

Patient's Perspective in Selection of Single Tooth Replacement Options: A Survey of North Western Rajasthan Population

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ABSTRACT

Aim: To analyze patient's choice between different treatment modalities for replacement of a single missing tooth and the factors that would affect this choice in North Western Rajasthan population.

Material and Method: A field survey was conducted consisting of 240 participants divided into various groups according to age, sex, socio-economic status and education in North Western Rajasthan population with a questionnaire which included the personal details, medical and dental history, habits and prosthetic rehabilitation following the loss of single tooth, also the possible factors affecting their choice of treatment, the expectations of the subjects regarding prosthetic rehabilitation in terms of esthetics, function and speech efficiency were also in the questionnaire. Results were collected, tabulated and statistically analyzed using SPSS Version 22.

Results: Out of 240 people who took part in the survey, 44.58% chose fixed partial denture as their replacement option, second choice was single tooth dental implant which 39.16% people chose. 16.25% people selected removable partial denture as their favorable choice. The people of various age groups had difference in their needs from the prosthesis like esthetics and function, the subjects who were on the strata of higher socio-economic status preferred fixed prosthesis including F.P.D. and dental implants whereas subjects of lower socio-economic group preferred R.P.D as their option. There was no significant difference between the preferred choice of males and females. Education also played a significant role in the selection process.

Conclusion: Fixed partial denture is the most common procedure in patient's perspective to restore a single tooth gap. Patient's education, socio-demographic and oral factors affect the decision-making process. There is a need to educate the patients regarding all the available options as well as their advantages and disadvantages, the final call should be made keeping all the factors in mind and whatever is best for the concerned patient.

Keywords: Single tooth replacement options, single implant, F.P.D, R.P.D, patient's awareness.

INTRODUCTION

Dentists are routinely faced with the need to restore a single tooth that was being removed because of trauma, periodontal disease, root

resorption or failed endodontic treatment.¹ So, whether the tooth is removed surgically or lost due to trauma the dentist should opt for immediate means to satisfy the patient's cosmetic

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requirements while balancing the functional outcomes as well.² Various treatment options for restoration of a single tooth include fixed partial denture, a removable partial denture and a single tooth implant. Although the fixed partial denture is the conventional treatment for a single edentulous case, but since the early 1980's the use of osseointegrated implants has become a well established and predictable treatment. Rehabilitation using an acrylic removable denture is also an option but they are time consuming and jeopardize the health of adjacent tissues. Because of the variety of treatment options for single-tooth replacement, there is limited literature covering all these treatments in a single survey. A few authors have reviewed data concerning multiple parts of the field of fixed prosthetics³ but most researchers focused on only one topic in every study. Studies on single-tooth replacement with removable prostheses are well documented.⁴ However, the comparison between the three most common prosthetic treatment choices of patients and the factors that dictate that choice are very limited. Often the bias of dentist plays a role rather than objective appraisal of the treatment options. This paper focuses on the study of the choice of the patient regarding three common single tooth replacement options and the associated factors while choosing these treatment options in the North Western region of Rajasthan as obtained by a survey conducted in various dental clinics for the patients with single tooth loss.

MATERIALS AND METHOD

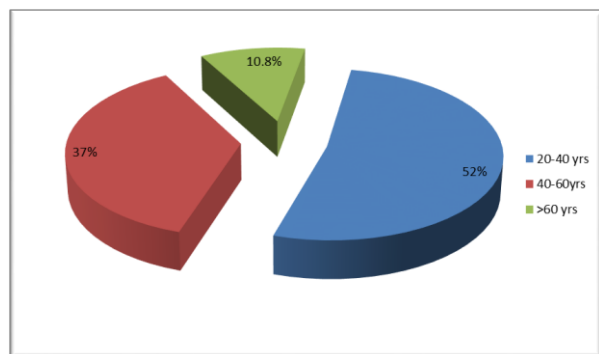
A field survey was conducted consisting of 240 participants in various dental clinics of north western Rajasthan with a questionnaire. Out of 240 participants 132 (55%) were males and 108 (45%) were females. **(Graph 1)** Growing patients (younger than 20 years) and multiple extractions were exclusion criteria. The subjects were divided into three groups according to age groups, Group A (20-40) 52%, Group B (40-60) 37% and Group C (>60) 10.8%. **(Graph 2)** The patients were also grouped according to their education **(Graph 3)** and socio-economic status **(Graph 4)**. Study forms included the following reasons for tooth removal: caries, periodontitis, fracture, pre-prosthetic, impaction, orthodontic and other. Given the fact that tooth replacement may only be required when

a tooth is lost because of caries, periodontitis or fracture, the analysis of the decision-making process was limited to these cases. For the same reason, wisdom teeth were not considered. Eligible patients were additionally informed by the clinician about the offered treatment options and their respective pros and cons. The questionnaire included various socio-demographic information, medical and dental history, smoking habits and also the preferred prosthetic rehabilitation following tooth loss, factors affecting the choice of treatments and the reasons for not selecting the other modalities including surgery, time, cost, phobia to new modality, lack of knowledge peer reviews etc were included along with their needs regarding prosthetic rehabilitation esthetically, functionally and speech efficiency. One of the following treatment options could be selected: (1) no treatment (2) removable partial denture (RPD) (3), fixed partial denture (FPD) (4) single implant treatment. The selected option was the actual decision made by the patient at the time of survey according to their choice of treatment. Results were collected, tabulated statistically analyzed using SPSS Version 22.

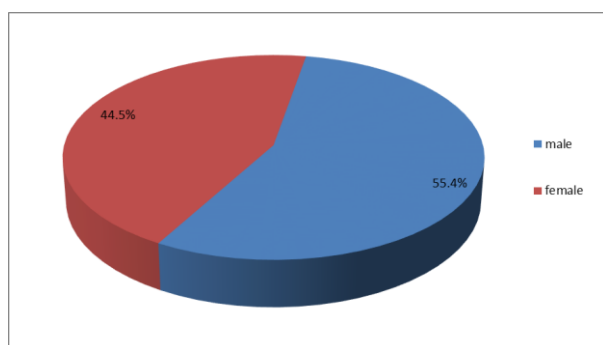
RESULTS

Tooth replacement was deemed necessary in the included subjects in the study and out of 240 people who were included in the survey, 44.58% chose fixed partial denture as their replacement option, second choice was single tooth dental implant which 39.16% people chose. 16.25% people selected removable partial denture as their favorable choice. FPD was mostly selected as the treatment of choice followed by single implant and then the RPD **(Graph 5)** which is in contrast with Al-Shammari et al. (2005) reporting on RPD as the preferred choice of treatment.⁴

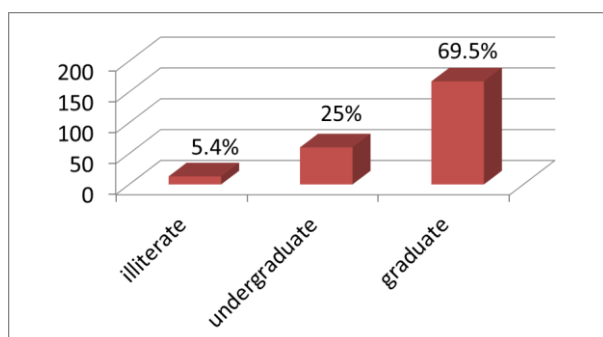
The decision-making process was basically dependent on 6 major deciding norms, including Fear of surgery/procedure (19.5%) cost (26.25%) time (7.5%) Healthy tooth/tissue damage (27.9%) Failure risk (9.58%) and Others including peer reviews, knowledge about procedure etc. (9.16%). **(Graph 6)** For single implant treatment was compared with FPD and RPD and demonstrated a significant impact of three factors. The cost, time required for the treatment and restoration level of



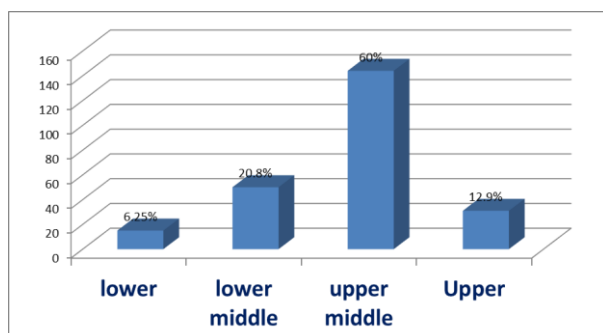
Graph 1: The subjects divided into three groups according to age.



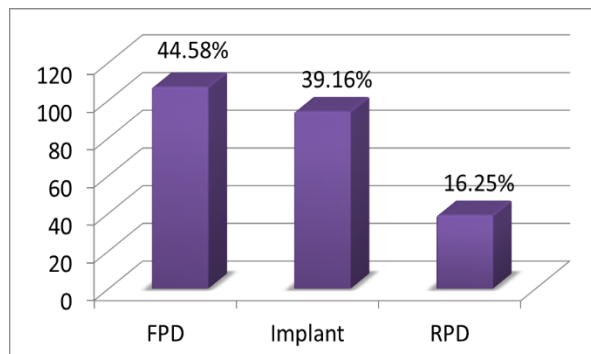
Graph 2: Distribution of subjects according to gender.



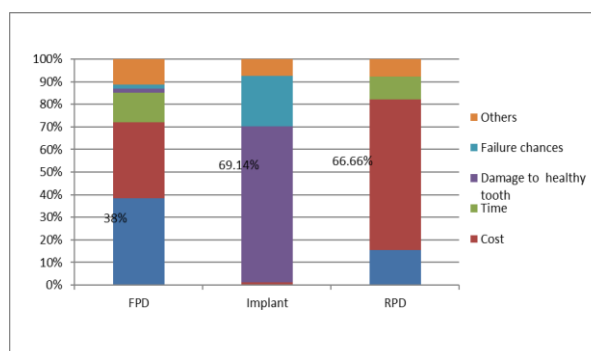
Graph 3: Subjects according to educational status.



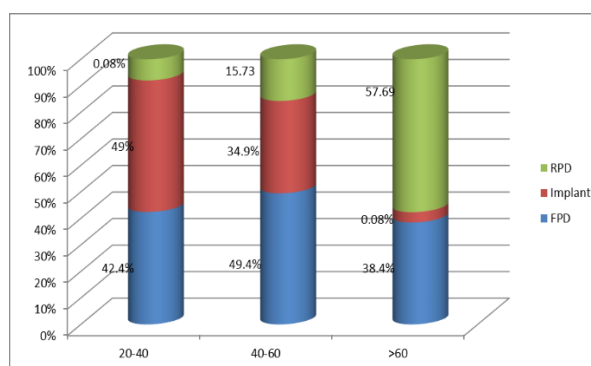
Graph 4: Socio-economic distribution of the subjects.



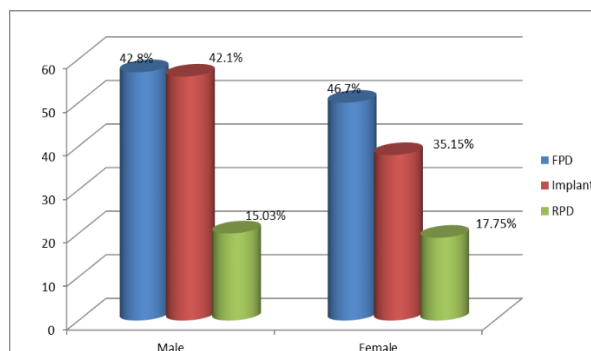
Graph 5: Preferred choices of subjects for single tooth loss.



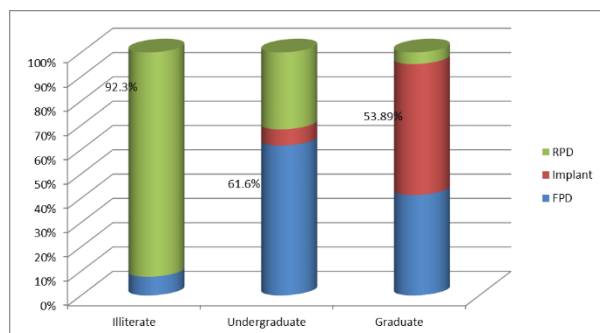
Graph 6: Various deciding norms.



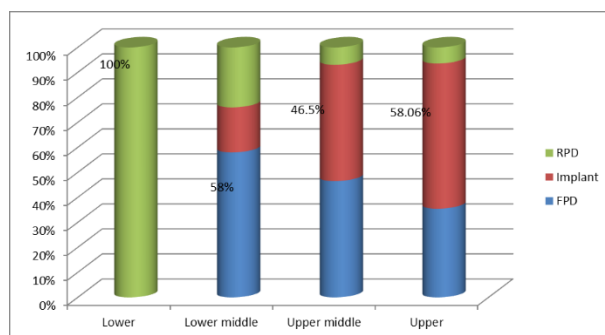
Graph 7: Treatment choices in different age groups.



Graph 8: Treatment choices in males and females.



Graph 9: Treatment choices in different groups according to education.



Graph 10: Treatment choices in different socio-economic groups.

adjacent teeth was negatively associated with single implant treatment in this study, which makes sense as this is one of the main factors to be considered when choosing between FPD and implant treatment.⁵

The reason for majority of subjects to choose fixed options including F.P.D. and implant may be because the majority of subjects that were included in the study were of the age group 20-40 years. In the subjects of younger age group A, 49% preferred implant as the mode of replacement. In Group B 49.5% preferred F.P.D. and as we progressed to Group C, advanced age, systemic factors, cost and time dictated choice and RPD was preferred by as much as 57.69% of the subjects. The selection was directly related to age and highly significant ($p < 0.05$). Hence, it is a definitive factor in the choice of treatment. **(Graph 7)**

Another interesting finding was that FPD and single implant treatment were more preferred in this study group for both males and females. However, both genders had a higher preference towards F.P.D. The difference between the various

options in males and females was insignificant ($p = 0.569$). **(Graph 8)**

It was also observed that education was a direct factor to dictate the method of tooth replacement. With higher education level, the subjects tend to go for implant and fixed denture prosthesis. The results for education level and the tendency towards fixed tooth replacement options were also highly significant ($p < 0.05$) in all the three age groups as well as males and females alike. Educated people tend to acquire executive jobs, awareness towards the therapy is more and hence they are more concerned about the aesthetics and longevity of prosthesis. This results in the favor of implants and fixed therapy in those individuals. **(Graph 9)**

When subjects were grouped according to socio-economic status R.P.D was the most preferred choice for lower and lower-middle class group subjects, for upper-middle and upper class subjects F.P.D. was most preferred followed by single implant therapy. The p value was significant in selection choices of these 4 groups ($p < 0.05$) indicating that socio-economic dynamics also determines the choice of treatment in subjects of different groups. **(Graph 10)**

DISCUSSION

The deciding norms

There are several factors that the patient considers while choosing a particular line of treatment. The information given by the clinician, the pros and cons of all the suggested procedures, peer reviews and personal factors like cost, time, fear and main reason for tooth replacement like function or aesthetics.⁷ In the following study there were 6 major deciding norms by which the subjects chose their replacement options for single tooth loss. These include:-

- 1. Fear of surgery** - A lot of patients have dental fear or anxiety regarding the oncoming procedure. Some of this comes from past dental experiences, and some is just the fear of "not knowing." Most of the subjects who chose FPD and RPD in this study had a fear of surgery during implant placement, a single implant placement is rather a contemporary

procedure and hence there is a specific stigma attached to this line of treatment. However, a single implant doesn't take too long to place and the procedure is non-complicated.

2. **Cost-** in this study cost was the second most selected norm which dictated the treatment option. With many subjects who cannot pay for the fixed treatment options, and the lack of insurances to cover such dental treatments chose RPD. But as reviewed in various studies, the implant reconstruction demonstrated a more favorable cost/effectiveness ratio. Especially in clinical situations with either non- or minimally restored teeth or sufficient bone, the implant reconstruction is to be recommended from an economical point of view.⁸ For single-tooth replacement, a single implant was a cost-effective treatment option in comparison with a traditional three-unit fixed dental prosthesis. For the replacement of multiple teeth, dental implants (fixed or removable prostheses) were associated with higher initial costs but better improvements in oral health-related quality of life compared with other treatment options.⁹ This aspect is necessary to be told to all the patients that require rehabilitation.
3. **Time-** In some of the subjects' time was also a deciding factor. Acrylic removable partial denture placed after a single tooth extraction is an immediate solution but they are bulky, uncomfortable to patient and impede healing. Conventional FPD procedures require aggressive tooth reduction and high risk of pulp exposure. Implant supported restoration has a more conservative approach but poor patient acceptance owing to lack of motivation, higher cost or fear of surgery. However, these procedures do not satisfy immediate aesthetic and functional requirements of the patient.
4. **Healthy tooth/tissue damage-** A 3-unit F.P.D is within the training and experience of most restorative dentists. This form of restoration requires the reduction of the abutment teeth resulting in an increased incidence of endodontic therapy and root decay. If the abutment teeth have large restorations, they would benefit from abutment preparation.

However, if the teeth have small restorations or if they are sound teeth, they would be damaged by abutment preparation and be placed at increased risk. In addition, cement loss or wash out under a retainer can lead to tooth loss. FPD bridges constitute a single restoration. Based on clinical experience, if one part of the bridge fails, the whole restoration fails, often with the loss of an abutment tooth. Despite these disadvantages, a 3-unit bridge is preferred because it is usually completed in a short time and esthetic control is fairly predictable.⁷

5. **Failure chances-** The literature search failed to identify any articles that directly compared survival or success of single implant-supported restorations with fixed partial dentures.¹⁰ Following the search criteria, and independent analysis by reviewers, pooled success of single-implant restorations at 60 months was 95.1%, while fixed partial dentures of all designs exhibited an 84.0% success rate. As for removable partial dentures the success rates were 60.3% as with time the edentulous state of subject changes and RPD has to be changed and extended with time.¹¹
6. **Others-** some of the deciding factors were peer reviews, no knowledge about new procedure, doubt on clinician's skill etc.

Studies on single-tooth rehabilitation with different prostheses showed an important impact of patient's education, oral factors and clinician-related factors on the decision-making process.¹² Conventional removable partial denture can replace a single tooth and with incremental tooth loss it can be modified to accommodate more acrylic teeth, it is more affordable than other alternatives of tooth replacement, it can be made in a single day and can be aesthetically pleasing covering the soft tissue defect if present post tooth loss. However, it is uncomfortable as it is much larger than natural tooth, covers the palate, reduces taste perception, needs replacing more frequently and requires specific cleaning procedure after removal. The single-tooth replacement with fixed partial dentures (FPDs) exposes the abutment teeth as well as the reconstruction to several biological

and technical risks such as endodontic complications, secondary caries, difficult access for plaque control resulting in periodontal complications, loss of retention, fracture of teeth and/or the FPD. A single crown on an implant might therefore be the treatment of choice, even if the patients have to accept to undergo a surgical intervention. A complex decision making process will influence the choice of treatment such as access for technology, skills, education, philosophy as well as evidence known from the literature and knowledge transfer to providers and patients.¹³

Implants require training that is not sufficiently addressed in most undergraduate dental programs and, therefore, is not within the practice realm of all restorative dentists. An implant takes longer to complete than a 3-unit bridge, but costs about the same if grafting is not required. Insurance seldom helps with financial support for implants. In addition, implants can be more demanding if bone and soft tissues are inadequate. Areas of tissue deficiency should also be addressed with grafting in the pontic space for 3-unit bridges, but often these defects are ignored. The tremendous advantage of the single-tooth implant lies in the fact that the adjacent teeth are not prepared. These teeth are left in their current state of health and are not linked as part of a larger restoration. The adjacent teeth have a better prognosis, as they are not subject to a higher incidence of endodontic therapy and decay as a result of tooth preparation. Patients should be properly advised of the advantages and disadvantages of all types of single-tooth replacement, so they can make an informed decision. Patients want more effective intervention but have limited budgets; this knowledge of the incremental cost for the additional effectiveness should help patients make an informed choice.¹⁵

CONCLUSION

Fixed partial denture is the most common procedure in patient's perspective to restore a single tooth gap in north-western Rajasthan population followed by single crown on implant and RPD. Patients of different age, education, socio-economic groups select the treatment options based on various factors that affect the decision-making process like cost, time, damage to healthy tissue, fear of surgery, risk of failure etc. There is a need to

educate the patients regarding all the available options as well as their advantages and disadvantages, the final call should be made keeping all the factors in mind and whatever is best for the concerned patient.

CONFLICT OF INTEREST

No potential conflict of interest relevant to this article was reported.

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