;16(3): 15-20.
7. Astin JA. Why patients use alternative medicine: results of a national study. Jama. 1998 May 20;279(19): 1548-53.
8. Mitchell NS, Catenacci VA, Wyatt HR, Hill JO. Obesity: overview of an epidemic. Psychiatric clinics. 2011 Dec 1;34(4):717-32.
9. Bakr EM, Ismail NA, Mahaba HM. Impact of life style on the nutritional status of medical students at Ain Shams University. The Journal of the Egyptian Public Health Association. 2002 Jan 1;77(1-2):29-49.
10. Khan ZN, Assir MZ, Shafiq M, Jabeen A. High prevalence of preobesity and obesity among medical students of Lahore and its relation with dietary habits and physical activity. Indian journal of endocrinology and metabolism. 2016 Mar;20(2):206.
11. Treaster D, Marras W, Burr D, Sheedy J, Hart D. Myofascial trigger point development from visual and postural stressors during computer work. Journal of Electromyography and Kinesiology. 2006 Apr;16(2):115-24.
12. Gonçalves JS, Moriguchi CS, Takekawa KS, Coury HJ, de Oliveira Sato T. The effects of forearm support and shoulder posture on upper trapezius and anterior deltoid activity. Journal of physical therapy science. 2017;29(5):793-8.
13. Bijur PE, Silver W, Gallagher EJ. Reliability of the visual analog scale for measurement of acute pain. Academic emergency medicine. 2001 Dec;8(12):1153-7.
14. Young IA, Dunning J, Butts R, Mourad F, Cleland JA. Reliability, construct validity, and responsiveness of the neck disability index and numeric pain rating scale in patients with mechanical neck pain without upper extremity symptoms. Physiotherapy theory and practice. 2019 Dec 2;35(12):1328-35.
15. Dommerholt J, Bron C, Franssen J. Myofascial trigger points: an evidence-informed review. Journal of Manual & Manipulative Therapy. 2006 Oct 1;14(4):203-21.
16. Gonçalves JS, Moriguchi CS, Takekawa KS, Coury HJ, de Oliveira Sato T. The effects of forearm support and shoulder posture on upper trapezius and anterior deltoid activity. Journal of physical therapy science. 2017;29(5):793-8.
17. Kalichman L, Bulanov N, Friedman A. Effect of exams period on prevalence of Myofascial Trigger points and head posture in undergraduate students: Repeated measurements study. Journal of bodywork and movement therapies. 2017 Jan 1;21(1):11-8.

18. Lintula M, Nevala-Puranen N, Louhevaara V. Effects of Ergorest® arm supports on muscle strain and wrist positions during the use of the mouse and keyboard in work with visual display units: A work site intervention. International journal of occupational safety and ergonomics. 2001 Jan 1;7(1):103-16.
19. Bron C, Dommerholt J, Stegenga B, Wensing M, Oostendorp RA. High prevalence of shoulder girdle muscles with myofascial trigger points in patients with shoulder pain. BMC musculoskeletal disorders. 2011 Dec;12:1-2.
20. Martín-Sacristán L, Calvo-Lobo C, Pecos-Martín D, Fernández-Carnero J, Alonso-Pérez JL. Dry needling in active or latent trigger point in patients with neck pain: A randomized clinical trial. Scientific Reports. 2022 Feb 24;12(1):3188.
21. Cerezo-Téllez E, Torres-Lacomba M, Mayoral-del Moral O, Sánchez-Sánchez B, Dommerholt J, Gutiérrez-Ortega C. Prevalence of myofascial pain syndrome in chronic non-specific neck pain: a population-based cross-sectional descriptive study. Pain medicine. 2016 Dec 1;17(12):2369-77.
22. Gerber LH, Sikdar S, Armstrong K, Diao G, Heimur J, Kopecky J, Turo D, Otto P, Gebreab T, Shah J. A systematic comparison between subjects with no pain and pain associated with active myofascial trigger points. PM&R. 2013 Nov;5(11):931-8. z z