

PREVALENCE OF VARIOUS ADJUNCTIVE TREATMENT INVOLVED IN FIXED PARTIAL DENTURE - RETROSPECTIVE STUDY

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ABSTRACT

According to the clinical condition and diagnostic findings, American College of prosthodontics (ACP) have developed a classification for partially edentulous patients. They are based on 4 criteria and each is based on 4 classification. The 4 criteria is based on location and extent of the edentulous span, condition of the abutment tooth (localised adjunctive treatment, insufficient tooth structure), occlusal plane and the condition of the edentulous ridge. This classification is done to provide potential benefits to the clinicians and plan a proper treatment planning for the patients undergoing dental prosthesis. The adjunctive treatment are Periodontal treatment, endodontic treatment and orthodontic treatment involving any of the sextant. Fixed partial denture (FPD) is one of the most commonly employed treatments for replacement of missing teeth. Most of the patients prefer for a fixed replacement of the missing tooth. One such option is fixed partial denture. Splinting the adjacent teeth and replacing the missing teeth is how a fixed partial denture is done. The abutment teeth evaluation and its dental status is at most important for the success of the fixed partial denture. If there is any compromise in the dental status of the abutment teeth, adjunct therapy is done. This study aimed to identify the localised adjunctive treatment involved in the patient who had fixed partial denture treatment in a private dental hospital setup.

KEYWORDS: Abutment, ACP Classification, Adjunctive treatment, FPD

INTRODUCTION

There are many ways of replacing missing natural teeth. Partial edentulism is a condition when there are one or more teeth missing. The treatment of choice varies depending upon the patient's existing oral condition. Nowadays, there are many ways to treat partial edentulism. Many of the patients will opt for fixed options and few due to various other conditions may opt removable prosthesis (Ghani *et al.*, 2010). Partial edentulism is an important feature of oral health and quality of life according to World health organisation. According to American college of prosthodontics, there are many classifications which involve partial edentulism. They are based on location and extent of edentulous areas, abutment condition in which is further subdivided into (need of localised adjunctive treatment and insufficient tooth structure), based on Occlusion and based on Residual ridge and finally conditions creating a guarded prognosis (Azad *et al.*, 2015; Ariga *et al.*, 2018).

Adjunctive treatment involves periodontics, endodontic and orthodontic treatment in any of the 6 sextant. The sextant are classified as Class I involving 14-17 teeth, Class II involving 13-23, Class III involving 24-27, Class IV involving 34-37, Class V involving 33-34, Class VI involving 44-47 teeth (Ahila, Suganya and Muthukumar, 2019). Based on the extent of the teeth adjunctive treatment are classified as Class I if none of the sextant have any Periodontal, Endodontic or orthodontic treatment required, Class II adjunctive treatment is classified as 1-2 sextants have either Periodontal, Endodontic or orthodontic treatment, Class III adjunctive treatment is at least 3 sextants have either periodontal, endodontic or orthodontic treatment, Class IV adjective treatment is more than 4 sextants is been involved in either periodontal, endodontic, or orthodontic treatment.

Fixed partial denture involved in replacing the missing natural teeth by involving the adjacent teeth as the abutment. Fixed partial denture is a common treatment available for restoration of partially edentulous ridges to replace the missing teeth. It is one of the most commonly employed methods for replacement of missing teeth and an effective method too (Ashok and Suvitha, 2016); (Vijayalakshmi and Ganapathy, 2016; Ganapathy, Kannan and Venugopalan, 2017). Usually employed when there is contraindication for dental implant (Hebel, Gajjar and Hofstede, 2000). When both FPD and implants are contraindicated, RPDs can be used, owing to financial issues, patient compliance and residual height of edentulous ridges (Jyothi et al., 2017). Success of FPD primarily depends on stability and vitality of the abutment. The type of adjunct treatment associated with abutment teeth is also associated with the success of FPD (Prasad et al., 2013), (Ganapathy et al., 2016; Selvan and Ganapathy, 2016).

The success of the FPD depends upon various conditions and one such being the oral health status of the abutment teeth, length of edentulism and the quality of the prosthesis (Ajay et al., 2017; Basha, Ganapathy and Venugopalan, 2018). The advantage of FPD is mainly patients comfort and satisfaction, being a fixed option the masticatory efficiency is also improved as it is luted to the tooth, and will maintain the biological and integrity of the oral health (Venugopalan et al., 2014; Kannan and Venugopalan, 2018). For such treatment even the abutment selection is important and other adjunct therapy as well plays an important role (Prasad et al., 2013).

Adjunct therapy includes periodontal (Kois, 1996), endodontic (Sorensen and Martinoff, 1985) and orthodontic therapy (Emami, St-Georges and de Grandmont, 2012); (Ashok et al., 2014; Ashok and Suvitha, 2016) for the abutment tooth involved in the construction of an FPD. Any of the procedures to the abutment teeth might alter the prognosis of the FPD. Hence this study aims to assess the prevalence of various adjunct therapy done for the abutment teeth which is used to construct the FPD.

MATERIALS AND METHODS

The present study is a single centered , observational retrospective study conducted in Saveetha dental college and hospitals from June 2019 to March 2020. Ethical clearance was obtained from an international review board in order to undertake the study and carry out procedures to assess the various adjunct therapy done in fixed partial denture patients. The study was reviewed by 2 reviewers and cross verified. The study included a sample size of 747 patients who fulfilled the inclusion and exclusion criteria out of 86000 patients. Inclusion criteria includes ACP PDI classification for missing teeth, adjunctive treatments undergone before placement of FPDs. The exclusion criteria includes patients who have not undergone fixed partial denture treatment. The data were extracted and tabulated. The data were subjected to statistical analysis using SPSS software. The statistical analysis used was the chi square test.

RESULTS AND DISCUSSION

Age group and adjunctive treatment which was involved in the patients who underwent FPD were compared and we found that adjunct therapy in ACP PDI class 1 (none of the treatment that is either periodontal, endodontic, or orthodontic treatment) is more common in the patients between the age group

of 26-40 years (29.51%) and least common in the patients above 61 years (0.93%). Adjunctive treatment was least prevalent in ACP PDI class 3. Among ACP PDI class 3, the most prevalent age group was between 41-60 years (1.74%) and the least prevalent age groups were between 18-25 years (0%) and above 61 years (0%). Adjunctive treatment in ACP PDI class 2 is more prevalent in the patients between the age group of 41-60 years (7.36%) and least prevalent in the patients above 61 years (0.80%) [Figure 1]. Adjunctive treatment in ACP PDI class 4 is common in patients above 61 years of age (2.54%) [Figure 1]. Chi square test was done and it was found to be statistically significant ($p < 0.05$) [Figure 1]. Gender and adjunctive treatment were compared and we found that adjunct therapy is more prevalent in males than in females. ACP PDI class 1, class 2, class 3, class 4 is more commonly observed in males than in females with percentages 47.26%, 7.90%, 1.20%, 1.34% respectively [Figure 2]. Chi square test was done and it was found to be statistically not significant ($p > 0.05$) [Figure 2]. Adjunctive treatment in ACP PDI class 1 is more prevalent in Sextant 2 (29.72%) [Figure 3]. Adjunctive treatment in ACP PDI class 2 is found to be prevalent in sextant 2 (5.62%) but when compared to ACP PDI class 1, it is less [Figure 3]. Adjunctive treatment in class 3 is found to be prevalent in sextant 6 (0.67%) but when compared with ACP PDI class 1, ACP PDI class 3 is less prevalent [Figure 3]. Adjunctive treatment in ACP PDI class 4 is common in sextant 6 (1.2%) [Figure 3]. Chi square test was done and it was found to be statistically not significant ($p > 0.05$) [Figure 3]. Correlating with age, gender and sextant, we found that adjunctive treatment is more common in ACP PDI class 1; second common is ACP PDI class 2; third common is ACP PDI class 4 and the least common is ACP PDI class 3.

In the study conducted by Arati Sharma in the year 2019, they reported that females were more prevalent when compared to males, contrary to the present study. In their study, class 1 is less prevalent and class 2 is more prevalent in patients <45 years, contrary to the present study ([Sharma, 2019](#)). In the study conducted by Azad Ali - Azad et al, they reported that males were more prevalent, similar to the present study and the common type observed is class 2 with mean age 50 years being the most common age, contrary to the present study ([Azad et al., 2015](#))

Other studies were conducted to check the vitality of abutment prior to treatment of FPD ([Prasad et al., 2013](#)), ([Al-Sinaidi and Preethanath, 2014](#)). A study was conducted by Aljoharal Al Sinaidi to check the periodontal status of abutment tooth post FPD and found an increase in plaque index, gingival index, probing depth and mobility which can lead to failure of FPD ([Al-Sinaidi and Preethanath, 2014](#)). In some cases, after FPD treatment, there may be high chances of getting caries or pulpitis in the abutment tooth. To avoid that endodontic therapy is done prior to FPD ([Prasad et al., 2013](#)), ([Safavi and Grasso, 1990](#)). Implant can also serve as an abutment for FPD ([Duraisamy et al., 2019](#)).

Abutment teeth should always be vital. Usually when the abutment teeth have periodontal problem, that teeth is not used as abutment teeth. In some cases the abutment teeth may be supra erupted. Commonly seen problems in abutments are damaged tooth, periodontally weak or mobile tooth, short abutments, tilted abutments or rotated abutments, protruded or retroclined abutment ([Prasad et al., 2013](#)). In case of dental caries and pulpitis, RCT can be done ([Prasad et al., 2013](#)), ([Safavi and Grasso, 1990](#)); In case of periodontally weak tooth, periodontal treatments should be done to establish the stable gingival margins before tooth preparation ([Freilich et al., 1992](#)). Aloe vera and chlorhexidine mouthwash can be employed too ([Subasree, Murthykumar and Dhanraj, 2016](#)). Periodontal therapy always follows restorative care because the resolution of inflammation may result in repositioning of teeth or in soft tissue and mucosal changes ([Kois, 1996](#)); In case of tilted molar abutments, orthodontic treatment can be done to upright the tilted molar ([Emami, St-Georges and de Grandmont, 2012](#))([Khouw and Norton, 1972](#)). These are some of the commonly employed adjunctive treatments for abutment teeth before proceeding to tooth reduction for

FPD. Computer-aided design/computer-aided manufacturing (CAD/CAM) system aids in fabrication of crowns for FPD (Jain, Ranganathan and Ganapathy, 2017).

CONCLUSION

Success of the FPD depends upon the condition of the abutment teeth and the surrounding structures. With proper awareness regarding the oral care we can minimize the patient to undergo adjunct therapy. Within the limitations of the study, adjunctive treatment is common in males than in females. The most common sextant of adjunctive treatment done was sextant 2 (13-23). The age group between 26- 40 years have undergone more adjunctive treatment than other age groups, however they were not statistically significant.

AUTHOR CONTRIBUTIONS

Author 1 (Chaitanya Shree.P) carried out the retrospective study by collecting data and drafted the manuscript after performing the necessary statistical analysis. Author 2 (Dr.Subhashree.R) aided in conception of the topic, has participated in the study design, statistical analysis and has supervised in the preparation of the manuscript. All the authors have discussed the results among themselves and contributed to the final manuscript.

CONFLICT OF INTEREST

None declared.

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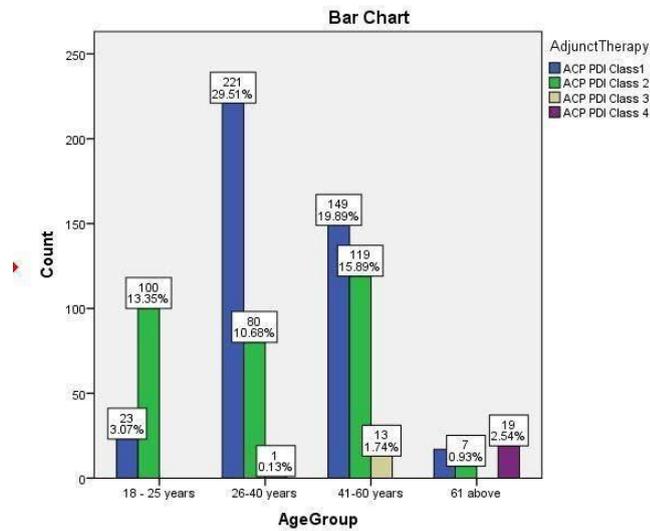


FIGURE 1: Bar graph represents the association between age group and adjunctive treatment done in fixed partial denture patients. X axis denotes age group and Y axis denotes the percentage of adjunctive treatment done. Blue denotes ACP PDI class 1, Green denotes ACP PDI class 2, Beige denotes ACP PDI class 3, Purple denotes ACP PDI class 4. Chi square test was done and the association was found to be statistically significant. Pearson chi square value: 451.233; df : 9; p value : 0.000 (> 0.05) hence statistically significant, proving the age group between 26-40 years have more Adjunct treatment Class 1 (no periodontal, endodontic or orthodontic treatment required) than other age group.

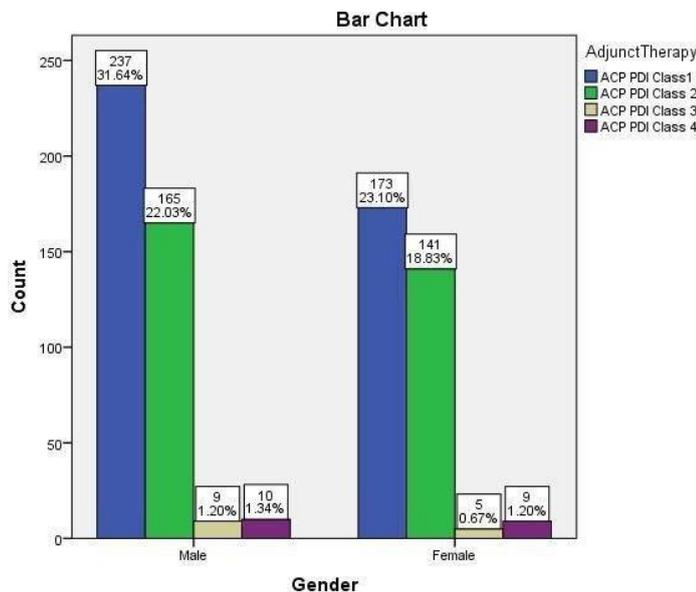


FIGURE 2: Bar graph represents the association between gender and adjunctive treatment done in fixed partial denture patients. X axis denotes gender and Y axis denotes percentage of adjunctive treatment done. Blue denotes ACP PDI class 1, Green denotes ACP PDI class 2, Beige denotes ACP PDI class 3, Purple denotes ACP PDI class 4. Chi square test was done and the association was found to not significant. Pearson chi square value: 1.545; df : 3; p value : 0.673 (> 0.05). Males undergo more adjunctive treatment (periodontal, endodontic, and orthodontic treatment) than females, however statistically not significant.

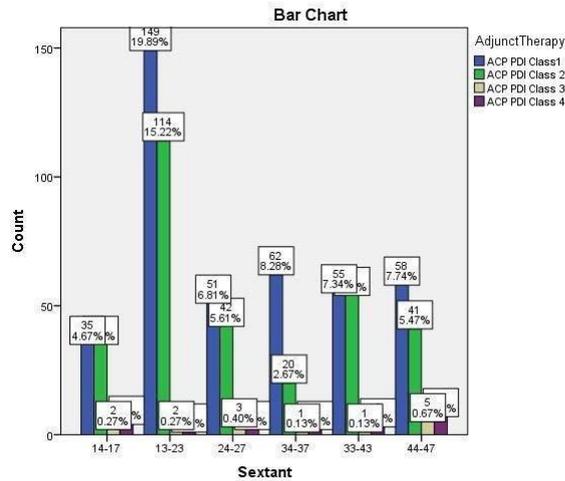


FIGURE 3: Bar graph represents the association between sextant and adjunctive treatment done in fixed partial denture patients. X axis denotes gender and Y axis denotes percentage of adjunctive treatment done. Blue denotes ACP PDI class 1, Green denotes ACP PDI class 2, Beige denotes ACP PDI class 3, Purple denotes ACP PDI class 4. Chi square test was done and the association was found statistically significant. Pearson chi square value: 37.278; df : 15; p value : 0.001 (< 0.05), hence proving that sextant I (13 -23 teeth) undergo adjunctive treatment (periodontal, endodontic, orthodontic) than other sextants.

LEGENDS

FIGURE 1: GRAPH ON COMPARISON OF AGE GROUP WITH ADJUNCT THERAPY

FIGURE 2: GRAPH ON COMPARISON OF GENDER WITH ADJUNCT THERAPY

FIGURE 3: GRAPH ON COMPARISON OF SEXTANT WITH ADJUNSCCT THERAPY