

A New Approach for Management of Kennedy's Class I Condition Using Dental Implants: A Case Report

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Abstract Replacement of multiple missing teeth mainly in the Kennedy's class I and class II condition is a challenge for the clinician and the patient in terms of retention, masticatory efficiency, esthetics, comfort and importantly economics. Here, a case using implants in the distal denture bearing area with ball attachments and fabricating a cast partial denture over it utilizing the best of all benefits has been presented.

Keywords Ball attachments · Denture bearing area · Dental implant · Cast partial denture · Kennedy's class I

Introduction

Dental implant therapy has become the prosthetic standard of care for a vast array of clinical applications, however, despite the high success rate of endosseous implant therapy, it has yet to achieve wide public acceptance and utilization. The most frequently cited reasons for under utilization of endosseous implant therapy is that treatment cost is perceived to be too high. Implants are expensive and therefore many patients cannot afford them, particularly those with large edentulous areas. For reconstruction among these patients, fixed-type prostheses usually require more implants for support than removable prostheses. In addition, these patients may require several surgeries to increase bone mass, thus making the entire treatment

extraordinarily expensive and complicated. However, if a traditional removable partial denture (RPD) is used, insufficient retention may induce problems.

The design and maintenance of bilateral and unilateral distal extension partial dentures (Kennedy class I and class II) present challenges for clinicians [1], 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 parafunctional activities. Variations in the design of the framework and denture base can be used to compensate, at least to some extent, those forces, which may affect retention, stability and support of the denture. Nonetheless, displacement of the denture, especially in the area of the distal extension, is more likely [1].

To prevent displacement of the denture, precision attachments or conventional clasps have been widely used [2, 3]. In addition, denture bases are usually fitted to the surrounding tissue as accurately as possible. However, the rotational tendency of the RPD after long-term use cannot be eliminated completely, regardless of design and fit of the denture [4]. To overcome this clinical challenge, single implants may be placed bilaterally at the distal part of the denture bearing area to minimize the potential for dislodgement of the denture [5, 6, 7]. The chief goal of placing an implant under the posterior-most molar of the distal extension denture base is to stabilize the RPD in a vertical direction. Distal implants effectively convert a Kennedy class I or II denture to a Kennedy class III denture. Therefore, a tooth- and implant-supported RPD is economical (because fewer implants are needed) and more stable, and may therefore be a better option for patients with limited financial resources than an implant-supported

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fixed partial denture [7, 8]. A few clinical reports have described partially edentulous patients with missing mandibular premolars and molars who have undergone rehabilitation with implant-supported removable partial dentures [7– 9].

The current case report describes the fabrication of a mandibular RPD supported by existing anterior teeth and two distal single implants with ball attachments, which effectively prevented displacement of the distal extension of the partial denture.

Case Report

A female patient aged 53 years reported to department of prosthodontics and implantology, Panineeya mahavidyalaya dental college, Hyderabad, India, with a complaint of replacement of missing teeth. On examination and investigations we found multiple decayed teeth and missing teeth (34, 35, 36, 37, 42, 43, 44, 45, 46, 47) (Fig. 1) which reflected her poor oral hygiene status. Initially counseling was done about the importance of oral hygiene and after oral prophylaxis, the decayed teeth were restored. Later, the replacement options for the missing teeth like implant supported fixed prosthesis, removable tissue and tooth supported partial denture, and implant and tooth supported

partial dentures were explained. The patient opted for implant supported partial denture as it was economical.

After the medical history and investigations, a temporary partial denture was fabricated and gutta percha was placed in the planned region of mandibular first molar area in the prosthesis and an orthopantomograph was taken (Fig. 2).

After bone mapping and using the orthopantomograph a 4.3×13 mm UNITI implant was selected. A surgical stent (Fig. 3) was fabricated by duplicating the temporary partial denture and in the first molar area a 2.2 mm diameter sleeve was fused to the acrylic partial which was used as a



Fig. 1 Kennedy's class I condition



Fig. 3 Surgical stent with sleeve

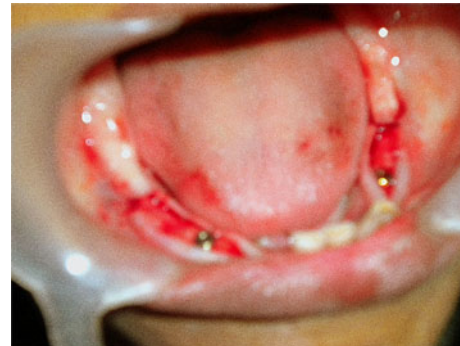


Fig. 4 UNITI implant with cover screw

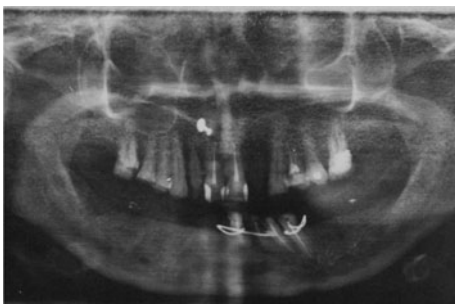


Fig. 2 OPG showing gutta percha at distal denture bearing area

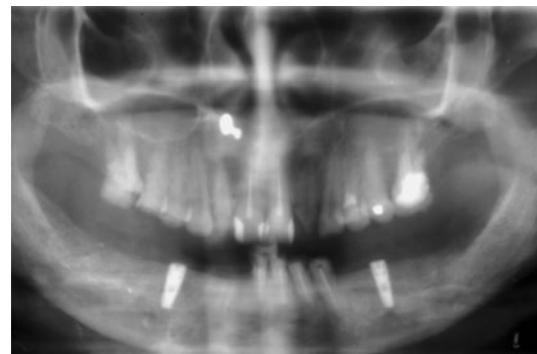


Fig. 5 Implant placed in distal denture bearing area

guide for the direction of pilot drill. After local anesthesia was administered, the site was prepared and 4.3×13 mm implant was placed in the proposed areas (Figs. 4, 5) and sutures given.

After the healing period of 6 months impressions were made and a cast partial denture was fabricated with



Fig. 6 Cast partial without clasps



Fig. 7 Ball attachments on implants



Fig. 8 O'ring attached to cast partial

cingulum rests on the mandibular teeth which would act as an indirect retainer and also as support for the prosthesis. No direct retainers or clasps were provided (Fig. 6). At the second stage surgery, the implant site was opened and gingival formers were placed. After 1 week ball attachments (Fig. 7) were placed on the implants and tissue side of the cast partial was relieved and O' ring (Fig. 8) was attached at the chair side. The patient was recalled for



Fig. 9 CPD in occlusal view



Fig. 10 Teeth and CPD in occlusion



Fig. 11 Teeth in occlusion



Fig. 12 Frontal view

checkup after 1, 6 months (Figs. 9, 10, 11, 12). The patient was satisfied because of the comfort, retention, improved masticatory efficiency, and the esthetics provided by the prosthesis.

Conclusion

Placement of implants at the distal area of the residual ridge provided the support in the distal area for the cast partial and this effectively changed the classification of the partially edentulous arch from class I to class III. The ball attachments enhanced the retention of the prosthesis, thereby the unaesthetic display of direct retainers could be avoided. Additional advantage of implant placement at the distal site would be reduction in the bone resorption at the posterior aspect. Economical advantage of removable prosthesis in combination with mechanical support of the

dental implant should always be a viable alternative to fixed implant supported prosthesis, mainly in the distal extension cases.

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