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Cervical sagittal curvatures of workers in the textile industry

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Abstract

Aim: Workers in the textile industry commonly use their upper extremities, and neck while working. The prevalence of neck and arm pain among workers in the textile industry is well understood. Impaired cervical lordosis is associated with pain and functional disability. Scientific studies have rarely focused on anatomical foundations. Our aim of the study is to measure the cervical lordosis angles (Cobb C2-7) of workers working in the textile industry.

Materials and Methods: Our study is a single-center, non-randomized, retrospective, and observational. Demographic information, clinical and radiological images were analyzed hospital records. Recorded visual analog scale, neck pain, arm pain, and sensory problems were examined hospital records. "Cobb 2-7" angles were measured by a single physician with the program called "Akgün", which is the electronic database program used by the hospital.

Results: We detected a total of 53 textile workers. 33 (62.26%) were female and 20 (37.73%) were male. All of the cases gave a history of working position with their neck flexion. The demographic information of the patients is shown in the table. The average of the Cobb 2-7 angles of the cases was measured as -6.43±12.17.

Conclusion: Textile workers commonly have neck pain. we detected deterioration in the cervical alignment of textile workers. We attribute the cause of neck pain in textile workers to the flexion position of the neck. We think that the continuous neck flexion position impairs cervical lordosis. Further prospective and high-quality studies are needed.

Introduction

Workers in the textile industry commonly use their upper extremities, neck, and shoulders while working [1]. Thus, shoulder, neck, and arm pain are common among textile industry workers [1-4]. Many studies have referred to the appropriate design of the workplace [5-7].

The curvature of the cervical spine is associated with important clinical consequences, including pain [8]. Impaired cervical lordosis has been associated with both pain and functional disability [9]. Biomechanical, anterior, and posterior stresses are minimal in the lordotic configuration of the cervical spine, while these stresses are greater in the kyphotic configuration than in lordosis [10].

Many studies have associated non-physiological cervical spine curvatures with pain. [8-10]. While some of these studies have focused on textile industry workers, few have examined the anatomical configuration of the cervical spine of this phenomenon. Thus, the aim of this study was to measure the cervical lordosis angles (Cobb C2-7) of workers in the textile industry with the goal of revealing the causes of their neck pain. The anatomical features and cervical sagittal alignment of textile workers may be more pathological than normal.

Materials and Methods

Our study is a single-center, non-randomized, retrospective, and observational study conducted from January 2020 to July 2021. Our study is a descriptive. All textile workers who applied to our polyclinic with complaints of neck pain were included in the study. After receiving ethics committee approval (Decision No: 2021/652) from Karabuk University Faculty of Medicine; It has been prepared in accordance with the Helsinki Declaration guidelines.

Our study was planned to be carried out with textile workers who applied to the neurosurgery outpatient clinics of our hospital between 01.01.2020 and 01.07.2021. Patients who stated that they were textile workers in their stories

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were recorded. Demographic information, clinical (Neck pain, arm pain, hypoesthesia in the arm), and radiological images (Lateral cervical spine radiograph, the Cobb C2-7 angles) were analyzed hospital records.

From the recorded clinical information of the patient, in which part of the textile industry (sewing, quality control, packaging, washing-grinding, embroidery, thread cleaning, and machinery) she-he worked, how she-he worked (standing or sitting) and how many years she-he worked were scanned. Recorded visual analog scale, neck pain, arm pain, and sensory problems were examined hospital records. "Cobb 2-7" angles were measured by a single physician with the program called "Akgün", which is the electronic database program used by the hospital.

This study used a non-sampling approach, and data on all textile workers who applied to our polyclinic with complaints of neck pain over the specified period were included. The sample size was determined using power analysis. According to calculations made using the G*power 3.1 program, the required sample size was determined to be at least 24 with an effect size of 0.85, a margin of error of 0.05, a confidence level of 0.95, and a population representation of 0.95 [11].

Visual analog scale

Textile workers with neck pain were asked to remark progressively between 0 and 10 where 0 represents no pain and 10 represents severe pain.

C2-7 Cobb angle

The Cobb angle is measured from C2 to C7. It is obtained by drawing parallel lines extending from the lower endplate of C2 and the lower endplate of C7 being considered and measuring the angle between them. Based on averages obtained from many studies, the C2-7 Cobb angle in healthy individuals is approximately 12 degrees.

Inclusion and exclusion criteria

Only patients whose medical records listed them as being employed as a textile worker were included in the study. Patients who had been textile workers in the past but were not at the time of the study were excluded. Cases of acute neck pain were also excluded.

Statistical analysis

For this study, statistical analysis was performed using IBM SPSS 21 software (SPSS Inc., Chicago, IL). Descriptive statistics are expressed as the median (min-max), mean±sd, and n (%). Because of the lack of groups in the study population, comparison tests were not performed.

Results

The final sample included 53 textile workers. Of these, 33 (62.26 %) were female, and 20 (37.73%) were male. All cases included a history of working in the neck flexion position. The demographic information of the patients is shown in Table 1. The mean Cobb 2-7 angle was measured as -6.43±12.17 (Figure 1). The patients reported working in various departments, including sewing, quality control, packaging, washing–grinding, embroidery, thread cleaning, and machinery operation. All patients reported working at least 8 hours a day in the neck flexion position.

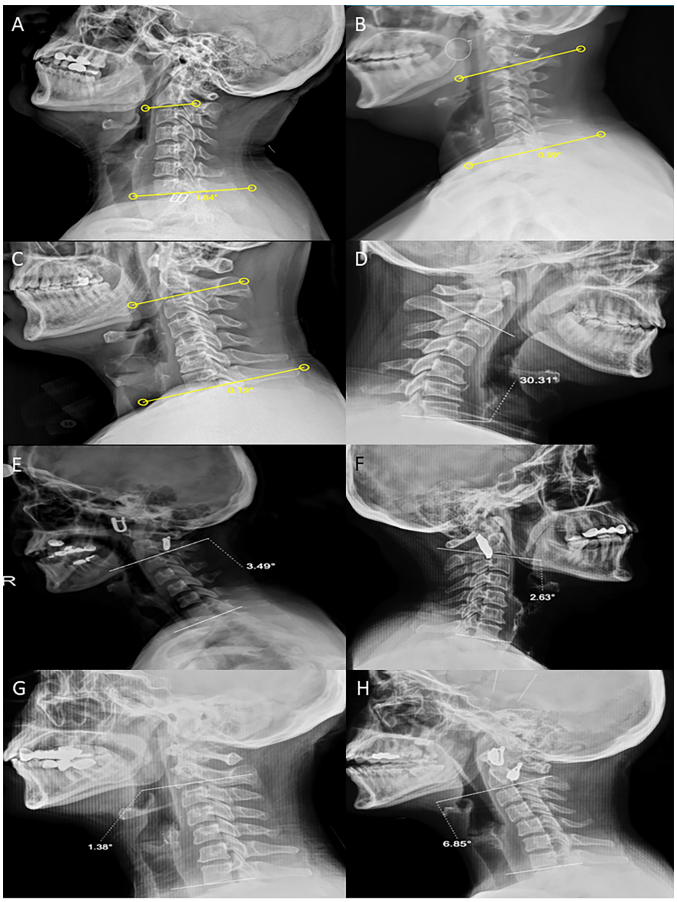

Figure 1. Deterioration of cervical lordosis is observed in textile workers.

Table 1. Information of textile workers who applied to the hospital with complaints of neck pain.

Variables	N (percentage or standard deviation)
The average age	38.07
Average working times (years)	10.38
Sitting down workers	31 (58.49%)
Standing workers	22 (41.50%)
Neck pain VAS scoring	3.24
Arm pain VAS scoring	1.58
Patients with hypoesthesia in the arm	31 (58.49%)
Patient with back and leg pain	15 (28.30%)
Textile workers working in neck flexion position	53 (100%)
The mean of the Cobb C2-7 angles	-6.43±12.17

Discussion

The textile industry is vital to many countries in terms of economic growth and social development [12]. However, pathological conditions, such as respiratory problems, musculoskeletal disorders, traumatic injuries, and hearing impairment, are common among textile workers [12, 13]. To the best of our knowledge, this study is the

first to discuss the anatomical features and cervical sagittal alignment of the spine of textile workers. In our article, we found high rates of deterioration in the cervical lordosis of textile workers.

Harrison et al. found 30 lateral cervical radiographs to have a mean C2-7 angle of -17° [14]. When looking at the Cobb 2-7 angle in asymptomatic volunteers, Kuntz et al. found a mean of -17°, Lee et al. found a mean of -9.9°, and Iyer et al. found a mean of -12.2°; when looking only at individuals between the ages of 20 and 40, Chen et al. found a mean Cobb 2-7 angle of -12.2°, and Hey et al. found a mean of -24.2° [15-19]. The mean C2-7 angle value of -6.43 found among the textile workers in this study was higher than the values found in these studies. Using data from 21 studies, Guo et al. found the mean Cobb C2-7 angle to be -12.71° [20]. The difference in results may be related to the textile workers in our study having to maintain the flexion position of their necks while working (Table 1).

Guo et al. reported no significant relationship between symptoms and cervical lordotic curvature [20]. In our opinion, textile workers suffering from chronic neck pain are a unique group and should not be included in this conclusion We argue that the neck flexion position in which textile workers are required to work is associated with neck pain and Cobb C2-7 angles. The Cobb C2-7 angles and VAS scores of the patients in our study support this view (Table 1). Çevik et al. showed that cervical lordosis is impaired in cervical degenerative diseases [21].

Öğrenci et al. concluded that mobile phones are used in cervical flexion and hyperflexion [22]. They predict that, as a result, the number of cervical vertebral probes being performed on young people will increase [22]. These findings are parallel to ours with textile workers working in the flexion of the cervical vertebrae. Similarly, we predict an increase in such procedures among textile worker who must work in the neck flexion position.

Our study has some limitations. First, the pain scales and Cobb C2-7 angles of the patients before they became textile workers were unknown. Another limitation of our study is that it was retrospective. We would like to observe the working environments of textile workers. Future studies should observe and analyze the working environments of textile workers with the goal of improving their working conditions and health outcomes.

Conclusion

Textile workers commonly experience neck pain. In this study, we detected deterioration in the cervical alignment of 53 textile workers. We attribute the cause of neck pain in these workers to the flexion position of the neck, implying that continuous neck flexion impairs cervical lordosis. Further prospective and high-quality studies are needed.

Ethical approval

This retrospective study was approved by the Ethics Committee of Clinical Research of Karabük University Faculty of Medicine with the decision no. 2021/652.

References

1. Krishnamoorthy, Kuberan D, Gopichandran V, Prevalence, Patterns and Disability Due to Musculoskeletal Disorders among Cotton Textile Industry Workers in Tamil Nadu–A Cross-Sectional Study. Int J Public Health 2019. 9(3).
2. Azevedo, J., et al., Prevalence of musculoskeletal symptoms among workers of Portuguese textile industry: Association with Body Mass Index and Work Position, in Occupational and Environmental Safety and Health II. 2020, Springer. p. 453-460.
3. Zakari, M.K., et al., Prevalence And Risk Factors Of Work-Related Musculo Skeletal Disorders Among Textile Dyers In Kano Metropolis. Journal of Medical and Applied Biosciences 9(1): p. 2017.
4. Zele, Y.T., Kumie, A., Deressa, W. et al. Registered health problems and demographic profile of integrated textile factory workers in Ethiopia: a cross-sectional study. BMC Public Health 21, 1526 (2021).
5. Ijadunola, K., et al., Perceptions of occupational hazards amongst office workers at the Obafemi Awolowo University, Ile-Ife. Niger J Med. 2003. 12(3): p. 134-139.
6. Thompson, S.K., E. Mason, and S. Dukes, Ergonomics, and cytotechnologists: reported musculoskeletal discomfort. Diagn Cytapathol. 2003. 29(6): p. 364-367.
7. Huang, G.D., and M. Feuerstein, Identifying work organization targets for a work-related musculoskeletal symptom prevention program. J. Occup Rehabil. 2004. 14(1): p. 13-30.
8. Kawakami, M., et al., Axial symptoms and cervical alignments after cervical anterior spinal fusion for patients with cervical myelopathy. J. Spinal Disord. 1999. 12(1): p. 50-56.
9. Tang, J.A., et al., The impact of standing regional cervical sagittal alignment on outcomes in posterior cervical fusion surgery. Neurosurg. 2015. 76(suppl_1): p. S14-S21.
10. Harrison, D.E., et al., Comparison of axial and flexural stresses in lordosis and three buckled configurations of the cervical spine. Clin Biomech (Bristol Avon) 2001. 16(4): p. 276-284.
11. Faul, F., et al., Statistical power analyses using G* Power 3.1: Tests for correlation and regression analyses. Behavior research methods, 2009. 41(4): p. 1149-1160.
12. Tefera Zele, Y., et al., Reduced cross-shift lung function and respiratory symptoms among integrated textile factory workers in Ethiopia. International Journal of environmental research and public health, 2020. 17(8): p. 2741.
13. Zaw, A.K., et al., Assessment of noise exposure and hearing loss among workers in textile mill (Thamine), Myanmar: a cross-sectional study. Saf Health Work, 2020. 11(2): p. 199-206.
14. Harrison, D.E., et al., Cobb method or Harrison posterior tangent method: which to choose for lateral cervical radiographic analysis. Spine (Phila Pa 1976), 2000. 25(16): p. 2072-2078.
15. Kuntz, C., et al., Neutral upright sagittal spinal alignment from the occiput to the pelvis in asymptomatic adults: a review and resynthesis of the literature. J. Neurosurger Spine, 2007. 6(2): p. 104-112.
16. Lee, S.-H., et al., The influence of thoracic inlet alignment on the craniocervical sagittal balance in asymptomatic adults. J Spinal Disord Tech, 2012. 25(2): p. E41-E47.
17. Iyer, S., et al., Variations in sagittal alignment parameters based on age: a prospective study of asymptomatic volunteers using full-body radiographs. Spine (Phila Pa 1976), 2016. 41(23): p. 1826-1836.
18. Chen, Y., et al., The change of cervical spine alignment along with aging in asymptomatic population: a preliminary analysis. Eur Spine J, 2017. 26(9): p. 2363-2371.
19. Hey, H.W.D., et al., Normal variation in sagittal spinal alignment parameters in adult patients: an EOS study using serial imaging. Eur Spine J, 2018. 27(3): p. 578-584.
20. Guo, G.-M., et al., Cervical lordosis in asymptomatic individuals: a meta-analysis. J Orthop Surg Res, 2018. 13(1): p. 1-7.
21. Çevik, H., et al., Servikal Dejeneratif Hastaliği Olan Hastalar İle Normal Sağlikli Bireylerdeki Servikal Sagittal Parametrelerin Karşilaştirilmasi. Journal of Turkish Spinal Surgery, 2017. 28(1): p. 11-14.
22. Öğrenci, A., et al., The effect of technological devices on cervical lordosis. Open access Maced J Med Sci, 2018. 6(3): p. 467.