
Evaluation and analysis of coronoplasty procedures- a retrospective study

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Abstract: Coronoplasty is the mechanical elimination of occlusal supracontact that may be present during functional moments. It deals with selective grinding or reducing of occlusal areas with the purpose of influencing mechanical contact, primitive contacts. The aim of the present study was to evaluate and analyse the number of coronoplasty procedures done among patients and the quadrant in which coronoplasty procedure was most prevalent. This study was carried out in a one year period (June 2019 to April 2020) on 56 patients (33 male patients, 23 female patients) who reported to a Private hospital, Chennai. All available data was extracted from an electronic dental record where the patient's case sheet was reviewed and results were obtained through SPSS analysis. From the results obtained 54.7 % males and 45.3 % females had participated in the study. Among the study population, quadrant 3 (42.17 %) had the most number of patients with coronoplasty treatment. Coronoplasty procedures was highest in 31-50 years amongst other age groups and males who underwent coronoplasty were more prevalent compared to females. The study concludes that the number of coronoplasty procedures reported to the hospital where 83 and quadrant 3 had the most number of procedures performed but the study was not statistically significant. Hence to conclude, the results of the present study are useful for generating hypotheses for further research with larger sample size and long term follow ups in order to create awareness about the importance of occlusal adjustment procedures.

Keywords: Coronoplasty; Evaluation; Occlusal supracontacts; Procedures innovative technique

INTRODUCTION

Occlusal adjustment therapy or “coronoplasty” is a procedure which involves selective coronal tooth modification. This reshaping of the teeth is performed on one or more teeth. Coronoplasty is done by selective removal of enamel and usually does not produce dentinal sensitivity. It helps in eliminating undesirable forces and is favourable to the periodontium. The goal of occlusal adjustment procedures is to achieve a stable, nontraumatic occlusal contact relationship between the maxillary and mandibular teeth. (Thamaraiselvan *et al.*, 2015)

Tooth position and arch are maintained by the balance among the forces of occlusion and oral musculature. When the balance are distributed, changes in functional environment may be deleterious to the periodontium. (Malathi *et al.*, 2014) Occlusal adjustment therapy has been treated in individuals for problems associated with the masticatory system, but only when the criteria for providing an occlusal adjustment are based on actual pathologic, clinical, and periodontal findings directly relating to the traumatic occlusal condition. (Ramesh, Sheeja Saji Varghese, *et al.*, 2016)

Occlusal therapy can be used to decrease the load of teeth that have lost bone due to periodontal disease mainly to maintain or achieve occlusal stability. (Varghese *et al.*, 2015) Thus, coronoplasty is used to provide better stability and occlusion in a permanent dentition noninvasively.

Occlusion takes on an almost mystic importance and attracts the saying “The heart of Dentistry”. It is usually adjusted after gingival inflammation subsides. The objective of coronoplasty is to eliminate the undesirable forces and occlusal supracontact involved in function and parafunction (Bernhardt *et al.*, 2006) (Panda *et al.*, 2014)

Coronoplasty is also used to minimize the mobility of teeth that have suffered trauma from occlusion. Trauma from occlusion (TFO) results from injury to periodontal tissue arising from occlusal forces that exceed the adaptive capacity of the ligaments (Jin and Cao, 1992) One of the clinical signs of TFO is tooth mobility. There are a variety of possible treatments for TFO, one of which is coronoplasty. Tissue damage & tooth mobility caused

by occlusion forces are resolved when undesirable occlusion forces are being eliminated by coronoplasty. (Gajendran, Parthasarathy and Tadeipalli, 2018)

Tooth mobility occurs due to a variety of factors. (Feliciano and Rozycki, 1999; Bernhardt *et al.*, 2006) (Wank and Kroll, 1981; Feliciano and Rozycki, 1999; Bernhardt *et al.*, 2006)) Pathogenesis and healthy aspects of trauma from occlusion suggests the benefits of coronoplasty are not complete if inflammation is not eliminated first. (Polson, 1986) Coronoplasty can also be performed in disorders of neuromuscular origin, and bruxism. The presence of any premature contacts, whether resulting from rehabilitation procedures or not, may lead to traumatic occlusion that causes damage to periodontal structures. Common signs and symptoms include bone loss, loss of connective tissue insertion, mobility, increased periodontal space, thickening of the lamina dura, pulp symptoms, and pain. (Khalid *et al.*, 2016)

Periodontal tissues respond to increased occlusal forces by adaptive or degenerative changes. The periodontium becomes more vulnerable to injury and to occlusal forces, and excessive occlusal forces lead to traumatic occlusion. (Ramesh *et al.*, 2019)

Other indications of coronoplasty are planned occlusion reconstruction and to improve functional relationship between teeth. There is evidence that coronoplasty provides better stability if occlusion and the method of occlusal adjustment creates a permanent occlusal relationship. (Eke *et al.*, 2012) The occlusion must be checked periodically and the patient should be advised accordingly. Therefore

Our department is passionate about research we have published numerous high quality articles in this domain over the past years (Abraham *et al.*, 2005; Devaki, Sathivel and Balaji Raghavendran, 2009; Neelakantan *et al.*, 2010, 2015; Arja *et al.*, 2013; Ramshankar *et al.*, 2014; Sumathi *et al.*, 2014; Surapaneni and Jainu, 2014; Surapaneni, Priya and Mallika, 2014; Ramamoorthi, Nivedhitha and Divyanand, 2015; Manivannan *et al.*, 2017; Ezhilarasan, 2018; Ezhilarasan, Sokal and Najimi, 2018; J *et al.*, 2018; Ravindiran and Praveenkumar, 2018; Malli Sureshbabu *et al.*, 2019; Mehta *et al.*, 2019; Krishnaswamy *et al.*, 2020; Samuel, Acharya and Rao, 2020; Sathish and Karthick, 2020)

The aim of this study was to evaluate the number of patients with coronoplasty and to find the most prevalent quadrant with the highest number of coronoplasty procedures.

MATERIALS AND METHODS

Study Setting: This was a university-based study, cross-sectional, retrospective, uni-centred study. The ethical board clearance was obtained from the institutional ethics committee of Saveetha Dental College and hospitals, Chennai. IEC approval number: SDC/SIHEC/2020/DIASDATA/0619-0320. The data was obtained by reviewing 86,000 case sheets of patients who reported to Saveetha Dental College and hospitals. Informed consent was obtained from the patients.

Sampling: All the data samples used in this study were obtained by reviewing the case sheets of patients belonging to Saveetha dental college and hospital. The data samples were collected from June 2019 to March 2020. All the case sheets of patients who had undergone coronoplasty procedure were taken in this study. No sorting of data was done.

Data Collection: The data collected included age, gender, number of coronoplasty procedures done quadrant wise. Patient case sheets with incomplete data were excluded if the data required could not be obtained from the intra oral photographs. The data samples obtained were collected and tabulated in excel sheets and were exported for statistical analysis.

Statistical Analysis: The present study was conducted in 56 patients (32 males and 23 females) who underwent coronoplasty procedures. A total of 83 coronoplasty procedures were performed. The samples were selected from the Department of Periodontics, Saveetha dental college. The values and variables were tabulated and analysed using the SPSS software by IBM. Chi-square tests were done to assess associations. Any p-value of less than 0.05 was considered as statistically significant.

RESULTS AND DISCUSSION

Frequency distribution of gender is shown in Figure-1, where 56.63% are males and 43.37% are females. Results from Figure-2 shows a quadrant distribution of study population, 21.69% procedures were done in quadrant 1, 16.87% procedures in quadrant 2, 42.17% procedures in quadrant 3 and 19.28% procedures in quadrant 4. Association of age and gender wise is shown in Figure 3. 17.86% males and 17.86% females were in the age group of 15-30 years. 25.0% males and 10.71% females were in the age group of 31-50 years. 17.86% males and 10.71% females were in the age group 51 years and above. Therefore most of the coronoplasty procedures were done in males (blue) who belonged to the age group of 31-50 years (Chi-square test value = 1.707; p value = 1.261 (<0.05); hence statistically not significant).

Occlusal adjustment as part of periodontal therapy has been controversial for years, mostly because there is not much literature to provide enough evidence regarding the influence of trauma from occlusion (TFO). (Avinash,

Malaippan and Dooraiswamy, 2017) When occlusal loads exceed the ability of the periodontium to resist and distribute the resulting forces, injuries may develop and eventually lead to failures in dental practice. (Ramesh, Ravi and Kaarthikeyan, 2017). The relationship between occlusal trauma and periodontal health has been a subject of considerable debate and investigation. A healthy periodontium can withstand occlusal forces, thus avoiding the formation of periodontal pockets and/or gingivitis. (Harrel, 2003)(Ravi *et al.*, 2017)

In a study done by Kengo et al, 21 patients reported for occlusal adjustment therapy having Temporomandibular joint disorders (TMD). (Torii and Chiwata, 2010) Periodontal problems have a higher documented prevalence in men compared to women, signifying a possible gender bias in disease pathogenesis. (Shiau and Reynolds, 2010) In the current study males (68.7 %) who reported for occlusal adjustment therapy were comparatively higher than females (31.03 %) [Figure-1]

Lack of adequate guidance in the canine area can increase the risk of single tooth molar supra contacts and produce trauma in functional and parafunctional movements. In a study done by Hallmon et al says that grinding should be limited to the maxillary cusp because grinding of the mandibular cusp jeopardizes the functional ICP cusp (Hallmon and Harrel, 2004). In another study according to Helsing et al, the probability of mediotrusive supra contacts is about 84.2% of healthy individuals which is routinely observed on 1st and 2nd molar teeth. (Helsing, Isberg-Holm and McWilliam, 1983). In the current study highest number of coronoplasty procedures were performed in quadrant 3 (42.17 %) amongst other quadrants. [Figure 2]

The risk of periodontal disease increases with the advancing age that is why the high prevalence of periodontal disease is seen among elderly population. Oral health status of older population is generally deficit with elevated periodontal disease this can eventually cause mastication difficulty and impair the quality of life and well-being (Gil-Montoya *et al.*, 2015). In the current study highest number of coronoplasty procedures were performed in the age group of 31-50 years. [Figure 3]

Understanding the relationship between dental occlusion and periodontal status is necessary for a correct diagnosis and for the establishment of restorative treatment in patients with periodontal problems. (Mootha *et al.*, 2016) Thus it's the role of the dentist to look into the patient's complaint to conclude proper diagnosis and treatment planning. (Khalid, 2017)

Coronoplasty procedures are being given less importance in the field of dentistry though it is a common clinical procedure not many researches were studied. (Priyanka *et al.*, 2017) Coronoplasty has remained as an ignored and perhaps need to be overlooked procedure by clinicians. (Ramesh, Sheeja S. Varghese, *et al.*, 2016) All targeted supra contacts must be removed or lessened by coronoplasty. Undesirable gross occlusal factors should be modified. (Kavarthapu and Thamaraiselvan, 2018) Care should also be taken to avoid changing or removing previously attained occlusal contact relationships. In the presence of occlusal trauma, occlusal adjustment is the treatment modality indicated. Further studies need to emphasize on the awareness of importance in coronoplasty procedures for the betterment of patients.

CONCLUSION

Within the limitations of this study, we can conclude that males who reported for coronoplasty procedures were predominantly higher compared to females. Most number of coronoplasty procedures were done in quadrant 3. By analysis, males and females in the age group of 31-50 years reported highest for occlusal adjustment therapy. Hence to conclude, the results of the present study are useful for generating hypotheses for further research with larger sample size and long term follow ups in order to create awareness about the importance of occlusal adjustment procedures.

AUTHORS CONTRIBUTION

First author [Monisha.K.] performed the analysis, and interpretation and wrote the manuscript.

Second author [Dr.Nashra Kareem] contributed to conception, data design, analysis, interpretation and critically revised the manuscript.

Third author [Dr.Aravind Kumar S] participated in the study and revised the manuscript. All the three authors have discussed the results and contributed to the final manuscript.

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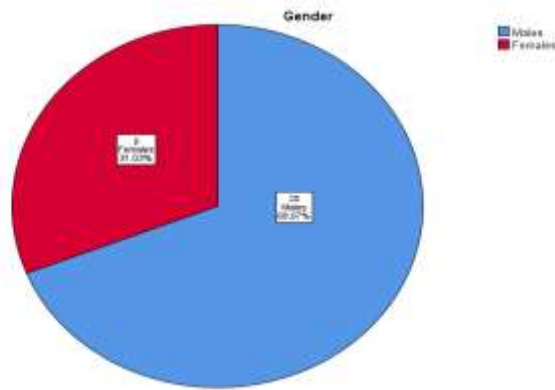


Fig.1: Pie-chart showing number of coronoplasty procedures done among genders. Male (blue) and Female (red). Number of males (69.97 %) who underwent coronoplasty procedure is higher compared to females (31.03%).

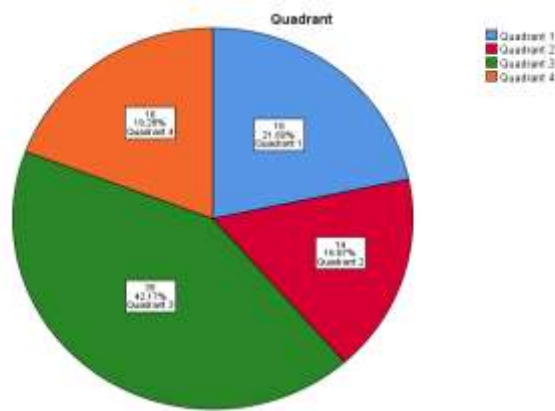


Fig.2: Pie chart shows quadrant wise distribution based on number of coronoplasty procedures. Quadrant 1 (blue), Quadrant 2 (red), Quadrant 3 (green), Quadrant 4 (orange). Most coronoplasty procedures were done in Quadrant 3.

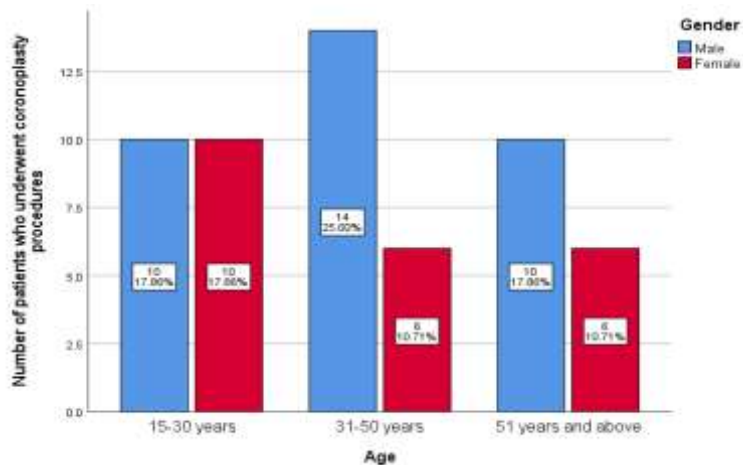


Fig.3: Bar graph showing the association between gender and different age groups of patients who underwent coronoplasty procedures. The x-axis denotes the age group and y-axis denotes the number of patients who underwent coronoplasty procedures. From the graph we can infer that most of the coronoplasty procedures were done in males (blue) who belonged to the age group of 31-50 years. Chi-square test =1.707 ; p=1.261(<0.05); hence statistically not significant.