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Transition from failing dentition to complete-arch implant rehabilitation with a staged approach using final abutments: ***A clinical report***

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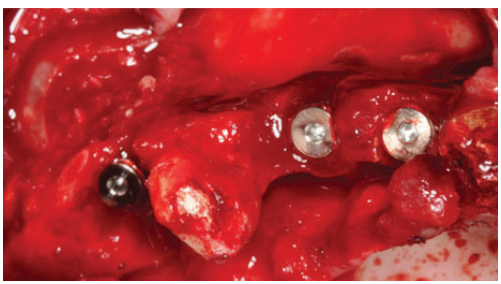
ABSTRACT

Many patients object to wear a removable complete denture during the transition from failing dentition to complete-arch rehabilitation using dental implants. A staged treatment approach provides a fixed interim prosthesis for use throughout the rehabilitation process, confronting such patient objection. This clinical report describes a staged approach protocol using Ditron Dental MPI™ implants. The prosthesis was supported by healthy abutment teeth up to complete-arch rehabilitation of a patient with failing dentition. This protocol allowed the use of a fixed interim prosthesis during the entire rehabilitation process, avoiding the use of complete dentures. The implants and prostheses were functioning successfully after 1 year of clinical service.



INTRODUCTION

The advent of implants revolutionized dentistry.[1-4] When transitioning from a failing dentition to a complete-arch rehabilitation, significant treatment planning is required.[5,6] This transition may involve temporarily rendering the patient edentulous. Different treatment approaches have been proposed for the rehabilitation of failing dentition.[5-13] Many patients object to the use of complete dentures for psychological, functional, or esthetic reasons and request fixed provisionalization throughout the rehabilitation process.[7-10]

The staged treatment approach includes the strategic use of teeth to serve as abutments for a fixed interim prosthesis during the osseointegration period.[5-13] This interim prosthesis can be tooth-supported during implant osseointegration and later converted to an implant-supported interim or permanent prosthesis.

The staged approach is comprised of the following steps:

1. Diagnosis and treatment planning;
2. Elimination of disease;
3. Strategic extractions and tooth-supported fixed interim restoration;
4. Prosthetically driven implant placement followed by a healing period;
5. Conversion of the interim restoration from tooth to implant-supported, and soft tissue conditioning;
6. Prosthodontic procedures for definitive rehabilitation.[6]

This treatment option offers the benefits of having fixed interim restorations throughout the treatment with maximum patient comfort and enhanced prosthodontic and periodontal control.[6-13]

CLINICAL REPORT

A 58-year-old woman presented to a private clinic for implant consultation. The patient's medical history was noncontributory. Intraoral clinical and radiographic examination found failing dentition as a result of advanced periodontal disease and recurrent caries. *(Fig. 1-2)*

Various treatment options were discussed with the patient as she refused to wear a removable prosthesis at any time during the treatment. Five maxillary teeth and 3 mandibular teeth were available to serve as definitive abutments for an interim and later a permanent fixed dental prosthesis *(FDP)*. Thus, an interim prosthesis with tooth retention was chosen. At the initial visit, existing FDPs were removed and hopeless maxillary and mandibular teeth were extracted. After the extractions, an interim maxillary FDP with lingual metal reinforcement was inserted and cemented with polycarboxylate cement *(Durelon; 3M ESPE)*. The maxillary FDP was supported by the right second premolar, the right and left central incisor, left lateral incisor and the left first molar. The same procedure was used to insert the mandibular FDP with lingual metal reinforcement supported by the right canine, left canine and first premolar. At the recall appointment, the patient expressed her satisfaction and comfort with the new fixed interim prostheses.

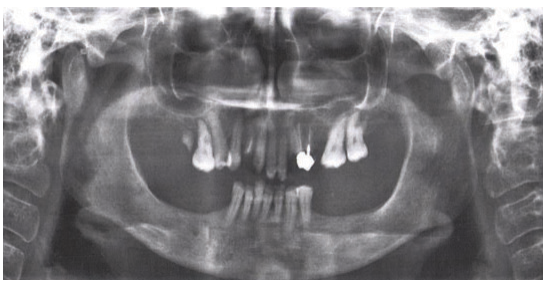
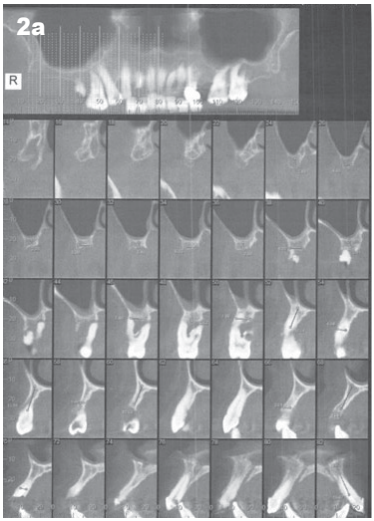
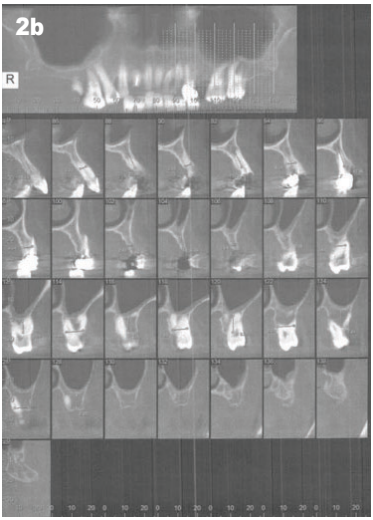
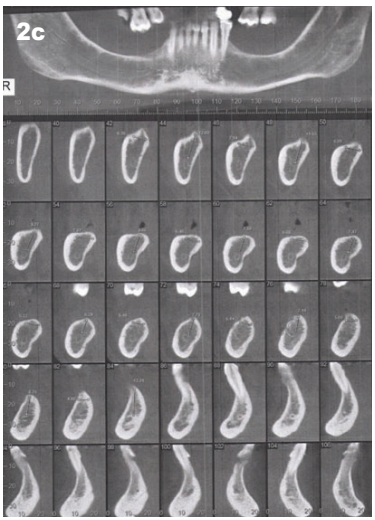


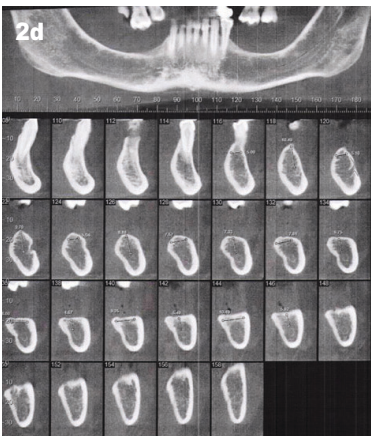
Fig. 1: extensive exposure of molar furcation





Figs. 2a and 2b Preoperative CT maxilla





Figs. 2c and 2d Preoperative CT Mandible

Two months post-extraction, the patient presented for sinus augmentation at the maxillary right posterior area *(Fig. 3)*.

A lateral window technique was used, and 3 dental implants *(MPI™ / Ditron Dental, Ashqelon, Israel)* were placed simultaneously at the first molar, first premolar and canine positions *(Fig. 4)*.

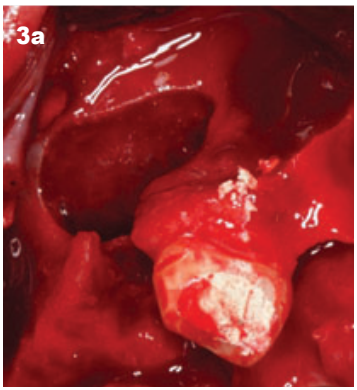


Fig. 3a: Sinus augmentation – lateral window

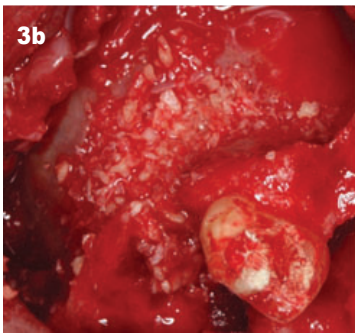


Fig. 3b: Sinus augmentation – bone graft

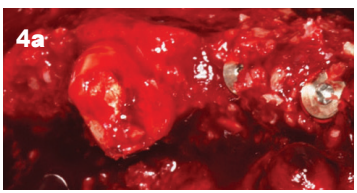


Fig. 4a: Implant placement + augmentation

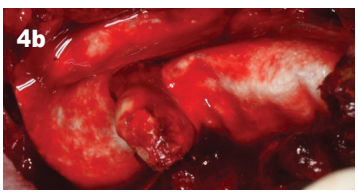


Fig. 4b: Membrane placement

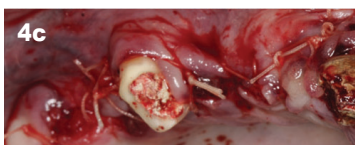


Fig. 4c: Soft tissue closure

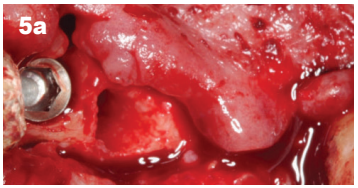


Fig. 5a: Implant placement 23

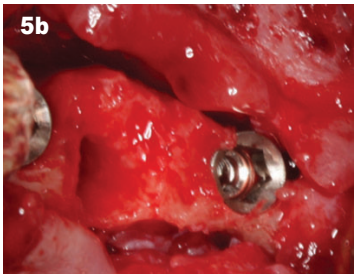


Fig. 5b: Implant placement 25

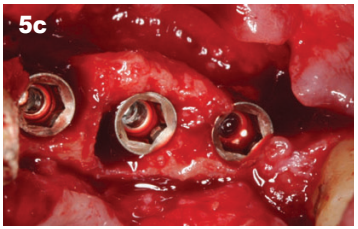


Fig. 5c: Implant placement 24

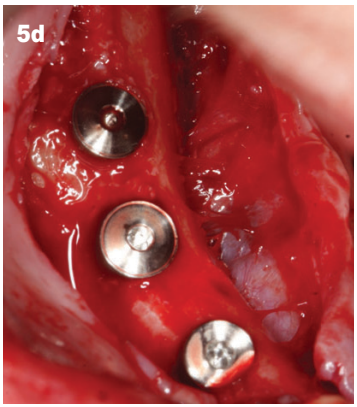


Fig. 5e: Implant placement 32, 42

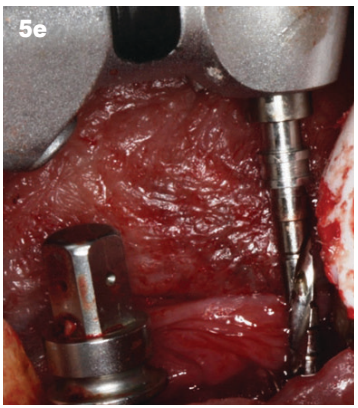


Fig. 5d: Implant placement 44-46

Three additional implants *(MPI™ / Ditron Dental, Ashqelon, Israel)* were added at the sites of the left canine, first and second premolars *(Fig. 5)*. In addition, horizontal augmentation was performed at all implant sites. Mandibular implant surgery was performed, and 7 dental implants *(MPI™ / Ditron Dental, Ashqelon, Israel)* were placed in the sites of the second lateral, second premolar and first molar bilaterally and first premolar on the right *(Fig. 5)*. At a postoperative appointment one week later, the patient expressed her satisfaction with the course of treatment *(Fig. 6)*.

After 9 months, maxillary and mandibular second stage surgery was performed, and healing abutments were connected to the implants. All the implants were stable without bone resorption *(Fig. 7)*.

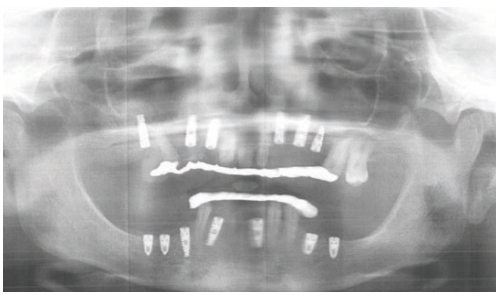


Fig. 6: Immediate post-surgery panoramic view

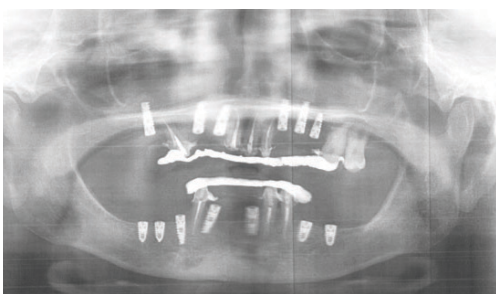


Fig. 7: 9 months post-surgery panoramic view

The patient presented for the definitive impressions after an additional 2 months of soft tissue maturation and conditioning. Modifications of the interim FDPs were made during this period to finalize and idealize the tooth form and spatial orientation. After packing retraction cord and placing the impression copings, impressions were made with custom closed-trays for both teeth and implants.

At the following clinical visit, the custom abutments and metal frameworks were fitted, and fit accuracy was confirmed clinically and radiologically.

The metal frameworks were veneered with porcelain. Two weeks later, the metal ceramic crowns and FDPs were evaluated at the bisque stage, and minor occlusal adjustments were made. The prostheses were returned to the laboratory for glazing.

At the prostheses insertion appointment, the custom abutments were tightened to 35N/cm, and screw access channels were sealed with cotton and composite resin *(Filtek Z250; 3M ESPE)*. Subsequently, metal ceramic crowns and FDPs were cemented with definitive resin cement *(GC Fuji Plus; GC America)*.

One week later, the patient expressed her satisfaction with the esthetics and function *(Fig. 8)*.

An occlusal device was provided to protect the prostheses from porcelain chipping and parafunctional activity.

When recalled a year later, the patient was still satisfied with her implant rehabilitation.

Fig. 8a: Final FDP – maxilla

Fig. 8b: Final FDP – mandible

Fig. 8c: Final FDP – occlusion

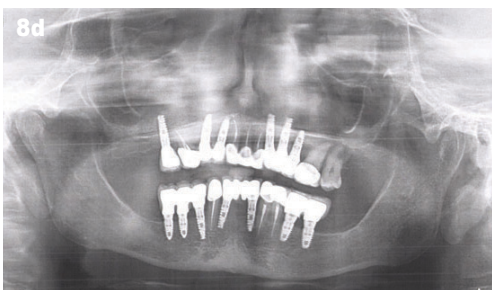


Fig. 8d: Final FDP – panoramic view

DISCUSSION

The advantages of the staged approach include the elimination of the need for removable prostheses and maximization of patient comfort.[6-11] If augmentation is necessary, the staged approach avoids any deleterious pressure from complete dentures to the augmented sites. Limitations pertain to the extension of treatment time compared with the option of removing the hopeless dentition and inserting a complete denture.[6-9]

A transitional removable prosthesis, often used as part of the staged approach, can lead to various functional and psychosocial problems[16] – aside from impaired masticatory force, lack of social interaction and inability to speak normally should also be considered.[17] An excess force applied by a removable prosthesis can also cause additional bone loss around the remaining teeth.[18]

For the aforementioned patient, the number of remaining teeth and the extent of the edentulous spans allowed teeth to be used for retention of interim prostheses. Therefore, a fixed interim prosthesis supported by the remaining teeth was chosen.[9]

The main problem associated with the clinical use of tooth-supported interim prostheses is decementation. In our case, decementation was not an issue - monthly recalls solved this problem, especially because this patient regularly visited the dental office for bone grafts, recalls, and surgical implant placements. The use of definitive cement such as polycarboxylate *(Durelon)* provided satisfactory retention.

Advanced periodontal disease is a rather common finding in patients in need of full mouth rehabilitation due to history of poor oral health. Strict oral hygiene must then become an everyday part of the patient's life, and the staged approach allows him

to adopt new, better oral hygiene habits. Cleaning underneath this interim prosthesis was no different than for any other fixed prosthesis. The use of a threader-led floss such as Super Floss *(Oral-B)* underneath the pontic areas was recommended.

A segmented design was selected for the definitive prosthesis. Teeth and implants were not connected. The rationales for segmenting the complete-arch rehabilitation include ease of fabrication and ease of maintenance in the event of complications. A recent systematic review found that biologic and technical complications are not uncommon with implant-supported fixed complete dental prostheses.[14,15]

SUMMARY

The clinical significance of this report lies in the treatment sequence of a staged approach protocol. Frequently, the number or the condition of remaining teeth and the extent of the edentulous spans allow the teeth alone to be used as interim abutments to support a fixed interim prosthesis. This clinical report demonstrates how using fixed interim prostheses supported by the remaining teeth allows the use of a fixed provisional restoration during the transitional period from failing dentition to definitive implant rehabilitation.

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