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CASE STUDY

SOLUTION TO THE DISTAL EXTENSION REMOVABLE PARTIAL DENTURE

***Dr. Ranganath Rao K Jingade, Dr. Sruthi Ravindra, Dr. Ponnanna, A. A., Dr. Nitesh Rai, Dr. Muralidhar and Dr. Subhabrata Maithi**

Department of Prosthodontics, Krishnadevaraya College of Dental Sciences and Hospital, Bangalore

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ABSTRACT

A major area of concern for rehabilitating a patient with a distal extension removable partial denture lies with unequal distribution of forces acting on both the teeth and the tissues. Implant placed at the end of the distal extension removable partial denture has been reviewed in past as one of the successful as well as convenient treatment modalities for solving such problems. This case report deals with a similar situation in which a 62 year old patient with a kennedy's class II modification was treated with an implant supported partial denture to successfully restore his masticatory ability and provide him with comfort.

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INTRODUCTION

Removable partial dentures still remain an indispensable treatment modality for the prosthetic rehabilitation of the edentulous spaces posterior to remaining natural teeth. An appreciable and satisfactory treatment of this free end saddle with partial dentures is still a challenge to the Prosthodontist. A common problem faced by the restorative dentist is due to dual support system consisting the teeth, mucosa and alveolar ridge with different resilience and anatomical characteristics. The challenge lies in fabrication of the prostheses which equally distributes the forces between the teeth and alveolar ridge and at the same time provides improved function and comfort to the patient. This can be even more difficult in mandibular arches because of decreased denture bearing area. One thing to be remembered is the dynamic nature of oral cavity; during function and parafunction there are forces acting in all three dimensions on the saddle area which result in rotation of the denture around the rest causing distal tipping action of the abutment teeth. These prostheses have been associated with poor patient acceptance, compromised function and esthetics, and an increased risk of caries and periodontal disease (Vermeulen *et al*., 1996). Thus there is a need to control harmful forces that may act on the abutment teeth and the posterior mandibular residual alveolar ridges (Kratochvil and Caputo, 1974). One of the options to solve the problems created with conventional distal extension bases is to provide implant supported fixed partial dentures; which may not always be an amicable option. An alternative and cost effective treatment modality would be placing an implant at the distal heal to act as a stop, thus prevent tissue-ward movement of the denture. By placing the implant at the end of the ridge Kennedy's class II situation is converted to class III which would help in better distribution of forces and provide a positive stop. This article reports a case with similar situation which utilizes implant in mandibular distal extension situation.

Case report

A 62 year old male patient came to the department of Prosthodontics and crown and bridge with the complaint of inability to chew food. Patient was in good health; Medical history indicated no contra-indication for dental treatment. History of previous dental treatments were noted. No affect on TMJ was noted. Patient did not report any para-functional habits. On examination patient was partially edentulous with few missing upper and lower teeth. Mandibular arch was noted as Kennedy's class II modification (Fig.1). Diagnostic impressions were made and mounting was done to assess the interarch space and for formulating treatment plan.

Corresponding author:* **Dr. Ranganath Rao K Jingade,
Department of Prosthodontics, Krishnadevaraya College of Dental Sciences and Hospital, Bangalore

Fig.1. Mandibular arch with kennedy class II modification

Patient was informed about various treatment plans and was allowed to choose. As finances did not permit him to get a fixed prostheses, a removable partial denture was planned. The distal extension on the mandibular arch was opposed by natural dentition; taking patients comfort into consideration an implant supported removable partial denture was planned. An informed consent was taken before proceeding with the treatment. Initially a treatment partial denture was fabricated and given to the patient to make him be well versed with the removable prostheses. After the patient was convenient with the removable partial denture, was recalled and implant placement was planned and a wide diameter (5*10) implant (MIS) was placed accordingly (Fig.2). During the period of Osseo integration patient continued wearing treatment partial denture which was relined with the soft liner. After 3 months a conventional second stage surgery was done and healing abutment was placed. A diagnostic impression was made. The cast was surveyed and planned for a cast partial denture supported by an implant at one end.

Fig.2. Implant placement

Third quadrant had a tilted third molar, and a root canal treated second premolar which had lost most of its crown structure (Fig.2). A metal crown was planned on the third molar with a mesial rest and an overdenture metal coping on the second premolar (Fig.3). First premolar in the fourth quadrant had distal caries; removal of which led to loss of tooth structure. A PFM crown with a distal rest was fabricated. All the crowns were cemented (Fig.4). Rest seats were prepared on the canines. Final impression was made with elastomeric impression material with healing abutment in place. Prostheses was planned with only healing abutment on the implant to provide vertical support to the prostheses (Fig.4). A lingual plate major connector was given to extend the support from all the remaining anterior teeth. Framework was fabricated in a such a way that there is space between the healing abutment and metal for the acrylic to flow and capture the details. Frame work trial and wax denture trial was done subsequently. Indirect composite was directly layered on framework in 35 region. Final prostheses was corrected in centric and eccentric positions (Fig.5).

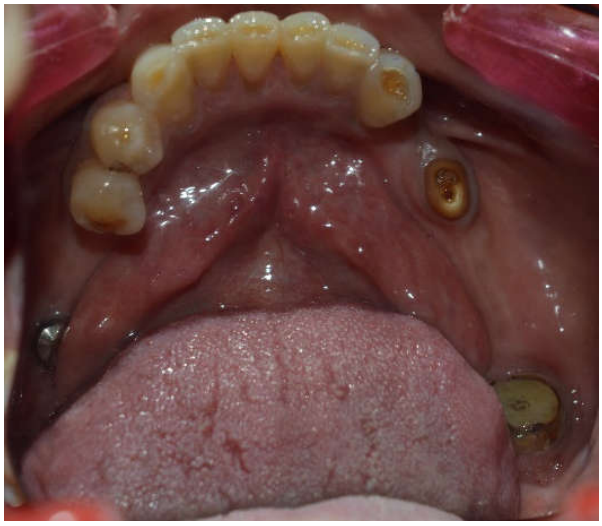

Fig.3. Rest seat preparations on 34 and 37

Fig.4. Wax trial

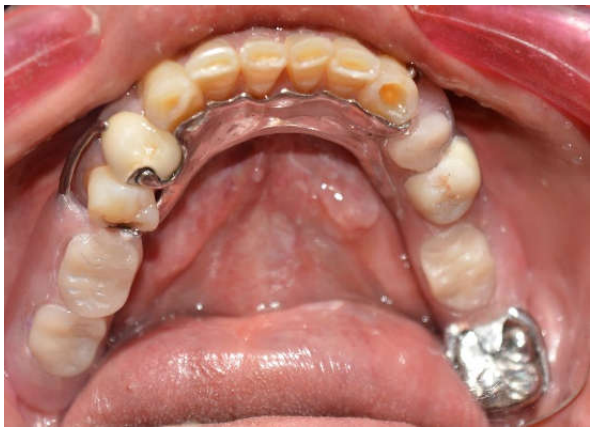

Fig.5. Final prosthesis

The acrylic which surrounded healing abutment was completely relieved and denture was delivered. A week later patient was recalled and all centric and eccentric contacts were readjusted and acrylic reline was done for the healing abutment. Care was taken to ensure a perfect vertical contact between healing abutment and acrylic. Slight relief was given in acrylic around buccal and lingual surfaces of abutment to accommodate for the lateral movements. Patient was comfortable and reported improvement in masticatory ability in subsequent visits.

DISCUSSION

This case report highlights the importance of providing vertical support which eventually enhances comfort and masticatory ability. Implant supported removable partial dentures can be an alternative to conventional removable partial denture and fixed implant restorations. A small number of shorter implants can be placed to stabilize the RPD in vertical direction, provide comfort and increase patient masticatory efficacy. (De Freitas *et al*., 2012) literature also provides evidence for the addition of implants in removable partial denture to improve prosthetic biomechanics. Keltjens *et al*. (1993) stated that the insertion of implants in a distal RPD extension provided more stable and reliable occlusion. Mitrani *et al*. (2003) observed an increase in patient satisfaction, minimal component wear, bone loss within the normal limits and stability of peri-implant soft tissues. Similarly, Mijiritsky and Karas, (2004) observed greater retention, stability, and improved patient satisfaction, aesthetics and function. Mijiritsky *et al*. (2005) also found an implant survival rate of 100% and significant improvement in patient satisfaction. Keltjens *et al*. (1993) also reported that this treatment alternative can also prevent bone resorption under the denture base, promote additional retention using attachment systems, reduce the stress in the supporting tooth and the number of extracoronal retainers and provide comfort. Pellizzer *et al*. (2010) induced axial and oblique forces in 2D finite-element models with different abutments and results were favourable to the association of implants with a healing abutment, ERA or O'ring attachment systems. Mitrani *et al*. (2003) compared the marginal bone loss inmesial and distal surfaces of implants within two groups (one with healing abutment and one with resilient attachment) through control radiographs taken at prosthesis insertion. The mean bone loss for both the surfaces was found less in the group with healing abutment (Mitrani *et al*., 2003). In the case presented healing abutment was used not only to provide vertical support but also to prevent the wear and subsequent repairs which occurs with the use of attchments. Also use of healing abutment will keep the options open for the future betterment in the treatment as attachments can be given whenever required.

Conclusion

Implant placement converts tooth tissue supported condition into tooth supported condition there by improves the support. Implant supported removable partial denture can be an economical alternative and amicable treatment option for distal extension situations.

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