Original Article

Effectiveness of Kendall Exercise for Forward Head Posture among IT Workers

Rahul S[1], Anitha A[2], Kamalakannan M[3], Ramana K[4]

[1]Undergraduate Student, [2]Associate Professor, [3]Associate Professor, [4]Assistant Professor, Saveetha College Of Physiotherapy, Saveetha Institute of Medical and Technical Sciences, Chennai, Tamil nadu, India.

How to cite this article: Rahul S, Anitha A, Kamalakannan Met al. Effectiveness of Kendall Exercise for Forward Head Posture among IT Workers. Indian Journal of Physiotherapy and Occupational Therapy / Volume 18, Year 2024.

Abstract

Background: Forward head posture(FHP), or anterior head syndrome, is a condition where the head is positioned in front of the body's center of gravity. In this posture, the head is tilted forward and extended beyond its normal alignment with the neck and spine. In a neutral position, the ear canal should align vertically with the shoulder, hip, and ankle. However, individuals with forward head posture have their head protruding forward, causing misalignment. This condition is becoming increasingly common due to lifestyle factors such as sedentary activities, excessive screen time, and poor posture habits. It's important to address forward head posture to prevent further complications. Corrective measures may include postural exercises, ergonomic adjustments in workstations, and adopting proper posture habits in daily activities.

Purpose: To determine the effectiveness of "Kendall's exercise" among IT workers with FHP.

Materials and Methods: A total of 50 subjects were selected according to inclusion and exclusion criteria and consent was obtained from participants. Cranio-vertebral angle and the Neck Disability Index were assessed as pre and post-test.

Results: The statistical examination of the forward head revealed a statistical significance between the pre and post intervention.

Conclusion: The study concluded that "Kendall's exercise" had improved forward head posture among IT workers, these exercises may be useful in correcting the forward-facing posture.

Key Word: neck pain, CV angle, cervical range, neck posture.

Introduction

FHP is defined as "any one position in which the external meatus of the auditory canal is situated proximal to the plumb line via the shoulder".[1] When the joint is moved, the articular capsule rotates and glides unevenly, resulting in these restrictions. Additionally, it was noted that prolonged FHP could lead since there are fewer filaments and a shortening of the muscle fibres, both of which could influence the ability of the muscles to contract.[2,3] FHP is characterized by greater flexion of the upper thoracic and lower cervical spine. Shortening of the sternocleidomastoid, posterior cervical extensor, upper trapezius, and elevator scapulae muscles are all linked to it.[4]

The forward-facing head posture, often known as the turtle neck posture, is one of the detrimental effects of working on a computer on the body's

Corresponding Author: Anitha A, Associate Professor, Saveetha college of Physiotherapy, Saveetha Institute of Medical and Technical Sciences, Chennai, Tamil nadu, India.

E-Mail: anitha.scpt@saveetha.com

skeletal system. This is because staring at a monitor that is below eye level for a prolonged period of time to maintain equilibrium when the head leans forward leads to thethe lower cervical vertebrae's anterior curvature increasing, as does the upper thoracic vertebrae's posterior curvature.[5-8] IT professionals are at a higher risk of acquiring musculoskeletal diseases due to forward head posture.[9, 10]

The Kendall exercise, a general treatment method, emphasizes on the posture and vertebral alignment in the FHP. In order to treat FHP, which is an instance of muscle imbalance, Kendall exercise is often employed as a form of physical therapy. It induces appropriate neck alignment by typically using building techniques for two muscles: "deep the cervical flexors and scapular retractors and neck extension muscles and pectoralis".[11]

Aim

To determine the effectiveness of Kendall's exercise in increasing the cranial-vertebral angle among IT workers with forward head posture.

Material and Method

A convenient sampling technique was used to select 50 participants from a total of 100 for this Quasi-experimental study at MC Engineers, 50 were selected out of the remaining candidates using Craniovertebral angle below 48-50. Study period: October 2022 to June 2023.

Inclusion criteria:

1. Both gender
2. neck pain with rounded shoulder
3. CV Angle below 48 – 50 degree
4. System based workers.
5. Working hour for more than (8 – 12 hours)

Exclusion criteria:

1. Cervical trauma
2. Surgical interventions in the cervical region
3. Spondylosis
4. Ankylosing spondylitis

Outcome Measures:

Assessment was performed at baseline (before starting of treatment) and after four weeks of study.

1. Craniovertebral angle: The angle less than 48 -50° angle denotes a forward head position.
2. Neck Disability Index (NDI): It is used to assess neck disability. It has ten items that assess neck pain intensity and the degree of ability to manage ADL [12]

Procedure

Participants received an explanation of the procedure's safety and efficiency. Informed consent was requested and received, along with a subject information paper. Subjects were chosen based on inclusion and exclusion criteria, and participants' concerns were collected. Craniovertebral angle and Neck Disability Index Questionnaire was assessed as a pre-test measurement and the same was assessed as post-test after four weeks of intervention.

Group A: Kendall Exercise Training Group

Kendall's exercises are also known as "Muscle Testing and Function with Posture and Pain" exercises. These exercises are commonly used in physical therapy and rehabilitation to assess and improve muscle strength, flexibility, and function.

Duration: Four weeks duration for five times per week, 12 repetitions, each lasting 30 seconds.

The exercise techniques used by Kendall were as follows:

1. Stretching of the Cervical Extensors:

By sitting with the head down and putting both hands across the occipital area, the cervical extensors can be stretched by adopting a flex neck position.[13]

While standing or sitting, you can perform this stretch. Sitting down allows for a larger stretch. Advice stretching while seated as a result. Make cautious not to slouch your shoulders during the stretch to prevent it from working. Additionally, maintain a straight neck (do not curve). Reach down as far as you can on the chest, touching the chin. By stretching, you can find relief and relaxation, which significantly reduces hunching. Furthermore, maintaining appropriate posture necessitates that the muscles of the neck extension stay relaxed, which can assist lessen muscle tension and strain.

Strengthening of the Deep Cervical Flexors:

With the head raised and the body flat on the back, and holding that position for 2 to 8 seconds.[13]

3. Strengthening the Shoulder Retraction:

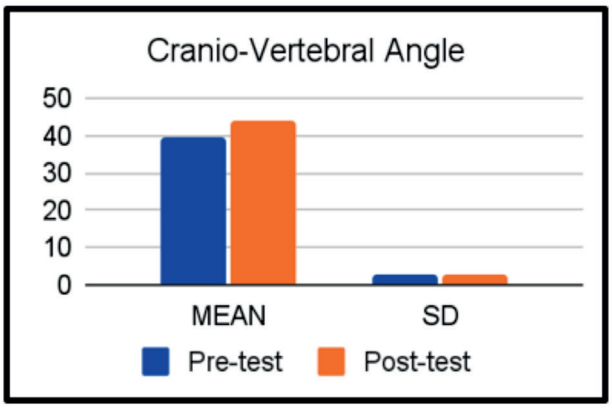
The shoulder blades can be brought closer together while standing by encircling a TheraBand and pulling the band back as far as it will go with both hands.[13]

4. Stretching the Pectoralis Muscle:

Placing the hands on the occipital region, unilaterally abducting the arms, and bilaterally turning externally the arms.

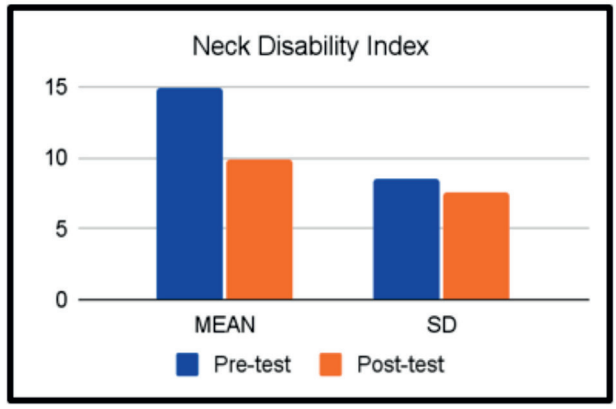
Gentle, not jerky or abrupt pulling is required. It ought to flow easily. Avoid stretching muscles that are frozen. After a warm-up, right after getting out of the shower, or at the conclusion of a workout, stretching is a good idea. Never stretch frozen muscles; instead, start with a brief cardio warm-up. Change the posture of your arms if you see that your shoulder joint is being stretched more than the chest muscles, which is the intended result. Always maintain a straight spine. Breathe correctly by inhaling through your nose and exhaling through your mouth. Hold the stretch until only slight discomfort remains, not until there is noticeable pain.[13]

Data Analysis



Graph No. 1

Interpretation: Graph No.1 shows that the values are extremely statistically significant.



Graph No. 2

Interpretation: Graph No.2 shows that the values are extremely statistically significant

Result

The mean pre and post-test of Craniovertebral angle (CV angle) was 39.42(2.52) and 43.92(2.56) respectively showing improvement in head posture respectively. Whereas the t value is 22.0006 and p value is <0.0001.SD pre and post-test of CV angle is 2.52 and 2.56 respectively. Graph-1 shows both CV angles were of statistical significance using conventional norms.

The mean of pre and post-test of NDI questionnaire was 14.92(8.47) and 9.96(7.57) respectively Graph-2 showing improvement in head posture respectively. Whereas the t value was 26.4861 and p value was <0.0001. SD pre and post value was 8.47 and 7.57 respectively. The NDI survey contains Statistical significance using conventional standards.

Discussion

In this study, subjects who underwent Forward head posture were screened for craniovertebral angle using a modified universal goniometer and NDI questionnaire. In previous study subjects whoever has the angle below 50 is considered as Forward head posture as D H Watson et al., Cephalalgia.[14] Similarly in this study also subjects who have an angle below 50 are included. A statistical analysis of the pre and post-tests measurements were Calculated. The results obtained from the study have shown that both the groups have statistically significant improvement. Also, on comparing the pre and post results, the progressive exercise showed more improvement Among IT workers with forward head posture.

In early study concluded that increased computer use brought on by scientific, technological, and industrial advancements, many people nowadays suffer from FHP and develop musculoskeletal irregularities and pain Preservation therapies including traction, stimulation with electricity, and heat therapy as well as therapeutic exercises like Kendall's skeletal muscle endurance and flexibility exercises and McKenzie's postural exercise, have all been used in physical therapy to treat FHP and improve posture[15] Similarly in this study subjects were treated using Kendall's exercise had better improvement for forward head posture among IT workers.

The results from the Kendall exercise group suggest that neck stability has improved. Kendall's workout regimen is based on the idea that exercises for alignment will rectify an unsteady forward head posture, albeit this also entails stretching the chest muscles in addition to the shoulder retractors and deep neck flexors should be strengthened. Despite having features that are similar to those of computers, televisions, and music-related devices, cell phones' small screens make it challenging to use them when standing up straight. The position of the head when using a computer or smartphone, which for an extended period of time prevents the spine's natural curvature from being maintained. The prevalence of neck and shoulder musculoskeletal issues rises as a result among smartphone users. As a result, persons who are susceptible to developing postural deformities as a result of poor posture habits and everyday living patterns should emphasize the value of exercise and good training. This study's objective was to ascertain whether participants' improved forward head position was influenced by the modified cervical exercise's level of momentum. This study suggested Kendall exercises for enhancing forward head posture.

In early study Harman demonstrated the effects of Kendall's exercise programme in a study involving treatment and control groups that had forward-leaning posture and a control group with forward head posture and concluded that Kendall's exercise had better improvement for forward head posture similarly we used this technique to correct that posture.[16]

In previous studies Kendall FP et al., 1993 states that Kendall's exercise program's basic premise is that alignment exercises can help correct an unsteady forward head posture, but this also requires stretching the chest muscles in addition to strengthening the deep neck flexors and shoulder retractors. Kendall exercise is frequently utilized as physical therapy to treat FHP, a disorder marked by muscle imbalance. It generally employs techniques for stretching and strengthening two muscles (deep cervical flexors and retractors of the scapula) and two other muscles (neck extensor muscles and pectorals) in order to bring about optimal neck alignment.[1]

In a previous study, Diab AA et al. (2012 concluded: It has been proven to improve neck stability and postural control. The cervical muscles are developed with the Kendall exercise, a stretching exercise.[17] Similarly, in this study, Kendall exercises were done by stretching and strengthening the deep neck muscles, showing improvement among IT workers.

Additionally, in a prior work by Wang CH et al., the other study showed that the head, shoulder, and upper-body parts were more aligned securely after six weeks of doing the stretching practice upon the chest muscle and shoulders retraction muscles.[18] Exercises to the cranial cervical flexors improved the nervous system's command for the longus colli along with longus capitis, 2 inner neck flexible skeletal muscles, and diminished the rate of unease in individuals with persistent neck pain. This study's conclusion was consistent with earlier research that found that craniocervical flexor training decreased pain intensity in people with persistent neck pain.[19-23] Controlling head motion and maintaining cervical spine stability are the main goals of the longus colli and longus capitis muscles resulting in improved FHP in people with neck discomfort.

The findings of the present study may support the notion that craniocervical flexor training is crucial for patients with persistent mechanical neck discomfort who want to improve their CV angle. The deep cervical flexor exercise-training group exhibited significantly higher levels of neck-flexor muscle strength. This outcome is in line with the findings of a prior study, in which participants underwent 6 weeks of craniocervical flexor training.[24] Deep cervical flexor

strength was found to be lower in patients with neck pain. The longus colli and longus capitis, among other deep cervical muscles, are crucial for maintaining cervical spine stability. Therefore, it is important to emphasize deep cervical muscle activity.[25]

Additionally, a study by Park incorporated cervical with pectoral muscle training with extension and flexibility bands found that the exercise had a good effect on the CVA.[26] Similarly in this study subjects who were trained using Kendall's exercise program the deeper neck flexible muscles & scapular retractor muscles are often strengthened, and the pectoralis muscle & cervical muscles that extend are stretched, to achieve appropriate neck alignment. Kendall exercises can therefore assist to enhance core stability, which can enhance performance and straighten out your forward head posture.

Conclusion

The study's conclusions imply that patients with forward head posture who engaged in Kendall's exercise might quickly improve and correct the faulty posture. Since FHP is a condition of muscle imbalance, Physical rehabilitation for Kendall usually takes place through exercise.

Ethical Clearance: Taken from institutional ethical committee.ISRB Number:03/ 065/ 2022/ ISRB/ SR/ SCPT.

Funding: Self

Conflict of Interest: Nil

References

1. Kendall FP, McCreary E, Provance P. Muscles Testing and Function Baltimore. MD: Williams & Wilkins. 1993;126.
2. Raine S, Twomey LT. Head and shoulder posture variations in 160 asymptomatic women and men. Archives of physical medicine and rehabilitation. 1997 Nov 1;78(11):1215-23.
3. Silva AG, Johnson MI. Does forward head posture affect postural control in human healthy volunteers?. Gait & posture. 2013 Jun 1;38(2):352-3.
4. Verma SL, Shaikh J, Mahato RK, Sheth MS. Prevalence of forward head posture among 12–16-year-old school going students—A cross-sectional study. Applied Medical Research. 2018;4(2):18-21.
5. Cho WH, Lee WY, Choi HK. An investigation on the biomechanical effects of turtle neck syndrome through EMG analysis. In Proceedings of the Korean Society of Precision Engineering Conference 2008 (pp. 195-196). Korean Society for Precision Engineering.
6. Szeto GP, Straker L, Raine S. A field comparison of neck and shoulder postures in symptomatic and asymptomatic office workers. Applied ergonomics. 2002 Jan 1;33(1):75-84.
7. Yoo WG, Yi CH, Cho SH, Jeon HS, Cynn HS, Choi HS. Effects of the height of ball-backrest on head and shoulder posture and trunk muscle activity in VDT workers. Industrial health. 2008;46(3):289-97.
8. Moore MK. Upper crossed syndrome and its relationship to cervicogenic headache. Journal of manipulative and physiological therapeutics. 2004 Jul 1;27(6):414-20.
9. Panchal S, Viramgami AP, Pingle S. Prevalence and Determinants of Musculoskeletal Disorders among Information Technology Sector Employees of Ahmedabad, Gujarat. Journal of Comprehensive Health. 2020 Oct 8;8(2):90-3.
10. Redivo VS, Olivier B. Time to re-think our strategy with musculoskeletal disorders and workstation ergonomics. South African Journal of Physiotherapy. 2021 Jan 14;77(1):1490.
11. Kumari S, Kumar R, Sharma D. Text neck syndrome: the pain of the modern era. International Journal of Health Sciences and Research. 2021 Nov;11(11): 161-5
12. Vernon H. The Neck Disability Index: state-of-the-art, 1991-2008. Journal of manipulative and physiological therapeutics. 2008 Sep 1;31(7):491-502.
13. Kim KH, Kim SG, Hwangbo G. The effects of horse-riding simulator exercise and Kendall exercise on the forward head posture. Journal of physical therapy science. 2015;27(4):1125-7.
14. Watson DH, Trott PH. Cervical headache: an investigation of natural head posture and upper cervical flexor muscle performance. Cephalalgia. 1993 Aug;13(4):272-84.
15. Do YL, Nam CW, Sung YB, Kim K, Lee HY. Changes in rounded shoulder posture and forward head posture according to exercise methods. Journal of physical therapy science. 2017;29(10):1824-7.
16. Harman K, Hubley-Kozey CL, Butler H. Effectiveness of an exercise program to improve forward head posture in normal adults: a randomized, controlled 10-week trial. Journal of Manual & Manipulative Therapy. 2005 Jul 1;13(3):163-76.

17. Diab AA. The role of forward head correction in management of adolescent idiopathic scoliotic patients: a randomized controlled trial. Clinical rehabilitation. 2012 Dec;26(12):1123-32

18. Wang CH, McClure P, Pratt NE, Nobilini R. Stretching and strengthening exercises: their effect on three-dimensional scapular kinematics. Archives of physical medicine and rehabilitation. 1999 Aug 1;80(8):923-9.

19. Jull GA, Falla D, Vicenzino B, Hodges PW. The effect of therapeutic exercise on activation of the deep cervical flexor muscles in people with chronic neck pain. Manual therapy. 2009 Dec 1;14(6):696-701.

20. Falla D, Jull G, Hodges P. Training the cervical muscles with prescribed motor tasks does not change muscle activation during a functional activity. Manual therapy. 2008 Dec 1;13(6):507-12.

21. Falla D, O'Leary S, Farina D, Jull G. The change in deep cervical flexor activity after training is associated with the degree of pain reduction in patients with chronic neck pain. The Clinical journal of pain. 2012 Sep 1;28(7):628-34.

22. Borisut S, Vongsirinavarat M, Vachalathiti R, Sakulsriprasert P. Effects of strength and endurance training of superficial and deep neck muscles on muscle activities and pain levels of females with chronic neck pain. Journal of physical therapy science. 2013;25(9):1157-62.

23. Lluch E, Schomacher J, Gizzi L, Petzke F, Seegar D, Falla D. Immediate effects of active cranio-cervical flexion exercise versus passive mobilisation of the upper cervical spine on pain and performance on the cranio-cervical flexion test. Manual therapy. 2014 Feb 1;19(1):25-31.

24. O'Leary S, Jull G, Kim M, Vicenzino B. Specificity in retraining craniocervical flexor muscle performance. journal of orthopaedic & sports physical therapy. 2007 Jan;37(1):3-9.

25. Falla DL, Jull GA, Hodges PW. Patients with neck pain demonstrate reduced electromyographic activity of the deep cervical flexor muscles during performance of the craniocervical flexion test. Spine. 2004 Oct 1;29(19):2108-14

26. Park HC, Kim YS, Seok SH, Lee SK. The effect of complex training on the children with all of the deformities including forward head, rounded shoulder posture, and lumbar lordosis. Journal of exercise rehabilitation. 2014 Jun;10(3):172.