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Fixed Partial Dentures vs Implants in Replacement of Single Missing Tooth in University Hospital Setting - A Retrospective Study

Ashwin Shravan Kumar M[1], Revathi Duraisamy[*2]

[1]Saveetha Dental College and Hospitals, Saveetha Institute of Medical and Technical Sciences, Saveetha University, Chennai-600077, Tamil Nadu, India
[2]Department of Prosthodontics Saveetha Dental College and Hospitals, Saveetha Institute of Medical and Technical Sciences, Saveetha University, Chennai-600077, Tamil Nadu, India

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ABSTRACT

The goal of prosthetic treatment is to restore the normal function, contour and comfort of the teeth. In replacement of anteriors enormous effort is required to bring up aesthetics whereas in posterior teeth replacement effort to replace the function should not be compromised. This study aims to evaluate the preference of FPD and implants in replacement of single lower anterior teeth. A retrospective data collection was done by collecting and reviewing 86000 case sheets of the outpatients department. The study period was about 10 months. Inclusion criteria & exclusion criteria were available. Parameters were tabulated and analysed using SPSS software. There were totally 667 patients treated for replacement of a single missing tooth in the study period. Among these 346 were males and 321 were females.90% of both the population irrespective of age and gender had been preferring fixed partial dentures in replacement of single missing tooth. This study is in consensus with existing literature that fixed partial dentures are widely used for the replacement of single teeth. However, though not statistically significant,10-20% of our study group still preferred to be treated with conventional fixed partial denture treatment. Whether systemic health issues or socioeconomic reasons played a role in the choice of treatment needs to be further evaluated with larger sample size and multicentre studies among our population.

[*]Corresponding Author

Name: Revathi Duraisamy
Phone: +91-7598267022
Email: revathid.sdc@saveetha.com

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INTRODUCTION

The goal of prosthetic treatment is to restore the normal form, function, comfort and contour of the specific tooth (Singh, 2014). In replacement of anterior teeth, there must be enormous effort to bring up the aesthetics whereas in replacement of posterior teeth, the replacement of functional stability should not be compromised. Many patients prefer replacement through fixed prosthesis rather than a removable prosthesis. Fixed prosthesis can be classified broadly as fixed partial dentures and implants. In dentistry, it is important to establish a relationship between the size of the teeth and the rest of the face with special preference to prosthodontics when restoring an edentulous dentition, which needs an initiating point for the selection of teeth. Knowledge of dentofacial relationships aids in the selection of important dental characteristics such as central incisor width and intercanine width, molar width and occlusion. Therefore, the correct selec-

tion of artificial teeth is essential to achieve a pleasant esthetic outcome (Ariga, 2018). Removable acrylic resin partial dentures tend to adversely affect periodontal parameters when teeth are in contact with resin base and hence are not preferred over the aesthetic region (Jyothi, 2017).

Speaking about implants as an option it has been stated that there was found to be a minimal gap between the abutments and implant which does not cause any tissue damage (Duraisamy, 2019). Since 1993, there have been articles stating the 100% survival rate of implants in replacement of a single tooth (Misch, 2007). In 1997 Roman Gomez et al. stated the 96% overall efficiency of implants (D'hoedt, 1996). The implant placement is an invasive treatment and hence there is chance of infection with methicillin resistant S.aureus which can be treated by cephalosporins (Selvan and Ganapathy, 2016). The same medical treatment can be proceeded even if there is bone augmentation or bone grafting prior to implant surgery. Bone grafting is inevitable in the regions or patients with a higher degree of alveolar bone loss as it makes the highest chance of implant treatment failure. Hence it is preferred for bone regeneration through either of the two methods. This technology makes the restoration of teeth easy, reliable, with high strength and biocompatibility (Hans and Hans, 2011). Laney started the placement of implants in varying period of years (Jemt, 1991).

On the other hand fixed partial dentures are done by preparation of adjacent tooth structures, taking impressions and designing crowns and finally luted by GIC, whereas some use resin cements to avoid any marginal discrepancies (Ganapathy, 2016). While doing there may be exposure of pulp unintentionally, that places a major role in added procedures to proceed with pulp capping or even root canal treatments in some cases. In such cases it is better to disinfect the gutta percha sticks in aloe vera to enhance protection from infections (Subasree *et al.*, 2016). In preparation for fixed partial dentures it is necessary to check for marginal discrepancies to avoid ill fitting dentures. It has been stated that marginal discrepancy was more in the incisal region than in the cervical region in many of the anterior teeth preparations (Jain *et al.*, 2017). Even though fixed partial dentures are not as invasive as others, there may be a chance for trauma to healthy tissues which needs an antibiotic coverage or it may lead to conditions like cellulitis leading to lymphoedema (Vijayalakshmi and Ganapathy, 2016). Taking into consideration the additional treatments that may be required implant, as a treatment modality, has been widely accepted for replacing single or multiple missing teeth (Ganapathy *et al.*, 2017). Various researches had been done in determining the appropriate treatment, one such includes perception of patients among south Indian population on the All ceramic restoration as a treatment for missing tooth by Saveetha Dental College (Ashok and Suvitha, 2016).

Similarly, many such articles were published each stating a different opinion. Another issue regarding the fixed partial dentures was it requires optimal density of bone for its quality of life. Ashok et al. stated that prosthetic rehabilitation in patients with bony defects is critical and requires appropriate planning before initiation of treatment (Ashok, 2014). Above all, it requires patient's psychological morale for the treatment to be successful (Venugopalan, 2014). In treatment of patients with cardiovascular problems or known hypertensive patients excessive care to be taken as cord packing has been reported to injure the supporting tissues and impinge into the biological width. Impregnation with adrenaline and other such chemicals has been known to bring about various deleterious systemic effects (Kannan and Venugopalan, 2018). Also, care must be taken to decide treatment modality for pregnant women as there are studies show that during pregnancy there is an increase in a specific type of microorganism (Prevotella species) that increases the chances of gingival infection since a lot of hormonal changes take place during this time (Basha *et al.*, 2018). The advantages and disadvantages of restoring using cement retained implants with the fixed prosthesis are documented vividly in the dental literature (Ajay, 2017). The main aim of this study is to evaluate the preference of implants and fixed partial denture in replacement of single missing tooth.

MATERIALS AND METHODS

Study type and setting

This is a retrospective study and 86000 case sheets of out patients were collected and reviewed from Saveetha Dental College and Hospitals over a period of 10 months from June 2019-March 2020.

Participants

Patients who were treated for restoration of a single missing tooth were included and it accounted for around 667 patients where 346 were male and 321 were female.

Sampling and verification

All data were obtained and are approved by the Institutional Ethical Committee and cross verified by 2 reviewers. The external and internal validity

were applicable.

Data analysis

All data retrieved were compiled in an excel sheet and imported to SPSS by IBM for statistical analysis. Chi-square statistical analysis was performed. The independent and dependent variables include age, gender and treatment respectively.

RESULTS AND DISCUSSION

The results were tabulated from Figure 1 representing Gender vs Treatment; it can be clearly seen that 89% of males (311/347) and 92% of females (297/320) preferred fixed partial dentures over implants. Figure 2 representing age vs treatment states that 80% of patients who were of age < 35 preferred fixed partial dentures (282/327), whereas 95% of participants above 35 years of age were preferring fixed partial dentures.

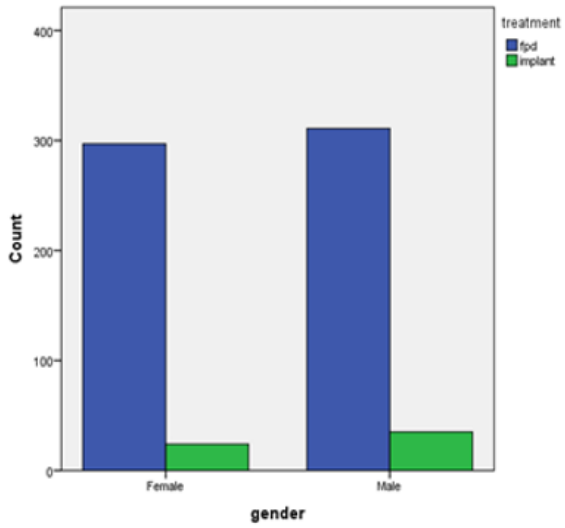

Figure 1: The bar chart Represents the association between gender and treatment provided

In the current study, we can see the preference of fixed partial dentures over implants in replacement of a single tooth. The comparison between gender over the treatment preference was established because it has been stated that males have a higher potential risk for periodontal diseases than women which might have a compromising effect on a treatment plan as the periodontal status plays the maximum role in deciding the treatment (Tezal *et al.*, 2001).

Mayura et al. stated that there would be generalised loss seen in the alveolar bone who are in the late 30s and 40s due to hormonal effects and imbalances. This was also reported by Kunchur in his studies (Kunchur and Goss, 2008). Hence we

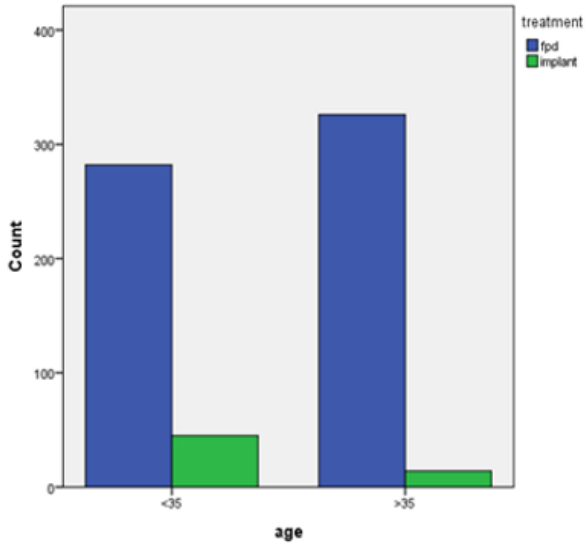

Figure 2: The bar chart Represents the association between age and treatment provided

established a cross relation between age and preference whereas fixed partial dentures stand as a choice of preference in both age group. It may be due to consideration like the future effect of age and hormonal adaptations which might lead to failure of implants, systemic illness etc. There have been numerous obstacles faced by dental practitioners across the globe to give an ideal and effective treatment for patients, whereas periodontal compromisation is an add on to their challenges in the survival of prosthesis. Interestingly patients started seeking for implant treatments and this has been reported in many literatures. But the one common disadvantage reported was advanced atrophy which might possess additional risk of failure of implants (Papas, 1991). Bragger stated that there was more fracture of fixed partial denture reported than screw loosening (Brägger, 2001). Buser in his literature stated that implants could be preferred in aesthetic regions like the anterior zone to avoid compensating the adjacent anterior abutments to reduce the chances of reducing further complications (Buser *et al.*, 2019). But on the contrary Lovell in his study reported that patients walking into dental offices often require cost efficient and faster treatment options and hence preferred fixed partial dentures than implants (Lovell, 1995). Also fixed partial dentures are preferred to avoid failure of treatments like screw loosening in case of implants as they are coated with zinc or due to resin reaction to tissues in case of removable prosthesis. But to this study result, there were many contradictory studies stating the high risk prevalence of pulp exposure, adrenaline effects due to impreg-

nated retraction cords, the marginal discrepancy between the crowns and the gingiva. Also many practitioners as well as patients were not feeling trimming or preparing adjacent teeth as a pleasing option. There were also many reports for ill fitting pontics. Another disadvantage is that in cases of moderate to severe malocclusion it is not advisable for fixed partial dentures as it may not yield the most pleasing effect. Hence it would be advisable to prefer an implant over the region as it has no interruption with adjacent teeth and can be easily planned in malocclusion cases. Also usage of dental implants was not only recommended for aesthetic approach but also for the osseointegration property of titanium with bones which gives almost the strength of a natural tooth (Venable *et al.*, 1937). But there have been certain documentation stating the effects of titanium on bones causing hypersensitivity by the local presence of abundant macrophages and T lymphocytes and the absence of B lymphocytes, indicating Type 4 hypersensitivity (Moran, 1991). This is a serious biohazard as a dental practitioner cannot predict such hypersensitive reactions to implants which might result in failure of implants also requiring further medical services. Many teeth are decimated by incipient or recurrent caries, trauma, endodontic complications, or periodontal disease which requires extraction. The fixed partial denture (FPD) has been regarded as the standard of care for replacement of single and multiple missing teeth (Salinas *et al.*, 2004). Since the fixed partial denture is much cheaper, less time consuming and with low complications many patients are preferred fixed partial dentures (Christensen, 2008). The implant-supported crown may not be advisable when available bone volume is minimal, or when the adjacent root is in close proximity (Kara and Aykent, 2012). Even after considering the disadvantages like fractures, pulp exposure, complications due to gingival retraction it can be seen that fixed partial dentures are a much safer and cheaper and faster option as they do not cause hypersensitivity or require elective procedures like bone augmentation or bone grafting. There has been global consensus with the result and this can be taken as a evidence to practice.

In Figure 1, X axis represents gender of the patients and Y axis represents the treatment provided. Colour codes in Y axis includes Green-Implant, Blue-Fixed Partial Dentures. 90% of males were treated by fixed partial dentures higher than females. However this is statistically not significant (Test: Chi square test; p value= 0.234)

In Figure 2, X axis represents the age of the patients whereas the Y axis represents the treatment provided.Colour codes in Y axis includes Green-Implants, Blue-Fixed Partial Dentures. 85% of patients above 35 years of age were treated by fixed partial dentures higher than patients less than 35. This is statistically not significant.(Test: Chi square test; p value= 0.0023)

Certain limitations were observed in this study which includes neglection of data regarding underlying medical conditions, financial status, postoperative complications, retreatment due to failure and dentofacial anomalies of the patients. All these limitations can be minimized by taking into account all the factors. Future prospects of this study can be established to find the efficiency of the prosthesis on a longer span of time and so there can be fair and conclusive evidence for their predominant preference and usage.

CONCLUSION

The results of this study showed that fixed prosthesis is still satisfying patient's needs for replacing their missing teeth. A large majority of patients were satisfied with all functional aspects of their fixed prosthesis. The most important finding of this study was the majority of patients were advised fixed dental prosthesis over implants in replacement of single missing teeth due to their affordability, reliability, safety and lesser complications.

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Conflict of Interest

The authors declare that they have no conflict of interest for this study.

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