

MAXILLARY IMPLANT-SUPPORTED FIXED DETACHABLE PROSTHESIS: A CASE REPORT

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Case Report

ABSTRACT

This clinical case report details the clinical sequence of a 78-year-old male receiving prosthetic rehabilitation using an implant-supported screw-retained fixed partial denture. Despite the limitations imposed, the aesthetic and functional demands of the patient were fulfilled by this prosthetic rehabilitation. The importance of detailed prosthetic planning and evaluation prior to implant surgery is essential, therefore ideally, it should be done by the same operator or a team of operators working together. Problems can arise when the construction of the prosthesis is performed by other people who are not involved in the planning stage.

INTRODUCTION

The shortcomings of complete dentures have been addressed by the emergence of osseointegration dental implants. This has been manifested by an increased demand in the use of dental implants in the rehabilitation of edentulous or partially edentulous patients. The predictable retention and stability of implant supported or retained prostheses have made these treatment modalities feasible solutions for improving oral function and quality of life (1).

The restoration of edentulous maxillary arch with implants can be extremely challenging particularly at the treatment planning stage. At this stage, one should always bear in mind of the principle known as treatment simplification (2). This is because certain treatments may be technically possible but too complex to be implemented, for instance, due to lack of skills and laboratory support.

In a worse situation, the prosthodontist may not be involved in the initial planning of implant placement thus resulting in a restorative phase that is too complicated and a treatment plan which seems not to work (2). Ideally, the management of the sequencing of the treatment and subsequent referral should be done by the prosthodontist.

The prognosis of fixed cantilever prosthesis when placed in the maxilla seemed to be less predictable as compared to one placed in the mandible (3). Most of the difficulties are related to the unique anatomical features of the maxilla

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subsequent to tooth loss. The replacement of missing maxillary teeth is fairly complex as the artificial teeth may need to be placed at a substantial distance horizontally and vertically from the location of supporting bone and implants. Among the most frequently cited problems with regards to maxillary implants were the lack of lip support, aesthetics, speech difficulties and oral hygiene access (4,5).

In general, a review of the literature demonstrated lower survival rate for osseointegrated maxillary implants than mandibular implants (6,7). This is due to the fact that the maxilla is able to withstand lower stresses with its thinner cortical layer and lower density maxillary spongiosa (8). Many clinicians have suggested the use of removable-overdenture type prostheses for the treatment of the edentulous maxilla (9).

CASE REPORT

A 78-year-old medically fit male previously treated with implants presented at the Eastman Dental Hospital (EDH), UK for an implant-supported prosthesis. Patient was initially referred to EDH because of a loose long span maxillary partial denture. The patient's dental history revealed that seven implants had been placed in the maxilla and two implants in the mandible by a previous implantology post-graduate student and was confirmed by radiographic examination. Regular platform implants (Nobel Biocare, Göteborg, Sweden) were placed in the region of 11, 14, 16, 21, 24, 26, 27, 46 and 47.

The patient was medically fit and clinical examination revealed seven unrestored implants already placed and one molar with a crown in the right quadrant in the maxilla (Fig. 1). In the



Figure 1: 6 weeks after second stage surgery.



Figure 2: Complete tooth set up.

mandible, five posterior teeth were missing and two implants were placed in the region of 46 and 47. One implant in the mandible became loose and was lost prior to the second stage surgery, however the patient declined to have it replaced as he did not want to go through anymore surgery. The patient had a maxillary mucosa borne acrylic RPD. His oral hygiene was moderate.

The treatment options proposed to this patient were fixed ceramometal prosthesis, fixed metal

acrylic prosthesis and implant-supported overdenture. He requested a permanent fixed prosthesis due to denture intolerance. He was informed of the difficulty in cleaning a fixed detachable prosthesis. Regarding the single molar tooth left in the maxilla, the patient insisted to keep the tooth although explanation was given to him that it may be the cause of ill-fitting RPD as he had not experienced a good complete maxillary denture which is usually stable and retentive. After a lengthy discussion with the patient regarding treatment options, a screw-retained metal acrylic fixed partial denture supported by seven implants was selected for this case.

The aims of the treatment were to provide the patient with maxillary implant supported prosthesis to restore function, aesthetics and general oral health.

Construction of maxillary provisional implant supported fixed prosthesis

Impressions of both arches were made using alginate from which maxillary special tray and wax rim were constructed. Maxillary final impression was then taken using vinyl polysiloxane material Working impression was made at abutment level using vinyl polysiloxane material. Two 17° multi-unit angled abutments (Fig. 3) were used due to the poor positioning of the two anterior implants. Wax rim was then constructed. Face bow record and jaw registration were taken using wax rim. Working casts were mounted on a semi-adjustable articulator.

Provisional prosthesis was prepared on the working cast with acrylic teeth (Fig. 2). In terms of occlusion, the arrangement of the acrylic teeth was based on group function. Tooth try-in was done to evaluate the aesthetics, phonetics and verify the location of the definitive prosthesis. The arrangement of the acrylic teeth was adjusted accordingly until patient was satisfied with the appearance. Provisional restoration was then constructed and fitted. The patient was reviewed and was comfortable with the provisional restorations.

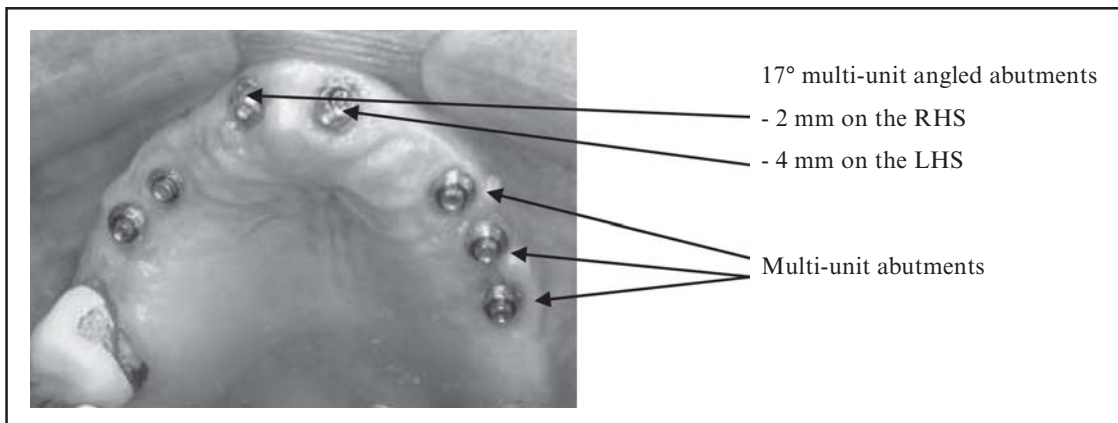


Figure 3: Try-in of abutments.

Construction of maxillary definitive implant supported fixed prosthesis

Just prior to the construction of the definitive restoration, patient realised that he was not fully satisfied with the appearance of the provisionals as he thought that they were too big, therefore tooth try-in was repeated where smaller teeth were selected. After that, a silicone index was taken over the provisionals so that all information regarding tooth arrangement can be transferred to the laboratory.

A gold bar superstructure was constructed where the acrylic teeth were arranged. The gold bar was tried in the mouth to ensure passive fit of the framework (Fig. 4). After confirming passive fit of the gold framework, acrylic denture teeth were arranged over the superstructure and a full try-in was carried out to make sure that the patient was happy with the teeth arrangement, any modification may still be feasible at this stage. After that, an implant-supported metal acrylic FPD was fabricated (Fig. 5).

A definitive prosthesis was fitted (Figs. 6-9) and all the screws were tightened. The screw-access openings were filled with vinyl polysiloxane (Memosil; Heraeus Kulzer). Patient was followed up and reviewed.

For the lower implant, a single PFM crown were constructed and cemented over a custom abutment (Fig. 7).



Figure 6: Anterior view.



Figure 7: Right lateral view.



Figure 4: Try-in of gold bar – Occlusal view.



Figure 8: Left lateral view.



Figure 5: Completed prosthesis.



Figure 9: Fitting of prosthesis.

Maintenance

The care and maintenance of any fixed prosthesis must be emphasized to the patient. An implant supported prosthesis requires a stricter regime to inspect for screw loosening. Cleaning a hybrid prosthesis on implants is very difficult for the patient. Hence, the patient is usually required to come for maintenance every three months. This prosthesis may not decay but it is liable to infection e.g. periimplantitis if not properly maintained. The patient was referred back to his general dental practitioner and hygienist for regular check-ups.

DISCUSSION

Treatment planning and choice of prosthesis need to be carefully planned especially for patients with high demand. The transition from dentate to partially or completely edentulous state may affect the patient's emphasis on treatment from the functional viewpoint to more subjective purposes, such as aesthetics and comfort (10). Implant restorations for edentulous patients can be either by means of fixed or removable prosthesis. Factors to be considered when deciding on the type of prosthesis include the patient (patient's expectations or demands) and condition of the arches (either for maxilla or mandible) (9).

As the patient had moderate maxillary bone loss with an average smile line, fixed detachable prosthesis is suitable for this case as suggested by Sadowsky (11). Acrylic teeth were considered as an alternative to ceramic teeth for this patient in view of the risk of differential wear of the opposed natural teeth. The cost of ceramic teeth has to be taken into consideration even though fixed ceramic prosthesis offers optimum aesthetics, function and hygiene (10).

Heydecke et al (12) found that maxillary implant overdentures were preferred to fixed prostheses, as they generally satisfied the aesthetics, lip support, phonetics and ease of cleaning, but this patient requested for a fixed prosthesis and prosthesis cleanliness was reinforced to this patient. Staining of the acrylic teeth was also done to improve aesthetics and to match the lower natural teeth.

Attard and Zarb (13) confirmed the long term treatment outcome of patients treated with fixed prostheses supported by Brånemark implants. For prosthesis that is meant for full mouth rehabilitation, Branemark et al (14) suggested that it required 4 to 6 10 mm implants for high predictability. However, implant overdenture may still be considered for patients with insufficient number of implants for a fixed prosthesis (15).

CONCLUSION

The treatment outcome for this patient was considered good and acceptable. In this case, the treatment planning was done by different operators therefore, it became a limitation to the author when giving appropriate treatment options to the patient. Implant supported overdenture would have been a better choice for a 78 year old patient. Nevertheless, as for all types of prostheses, regular review must be done to ensure longevity of this prosthesis.

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