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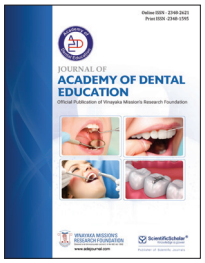

Case Report

Clinical procedures in stage II implant supported fixed dental prosthesis: A case report

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ABSTRACT

Restoring a partially edentulous jaw with implant-supported prosthesis is a challenge. The clinical outcome will be satisfactory only when both the surgical phase as well as the prosthetic phase are planned in advance and executed while keeping in mind the aesthetic and functional necessities. In this case report we describe the steps in successfully restoring the edentulous space with implant supported FP1 prosthesis. The sequential steps that were followed in the prosthetic phase has been described in detail. From the satisfactory outcome of the case, it can be concluded that proper evaluation, prosthetically driven treatment planning and correct execution of the plan would ensure good predictability of the implant-supported prosthesis.

Keywords: Implant, Fixed dental prosthesis, Edentulous, Treatment, FP1 prosthesis

INTRODUCTION

Fixed partial denture (FPD) is a dental prosthesis that is used for replacing missing tooth where a natural tooth, tooth root or an implant is used to support and hold the prosthesis. It is not removable and is fixed to the adjacent tooth or underlying root or an implant. A root is the most ideal support for the prosthesis as it is a natural structure and no man-made material can completely replace it. However, if the entire tooth is lost, then usually the adjacent teeth are used as a support but they need to be reduced before cementing the retainer part of the FPD onto them. But in implant-supported or root supported FPD the tooth takes support from only the implant or the root below, hence preparation of the adjacent teeth is not required.[1-3]

Implant-supported FPDs can be used in a wide variety of situations where a tooth-supported FPD cannot be used, such as in a distal extension case, where there is no posterior abutment to support the prosthesis. In this situation, an implant can be placed in the posterior region to support the FPD distally.[1,2]

Implants also help in the preservation of the alveolar bone as they integrate with the underlying bone and significantly reduce resorption, whereas tooth-supported FPD, in the long run, leads to alveolar ridge resorption and may create a space between the prosthesis and the ridge leading to poor aesthetics. We can avoid mutilation of teeth which are used for abutment.[4]

Implant – Implant-supported prosthesis is usually preferable, although in exceptional circumstances, Implant – tooth-supported prosthesis can be used. This is because, the tooth has

micro movements during function, but Implant is rigidly integrated with bone and shows almost no movement. Hence, the discrepancies in the amount of movement between the implant and the tooth will cause damage to the tooth and the implant in the long run.[4,5]

An implant-supported three-unit FPD has two implants placed at the mesial and distal ends of the edentulous space and a three-unit FPD is attached on the implant platforms with a central pontic. It is more aesthetic, has a better prognosis, lasts longer when maintained well, and there is less associated ridge resorption.[4,6-8]

A good ridge width and ridge height is an ideal situation for implant-supported FPD; in case the ridge height and/or width is insufficient, it needs to be increased through ridge grafting or augmentation procedures. If the patient is unable to afford such procedures, then implant-supported FPD is not possible.[4,6-8]

There are a few prerequisites that need to be met before deciding the treatment plan – the minimum inter-arch distance required is between 8 and 10 mm during occlusion; and the quality of bone should be D1, D2, or D3 according to Misch's classification;[7] bone of Division A type (>5 mm of width, >12 mm of height, > 7 mm of length, <1 mm of crown root ratio and 25 degree angulation).[2,9] Herein, we report a case of restoring a patient's missing teeth with implant-supported FP1 prosthesis. The patient's consent for using his clinical images for education and scientific purpose was obtained.

CASE REPORT

A 35-year-old male reported to the outpatient department with a chief complaint of missing teeth in his upper right back tooth region for the past 6 months. He had no deleterious habits, brushes once a day and had a temporary partial denture. Past dental records show periodontitis as a reason for the loss of teeth. He had no systemic illnesses. The diagnostic models were evaluated, and the edentulous space was also evaluated using cone-beam computed tomography (CBCT) for quality and adequacy of bone in the edentulous region. After explaining to the patient about the different treatment modalities and their expected clinical outcomes, the patient desired to have implant-supported prosthesis, and hence, it was decided to restore his missing teeth using an Implant-supported FP1 prosthesis.

The prosthesis discussed in the case report is a FP1 type, that is, the prosthesis replaces only the hard tissue since there is minimal loss of soft tissue or periodontal structures. It was fabricated as a cement-retained prosthesis as there was adequate inter-arch space available. Nobel biocare active Implants were selected due to their extensive data of ADA certification, their catalogue of dental implants and excellent quality. In accordance with the nobel active implant system, regular platform (RP) (Colour code – yellow) of 11.5 mm was used in the canine region and wide platform (WP) (Colour code – blue) of 10 mm was used in second premolar region which was decided by the width and height of the residual bone at the implant sites.

In this case report, we shall discuss only the prosthetic steps in detail, the surgical aspect of the treatment is explained in brief.

Steps

Pre-operative evaluation

Pre-operative pictures shows a normal smile line [Figure 1a], frontal view [Figure 1b], straight profile [Figure 1c], mandibular arch with full complement of teeth and maxillary arch with partial edentulousness in relation to 13, 14, and 15 (FDI system of nomenclature) [Figure 1d and e]. RVG showed adequate bone width, height and density.

Step 1

The patient's inter-arch distance in occlusion was of 8 mm on the right side of the arch [Figure 2a] and 0mm on the left side of the arch [Figure 2b], indicating adequate inter-arch space [Figure 2c]. Primary impression was made using a stock tray with putty and light-body impression materials. Then, the diagnostic cast was obtained. The pre-existing temporary partial denture was used to prepare radiographic markers by drilling holes of 2 mm depth at the central fossae of the occlusal surfaces of the acrylic teeth, which were then filled with gutta-percha and CBCT was taken. Subsequently, this partial denture was modified to form the surgical guide.

Step 2

Stage I implant surgery was done wherein, a full-thickness flap was raised and a sequence of drills were used to prepare the implant site after which the implant was carefully placed inside the bone using a ratchet. Two implants were placed – RP (Color code – yellow) was used in the canine region and WP (Color code – blue) was used in the second premolar region; and 3 months later an RVG was taken which showed evidence of good osseointegration of the two implants.

Since the cover screws of the implants were visible underneath the gingiva, stage II implant surgery was started without flap resection. The cover screws were exposed using a number 11 BP-blade and were removed and healing abutments were placed [Figure 3a].

Step 3

One week later, the healing caps were removed, the appropriate abutment with Snappy Abutment impression copings were placed on the two implants and a closed tray impression using putty-wash technique was made as per the following procedure: After fixing the impression copings on the abutments and radiographic verification of the proper abutment seating [Figure 3b] was done, a stock tray loaded with putty polyvinyl silicone impression material (Zhermack) was used to record

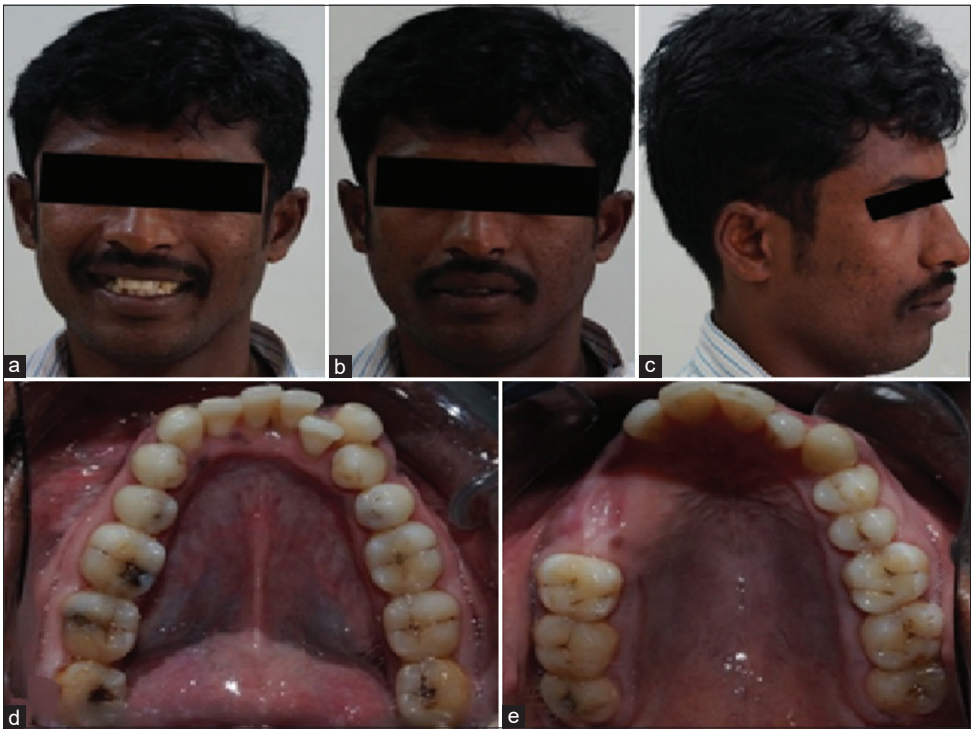

Figure 1: (a) Normal smile line; (b) front profile; (c) side profile; (d) mandibular arch; (e) maxillary arch.

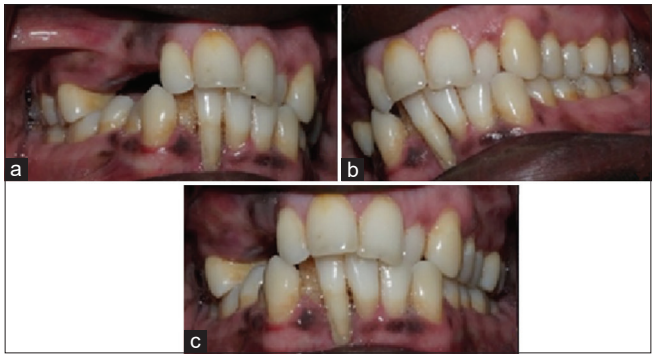

Figure 2: (a) right side of the maxilla; (b) left side of the maxilla; (c) adequate inter-arch space.

the impression. Upon disengaging the impression from the mouth, the impression copings were embedded within the putty impression. The transfer copings were removed from the impression and placed (snapped) back on the abutments [Figure 3c]. Then using a BP blade, some material of the putty impression around the transfer coping region was removed to a depth of 1 mm approximately and light body polyvinyl silicone impression material (Zhermack) was flowed around the abutment and coping (intra-oral) as well as over the putty impression, and the tray was repositioned in the mouth and the final impression was recorded. The impression was then removed from the mouth with the transfer coping being embedded within it, the abutment was unscrewed from the implant and snapped back onto the transfer coping in the impression [Figure 3d]. The lab analogue was then fixed onto the abutment. The impression was disinfected and the cast was poured. It was then dispatched to the lab for the fabrication of the verification jig.

Step 4

The jig trial was done to check the accuracy of the impression and the positioning of the lab analogues in the model. The verification jig was made before fabricating the final framework and verified in the mouth. GC Pattern resin was used for fabricating the two jigs. Pattern resin was placed around the abutment in the model such that it connects the implant abutment and the neighbouring tooth [Figure 3e]. The jig along with the abutment was then removed from the model and placed on the implant and a radiograph was taken to verify the seating of the abutment on the implant platform. After verifying the fit, the abutments were sent to laboratory for the fabrication of the metal framework.

Step 5

The metal framework was checked in the mouth and any required adjustments were made to ensure a proper fit of the framework on the implant platform [Figure 4a and b]. This step is also verified radiographically. Shade selection was done and the framework was sent for ceramic layering.

In the next appointment, pre-glaze trial was done, where the proximal contacts and occlusion were checked. After verification and occlusal corrections, the prosthesis was sent

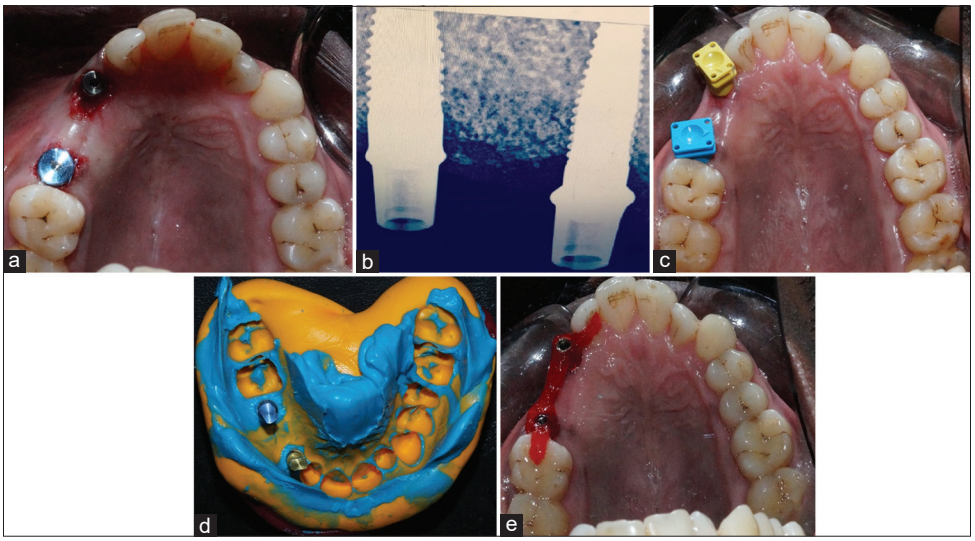

Figure 3: (a) intraoral picture showing healing screw/cap; (b) Post-operative digital radiograph of implant with the abutment attached showing osseointegration; (c) intraoral image with the impression coping placed on the abutment; (d) impression with the impression coping embedded in it to which the abutment was attached; (e) jig trial.

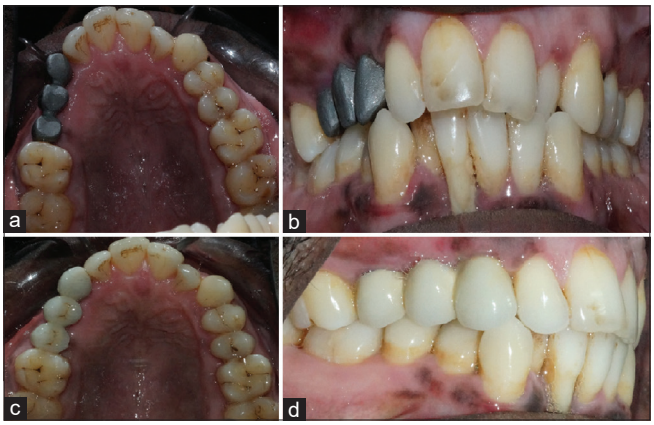

Figure 4: (a) metal framework (occlusal view), (b) metal framework (frontal view); (c) metal ceramic prosthesis (occlusal view); (d) metal ceramic prosthesis (lateral view).

for ceramic glazing. On arrival of the final prosthesis, it was cemented using GIC luting cement onto the abutment and the occlusion was checked again. Implant protected occlusion was ensured [Figure 4c and d]. Implant protected occlusion is an occlusal scheme that protects the implant and the crestal bone from excessive occlusal load and prevents rapid bone loss which would otherwise lead to implant failure. Poor occlusal scheme increases the mechanical stresses and strains at the crestal bone which acts as a fulcrum when there is an occlusal overload. There are several conditions that fall under implant protected occlusion, adhering to these conditions ensures the health and longevity of the implant. Subsequently, post-operative instructions were given to the patient and he was recalled for review 1 week later. The patient expressed his satisfaction on the aesthetics and function of the implant supported prosthesis.

CONCLUSION

Implant-supported prosthesis is now widely accepted modality of treatment for replacing missing teeth as it gives predictable clinical outcomes in terms of aesthetics, patient comfort and function. Here, we report a successful case of implant-supported prosthesis, and the successful outcome of the implant prosthesis was due to proper diagnosis, treatment planning and the following proper surgical and prosthetic protocol. However, the long-term success of the implant is also dependent on the proper maintenance of oral hygiene by the patient. It can be concluded that implant-supported prosthesis provides satisfactory clinical outcomes to both the dentist and the patient when planned and executed properly.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent.

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Conflicts of interest

There are no conflicts of interest.

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