

ASSOCIATION OF SUPRAERUPTION AND ABSENCE OF OPPOSING DENTITION

Reshma Thirunavakarasu¹, Nivethigaa B², Balaji Ganesh S³

¹Saveetha Dental College and Hospitals, Saveetha Institute of Medical and Technical Science Saveetha University, Chennai 77

²Senior Lecturer, Department of Orthodontics Saveetha Dental College and Hospitals, Saveetha Institute of Medical and Technical Science Saveetha University, Chennai 77

³Senior Lecturer, Department of Periodontology Saveetha Dental College and Hospitals, Saveetha Institute of Medical and Technical Science Saveetha University, Chennai 77

¹151501070.sdc@saveetha.com

²nivethigaab.sdc@saveetha.com

³balajiganesh.sdc@saveetha.com

ABSTRACT

Supraeruption can be defined as a phenomenon whereby the crown of the tooth erupts beyond the occlusal plane. Occlusal plane disruption can result in improper distribution of occlusal force resulting in trauma from occlusion. Supraeruption of teeth with opposing missing teeth will lead to migration of the gingival margin and increase in the crown height. The aim of this study was to determine the association of supraeruption with relation to opposing missing teeth. A retrospective study was done in an institutional setting to study the association of supraeruption and opposing missing dentition. Among patients who have visited the dental facility, the records of the patients were obtained from a given time period of June 2019 to April 2020. The patients case sheets were analysed using parameters which are supraerupted teeth (upper posteriors & lower posteriors), opposing missing (upper posterior, lower posterior, & NIL) and gender. The data was sorted and was tabulated in excel. Analysis of data was done in SPSS software. The association of supraerupted teeth and its correlation to opposing missing teeth was evaluated. Total of 153 supraerupted teeth were noted. It was found most of the supraerupted upper posteriors had missing lower posteriors (81.05%) whereas some had no missing opposing teeth (12.42%). In all supra erupted lower posteriors, the upper posteriors were missing (6.54%). Significant association between supraeruption and opposing missing teeth.

Keywords : Dentition , lower posterior , opposing teeth ,supraeruption, upper posterior,

INTRODUCTION

Tooth loss could be due to caries, periodontal diseases, trauma, infection, malignancies or failed endodontic treatments ¹ These causes can present adverse consequences on the remaining dentition. According to Petridis et al ² supraeruption of the opposing teeth to the edentulous space in their study do occur. Rosenstiel et al ³ reported that failure to replace missing posterior tooth may not only cause the supraeruption of the opposing teeth however it will also cause disrupt the balance in stomatognathic system

Supraerupted posterior teeth/teeth are common clinical findings during daily practice. Delaying the replacement of the extracted tooth/teeth often leads to extrusion of opposing tooth/teeth into the edentulous space. This will eventually lead to masticatory insufficiency and temporomandibular disorders. Fixed and removable prosthesis are available as a dental treatment to replace the edentulous space to re-establish a functional posterior occlusion ⁴

If the dentoalveolar extrusion is not severe the space can be recaptured by performing various procedures such as coronoplasty and intentional endodontic treatment of the supraerupted tooth. Various treatment modalities have been introduced to re-establish the occlusal place such as enameloplasty, intentional root canal treatment, orthodontic movement ⁸⁻¹² such as molar intrusion by orthodontic TADS (Temporary Anchorage Devices) ¹³⁻¹⁵, Orthognathic surgical procedures and finally extraction of tooth. Orthodontic treatment involves the application of force that is continuous in activity on as many areas of the dentition as possible and working in the direction in which the teeth are to move ¹⁶⁻²⁰ However patients who are medically compromised are not a promising candidate for orthodontic treatment ^{21,22}

The aim of this study was to determine the association of supraeruption with relation to opposing missing teeth.

MATERIALS AND METHOD

A university set up was selected for this study which provided easy accessibility to data which provided a population with similar ethnicity for this study. There were 2 reviewers to analyse the data obtained. The approval for this university setting was obtained from the Institutional Scientific Review Board. The institutional ethical committee provided approval for the study (SDC/SIHEC/2020/DIASDATA/0619-0320). Among patients who have visited the dental facility, the records of the patients were obtained from a given time period of June 2019 to April 2020. Exclusion criteria were patient records that were incomplete or repetitive. There were three people involved in this study, - the guide, the reviewer and researcher. All available data was collected and sorted. The patients detailed case sheets were analysed using the parameters are supraerupted teeth (upper posteriors & lower posteriors), opposing missing (upper posterior, lower posterior, & NIL) and gender. Cross verification of the data was done by the second reviewer in order to avoid any missing or repetitive data.

Statistical analysis

Once the results have been tabulated based on the parameters, the data is then exported to SPSS software to determine descriptive and inferential statistics. Correlation between the parameters ; supraeruption opposing dentition and gender, were done in SPSS software. Charts and tables were added to represent the correlation between the parameters

RESULTS AND DISCUSSION

A total of 153 supraerupted teeth were found in both upper and lower posterior teeth. More numbers of supra eruption was noted in the upper arch than in the lower arch. The P value was $0.0005 < 0.05$, which was statistically significant (Chi Square Test)

Over-eruption/ supraeruption of teeth can often result in poor appearance and complicate subsequent restorative dentistry²³. Based on all studies, it is agreed that delayed replacement of loss tooth/teeth often leads to the extrusion of opposing teeth in edentulous space. Supraerupted teeth are preferably adjusted after the treatment of an existing disease such as gingival inflammation healing of a pathogenesis and treatment of trauma of occlusion

Based on our study , it was evident that the majority of the supraerupted teeth were upper posterior teeth with some of them having missing lower posterior teeth which is described in Figure 1 which shows the distribution of supraerupted teeth (upper posterior and lower posterior) and opposing missing teeth (upper posterior, lower posterior). It was found most of the supraerupted upper posteriors had missing lower posteriors (81.05%) whereas some had no missing opposing teeth (12.42%). P value was found to be 0.0005, which was statistically significant (Chi Square Test). In all missing lower posteriors, the upper

posteriors were missing (6.54%). A study found a positive correlation between extent of supraeruption and the period of edentulism ²². A case report demonstrated that a caucasian woman had a missing premolar for the past 18 years and it was found that the upper premolar teeth was supraerupted ²³In another study, they have found the supraeruption of maxillary first molar in the absence of mandibular first molar subjects with both normal and pathologic periodontitis

Our study showed that among the 153 supraerupted teeth, Figure 2 showed a distribution of supraerupted teeth in both males and females and opposing missing teeth. It showed that most of the supraerupted teeth are upper posteriors (45.45% and 41.26%) whereas the remaining supraerupted upper posterior did not have missing lower posterior (8.39% and 4.90%). In both males and females, it shows that all the lower posterior teeth had missing opposing teeth (40% and 60%). There was a 100% positive correlation between supraeruption and opposing missing teeth seen in lower posteriors in both males and females. P value was found to be 0.001, which was statistically significant (Chi Square Test). A study was done among patients attending a prosthetic clinic to determine their knowledge of consequences of missing teeth and it was found that the most common cause of tooth loss in their study was trauma 83(40.9%) followed by tooth decay 63(31.0%). Besides that their study has found that periodontal disease was responsible for 39(19.2%) of the cases of tooth loss whereas 18(8.9%) participants did not indicate the cause of their tooth loss ¹. In another study, they have found the prevalence of edentulism was 0.1% and the prevalence of tooth loss (one missing) was 78%, ; 66.9% of tooth loss was due to caries and 11.2% was attributed to other reasons

Importance of prosthetic replacement should be stressed on all patients who have lost teeth and one of the many causes of not replacing lost teeth is supraeruption of opposing teeth. As stated, supraeruption can cause a disruption in the occlusal harmony and even disrupt mastication force and speech. Various treatment modalities are available and should be emphasized to all patients

STUDY LIMITATION

This study has a geographic limitation as it is done in a certain area and cannot be generalised to other populations. It does not represent all the ethnic groups or populations from around the world. This study was also done in a small sample size as it was done in a single dental hospital which may not provide results for the entire population. Finally there could be a subjective bias/error.

FUTURE SCOPE

Study a larger population as this will help in further diagnosis and treatment planning.

CONCLUSION

Significant positive correlation exists between supraeruption and opposing missing teeth. It was evident that most supraerupted teeth were seen in the upper quadrant in the posterior segments with missing lower posterior whereas for supraerupted lower posteriors had missing upper posteriors. The results obtained had a high level of statistical significance (P value < 0.05). Understanding the severity of such malocclusion, it is essential to replace missing teeth as early as possible. Even if left untreated, supraeruption of opposing teeth occurs, care should be taken to establish ideal occlusion by orthodontic or endodontic therapy followed by tooth replacement.

REFERENCES

- [1] Dosumu OO, Ogunrinde JT, Bamigboye SA. Knowledge of consequences of missing teeth in patients attending prosthetic clinic in u.C.h. Ibadan. *Ann Ib Postgrad Med.* 2014 Jun;12(1):42–8.
- [2] Eckerbom M, Magnusson T, Martinsson T. Reasons for and incidence of tooth mortality in a Swedish population. *Endod Dent Traumatol.* 1992 Dec;8(6):230–4.

- [3] Burt BA, Eklund SA. Dentistry dental practice and the community. 5 th. Philadelphia: WB: Saunders [Internet]. 2005; Available from: <http://resque.favstar.fm/3ejmk4f1arpx/06-gerda-bergstrom/dentistry-dental-practice-and-the-community-6th--9780721605159-d.pdf>
- [4] Krall EA, Garvey AJ, Garcia RI. Alveolar bone loss and tooth loss in male cigar and pipe smokers. *J Am Dent Assoc.* 1999 Jan;130(1):57–64.
- [5] Petridis HP, Tsiggos N, Michail A, Kafantaris SN, Hatzikyriakos A, Kafantaris NM. Three-dimensional positional changes of teeth adjacent to posterior edentulous spaces in relation to age at time of tooth loss and elapsed time. *Eur J Prosthodont Restor Dent.* 2010 Jun;18(2):78–83.
- [6] Rosenstiel SF, Land FM, Fujimoto J. Contemporary Fixed Prosthodontics, ; Mosby. Elsevier; 2006.
- [7] Ahmari NMA, Al Ahmari NM. Techniques for Management of Supraerupted Teeth Prior to Prosthetic Treatment: Updated Review [Internet]. Vol. 13, Bioscience Biotechnology Research Communications. 2020. p. 261–73. Available from: <http://dx.doi.org/10.21786/bbrc/13.1/43>
- [8] Felicita AS. Orthodontic management of a dilacerated central incisor and partially impacted canine with unilateral extraction--A case report. *The Saudi dental journal.* 2017;29(4):185–93.
- [9] Felicita AS. Orthodontic extrusion of Ellis Class VIII fracture of maxillary lateral incisor--The sling shot method. *The Saudi dental journal.* 2018;30(3):265–9.
- [10] Sivamurthy G, Sundari S. Stress distribution patterns at mini-implant site during retraction and intrusion—a three-dimensional finite element study. *Prog Orthod.* 2016 Jan 18;17(1):4.
- [11] Samantha C, Sundari S, Chandrasekhar S, Sivamurthy G, Dinesh S. Comparative Evaluation of Two Bis-GMA Based Orthodontic Bonding Adhesives - A Randomized Clinical Trial. *J Clin Diagn Res.* 2017 Apr;11(4):ZC40–4.
- [12] Rubika J, Sumathi Felicita A, Sivambiga V. Gonial Angle as an Indicator for the Prediction of Growth Pattern [Internet]. Vol. 6, World Journal of Dentistry. 2015. p. 161–3. Available from: <http://dx.doi.org/10.5005/jp-journals-10015-1334>
- [13] Vikram NR, Raj Vikram N. Ball Headed Mini Implant [Internet]. *JOURNAL OF CLINICAL AND DIAGNOSTIC RESEARCH.* 2017. Available from: <http://dx.doi.org/10.7860/jcdr/2017/24358.9240>
- [14] Felicita AS. Quantification of intrusive/retraction force and moment generated during en-masse retraction of maxillary anterior teeth using mini-implants: A conceptual approach. *Dental Press J Orthod.* 2017 Sep;22(5):47–55.
- [15] Jain RK, Kumar SP, Manjula WS. Comparison of intrusion effects on maxillary incisors among mini implant anchorage, j-hook headgear and utility arch. *J Clin Diagn Res.* 2014 Jul;8(7):ZC21–4.
- [16] Dinesh SPS, Arun AV, Sundari KKS, Samantha C, Ambika K. An indigenously designed apparatus for measuring orthodontic force. *J Clin Diagn Res.* 2013 Nov;7(11):2623–6.
- [17] Felicita AS, Chandrasekar S, Shanthasundari KK. Determination of craniofacial relation among the subethnic Indian population: a modified approach - (Sagittal relation). *Indian J Dent Res.* 2012 May;23(3):305–12.
- [18] Ramesh Kumar KR, Shanta Sundari KK, Venkatesan A, Chandrasekar S. Depth of resin penetration into enamel with 3 types of enamel conditioning methods: A confocal microscopic study. *Am J Orthod Dentofacial Orthop.* 2011 Oct 1;140(4):479–85.
- [19] Pandian KS, Krishnan S, Kumar SA. Angular photogrammetric analysis of the soft-tissue facial profile of Indian adults. *Indian J Dent Res.* 2018 Mar;29(2):137–43.
- [20] Kamisetty SK, Verma JK, Arun, Sundari S, Chandrasekhar S, Kumar A. SBS vs Inhouse Recycling Methods-An Invitro Evaluation. *J Clin Diagn Res.* 2015 Sep;9(9):ZC04–8.
- [21] Krishnan S, Pandian S, Kumar S A. Effect of bisphosphonates on orthodontic tooth movement-an update. *J Clin Diagn Res.* 2015 Apr;9(4):ZE01–5.
- [22] Viswanath A, Ramamurthy J, Dinesh SPS, Srinivas A. Obstructive sleep apnea: awakening the hidden truth. *Niger J Clin Pract.* 2015 Jan;18(1):1–7.
- [23] Bhatt NN, Patel J, Sethuraman R, Naidu NS, Javiya P, Chauhan S, et al. Correlation Between Extent of Supraeruption of Posterior Teeth and Period of Edentulism: A Cross Sectional Study. 2019; Available from: <http://14.139.121.113:8083/jspui/handle/123456789/638>
- [24] Djemal S, Bavisha K, Gilmour G. Management of a supra-erupted premolar: a case report. *Dent Update.* 2004 May;31(4):220–2.

ACKNOWLEDGEMENT

The authors are thankful to Saveetha Dental College for providing a platform to express our knowledge

CONFLICT OF INTEREST

The authors declare no conflict of interest

AUTHOR CONTRIBUTION

Reshma Thirunavakarasu : Data collection and interpretation, Drafting the article

Dr. Nivethigaa B : Critical revision of the article and final drafting of the article

Dr. Balaji Ganesh: Final drafting of the article to be published

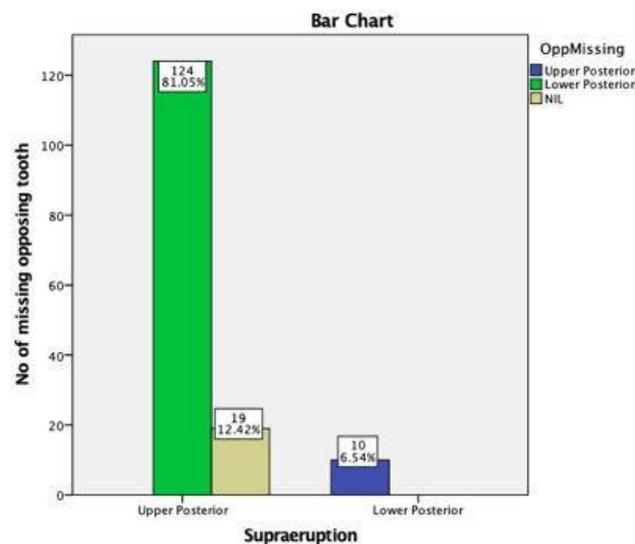


Figure 1: Bar graph shows the correlation between supraeruption with opposing missing teeth. X axis represents the patients with supraerupted teeth and Y axis represents the number of opposing missing teeth. Blue color represents missing upper posterior, green color represents missing lower posteriors and beige represents no missing teeth. It was found most of the supraerupted upper posteriors had missing lower posteriors (81.05%) whereas some had no missing opposing teeth (12.42%). In all missing lower posteriors, the upper posteriors were missing (6.54%). There was a 100% correlation between supraeruption and opposing missing teeth seen in lower posteriors. P value was $0.0005 < 0.05$, which was statistically significant (Chi Square Test)

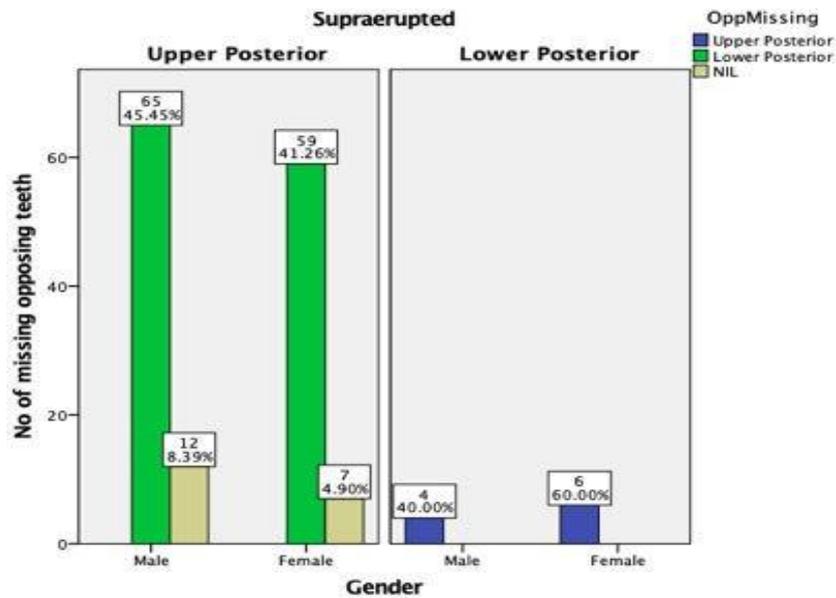


Figure 2: Bar graph shows the gender distribution of supraerupted teeth with opposing missing teeth. Y axis represents the opposing missing teeth and X axis represents supraerupted teeth based on gender. Blue color represents missing upper posterior, green color represents missing lower posteriors and beige represents no missing teeth. It shows that in both males and females most of the supraerupted teeth are upper posteriors (45.45% and 41.26%) whereas the remaining supraerupted upper posterior did not have missing lower posterior (8.39% and 4.90%). In both males and females, it shows that all the lower posterior teeth had missing opposing teeth (40% and 60%). There was a 100% correlation between supraeruption and opposing missing teeth seen in lower posteriors in both males and females. P value $0.001 < 0.05$, statistically significant (Chi Square Test)