

Evaluation of association between Elongated Styloid Process and Temporomandibular Joint Disorders

Harita Ravikumar¹, M.P. Santhosh Kumar², Gidean Arularasan³

¹Graduate student, Department of Oral and Maxillofacial Surgery, Saveetha Dental College and hospitals, Saveetha Institute of Medical and Technical Sciences, Saveetha university, Chennai - 600077

²Professor, Department of Oral and Maxillofacial surgery, Saveetha Dental College and Hospital, Saveetha Institute of Medical and Technical Sciences, Saveetha University, Chennai, 600077

³Associate Professor, Department of Oral and Maxillofacial surgery, Saveetha Dental College and Hospitals, Saveetha Institute of Medical and Technical Sciences, Saveetha University, Chennai- 77

santhoshsurgeon@gmail.com

How to cite this article: Harita Ravikumar, M.P. Santhosh Kumar, Gidean Arularasan (2024) Evaluation of association between Elongated Styloid Process and Temporomandibular Joint Disorders. *Library Progress International*, 44(3), 17274-17278.

ABSTRACT

Introduction: Styloid process (SP) is an integral part of the styloid complex that is derived from 2nd pharyngeal arch (Reichert's cartilage). The tip of SP is situated between the external carotid artery, Internal jugular vein, cranial nerves 5 and 9. Around 8% of the people with elongated styloid process present with neck pain, foreign body sensation in throat, pain on turning head, odynophagia, often misdiagnosed as the clinical symptoms for temporomandibular joint disorders (TMD).

Aim: The aim of the study is to evaluate the association between elongated styloid process and prevalence of temporomandibular joint disorders in our regional population.

Materials and Methods: This study was conducted at Saveetha Dental College and hospital, Chennai. 1012 orthopantomographs (OPG) were reviewed from the DIAS from which 137 with elongated styloid processes were filtered among which assessment was done for the patients having TMD or not. Statistical analysis using SPSS was done and chi square analysis was done.

Results: It is seen that almost equal number of males and females are having both elongated SP and TMD. Different age groups were affected with both conditions, among which 28-37 years were more affected. 38 people had elongated SP along with TMD.

Conclusion: From this study it can be concluded that there was no association between elongated styloid process and the occurrence of temporomandibular joint disorders.

Keywords: temporomandibular joint disorders, elongated styloid process, neck pain, orofacial disorders, orofacial pain

INTRODUCTION

Styloid process is a bone that is slender having pointed projection and extending downward and forward from the petrous part of the temporal bone. They are found on either part of the skull (1). Several muscles and ligaments are attached to this structure that are responsible for the movement of the tongue and also for swallowing and also some of the complex structures supporting the head and neck region. The length of the styloid process can vary among individuals; it can be elongated naturally while in others it may be shorter (2). Normal styloid process does not cause much of an issue whereas an elongated styloid process may lead to symptoms such as throat pain, dysphagia, or even facial pain. Elongated styloid process may be sometimes associated with eagle syndrome, a condition that is characterized by persistent pain in the oropharynx region and the face (3). Elongated styloid processes can often be confirmed through imaging studies such as panoramic radiographs or CBCT.

Elongated styloid processes are often confused between temporomandibular joint disorders (TMD) as they

produce similar symptoms. TMD is a complex and multifactorial disorder that manifests various symptoms and their exact cause is challenging to determine. Their symptoms include jaw pain and tenderness, headaches or migraine, tinnitus, facial pain or discomfort, difficulty and pain while chewing (4,5). TMD is often multifactorial that include trauma, bruxism, malocclusion, arthritis affecting jaw, genetics etc. Diagnosis includes comprehensive evaluation including a dentist, maxillofacial surgeon or an orofacial pain specialist. The evaluation may include a review of the patient's medical history, physical examination of the jaw and the surrounding tissues, and imaging studies such as x-ray or an MRI (6).

The association between the elongated styloid process and temporomandibular joint disorder has been a topic of interest in the field of dentistry, maxillofacial surgery and otolaryngology. Previous study conducted by Krohn x-ray images of patients were studied and statistically analyzed using two way ANOVA, Pearson's and Kruskal wallis test which suggests that styloid length in relation to ramus height was larger in females (7). In the study conducted by Kelly Machado, the radiographs of people having TMD were studied every one month period and various tests such as Pearson's were performed and it was concluded that there was prevalence of elongated styloid process and patients with TMD (8).

Similar previous studies focused on the various other populations (9-14). But there were very few studies on the South Indian population. The aim of the study is to evaluate the association between elongated styloid process and prevalence of temporomandibular joint disorders in our regional population.

MATERIALS AND METHODS

The study was conducted in Saveetha Dental College and Hospitals, Chennai where 1012 OPGs were reviewed from the Dental information archiving system (DIAS) among which 137 OPGs with elongated styloid processes were filtered. The assessment was done whether the patient was having TMD or not with the help of elaborate medical and dental history of the patient.

The data were collected and tabulated in excel sheets after which the statistical analysis was done using SPSS software version 23. Pearson's chi square test was performed and the results were collected and the graphs were plotted.

RESULTS

Our study results are depicted in Figures 1-3. It is seen that almost equal number of males and females are having both elongated SP and TMD. Different age groups were affected with both conditions, among which 28-37 years were more affected. 38 people had elongated SP along with TMD.

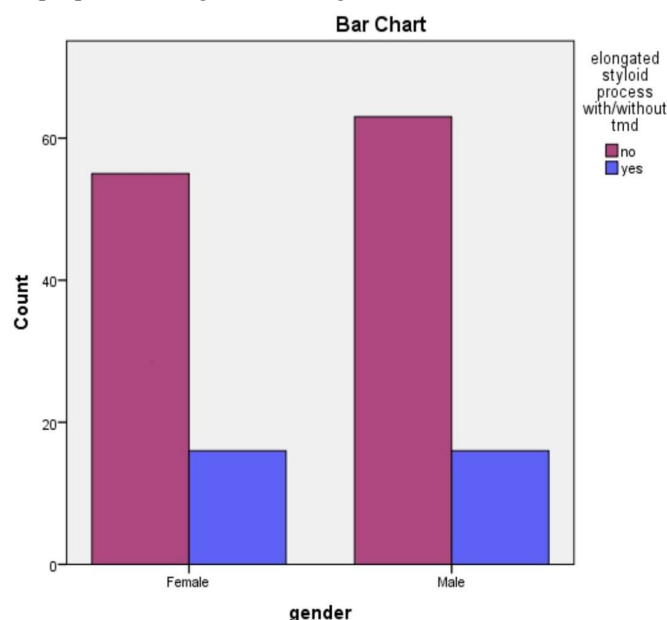


Figure 1. Bar chart depicts the association between the people with elongated styloid process with or without TMD and the gender.

Purple depicts people with both TMD and elongated styloid process and pink depicts people with only elongated styloid process.

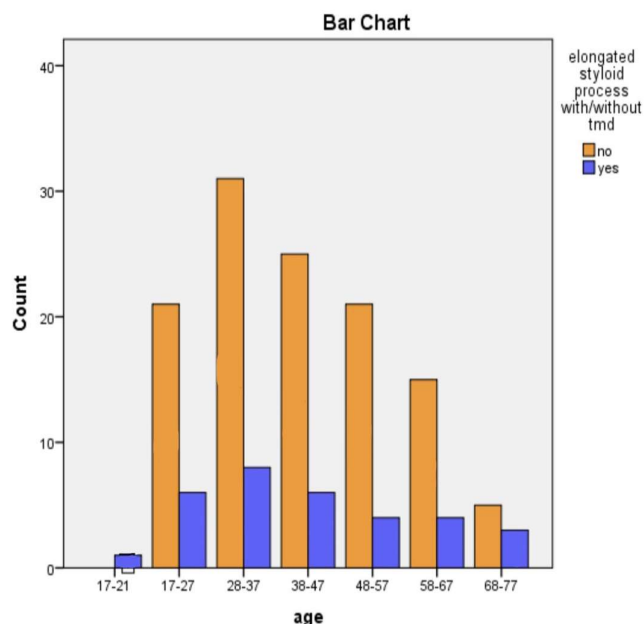


Figure 2. Bar chart depicts association between the people with elongated styloid process with or without TMD among different age groups.

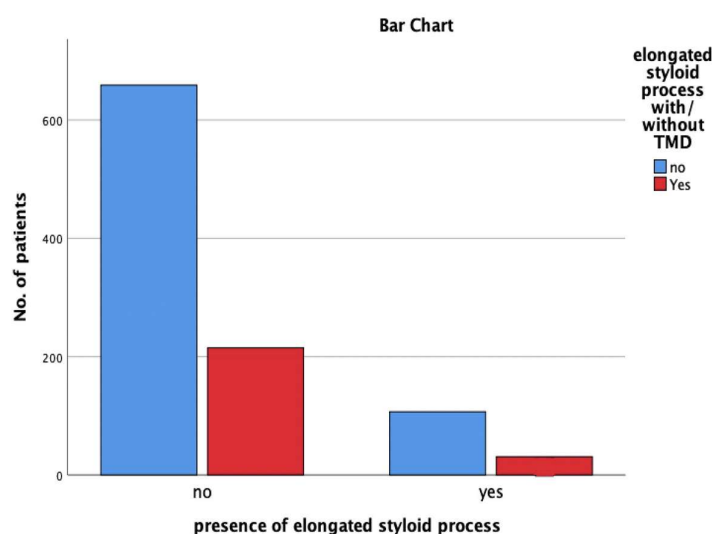


Figure 3. Bar chart depicts the association between elongated styloid process and temporomandibular disorders among the study participants.

DISCUSSION

Styloid process (SP) is an integral part of the styloid complex that is derived from the second pharyngeal arch (Reichert's cartilage). The tip of SP is situated between the external carotid artery, Internal jugular vein, cranial nerves 5 and 9. Our study results in Figure 1 in which gender and the patients having TMD were plotted, showing that almost equal number of males and females were having both elongated styloid process and temporomandibular joint disorder with a p-value of 0.733 which was statistically not significant. Figure 2 shows different age groups affected with both conditions among which it can be seen that age groups 28-37 years were commonly affected with a p-value of 0.436 which was statistically not significant. Figure 3 shows that almost 38 people had elongated styloid process along with TMD. However the p value was 0.549, thus indicating the association between elongated styloid process and prevalence of temporomandibular disorders is not significant.

The styloid process is anatomically very close to the temporomandibular joint (TMJ). An elongated styloid process may intervene with TMJ and potentially influence the function of it. The study conducted by Kosar et al investigated the association of the elongated styloid process and TMD, finding a higher prevalence of TMD symptoms in individuals with elongated styloid process (15). An elongated styloid process affects the movement of the jaw and also provides symptoms for the TMD. Study conducted by Mazzetto et al examined the relationship between elongated styloid process and the symptoms which suggests that a significantly higher percentage of patients with TMD had an elongated styloid process compared to a control group (16).

In the study conducted by kis et al, the clinical and radiographic analysis was done for the diagnosis of the people with TMD and control group. It was seen that there was significant difference between the TMD group and the control group with 62% of patients presented with both TMD and elongated styloid process (17).

The study conducted by Sahin et al showed the most accurate assessment of the styloid process length and its potential relevance to symptoms, including those related to the TMJ. Different angulations were considered for the height and width of the styloid process for the control group and the TMD group. It was seen that there was no significant relationship between the length and angulations of the SP between TMD and control groups (18).

The study conducted by Assiri et al (4) mentioned that the age groups considered were 8-88 years and there was statistical difference between the age groups in terms of elongated styloid process prevalence. In their study high number of elongated styloid processes was observed in people with 18-53 years age groups (4).

In our study there was no significant association between elongated styloid process and TMD. The interpretation of our study findings to be done cautiously as there are varied results for association between elongated styloid process and TMD among many studies (19-23).

CONCLUSION

From the study conducted it can be concluded that there was no significant association between elongated styloid process and TMD.

CONFLICTS OF INTEREST

The authors declare no potential conflict of interest.

REFERENCES

1. Ghosh LM, Dubey SP. The syndrome of elongated styloid process. *Auris Nasus Larynx*. 1999 Apr 1;26(2):169-75.
2. Palesy P, Murray GM, De Boever J, Klineberg I. The involvement of the styloid process in head and neck pain—a preliminary study. *Journal of oral rehabilitation*. 2000 Apr;27(4):275-87.
3. Werheim E, Sokol Z, Brown D, Oselkin M. Eagle syndrome causing cerebral sinus hypertension: Case report. *Radiology Case Reports*. 2023 Aug 1;18(8):2758-62.
4. Assiri Ahmed H, Estrugo-Devesa A, Roselló Llabrés X, Egido-Moreno S, López-López J. The prevalence of elongated styloid process in the population of Barcelona: a cross-sectional study & review of literature. *BMC Oral Health*. 2023 Sep 19;23(1):674.
5. Alsoghier A. Elongated styloid syndrome mimicking temporomandibular joint disorders: a case report and short literature review. *J Korean Assoc Oral Maxillofac Surg*. 2023 Jun 30;49(3):157–62.
6. Bhargava D, Bhargava. *Temporomandibular joint disorders*. Springer Singapore; 2021.
7. Krohn S, Brockmeyer P, Kubein-Meesenburg D, Kirschneck C, Buegers R. Elongated styloid process in patients with temporomandibular disorders - Is there a link? *Ann Anat*. 2018 May;217:118–24.
8. de Andrade KM, Rodrigues CA, Watanabe PCA, Mazzetto MO. Styloid process elongation and calcification in subjects with tmd: clinical and radiographic aspects. *Braz Dent J*. 2012;23(4):443–50.
9. Kumar MP, Harshini AK. Knowledge and awareness about oral cancer among undergraduate dental students. *Asian J Pharm Clin Res*. 2016;9:165-7.
10. Santhosh K. Knowledge, attitude and practices regarding needlestick injuries among dental students. *Asian J Pharm Clin Res*. 2016;9(4):312-5.
11. Mp SK. The emerging role of serratiopeptidase in oral surgery: literature update. *Asian Journal of Pharmaceutical and Clinical Research*. 2018 Mar 1:19-23.
12. SK M. Knowledge, attitude, and practices regarding infection control among undergraduate dental students. *Asian J Pharm Clin Res*. 2016;9(1):220-4.

13. Gayathri MM. Knowledge and awareness among patients about dental implants. *Journal of Pharmaceutical Sciences and Research*. 2016 May 1;8(5):351.
14. Barma MD, Indiran MA, Kumar P, Balasubramaniam A, Kumar MS. Quality of life among head and neck cancer treated patients in South India: a cross-sectional study. *Journal of Oral Biology and Craniofacial Research*. 2021 Apr 1;11(2):215-8.
15. Kosar MI, Atalar MH, Sabancioğullari V, Tetiker H, Erdil FH, Cimen M, et al. Evaluation of the length and angulation of the styloid process in the patient with pre-diagnosis of Eagle syndrome. *Folia Morphol*. 2011 Nov;70(4):295–9.
16. Mazzetto MO, Andrade KM de, Magri LV, Rodrigues CA, Watanabe PCA. Anterior and medial angulations of the styloid process in subjects with TMD: clinical and radiographic findings. *Braz Dent J*. 2013;24(1):80–4.
17. Kış HC, Soydan Çabuk D. Evaluation of styloid chain calcification related to temporomandibular joint disc displacement: a retrospective cohort study. *Oral Radiol*. 2021 Jul;37(3):395–402.
18. Şahin O, Kalabalik F, Tatar B, Odabaşı O. Cone-Beam Computed Tomographic Evaluation of Styloid Process in Patients With Temporomandibular Disorders and Asymptomatic Individuals. *J Craniofac Surg*. 2019 Oct;30(7):2236–8.
19. Kumar MP. Newer methods of extraction of teeth. *Int J Pharm Bio Sci*. 2015;6(3):679-85.
20. Chandrasekhar H. Comparison of influence of vicryl and silk suture materials on wound healing after third molar surgery-A review. *Journal of Pharmaceutical Sciences and Research*. 2017 Dec 1;9(12):2426-8.
21. Vijayalakshmi B, Kumar MS. Knowledge of students about Local anaesthetics used during oral surgical procedures. *Journal of Pharmaceutical Sciences and Research*. 2015 Nov 1;7(11):1011.
22. Priya A, Jain RK, Santhosh Kumar MP. Efficacy of different methods to reduce pain during debonding of orthodontic brackets. *Drug Invention Today*. 2018 Sep 1;10(9).
23. Gayathri MM. Knowledge, Awareness and Attitude among dental students about hepatitis B infection. *Journal of Pharmaceutical Sciences and Research*. 2016 Mar 1;8(3):168.