

CASE REPORT: IMPLANT SUPPORTED REMOVABLE PARTIAL OVER-DENTURE RESTORING MANDIBULAR KENNEDY'S CLASS I.

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ABSTRACT

Removable dentures remain an essential prosthetic consideration in many conditions of oral rehabilitation, especially when restoring edentulous spaces posterior to the anterior remaining teeth. The problems could be attributed to the absence of the posterior abutment, placement of posterior implants provides patients with unique service and benefits not possible with more conventional treatment options. A 44 years old male with Kennedy class I mandibular partially edentulous ridge extending distal to the second premolar, full dentition in maxillary arch, was complaining of poor stability with his old denture. Two implants are placed in the second molar position (one in each side) and received a removable partial denture supported on healing abutments. Patient was followed up for one year clinically.

Keywords: Removable partial overdenture, implant supported overdenture, distal extension removable partial denture.

INTRODUCTION

Kennedy class I presents challenges for clinicians, as these dentures require support from the teeth, the mucosa and the underlying residual alveolar ridges. In particular, the distal extension removable partial denture (RPD) is subjected to vertical, horizontal and torsional forces that may have adverse effects during functional and para-functional activities (1).

The problems could be attributed to the absence of the posterior abutment.(2) Since, the difference in displacement between the mucosa and the periodontal ligament of last standing abutment was estimated to be up to 25 times.(3) Consequently, when functional pressure is applied to the distal extension base removable partial denture, the resultant forces are extremely damaging to the abutment teeth and must be controlled if clinical treatment is to be successful.(4)

The use of dental implant as a distal abutment can convert a distal extension removable partial denture from a tooth- and tissue-supported prosthesis to a tooth- and implant- supported and retained prosthesis. A posteriorly placed implant provides a definite stop and stability and eliminates the problems often associated with a tooth- and tissue-supported distal extension removable partial denture (5, 6)

Combination of natural tooth and implant supported removable partial denture was reported. This design of connection allows stress control on the fixtures and natural abutments, provides strength, aesthetics, fulfilling patients' desire and increasing the long-term prognosis for the remaining teeth. (7).

CASE REPORT

A 44 years old male with Kennedy's class I in the mandibular arch where second premolars are last standing teeth and fully dentate in the maxillary arch, presented to the outpatient clinic Prosthodontics Department, Faculty of Dentistry, Minia University, who was complaining of poor stability of his old partial denture.

Clinical procedures:

Stage 1: Construction of acrylic partial denture for the lower arch.

Lower acrylic partial denture was constructed with conventional method which was used in construction of surgical guide.

Stage 2: Fabrication of surgical guide and radiographic examination.

A customized surgical guide was fabricated using CAD/CAM technology through the data obtained from the cone-beam CT (CBCT), Captured images by CBCT were imported into viewing software then sent for fabrication of the guide.

Stage 3: Surgical procedure

The surgical procedures were performed in one step under aseptic conditions. The implants were located at the second molar site in the edentulous area of the mandible, local nerve block and infiltration at the site of the surgical field. The incision was made at the crest of the ridge, crestal flap was achieved by a sharp scalpel number 15 blades. The scalpel was pressed firmly to bone and the incision was made once for clean cut or by tissue punch. Pilot drill was pointed down through the hole reaching down to the alveolar bone and punching it to make a point that acts as a guide for drilling. The sterilized surgical stent was placed securely in the oral cavity with its hole corresponding to the planned implant position.(Fig. 1) Drilling was done through the stent's hole with light intermittent finger pressure using sterile saline solution irrigation. Drilling was performed starting with the pilot drill (2.3mm) in diameter then intermediate drill (2.8mm D) was used and driven to the full depth of the planned implant, and finally with (3.5mm D). The paralleling rod was inserted into the drill hole to make sure that the implant was in its right position. The implant was removed from the sterile pack with the fixture mount and was inserted to the osteotomy till the implant collar by hand piece then manual by using ratchet wrench. A surgical cover screw corresponding to the diameter of the implant was placed and tightened into position with hand screwdriver. A hand debridement and irrigation of the surgical site was carried out. The flap was repositioned around the implant and sutured by interrupted sutures using 3-0 silk sutures. Surgical technique was repeated for the other side.

Stage 4: Prosthetic procedure

Mouth preparations

After 3 months of healing period ,phase I therapy was done by using supra and subgingival scalling, root planning and curettage. Proper oral hygiene instructions including the appropriate brushing technique and inter-dental cleansing procedures were implemented. Uncovering the implants was done by removing the tissue above by using a tissue punch. The surgical cover screw was removed using the screw driver and the implant healing abutments were screwed onto the implants. (Fig.2)

The mouth preparations were made as the following:

- Mesial occlusal rest seat for 2nd premolar
- Distal occlusal rest seat adjacent to the main abutment

Construction of Cobalt Chromium RPD with the conventional way. Maxillary and mandibular preliminary impressions, mouth preparation and final impression,duplication of the master cast was performed to obtain a refractory model for waxing up the partial overdenture framework ,try in of metal framework with the secondary coping is a part of the metal frame work (Fig.3, 4). Jaw relation registration, partial overdenture try in was made with normal acrylic teeth, flasking, finishing and polishing then insertion (Fig.5)

- Mesial occlusal rest for the 2nd premolar (the main abutment) adjacent to the edentulous area.
- Lingual plate major connector.
- Distal occlusal rests adjacent to the abutment. Partial over-denture was inserted into the patient's mouth and was checked for retention, stability and support. Instructions were given to the patient about how to use and clean the partial denture.

Discussion

Mandibular implant-retained over-denture treatment has significantly increased the scores for retention and stability of the denture, masticatory function and general denture satisfaction. Furthermore, it may have favourable psychological and social effects on the patient (8). Also the pressure applied to tooth abutments can be decreased.

Two-stage surgery for the implant placement primarily have been considered by many authors for two reasons; to prevent early failure due to loading and to prevent infection (9,10). The number of stages for implant placement depends on the primary stability of the implant and the quality of the bone.

Implant used in this study was placed into the second molar area, to avoid the posterior rotation of the partial over-denture on the implant's abutment as a fulcrum. (11, 12)

Implant-abutment tooth attachment type is a matter of discussion (13). In rigid attachments higher stress accumulation can cause higher bone loss and increase the frequency of prosthetic complications such as fatigue fracture and screw loosening compared to resilient attachments. In non-rigid attachments may cause dental intrusion. Intrusion of tooth abutment decreases support and increases cantilever stresses in implants and the supporting bone. (14)

However, in attachment of natural teeth and implant by a removable partial denture, intrusion of natural teeth does not seem to be problematic because permanent attachment of prosthesis to tooth and implant does not exist (15).

Implant retained/supported partial over-dentures can be safely considered as the baseline treatment option for the rehabilitation of partially edentulous mandible.

CONCLUSION

Using healing dome shaped abutment in mandibular removable partial over denture on a bilateral single molar implants in cases of Kennedy class I cases helped to support and retain the mandibular removable partial denture and present a cost effective treatment.

REFERENCES

1. Starr NL. The distal extension case: an alternative restorative design for implant prosthetics. *Int J Periodontics Restorative Dent* 2001; 21: 61-67.
2. Fahmy A, Abuelroos EM, Nada MM. Effect of using attachment on implant supported distal extension lower partial overdentures. *Cairo Dent J* 2008; 24: 1-10.
3. Ishii OA, Nagare I. Longitudinal study on torque transmitted from a denture base to abutment tooth of a distal extension removable partial denture with circumferential clasp. *J Oral Rehab* 1992; 19: 245-52.
4. Phoenix RD, Cagna DR, Defreest CF. *Stewart's clinical removable partial prosthodontics*. 4th ed. UK: Quintessence Publishing Co, Inc, 2008. PP.101-18. ISBN: 978-0-86715-485-6; 9780867154856.
5. Carr AB, Brown DT. *McCracken's Removable Partial Prosthodontics*. 12th ed. St Louis: CV Mosby, 2011. 24.
6. Ball D. Attachment and O-ring to retain mandibular removable partial denture. *J Prosthet Dent* 2004; 92: 8-11.
7. Ganz S. Combination natural tooth and implant- borne removable partial denture. A clinical report. *J Prosthet Dent* 1991;66:1-5.
8. Sadowsky SJ. Mandibular implant-retained overdentures: A literature review. *J Prosthet Dent* 2001 ; 55: 62-73.
9. Lundborg G, Branemark PI, Rosen B. Osseointegrated thumb prostheses: a concept for fixation of digit prosthetic devices. *J Hand Surg [Am]* 1996;21:216–21.
10. Aydin C, Nemli SK, Yilmaz H. Esthetic, functional, and prosthetic outcomes with implant-retained finger prostheses. *Prosthet Orthot Int*. 2013 Apr;37(2):168–74.
11. Gotfredsen K, Holm B. Implant –supported mandibular overdentures retained with a ball or bar attachment: A randomized prospective 5- year study. *Int J Prosthodont* 2000; 13: 125-30.
12. Zinner I, Stanley A, Curtis E, Francis V. Multiple Implants for First Molar Prosthodontics. *J Prosthodont* 2005; 5(3): 158-65.
13. Cho GC, Chee WW. Apparent intrusion of natural teeth under an implant-supported prosthesis: A clinical report. *J Prosthet Dent*. 1992 Jul;68(1):3-5.
14. Chee WW, Cho GC. A rationale for not connecting implants to natural teeth. *J Prosthodont*. 1997 Mar; 6(1):7-10.
15. Olsson M, Gunne J, Astrand P, Borg K. Bridges supported by free-standing implants versus bridges supported by tooth and implant. A five – year prospective study. *Clin Oral Implants Res*. 1995 Jun; 6(2):114-21

Figures



Fig.1 Surgical guide placed intraoral.



Fig. 2 Healing abutments were screwed onto the implants.



Fig. 3 metal framework try in.

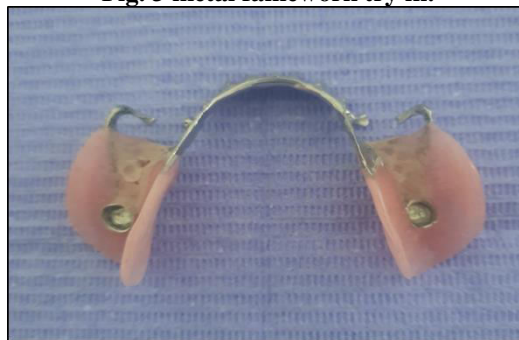


Fig. 4 The secondary coping is a part of the metal framework.



Fig. 5 Removable partial overdenture insertion.