

Assessment of Canine Guided Occlusion among FPD Patients - A Retrospective Study

Research Article

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Abstract

Canine guided occlusion is a mutually protected occlusion where the vertical and horizontal overlap of canine causes disengages posterior teeth in lateral movement of mandible. Group function occlusion is based on multiple contacts between the maxillary and mandibular teeth in lateral movements on the working side. Fixed partial denture is a dental restoration used to replace missing teeth and that is permanently attached to the adjacent teeth. The aim of the study was to assess the prevalence of missing teeth as well as presence of canine guided occlusion among FPD patients. A retrospective cross sectional study was done on 86000 patient records between June 2019 to March 2020 and arrived at the data of 487 by considering the inclusion criteria of the study such as patients who had undergone fixed partial denture and had intact permanent canine and molars and all the available data were included and no sorting process was done to minimise the sampling bias. Statistical test done was chi square test and the software used was SPSS version 26 by IBM. Type of analysis done was descriptive analysis. From this study, we observed that the prevalence of missing teeth were found to be higher among males(54%) than in females(45%). It is found that canine guided occlusion was prevalent in all age groups such as <25 years (10.6%), 25-40 years(34.70%) and >40years (30.35%). This study shows the prevalence of canine guided occlusion irrespective of gender and age.

Keywords: Missing Teeth; Fixed Dental Prosthesis; Dental Occlusion; Canine Guided Occlusion; Group Function.

Introduction

Lateral occlusion plays a major role in masticatory function, comfort and aesthetics [1]. The two commonly applied lateral occlusion schemes are canine guided occlusion and group function occlusion. The canine guided occlusion is a mutually protected occlusion where the vertical and horizontal overlap of canine teeth causes disengagement of posterior teeth in the lateral movement of the mandible [2]. Group function occlusion is based on multiple contacts between the maxillary and mandibular teeth in lateral movements on the working side [2, 3]. Canine guided occlusion protects the posterior teeth laterally because of the strategic location, anatomy and proprioceptive properties of canine [4]. Group function contributes to a wide distribution of occlusal forces on several teeth, thus it is more comfortable and functional.

With different degrees of excursion, the lateral occlusal scheme might differ [5]. Functional occlusion may also change without any physiological abnormalities [5, 6]. Fixed prosthodontics is the area of prosthodontics focused on permanently attached dental prosthesis [7]. It is also referred to as indirect restoration. It includes crowns, bridges, inlays, onlays and veneers. FPD can be used to restore a single or multiple teeth that is permanently attached to the adjacent teeth [8]. The adjacent teeth are called abutments and act as a support to the FPD bridge. Three main components are: pontic, retainers and connector [9].

Contact area and contact number have been used frequently as a measure of the adequacy of dental occlusion [10-14]. Occlusal features are dynamic and subject to change with aging and dental

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treatment. Restoration, tooth wear and fracture will inevitably affect on the lateral occlusion [15]. Main objective of prosthodontic treatment is to improve oral function, to observe the changes in occlusal contacts [16, 17].

Every tooth restoration, prosthetic device, extraction and orthodontic treatment changes static and dynamic occlusion. In complete denture, balanced occlusion is provided where all static relations are balanced [18]. For removable partial denture to be successful, the occlusal pattern of the natural teeth should be harmonized with the temporomandibular joints, and the same occlusal pattern should be incorporated into the artificial teeth [19]. The ideal occlusal contact for an implant is over the body which leads to the axial loading of implants [20]. For implant supported full mouth rehabilitation, balanced occlusion or mutually protected occlusion is provided, which is obtained by placing implants on the canine region.

The canines have a good crown root ratio and are capable of tolerating high occlusal forces. Canines provide higher proprioception when compared to posterior teeth. The palatal surface of canine is concave and is suitable for guiding lateral movements. Lateral forces should be directed toward the anterior teeth especially canines as lateral forces on posterior teeth can result in a fracture or excessive wear. Canine-protected occlusion reduces the chances of temporomandibular dysfunction, since it reduces the lateral tooth contact [21].

Previously our team had conducted numerous clinical trials [22-28] and lab animal studies [29-33] and *in vitro* studies [32-36] over the past 5 years. Now we are focussing on retrospective study. The idea for this study is stemmed from the current interest in our community.

Materials and Methods

A retrospective study was done in the university setting. The retrospective cross sectional study was done by reviewing patient records and analysed the data of 86000 patients between June 2019 to March 2020 and we arrived at the data of 488. Data of patients who underwent FPD treatment was analysed and retrieved. The cons of the study will be geographic limitations, locations, trends not accessed. Number of people involved were two reviewers. Ethical approval was approved by the institutional ethical committee, SIMATS. Inclusion criteria were fixed partial denture, canine guidance, occlusion. All the available data's were included and no sorting process was done to minimise sampling bias. Independent variables are the, gender, ethnicity and age. Dependent

variables are fixed partial denture and occlusion. The results were tabulated in excel sheet and are transferred to SPSS for analysis.

Statistical software used was SPSS version 26 by IBM and the statistical test done was chi square test. Type of analysis done is descriptive analysis.

Results and Discussion

In the study, we observed that male received FPD at a higher rate (54%) than females (45.7%) and transgenders (0.21%) (Figure 1). People of age range 25-40 years received FPD at a higher rate (48.82%) and people of <20 years (12.54%), >40 years (40.25%) which was lesser comparatively (Figure 2). The association between gender and missing teeth was done where males with missing teeth sextant 1(5.02%), sextant 2(19.87%) (sextant 3 (4.81%), sextant 4(6.26%), sextant 5(10.04), sextant 6(7.53%) and Females with missing teeth in sextant 1(6.65%), sextant 2(13.39%), sextant 3 (5.23%), sextant 4(9.21%), sextant 5(4.39) sextant 6(7.32%) was seen, therefore sextant 2 (red) was more prevalent when compared to sextant 1(blue), sextant 3(green), sextant 4(orange), sextant 5(yellow) and sextant 6(emerald) (Figure 3).

The association between gender and the corresponding lateral occlusion was done where canine guided occlusion (blue) was predominant in both males (40.45%) and females (34.50%) when compared to group function occlusion (red) (Figure 4). The association between missing teeth in sextant wise and corresponding occlusion was done which showed that canine guided occlusion (blue) was prevalent in sextant 1(8.58%), sextant 2(25.31%), sextant 3(7.53%), sextant 4(12.76%), sextant 5(9.41%), sextant 6(11.51%) when compared to group function occlusion (red) (Figure 5). The association between age and corresponding occlusion was done where canine guided occlusion/(blue) was prevalent in age groups <25years (10.06%), 25-40 years (34.7%) and >40 years (30.39%) when compared to group function (red) (Figure 6)

The association between gender and missing teeth was done by chi-square test. It was seen that males are more susceptible to missing teeth when compared to females. According to a study by Khazaieci al, reported a high prevalence of tooth loss in Iranian adult population. They stated that tooth loss was more prevalent among men than women [34]. In contrast, Most of the authors have concluded that there is no significant gender correlation with missing teeth. The discrepancy between studies may be due to differences in sample size, culture and food habits and the family history of the individual patient.

Figure 1. Bar graph represents the frequency of gender predilection among patients with fixed partial denture(FPD). It shows, male (54%) predilection in the study population when compared to females (45.7%) and transgender (0.21%).

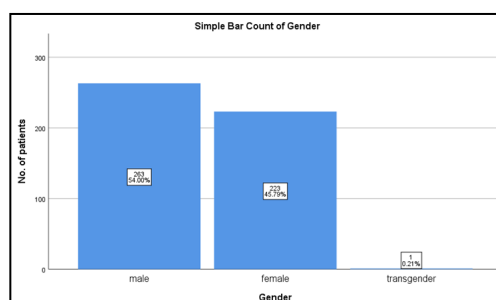


Figure 2. Bar graph represents the frequency of age distribution among patients with fixed partial denture(FPD). It shows, 25-40 years (46.8%) has more prevalence when compared to <25yrs (12.9%) and >40 yrs (40.2%).

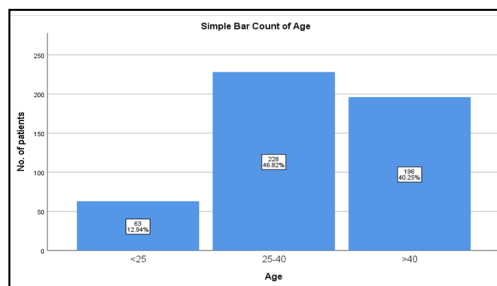


Figure 3. Bar graph represents the association between gender and missing teeth among patients with fixed partial denture (FPD). Prevalence of missing teeth were found to be higher among males when compared to females and transgenders and sextant 2 has the most number of missing teeth. Pearson's chi square test shows -p value is 0.02(<0.05). Hence, it is statistically significant.

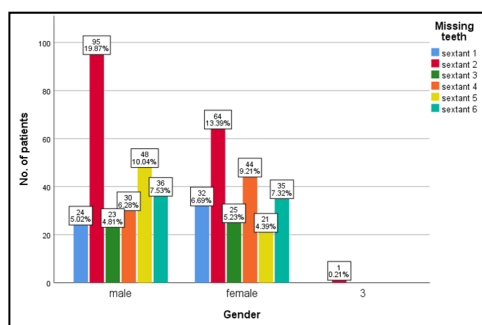


Figure 4. Bar graph represents the association between gender and corresponding occlusion among patients with fixed partial denture (FPD). Higher prevalence of canine guided occlusion was seen among FPD patients irrespective of gender. Pearson's chi square test shows- p value is 0.84(>0.05), statistically insignificant.

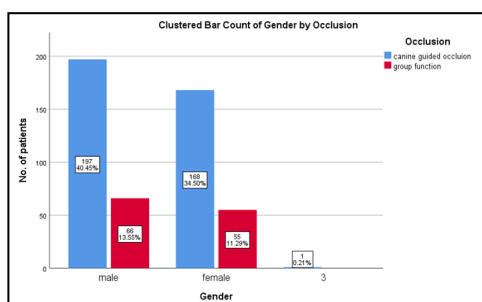
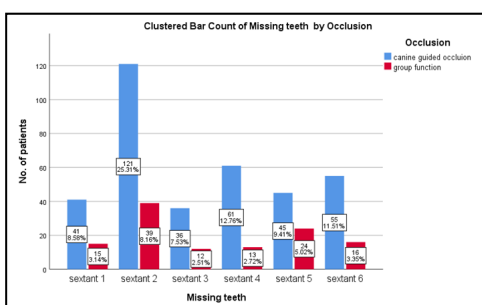


Figure 5. Bar graph represents the association between missing teeth in sextant wise and corresponding occlusion among patients with fixed partial denture(FPD). Higher prevalence of canine guided occlusion among FPD patients irrespective of missing teeth in sextants. Pearson's chi square test shows-p value is 0.299(>0.05), statistically insignificant.

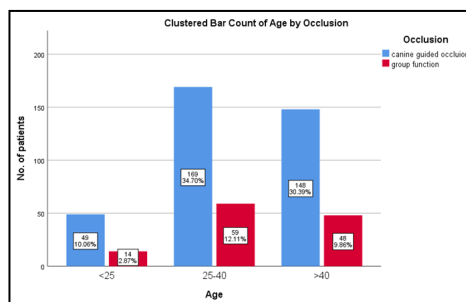


Association between age and corresponding occlusion was done by chi square test. It is found that canine guided occlusion (blue) was prevalent in all age groups such as <25 years (10.6%), 25-40 years (34.70%) and >40years (30.35%). Ahmad A, Shan and others reported that there is more percentage of canine guided occlusion among the study population irrespective of age [37]. By contrast, few authors suggest that as the age increases, canine wears down and occlusion gets transformed into group function [38].

The discrepancy among various studies and the current study can be due to the difference in study population, different sample size, inclusion criteria of the study.

Association between gender and corresponding lateral occlusion was done by chi square test. It is found that canine guided occlusion (blue) was prevalent in both males (40.45%) and females (34.5%). Ogawa et al found no difference in the occurrence of ca-

Figure 6. Bar graph represents the association between age and corresponding occlusion among patients with fixed partial denture(FPD). Higher prevalence of canine guided occlusion among FPD patients irrespective of age groups and patients within the age group of 25-40 years has higher prevalence of FPD. Pearson's chi square value:0.736, df :3, p value:0.865(>0.05),statistically insignificant.



nine and group guidance in relation to genders [39]. By contrast, Rinchuse et al reported loss of canine guidance in individuals who eat coarse and abrasive food 4. In the current study 40.45% of males and 34.4% of females have canine guided occlusal schemes whereas only 13.55% of males and 11.29% of females have group function. Which shows the presence of canine guided occlusion irrespective of gender. The discrepancy between studies can be due to the difference in sample size, culture and eating habits.

Conclusion

Within the limits of the study, it is seen that irrespective of gender, age or sextant of the missing teeth, a generality of canine guided occlusion is seen among patients who have undergone FPD treatment.

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