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CLINICAL REPORT

All in One: A Case Report

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Abstract To plan and execute the rehabilitation of a decimated occlusion is probably one of the most intellectually and technically demanding tasks faced by any restorative dentist. This clinical report describes a multidisciplinary approach for complete oral rehabilitation of a patient with few remaining natural teeth. The treatment included the use of a complete denture, removable partial denture, fixed partial denture and implants for restoring the patient's esthetics and function.

Keywords Precision attachments · Implants · Overdenture · Fixed partial denture

Introduction

The goal of dentistry is to increase the life span of the functioning dentition, just as the goal of medicine is to increase the life span of the functioning individual. In striving to achieve this, dentist use their knowledge, skill, and possible resources for maintenance and rehabilitation [1]. In Prosthodontics we commonly deal with replacement of missing teeth using removable partial dentures with or without precision attachments, fixed partial dentures with tooth or implant support, tooth or implant retained overdentures etc. In some clinical situations a combination of different type of restorative options is required to achieve the best results. One such case is being discussed in this report where a combination of implant retained complete denture, removable partial denture with precision attachments and fixed partial denture has been used for successful rehabilitation.

Precision attachments permit a favourable distribution of functional stresses, both in a vertical and horizontal direction [2]. A precision attachment is used with removable partial denture for better esthetics, maintainable periodontal health, longevity of abutment teeth, patient comfort and enhanced retention.

The tipping of an abutment tooth as a result of the simple type of occlusal rest usually employed in clasp appliances is prevented with the use of a precision attachment as the thrust of the occlusal end of the male portion forces the tooth to maintain its position [3]. The principles to be followed in the construction of a precision attachment are divided into three phase's i.e., (1) abutment planning, (2) saddle design, and (3) relationship of saddles to abutments [4].

The presence of natural teeth in the maxillary arch imparts more stresses to the opposing residual alveolar ridge which leads to more resorption. This resorption could be prevented by placing implants on the mandibular arch.

An implant retained overdenture has the advantage of better retention, comfort, improved masticatory efficiency and prevention of alveolar ridge resorption over a conventional denture. Implants for overdentures should be placed only after careful analysis of the space needed for the prosthetic components. The minimum space requirement differs according to the dimensions of the attachment and implant system used. Proper implant positioning in a mesiodistal, buccolingual, and occlusogingival direction are significant for a successful overdenture. Implant over dentures provide the greatest degree of efficiency, followed by the tooth supported overdenture and then the complete denture [5].

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Ball/O-ring attachments transfer less stress to implants than the bar-clip attachments and also minimize denture movement [6, 7].

Case Report

A 70 years old male patient reported to the Department of Prosthodontics in Panineeya Mahavidyalaya Institute of Dental Sciences, Hyderabad, with a complaint of inability to chew food. Patient is affected with Bell's palsy of the left side since the past 10 years and is still under medication.

Fig. 1 Maxillary partially edentulous arch

Fig. 2 Mandibular edentulous arch

Fig. 3 Pre-operative OPG

Clinical findings (Fig. 1) showed that 12, 13, 14, 15, 23, 24, 25, 33, 47 teeth were present in the maxillary and the mandibular arch. 12, 33, 47 were periodontally compromised with grade III mobility, rest of the teeth were firm and favourable to function as abutments for fixed partial denture or removable partial denture. The mandibular residual alveolar ridge (Fig. 2) was severely resorbed and could be classified under Atwood's class V Orthopantomograph (Fig. 3) showed that 12 had angular bone loss, 47 showed furcation involvement and horizontal boneloss, 33 showed boneloss with widening of periodontal ligament.

Preliminary impressions of the maxillary and mandibular arch were taken with alginate (tropicalgin). Tentative

Fig. 4 Temporization and trial done

Fig. 5 Elastomeric impression

Fig. 6 Master cast

Fig. 7 Attaching the stud attachment to the wax pattern with the help of parallellometer

Fig. 8 Wax pattern with stud attachment

Fig. 9 Metal trial

Fig. 10 Metal trial (*left side*)

Fig. 11 Metal trial (*right side*)

jaw relations were recorded and diagnostic mounting was done to assess the vertical height for precision attachment and implant retained overdenture. A diagnostic waxing of the proposed fixed partial denture was used to determine esthetics. Based on clinical and radiographic findings the following treatment plan was formulated:

- Oral prophylaxis
- Extraction of 12, 33, 47
- Fixed partial denture in the region of 13, 12, 11, 21, 22, 23
- Splinted crowns for 14, 15 and 24, 25
- Cast partial denture with precision attachments in the region of 26, 27, 36, 37
- Implant retained mandibular overdenture

Procedure

Oral prophylaxis was followed by extraction of maxillary right lateral incisor. Preliminary impressions of the maxillary and mandibular arches were made with alginate (tropicalgin) and impression compound (DPI) respectively.

Fig. 12 Bisque trial (*left side*)

Fig. 13 Bisque trial (*right side*)

Fig. 14 Bisque trial

Border moulding (DPI green stick) and secondary impression (DPI zinc-oxide eugenol) of mandibular arch was made using a custom tray. Tooth preparation was done for 13, 14, 15, 23, 24, 25 followed by elastomeric impression (Exaflex) (Fig. 5) of the prepared tooth and master cast was poured (Fig. 6). Face-bow transfer was done to Hanau—wide vue semi-adjustable articulator, jaw relation were recorded and try in was done. Indirect method of temporization was done (Fig. 4).

Fig. 15 Undercuts blocked

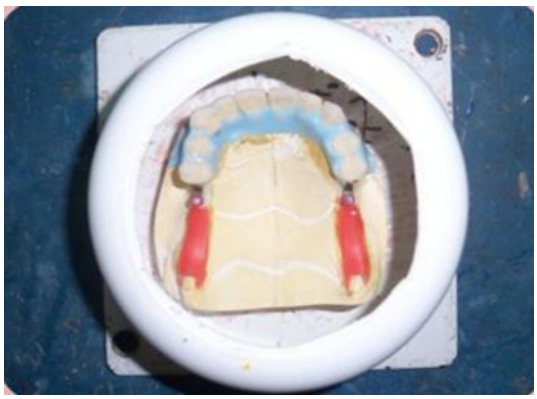

Fig. 16 Master cast sealed in duplicating flask

Fig. 17 Duplicating silicone is mixed

Wax patterns were made for porcelain fused to metal fixed partial denture from 13 to 23 and splinted porcelain fused to metal crowns on 14, 15 and 24, 25. Prefabricated plastic stud attachments (rhein attachments) were attached to the distal surface of the wax pattern of 15 and 25 by using the parallellometer (Figs. 7, 8) which helped to position the stud attachment parallel to the path of insertion. Casting of the wax pattern was done followed by metal trial (Figs. 9, 10, 11) and bisque trial (Figs. 12, 13, 14).

Fig. 18 Duplicating silicone poured in the flask

Fig. 19 Master cast is retrieved from the flask

Fig. 20 Wax pattern on the refractory cast

During bisque trial, pick-up impression was made with elastomeric impression material, in which the FPD and crowns with the stud attachment were picked up along with the impression of the arch and the master cast was poured in die stone. Master cast with the FPD and crowns were blocked out with blockout wax, relief wax was placed in the residual alveolar ridge, plastic positioner was placed on the stud attachment, beading was done at the peripheral extension of the major connector (Fig. 15). The master cast was sealed in the duplicating flask (Fig. 16) and duplicated with the silicon duplicating material (Figs. 17, 18). After

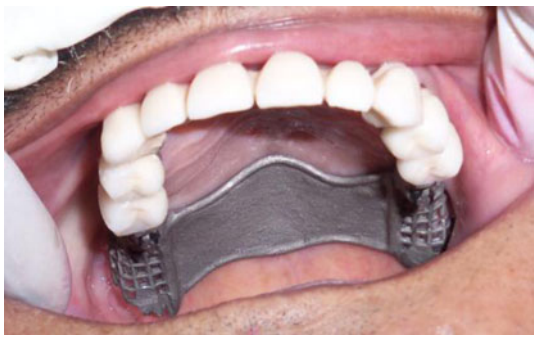

Fig. 21 Cast partial framework trial

Fig. 22 Try in done

Fig. 23 FPD cementation done

Fig. 24 CPD insertion done

Fig. 25 Mandibular denture insertion done

Fig. 26 Post-operative intra oral view

Fig. 27 Osteotomy

Fig. 28 Implant placement

Fig. 29 Implant placed in 43

Fig. 30 Implant placed in 33

the silicon duplicating material was set, the master cast was retrieved (Fig. 19) from the duplicating flask and refractory material was poured into the flask.

Palatal strap major connector wax pattern was adapted along the beaded portion to the refractory cast followed by meshwork minor connector wax pattern on the residual alveolar ridge and a castable housing above the stud attachment was placed, which was sealed with wax to the major connector (Fig. 20). Refractory cast with wax pattern was invested, followed by burnout and casting. The trimmed and finished framework was verified on the master cast and checked intraorally (Fig. 21). Jaw relation and try-in (Fig. 22) were carried out. The dentures were processed, trimmed, finished and polished. On the day of insertion, nylon caps (female part) were placed on the housings of the cast partial denture, FPD 13–23, crowns 14, 15, 24, 25 were cemented (Fig. 23) with glass ionomer luting cement and simultaneously the cast partial denture (Fig. 24) along with the mandibular complete denture (Fig. 25) were inserted and the patient was asked to occlude until the luting cement set (Fig. 26). The nylon caps were fixed to the housing with autopolymerizing acrylic resin.

The mandibular denture was later duplicated and used as a surgical stent for the implant retained overdenture. Bone mapping was done to assess the bone width in the

Fig. 31 Post-operative OPG

mandibular canine region which was calculated as 6 mm bilaterally. Mucoperiosteal flap was reflected in the mandibular inter canine region, osteotomy (Fig. 27) was done in the region of 33 and 43 followed by implants placement (UNITI 3.7/13 mm) and suturing (Figs. 28, 29, 30). Post–operative OPG was taken to evaluate the position ofimplants (Fig. 31). After an osseointegration period of 4 months a flap was elevated in the implant region and the ball-abutment was screwed in to the implant. Female part was placed above the ball abutment and the denture was relieved until the denture seated completely on the residual alveolar ridge. Female part was picked up in the denture with the auto-polymerizing acrylic resin placed in the relived area and the patient was asked to bite in occlusion until the resin cured.

Conclusion

The case presented here gives us an insight of how various treatment modalities, both contemporary and modern, can be efficiently used to restore esthetics and function in a patient with multiple missing teeth.

Enhanced retention and stability, optimal functional stress distribution on the residual ridge and abutment teeth, pleasing esthetics, improved masticatory function and patient comfort were satisfactorily achieved in this patient with a combination of various restorative treatment options.

References

1. Goldman I (1952) The goal of full mouth rehabilitation. J Prosthet Dent 2(2):246–251
2. Schuyler CH (1946) Partial denture design and planning. In: Miller SC (ed) Oral diagnosis and treatment, 2nd edn. The Blakiston Company, Philadelphia, p 461
3. Granger ER (1943) Mechanical principles applied to partial denture construction. J Am Dent Assoc 28:1943–1951
4. Leff A (1952) Precision attachment dentures. J Prosthet Dent 2(1):84–91
5. Chaffee NR (2002) Prosthetic complications in an implant-retained mandibular overdenture population: initial analysis of a prospective study. J Prosthet Dent 87:404
6. Kenney R, Richards MW (1998) Photoelastic stress patterns produced by implant-retained overdentures. J Prosthet Dent 80:559–564
7. Tokuhisa M, Matsushita Y, Koyano K (2003) In vitro study of a mandibular implant overdenture retained with ball, magnet, or bar attachments: comparison of load transfer and denture stability. Int J Prosthodont 16(2):128–134