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Pathological Migration Associated with Loss Of Posterior Teeth

Research Article

Harrita. S[1], Suresh. V[2*], Senthil Murugan. P[3]

[1] Saveetha Dental College and Hospitals, Saveetha Institute of Medical and Technical Sciences, Saveetha University, Chennai, India.
[2] Reader, Department of Prosthodontics, Saveetha Dental College and Hospitals, Saveetha Institute of Medical and Technical Sciences, Saveetha University, Chennai, 600077, India.
[3] Associate professor, Department of Oral and Maxillofacial Surgery, Saveetha Dental College and Hospitals, Saveetha Institute of Medical and Technical Sciences, Saveetha University, Chennai, 600077, India.

Abstract

Many evidences are available on tooth positional changes following loss of an adjacent tooth but only few studies are available on the investigation of tooth, positional changes adjacent to the site of posterior tooth loss attempts to provide increased understanding of magnitude direction and associated features that may be helpful in decision making and treatment planning.In case of vertical positional changes such as supra eruption, The anatomy of the supraerupted tooth may have prognostic implications where active eruption is encountered. In teeth with root furcation, these may become exposed, and create plaque traps which may compromise the periodontal health. Exposure to the root surface may also precipitate pulpal sensitivity, root caries and create aesthetic compromise. In case of horizontal positional changes such as migration, tipping, rotation of adjacent tooth leads to reduction in space or interocclusal clearance for placement of a replacement tooth, this leads to angulation of abutment teeth, Changes in occlusal loading, Poor embrasure contour around pontic. Obviously, change in the position of the tooth crown is clinically visible, but the changes in position of the root and therefore the apex may be of clinical relevance. Tipping may increase the proximity of roots of adjacent teeth and other anatomical structures. Changes in root position may also affect the interdental space available for implant placement and make it more difficult owing to changes in relative anatomical position. Thus the aim of the study is to evaluate the pathological changes associated with posterior tooth loss.

A retrospective study done under university setup, where 86000 case sheets were reviewed from the record management system of the college, out of which 419 case sheets satisfied the inclusion criteria of this study. The collected data was compiled and statistically analysed using SPSS software version 23.0. From this study, In patients who needed localised plane correction, 14.32% had supra eruption, 12.41% had mobility, 0.24% had attrition and 0.24% had proclination of remaining teeth and in patients who needed generalised plane correction, 52.51% had supra eruption, 14.80% had mobility, 5.49% had attrition of remaining teeth for which the P value (0.000) was found to be statistically significant (<0.05). Thus there is significant association Occlusal correction and remaining teeth condition. In 18 to 30 years, 0.24% had mobility, 4.53% had supra eruption,0.24% had proclination. In 31 to 50 years 12.41% had mobility, 28.40% had supra eruption, 1.43% had attrition. In 51 years and above 14.56% had mobility, 33.89% had supra eruption, 4.30% had attrition, this was the statistically significant with P value lesser than 0.05. From this study it can be concluded that ACP PDI class III condition creates spatial changes in the remaining natural teeth. Supra eruption as the most common changes to occur and such individuals required generalisedocclusal plane correction indicating its just not one tooth in the line for supraeruption correction but multiple teeth. This shows the long term negligence of patients in replacement of missing teeth, the importance of teeth replacement and its associated effect on other masticatory systems are lacking among the population studied.

Keywords: ACP PDI; Migration; Mobility; Posterior Tooth Loss; Supra Eruption.

***Corresponding Author**:
Suresh.V,
Reader, Department of Prosthodontics, Saveetha Dental College and Hospitals, Saveetha Institute of Medical and Technical Sciences, Saveetha University, Chennai, 600077, India.
Tel: +91 95431 92858
E-mail: suresh@saveetha.com

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Introduction

Shortened dental arches consisting of anterior and premolar teeth have been shown to meet oral functional demands however the occlusion stability may be at risk as a result of tooth migration [1]. Movement of teeth adjacent to our opposing edentulous space may often complicate planned prosthetic restoration or create a closer look interference [2, 3]. The stability of dental arches in humans has been the subject of several investigations. Movement of teeth adjacent to, or opposing edentulous spaces may often complicate planned prosthetic restorations or create occlusal interference. Some theories support the concept that dental supraeruption is a continuous process compensating for tooth wear. Nevertheless, there is no adequate scientific documentation regarding dental arch stability following tooth loss. There is a general belief among dentists that teeth without antagonists are most likely to be supraerupted [4]. The main positional change to be expected in unopposed teeth, retained root stump and carious teeth is supra eruption. If we replace the edentulous area with the prosthesis, without correcting the supra-erupted teeth, it may lead to inefficiency in the masticatory function due to improper distribution of masticatory force, deviation in the mandibular movement and problems in the Temporomandibular Joint [5]. Muller De Van stated that "the preservation of that which remains is of utmost importance and not the meticulous replacement of that which has been lost". This statement holds true in case of management of supraerupted teeth. Because invariably the moment we see a small amount of supra-eruption, we still go ahead with replacement of the opposing edentulous area with an RPD or FPD which leads to occlusal disharmony and consequently TMJ Disorders. When the dentoalveolar extrusion is not too severe, it is possible to recapture space by performing Coronoplasty or intentional endodontic treatment of the supra-erupted teeth.6 A survey by military dentists concluded that mesial inclination of teeth distal to an edentulous area was not inevitable but rather seem to depend on the age tooth loss had occurred but rather proofs were given by Dental casts and radiograph of patients with unopposed molars.

A retrospective study compared bitewing radiographs in patients of 24 to 90 years of age for changes in position and periodontal health of teeth next to edentulous space [7]. Investigation with Unopposed posterior teeth presented with some form of supraeruption and teeth adjacent to extraction sites presented with some form of tripping or rotation [8, 9]. A recent study showed deviations five years after adjacent tooth loss [10]. There is a possible correlation between the age and time of tooth loss and subsequent dental arch stability, It would be helpful to be able to identify patients who are prone to tooth movement following tooth loss [10, 11]. Thus the aim of the study is to evaluate the pathological changes associated with posterior tooth such as mobility, proclination, supraeruption.

Materials and Methods

Study setting

This study was a retrospective cross sectional study done in a university setting Saveetha Dental College, Chennai. Approval from ethical committee was obtained. Two examiners were involved in this study.

Sampling

The data was collected from the college software system,which maintains the records of patients with their intra oral and extra oral photographs (taken with consent of the patients) , their demographic details, personal history, medical history and the Dental findings.

The study is a retrospective study. The data was collected over a period of nine months, from June 2019 to March 2020 the sample size of 419 was narrowed down, collected and data was verified with photographs obtained from the digital documentation.The inclusion criteria was all patients with American College of Prosthodontists-Prosthodontic diagnostic Index (ACP PDI) Class III, Multiple missing posterior teeth. The exclusion criteria was insufficient or incomplete case records and ACP PDI class I and II.

Data collection

Data of patients who had ACP PDI class III was collected from the record management system of the college. Data was entered in excel in a methodological manner and imported to SPSS.Incomplete data was excluded from study.

Analysis

IBM SPSS 23.0 software was used for data analysis. Independent variables include age, gender, ACP PDI Class III. Both descriptive and inferential statistics was done. Frequency distribution was done for age and gender. Chi square test was done to find the association and the level of significance was set at 0.05.

Results and Discussion

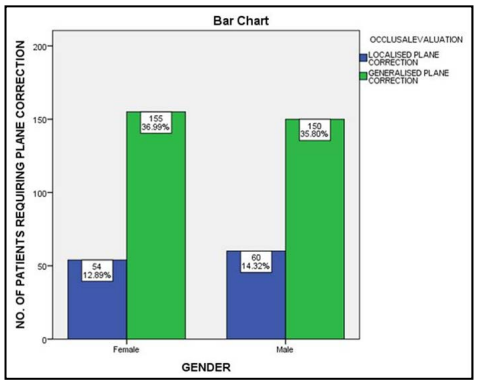
The collected data was imported in SPSS software version 23.0 and the results were obtained using chi-square test.In this study only patients with ACP PDI Class III were included among which 50.1% male and 49.8% female patients. (Graph 2)

Among the patients who needed occlusal correction, 35.8% male and 36.99% female patients needed generalised plane correction and 14.32% male and 12.89% female patients needed localised plane correction. There was no significant association between gender and plane correction.($P>0.05$). (Graph 1)

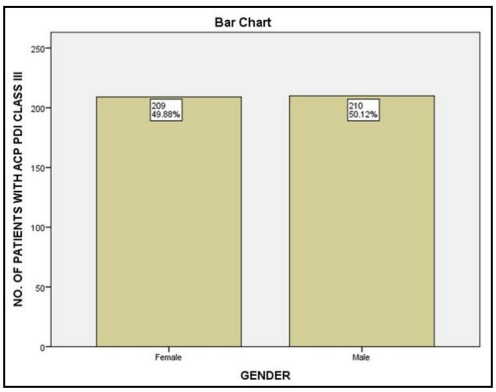
However, in patients who needed localised plane correction, 14.32% had supra eruption, 12.41% had mobility, 0.24% had attrition and 0.24% had proclination of remaining teeth and in patients who needed generalised plane correction, 52.51% had supra eruption, 14.80% had mobility, 5.49% had attrition of remaining teeth for which the P value (0.000) was found to be statistically significant (<0.05). Thus there is significant association between Occlusal correction and remaining teeth condition. (Graph 4)

In 18 to 30 years, 0.24% had mobility, 4.53% had supra eruption, 0.24% had proclination. In 31 to 50 years 12.41% had mobility, 28.40% had supra eruption, 1.43% had attrition. In 51 years and above 14.56% had mobility, 33.89% had supra eruption, 4.30% had attrition, this was statistically significant with $P < 0.05$. (Graph 5)

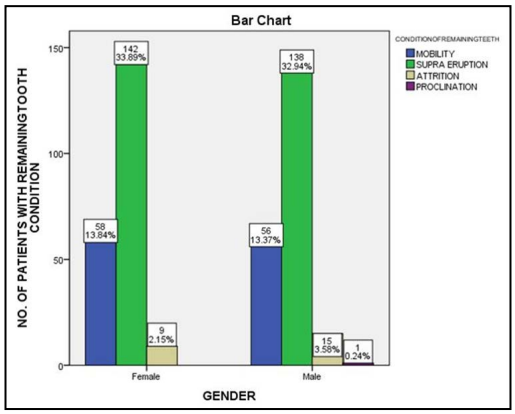
Graph 1. The above depicted graph shows association between gender and patients requiring plane correction. X-axis depicts gender and y-axis depicts count of patients who require plane correction. (green). There was no statistically significant difference in the plane correction between males and females. Pearson chi-square value is 0.395 with df 1 and P value of 0.302(>0.05). Both male and female patients needed generalised plane correction.



Graph 2. The above depicted graph shows association between gender and ACP PDI classification. X-axis depicts gender and y-axis depicts count of patients with ACP PDI class III. The above graph shows that 50.1% male and 49.8% female patients had class III of ACP PDI classification.



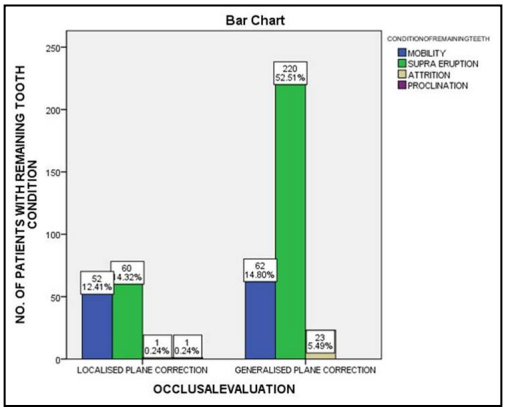
Graph 3. The above depicted graph shows association between gender and remaining teeth condition. X-axis depicts gender and y-axis depicts number of patients with mobility,supraeruption.proclination,attrition. Although supra eruption was the most common pathological change associated with posterior missing teeth in both male and female patients, there was no statistically significant difference between gender and remaining teeth condition. Pearson chi-square value is 2.590 with df 3 and P value of 0.459 (>0.05).



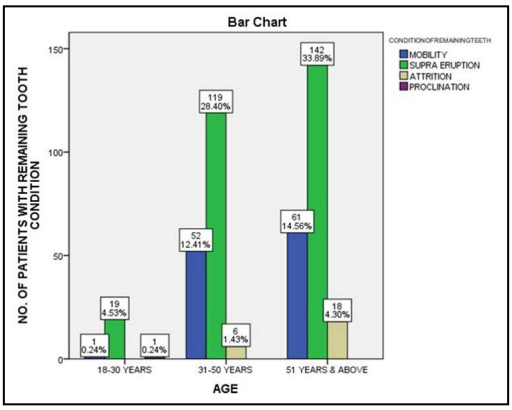
The positional stability of teeth opposing or adjacent to an edentulous space may not critically influence the oral functions of a patient unless occlusal interference occurs. However when prosthetic restoration of edentulous space becomes necessary difficulties may arise due to super eruption, mobility, tilting, rotation or attrition of dental arch.The present study shows supraeruption as most common change in antagonist tooth, this was similar to the result by Craddock et al [8]. In this study 114 patients out of 419 had mobility in the remaining teeth this is similar to Results by Craddock Et al where the adjacent tooth or opposing teeth had statistically significant movement towards edentulous space [2].

Henry et all states that changes take place in adjacent teeth and in the remaining teeth like migration and attrition occur both are closely and interdentally [12]. A study by Witter et al states that occlusal wear and mobility were high in Dental arches with loss of posterior teeth [1]. With loss of posterior teeth that distribution of clenching forces also changes [13].

Graph 4. The above depicted graph shows association between occlusal evaluation and remaining teeth condition. X-axis depicts occlusal evaluation and y-axis depicts count of patients with mobility,supraeruption.proclination,attrition. There was a statistically significant association between Occlusal correction and remaining teeth condition.Pearson chi-square value is 33.332 with df 3 and P value of 0.000 (<0.05). More number of patients with supra eruption needed plane correction than other factors.



Graph 5. The above depicted graph shows association between age group and remaining teeth condition. X-axis depicts age and y-axis depicts count of patients with mobility,supraeruption.proclination,attrition. There was a statistically significant association between Occlusal correction and remaining teeth condition. Pearson chi-square value is 30.287 with df 6 and P value of 0.000 (<0.05). Supra eruption was the most common change in the remaining tooth after loss of posterior teeth in all age groups.



The present study indicates supra eruption of the opposing teeth as the common finding among both the genders and also to be increasing with the age factor indicating probability of extracting posterior teeth was more common for dental pain. The age group of 51yrs and above showing more supraeruption also indicates long term negligence for teeth replacement. When multiple teeth especially posteriors are missing there can be migration of opposing and adjacent teeth, this study indicates both are present and hence the indication of generalized occlusal correction. Previously conducted numerous clinical trials [14-21], A few review papers and questionnaire based studiesover the past 5 years [22-28]. The present study can be directed further into timing of extraction, reason for extraction, reason for negligence in replacement, clinical condition of remaining teeth, temporomandibular joint and functioning of gnathological system as whole.

Conclusion

From this study it can be concluded that ACP PDI class III condition creates spatial changes in the remaining natural teeth. Supra eruption as the most common changes to occur and such individuals required generalisedocclusal plane correction indicating its just not one tooth in the line for supraeruption correction but multiple teeth. This shows the long term negligence of patients in replacement of missing teeth, the importance of teeth replacement and its associated effect on other masticatory systems are lacking among the population studied.

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