Awareness On Management of Transitional Implants

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Abstract

Introduction: Dental implant treatment has evolved a lot over the years for replacing missing teeth. There are clinical situations wherein the patient would have to go through a waiting period after a surgical procedure. During such a waiting period, the patient needs to function on a fixed temporary restoration till the final restoration can be placed. This has been made possible by the advent of transitional implants which have been designed and placed along with the conventional implants for the replacement of the patient’s missing dentition and enabling the patient to experience the benefits of implantology immediately. Aim: The purpose of this study was to evaluate the awareness about transitional implants among dental students.

Materials And Method: The present study was a questionnaire based survey study. A total of 100 dental students from Chennai population took part in the study. Self-structured standard questionnaires were given to the students through an online portal and the survey was administered to the students belonging to first year, second year, third year, final year, interns and PG. The survey was conducted among them to analyse their awareness of management of transitional implants. Survey consisted of a set of 10 questions. Random sampling was done. Data was collected and put into pie charts to display the statistical results.

Results: Students belonging to PG were most aware about transitional implants and its indications. 58.4% were aware of the osteotomy, 60% were aware that both edentulous and partially edentulous patients can undergo transitional implant placement and 60% were aware of its role during overdentures. According to the chi square test, (p<0.05). Thus data was statistically significant.

Conclusion: Within the limits of the study, it is observed that the students had awareness about transitional implants. However, further awareness can be created among a larger number of participants.

Keywords: Osseointegration, transitional implants, temporization, overdenture, innovation

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INTRODUCTION

Transitional implants are narrow diameter implants that were developed to support provisional fixed restorations during the phase of osseointegration of the definitive implants and are usually placed simultaneously with definitive implants (1). They are placed in a non submerged fashion in a single stage surgical procedure and are designed to be immediately loaded. Typically they are placed between the definitive implants and allow for their load free osseointegration (2). The patient can function normally and at the same time have good esthetics and phonetics with the help of good provisional/temporary restorations fixed to such transitional implants (3).

They are removed with manual tools at the end of the provisional phase. The definitive implants are then restored according to the main treatment plan. The concept of osseointegration is the direct anchorage of pure/alloyed titanium in the jaw bone and was a great breakthrough in oral rehabilitation (4). Experimental and clinical evidence led to the establishment of clinical guidelines for achieving predictable osseointegration with titanium implants (5).

For a long time, submerging of the implant by means of a two-stage procedure was thought to be a prerequisite. This is the classical Branemark protocol and involves placing of the implant in the bone and covering it with a muco-periosteal flap (6). The implant is uncovered after a submerged healing period. However, various studies beginning with those carried out on the
ITI system of implants demonstrated good results with a non submerged/ single stage procedure, i.e. a procedure wherein the implant was placed in the bone with the healing abutment attached to it at the same stage and mucosa sutured circumferentially around it (7).

Such single stage procedures are gaining in popularity but can be utilized only when the suitably long (more than 10 mm) implants are inserted with a high 'primary stability' (high insertion torque), in a patient's native bone and in a mouth free of periodontal disease (8). In the past, implants were placed in regions of adequate bone, albeit with little/no regard to rules of prosthodontics. Today’s implantology is more ‘prosthetically driven’. Over the last two decades, the ability to accurately assess bone quality and quantity has greatly simplified the treatment planning process (9). CT scanning, use of three-dimensional reformatted imagery and related software, e.g. Simplant (Columbia Scientific Inc, Columbia) has added to our ever increasing diagnostic armamentarium (10). Advances in techniques and materials have facilitated rebuilding ridge height and volume, preventing some of the surgical and prosthetic problems that used to be encountered. Today’s reality is that a sound foundation can be prepared for future health, function and esthetics using modern implantology (11,12). The purpose of this study was to evaluate the awareness about transitional implants among dental students.

Our team has extensive knowledge and research experience that has translate into high quality publications (13–33).

Materials And Method

The present study was a questionnaire based survey study. A total of 100 dental students from Chennai population took part in the study. Self-structured standard questionnaires were given to the students through an online portal and the survey was administered to the students belonging to first year, second year, third year, final year, interns and PG. The survey was conducted among them to analyse their awareness of management of transitional implants. Survey consisted of a set of 10 questions. Random sampling was done. Data was collected and put into pie charts to display the statistical results. The chi-square test was used to compare the data and check for the distribution at 0.05 level of significance for effect of statistical significance. Results were analysed graphically, for both frequency distribution and statistical significance.

Results And Discussion

From the given charts after statistical analysis, it is observed that in Figure 1, 26.15% of the total number of students in the majority who took the survey were postgraduate students. In Figure 2, 80% were aware of what transitional implants are, Figure 3 shows that 47.69% are aware of its uses, Figure 4 shows that 58.46% are correct about the osteotomy procedure, Figure 5 shows 55.38% are aware of its indications, Figure 6 shows that 60% are aware of the type of patients ideal for transitional implants, Figure 7 shows 40% are aware about the healing period, Figure 8 shows that 60% think it is useful for overdentures, Figure 9 shows that 67.69% are aware of bone integration and Figure 10 shows that all the students who took the survey got awareness about transitional implants and would spread the awareness.

Upon chi-square and cross tabulation, it is observed that Figure 11 shows PG students are most aware of transitional implants, p value = 0.012 (p<0.05). Figure 12 shows that 15.38% of PG students are aware of its indications, p value = 0.001 (p<0.05). and Figure 13 shows that intern students were most aware of the kind of patients ideal for transitional implants, p value = 0.010 (p<0.05) and Figure 14 shows that interns were correct compared to other years about the healing period, p value = 0.001 (p<0.05). Thus all data were statistically significant.
Figure 1: pie chart showing frequency of year of study. It is seen that blue colour indicates 12.32% of first year students, green colour indicates 13.85% of second year students, beige colour indicates 26.15% of PG students, purple colour indicates 16.92% of final year students, yellow colour indicates 20% of interns and red colour indicates 10.77% of third year students.

Figure 2: pie chart showing response to question “are you aware of transitional implants”. It is seen that blue colour indicates 80% who have responded yes and green colour indicates 20% who have responded no.
Figure 3: pie chart showing response to the question “are you aware of its uses”. It is seen that the blue colour indicates 47.69% have responded maybe, green colour indicates 15.38% have responded yes and beige colour indicates 36.92% have responded no.

Figure 4: pie chart showing response to the question “are you aware that osteotomy shouldn’t be performed when in D4 and soft bone”. It is seen that blue colour indicates 58.46% have responded yes and green colour indicates 41.54% have responded no.
Figure 5: pie chart showing response to the question “are you aware of its indications”. It is seen that the blue color indicates 55.38% who have responded yes and green colour indicates 44.62% have responded no.

Figure 6: pie chart showing response to the question “which type of patient is transitional implant needed”. It is seen that 20% responded partially edentulous (green), 20% responded completely edentulous (green) and 60% responded both (beige).
Figure 7: pie chart showing response to the question “what do you think is the healing period for implants to become osseointegrated”. It is seen that 20% responded one month (blue), 40% responded no (green) and 40% responded maybe (beige).

Figure 8: pie chart showing response to the question “do you think they are useful for over dentures”. It is seen that 60% responded yes (blue), 15.38% responded no (green) and 24.62% responded maybe (beige).
Figure 9: pie chart showing response to the question “to establish bone integration do you think implant can be delayed”. It is seen that 67.69% have responded yes (blue), 9.32% responded no (green) and 23.08% responded maybe (beige).

Figure 10: pie chart showing response to the question “did the survey give you some awareness”. It is seen that all the participants of the survey got awareness about transitional implants and responded yes.
Figure 11: Bar chart showing correlation between the year of study and awareness about transitional implants. The x axis represents the year of study and the y axis represents the awareness of transitional implants among the study population. The blue bar indicates the response yes and the green bar indicates the response no. According to the chi Square test, p value = 0.012 (p<0.05). Thus data was statistically significant.

Figure 12: Bar graph showing correlation between year of study and awareness on the indications of transitional implants. The x axis represents the year of study and the y axis represents the awareness of indications of transitional implants among the study population. The blue bar indicates the response yes and the green bar indicates the response no. According to the chi Square test, p value = 0.001 (p<0.05). Thus data was statistically significant.
Figure 13: Bar graph showing association between year of study and knowledge on the type of patients best suited for transitional implants. The x axis represents the year of study and the y axis represents the type of patients where transitional implants can be used among the study population. The blue bar indicates the response yes, the green bar indicates the response no and the beige bar indicates the response maybe. According to the chi Square test, p value = 0.010 (p<0.05). Thus data was statistically significant.

Figure 14: Bar graph showing correlation between year of study and awareness on the healing period of osseointegration of implants. The x axis represents the year of study and the y axis represents the awareness on the time period of osseointegration of transitional implants among the study population. The blue bar indicates the response yes, the green bar indicates the response no and the beige bar indicates the response maybe. According to the chi Square test, p value = 0.001 (p<0.05). Thus data was statistically significant.
The main rationale for use of transitional implants is to provide retention, stability and support for a fixed provisional prosthesis during the time required for osseointegration of conventional implants.

The other applications documented for transitional implants are to provide a fixed provisional for protecting an osseous grafted site, for a fixed prosthetic reconstruction during the healing period, to provide stability to the surgical stent during implant placement, to eliminate need for a temporary tissue borne restoration, as an orthodontic anchor for quick and effective movement of other teeth, to stabilize existent dentures and replace congenitally missing maxillary lateral incisors (34). Transitional implants are placed after the definitive implants are in position. Generally in a fully edentulous mandible, four transitional implants are recommended for a fixed provisional restoration (35). However for a fully edentulous maxilla, at least five transitional implants are required for a similar result. For partially edentulous situations, two or three transitional implants are used. The number of pontics should generally be restricted to two, for posterior regions if a temporary bridge is being made (36). They should be placed at least 1.5 mm from adjacent teeth and the distance between any transitional implant and a definitive implant must be at least 1.5-2 mm (37). Transitional implants are contraindicated when there is less than 10 mm of cortical bone available for good anchorage and initial stability and when there is insufficient space available to place a sufficient number of implants to anchor the fixed provisional restoration. If the transitional implant is shortened because of lack of bone height, the bioengineering of the case should be reviewed and consideration should be given to placing additional implants to increase the support (38).

Developing a comprehensive treatment plan:- The importance of a written comprehensive treatment plan cannot be overemphasized. It should include all the proposed steps, including seemingly minor ones and must allow sufficient time for contingency procedures (39). Treatment planning begins at the initial consultation stage when the patient completes a detailed questionnaire. Panoramic and tomographic radiographs, if necessary, are taken. Two sets of impressions are made. A face bow transfer and bite registration is done. The casts are thus mounted on a semi-adjustable articulator (7).

A wax up of the case is done on one of the models. Care is taken to achieve an ideal occlusal plane and to incorporate a functionally sound occlusal scheme in the wax-up itself.

This step generally enhances not only patient-doctor communication, but it also supports communication between the surgeon, the restorative dentist and the laboratory technician (40). From a surgical stand point, the proper position and angulations of implants can be determined and the need for bone augmentation procedures can be realized before implant placement itself. The retention of natural teeth and their role in the treatment plan can also be evaluated (41). When considering the prosthodontic aspect, the use of transitional implants is decided as well as the number of implants to be placed. The best possible angulations for implants can be decided from the stand point of the occlusion planned for the case as well the esthetic aspects (42). Even other procedures besides the primary implant treatment can be evaluated and planned, such as a crown lengthening on a particular tooth, an elective endodontic procedure to correct the occlusal plane, or an orthodontic procedure to bring about better alignment and occlusion of teeth before initiating treatment.

Upon completion, the wax up is duplicated and two stents are fabricated. A clear vacuum formed stent is used during surgery to determine ideal implant location, angulation and bone/soft tissue sites that require augmentation. The second stent may be made from silicone and is used to develop the provisional restorations for function and esthetics. Unless these procedures are done, most technicians are required to interpret and execute a prosthetic case with little/no relevant information - mostly from imagination which always leads to patient's disappointment, greater chair side time, and at times, costly remakes (43).

Once the diagnostic wax-up is ready, there is a joint consultation between patient, surgeon, and the restorative dentist. The laboratory technician may also be present if required. Questions about the number of implants to be placed, whether bone grafting or soft tissue augmentation would be required, the type of restoration, the duration of treatment are discussed and explained to the patient (44). Following this, the implant placement surgery is executed. The conventional implants are placed in their positions as dictated by the main treatment plan. The transitional implants are then placed using guidelines as discussed previously.

Awareness was created among the students about transitional implants, its uses and indications and its significant role in the field of implantology. The use of transitional implant for supporting restorations during the phase of osseointegration of the definitive implants has been shown to be appropriate, productive, and highly rewarding. The ultimate result of following such a protocol is an enhanced quality of life for the patient (45).

Besides promoting function, by using provisional restorations on transitional implants, dentists can assess patient's concerns and make necessary amendments to the provisional and final restorations. There is no doubt that transitional implants have
become part of the standard of care of modern implantology.

**Conclusion**

Within the limits of the study, it is observed that the students had awareness about transitional implants. However, further awareness can be created among a larger number of participants in the field of dentistry about transitional implants, its management and indications. Aesthetics plays a major role in dentistry as well as the treatment duration. Transitional implants are very efficient when it comes to aesthetics and treatment duration until the final prosthesis is planned and performed in the patient. Further studies can be done for better results in a longer period.

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**Author Contribution**

R. Preety - completed the study and wrote the manuscript

Dr. Dhanraj M. Ganapathy and Dr. Revathi Duraisamy - Evaluation and revision of manuscript

**Conflict Of Interest**

None to Declare.

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