

PalArch's Journal of Archaeology of Egypt / Egyptology

CRANIOVERTEBRAL ANGLE MEASUREMENTS AMONG DENTAL PRACTITIONERS

B. Keerthana¹, Dr. Lavanya Prathap², Dr. Preetha S³

¹Department of Anatomy Saveetha Dental College and Hospitals, Saveetha Institute of Medical and Technical Sciences Chennai

²Assistant Professor Department of Anatomy Saveetha Dental College and Hospitals, Saveetha Institute of Medical and Technical Sciences Chennai.

³Senior Lecturer Department of Physiology Saveetha Dental College and Hospitals, Saveetha Institute of Medical and Technical Sciences Chennai.

² lavanyap.sdc@saveetha.com

B. Keerthana, Dr. Lavanya Prathap, Dr. Preetha S. CRANIOVERTEBRAL ANGLE MEASUREMENTS AMONG DENTAL PRACTITIONERS--PalArch's Journal Of Archaeology Of Egypt/Egyptology 17(7), 1818-1825. ISSN 1567-214x

Keywords: Micro Business Unit, Competitive Strategy, Performance

ABSTRACT:

Dental practitioners are widely exposed to a variety of occupational hazards such as physical, chemical, biological and ergonomically too which can lead to musculoskeletal disorders. Forward neck posture involves increased flexion of lower cervical vertebrae, upper thoracic regions and increased extension of upper cervical vertebrae which can lead to altered curvature of cervical spine. The aim of the present study is to analyze the differences in craniovertebral angle measurement among dental practitioners. The study was conducted with 40 internship students who work more than 4 hours a day. The study was conducted in a private dental college, Chennai. Craniovertebral angle was measured using the goniometer, as a tool to measure the forward head posture. The collected data is analyzed statistically using the SPSS for descriptive statistics and gender association analysis using Chi Square. The average craniovertebral angle was calculated to be 55°, Majority (30%) of the participants had 60° of craniovertebral followed by 55° and 65° suggestive of altered cervical spine curvature. The findings of the study are imprecise due to limited participants. On an average the craniovertebral angle was found to be 55° which is more than the standard value of craniovertebral angle.

INTRODUCTION:

Dental practitioners are widely exposed to a variety of occupational hazards such as physical, chemical, biological and ergonomically too which can lead to musculoskeletal disorders. Forward neck posture involves increased flexion of lower cervical vertebrae, upper thoracic regions and increased extension of upper cervical vertebrae which can lead to altered curvature of cervical spine. The alternation in the lordotic curvature of cervical spine can lead to degenerative changes in the neck. (Munaga *et al.*, 2013). Dental professionals are prone to health hazards in day-to-day practice. They are constantly exposed to dental materials, noise from instruments besides work stress and patient management (Ramachandran *et al.*, 2017). Musculoskeletal disorder is characterized by discomfort, disability and pain on joints, tendons and soft parts and can also affect forced body postures (Morse, Bruneau and Dussetschleger, 2010)(Newell and Kumar, 2004)(Gupta *et al.*, 2013). Lower back pain is common among dentists which may result due to prolonged and awkward posture (Al-Mohrejet *et al.*, 2016)(Gupta, 2011)(Gupta, 2011; Gaowgzehet *et al.*, 2015). Forward neck posture may result in physiological changes which can lead to back, neck or shoulder pain or any kind of musculoskeletal disorder..(Ryalat *et al.*, 2009). The working characteristic leads to pain, spasms, joint rigidity, and disturbances in the life of a dentist (Shaik, 2015; ZakerJafari and YektaKooshali, 2018)). If regularly occurring pain or discomfort is not given importance, the damage can lead to an injury (macro change) or a career-ending disability (Al-Ali and Hashim, 2012)(Gosavi, Gosavi and Jawade, 2012)(Shaik, 2015). The report has told that dentists who are prevalent to musculoskeletal disorders are more likely to acquire neuro- circulatory disease which includes varicose vein, postural defects and foot with effects on general health and well being(Moodley, Naidoo and van Wyk, 2018)(Khan and Chew, 2013). Another main factor for forward neck posture may be the duration of time (Pejčić *et al.*, 2017). More extended working hours may be led to a high incidence of forward neck symptoms (Ajwa, 2018)(Siddiqui, 2019). Low back pain and neck pain are the most vulnerable problems of dental practitioners. The dental practitioners are mostly prone to neck pain because of the constrained work and limited resting time (Munaga *et al.*, 2013; Almosa and Zafar, 2019). These problems can be controlled by increasing awareness of the postures among dental practitioners use during work, redesigning the workplace to promote neutral positions, examining the impact of an instrument used on upper body pain, and following healthy working practices to reduce the stress of dental work and on dental practitioner's body (Suliman, 2018).The prevalence of neck posture amongst dental practitioners is a fact which is required to educate the importance of the issue to full-time dental practitioners (Aghahi, Darabi and Hashemipour, 2018). The aim of the present study is to analyze the differences in craniovertebral angle measurement among the dental practitioner as the dental practitioners stress themselves a lot while treating patients, like bending down for a longer duration which may result in cervical spine curvature derangements.

MATERIALS AND METHODS:

The study was conducted among dental practitioners in a private dental college at Chennai. This is a feasibility study which includes 40 dentists who practice for more than four hours a day. The study was approved by the institutional review board. The study was done under the measurement of the craniovertebral angle using a variable instrument called a goniometer. The craniovertebral angle is identified as the intersection of a horizontal line passing through the C7 spinous process and a line joining the midpoint of the tragus of the ear to the skin overlying the C7 spinous process. A goniometer is an instrument that measures an angle of a joint. The participants were explained about the procedure and their willingness is obtained through informed consent. The craniovertebral angle was measured in sitting position. The axis of the goniometer is placed at the C7 spinous process with stable arm placed horizontally at C7 level and movable arm at the tragus of the ear and the resulting angle was measured. The results are recorded with their demographic details. The data is tabulated and analyzed statistically using SPSS for descriptive and association analysis.

RESULTS AND DISCUSSION:

The study population includes a gender proportion of 58.54% female and 41.56% male (figure-1). From the obtained results of the craniovertebral angle among 40 dentists, 29.27% of the participants represented 60°, 4.88% represent with 45°, whereas 7.32% represented 50°, 17.07% participants represented 55° and 65° respectively, 12.20% represents angle as 70°, 2.44% of participants represents angle as 80°, 63° and 67° respectively. Majority of participants reported 60° as their Craniovertebral angle. The chi square analysis was done and reported as Pearson's chi square value- 17.054, P value: 0.048 (<0.05), hence statistically significant. It can be inferred that the majority of females reported with craniovertebral angle of 60° compared to male with statistically significant differences. However the average craniovertebral angle was reported to be 55° (figure 2).

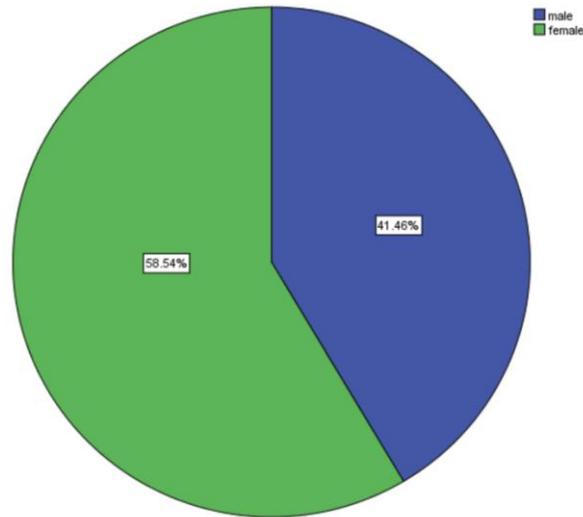


Fig 1: Pie Chart representing the percentage distribution of participants based on their gender, where blue colour represents male and a green colour represents female. 58.54% of the participants were female and 41.56% participants were male.

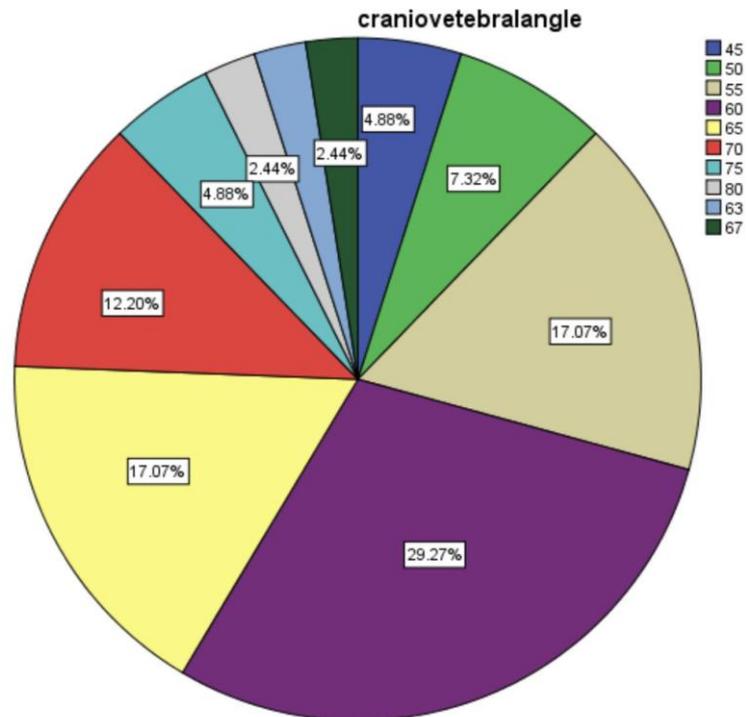


Fig 2: Pie Chart representing the percentage distribution of participants' craniovertebral angle. By the observation of the craniovertebral angle of 40 dentists , 29.27% of the participants (purple colour) represents 60°, 4.88% represents 45° (dark blue), 7.32% represents 50° (green), 17.07% represents the 55° (ivory), 17.07% represents the angle 65°(yellow),12.20% represents the angle 70°(red), 2.44%. represents the 80°(grey), 63° (aqua) and (dark green) and 67° colour. Majority of participants reported to have 60° the averagecraniovertebral angle is reported as 55°

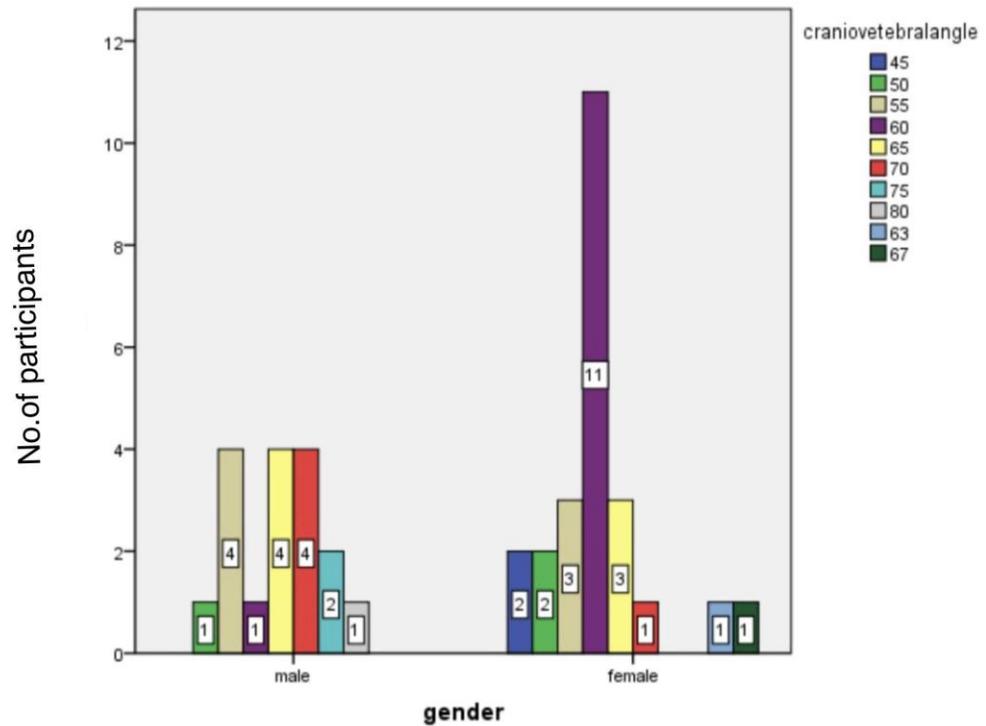


Fig 3: Bar graph represents the association between the gender and craniovertebral angle of the participants. X axis represents the gender and Y axis represents the number of participants. The chi square analysis was done and reported as Pearson's chi square value: 17.054, P value: 0.048 (<0.05), hence statistically significant. It can be inferred that the majority of females reported with craniovertebral angle of 60° (purple) compared to male with statistically significant differences.

In a study with regard to the occupational health hazards among dental practitioners reported 65.65% of population with neck pain (Ramachandran *et al.*, 2017) the author has discussed the historic shift from standing to seated posture, the results obtained were about 26-73% reported with symptoms of neck disorders (Morse, Bruneau and Dussetschleger, 2010). In a study conducted in 2018, reported the impact of low back pain, neck pain and shoulder pain and the results reported with 56% of neck pain symptoms. (Suliman, 2018). The responses of a study in relation to occupational hazards reported 52% of neck pain, low back pain 41% and shoulder 29%. (Muralidharan, Fareed and Shanthy, 2013). A study conducted in 2015 reported that dental practitioners demonstrated a high prevalence of low back pain. (Gaowgzehet *al.*, 2015). Previous studies focus regarding head, neck and shoulder pain has been accomplished on dentists and dental practitioners, while forward neck posture prevalence amongst dental practitioners has not been thoroughly addressed in any studies. The findings of a study are alarming and entailing further investigations to identify risk factors associated with temporomandibular joint dysfunction in order to establish measures for prevention and treatment. (Ryalat *et al.*, 2009) Another study describes that the ergonomics and healthy workplace help the dental surgeons increase their performance without putting off their own health at risk (Shaik, 2015) The

study showed that musculoskeletal pain is prevalent in female and male dental practitioners because of their long working hours. (ZakerJafari and YektaKooshali, 2018) and (Khan and Chew, 2013) and (Pejčić *et al.*, 2017) A study found a significant difference between the type of pain and number of patients treated per day and reported to have a strong association between work-related pain and sitting posture. (Ajwa, 2018) The study shows that most of the dental practitioners are not aware of ergonomics and their results were 82% resulted in neck pain, 72% had back pain, shoulder pain was 62%. Another study (Tang, 2018) reveals that stressful and irreverent posture results in neck pain among dental practitioners. (Warren, 2010) They contained information from each department which was about 54% in endodontics followed by 20% in surgical procedures and 15% in orthodontic procedures. Since our study is a feasibility study, the number of participants were less and the study involved young practitioners. The precise measurement of craniocervical angle can be obtained with the chronic full time dental practitioners. Future studies can be conducted in large scale to get the precise measurements.

CONCLUSION:

The findings of the study are imprecise due to limited participants. On an average the craniocervical angle was found to be 55 degree which is more than the standard value of craniocervical angle. From the results obtained it can be concluded that the average angle is more than the normal limits, the increased angulation may reflect alteration in normal cervical curvature that can impact degenerative changes in dental practitioners. The work-related stress of ergonomics can make them more prevalent.

ACKNOWLEDGEMENT

We thank Saveetha Dental College for providing us the support to complete the study.

CONFLICT OF INTEREST :

The authors declare no potential conflict of interest.

REFERENCE:

- Aghahi, R. H., Darabi, R. and Hashemipour, M. A. (2018) 'Neck, back, and shoulder pains and ergonomic factors among dental students', *Journal of education and health promotion*, 7, p. 40.
- Ajwa, N. (2018) 'Neck and back pain as reported by dental practitioners in Riyadh city', *Journal of Dental Health, Oral Disorders & Therapy*. doi: 10.15406/jdhodt.2018.09.00405.
- Al-Ali, K. and Hashim, R. (2012) 'Occupational health problems of dentists in the United Arab Emirates', *International dental journal*, 62(1), pp. 52–56.
- Al-Mohrej, O. A. et al. (2016) 'Prevalence of musculoskeletal pain of the neck, upper extremities and lower back among dental practitioners working in Riyadh, Saudi Arabia: a cross-sectional study', *BMJ Open*, p. e011100. doi: 10.1136/bmjopen-2016-011100.

- Almosa, N. A. and Zafar, H. (2019) 'Assessment of Knowledge about Dental Ergonomics among Dental Students of King Saud University, Riyadh, Kingdom of Saudi Arabia', *The Journal of Contemporary Dental Practice*, pp. 324–329. doi: 10.5005/jp-journals-10024-2517.
- Gaowgzeh, R. A. et al. (2015) 'Prevalence of and risk factors for low back pain among dentists', *Journal of Physical Therapy Science*, 27(9), pp. 2803–2806.
- Gosavi, S. S., Gosavi, S. Y. and Jawade, R. S. (2012) 'Posturedontics: Reducing the Stress in Dentistry', *World Journal of Dentistry*, pp. 335–339. doi: 10.5005/jp-journals-10015-1185.
- Gupta, S. (2011) 'Ergonomic applications to dental practice', *Indian Journal of Dental Research*, p. 816. doi: 10.4103/0970-9290.94677.
- Gupta, S. et al. (2013) 'Prevalence of musculoskeletal disorder among dental practitioners', *ASL- Musculoskeletal Diseases*, p. 22. doi: 10.4103/0000-1112.111951.
- Khan, S. A. and Chew, K. Y. (2013) 'Effect of working characteristics and taught ergonomics on the prevalence of musculoskeletal disorders amongst dental students', *BMC musculoskeletal disorders*, 14, p. 118.
- Moodley, R., Naidoo, S. and van Wyk, J. (2018) 'The prevalence of occupational health-related problems in dentistry: A review of the literature', *Journal of occupational health*, 60(2), pp. 111–125.
- Morse, T., Bruneau, H. and Dussetschleger, J. (2010) 'Musculoskeletal disorders of the neck and shoulder in the dental professions', *Work*, pp. 419–429. doi: 10.3233/wor-2010-0979.
- Munaga, S. et al. (2013) 'Assessment of knowledge, practices, and work place condition related to ergonomics among dental students of Bhopal city - A questionnaire study', *Journal of Orofacial Sciences*, p. 109. doi: 10.4103/0975-8844.124254.
- Muralidharan, D., Fareed, N. and Shanthi, M. (2013) 'Musculoskeletal Disorders among Dental Practitioners: Does It Affect Practice?', *Epidemiology Research International*, pp. 1–6. doi: 10.1155/2013/716897.
- Newell, T. M. and Kumar, S. (2004) 'Prevalence of musculoskeletal disorders among orthodontists in Alberta', *International Journal of Industrial Ergonomics*, pp. 99–107. doi: 10.1016/j.ergon.2003.06.003.
- Pejčić, N. et al. (2017) 'Assessment of risk factors and preventive measures and their relations to work-related musculoskeletal pain among dentists', *Work*, 57(4), pp. 573–593.
- Ramachandran, S. et al. (2017) 'Evaluation of knowledge, attitude, and practices about the health-related occupational hazards among dental practitioners in Pondicherry, India', *Journal of Education and Ethics in Dentistry*, p. 44. doi: 10.4103/jeed.jeed_1_18.
- Ryalat, S. et al. (2009) 'Prevalence of temporomandibular joint disorders among students of the university of Jordan', *Journal of clinical medicine research*, 1(3), pp. 158–164.
- Shaik, A. (2015) 'Dental ergonomics: Basic steps to enhance work efficiency', *Archives of Medicine and Health Sciences*, p. 138. doi: 10.4103/2321-4848.154966.

- Siddiqui, A. A. (2019) 'Ergonomics, Exercises and Education to Prevent Neck and Back Pain among Dentists', *Journal of Dentistry and Oral Sciences*. doi: 10.37191/maps-ci-2582-3736-1(1)-002.
- Suliman, M. (2018) 'Prevalence of low back pain and associated factors among nurses in Jordan', *Nursing Forum*, pp. 425–431. doi: 10.1111/nuf.12269.
- Tang, J. (2018) *A Practical Guide to the Self-Management of Musculoskeletal Pain in Dental Professionals*. Cambridge Scholars Publishing.
- Warren, N. (2010) 'Causes of musculoskeletal disorders in dental hygienists and dental hygiene students: a study of combined biomechanical and psychosocial risk factors', *Work*, 35(4), pp. 441–454.
- ZakerJafari, H. R. and YektaKooshali, M. H. (2018) 'Work-Related Musculoskeletal Disorders in Iranian Dentists: A Systematic Review and Meta-analysis', *Safety and health at work*, 9(1), pp. 1–9.
- Vidulasri, N. and Thenmozhi, M.S., Assessment of neck pain among dental students and general dental practitioners.