



PROSTHETIC REHABILITATION OF MISSING MANDIBULAR MOLAR USING FRICTION FIT ZIRCONIA CROWN OVER DUAL ONE-PIECE NARROW DIAMETER IMPLANTS

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Abstract: The present patient report describes a missing mandibular molar rehabilitated by two one-piece narrow diameter dental implants. Although the gold standard treatment is to place a regular diameter implant, unfortunately due to horizontal bone resorption, this option is not possible without lateral bone augmentation. In this situation narrow diameter implants are a viable alternative. Immediate provisional are provided after implant placement and three months later, replaced with partially transparent monolithic friction frit cement free zirconia crown. Follow up till the end of six months revealed healthy hard and soft tissues around implants.

Index Terms - bone height, bone width, horizontal bone resorption, narrow diameter implants, mandibular molar area, friction fit crown.

I. INTRODUCTION

Implantation is a preferred choice to replace a missing single tooth, avoiding adjacent vital teeth preparation and fixed prosthesis fabrication.¹The most frequent mandibular molar to be replaced is the first mandibular molar. Implantation in the posterior area is a predictable procedure over time.²The low rate of complications in addition to the high long term success rate makes implant restoration a reliable solution to treat posterior partial edentulism.³The use of two implants to replace a single molar seems a logical treatment solution to avoid prosthetic complications associated with two-part implants. yet, one significant disadvantage to the use of this concept is the limitation of the size of implants and their associated prosthetic components.⁴

There are different definitions for the narrow diameter implant (NDI), starting from small body implant, implant with a reduced end osseous diameter and narrow body implant to reduced diameter implant. The diameter is always less than or equal to 3-5mm.Originally its use was reserved for the replacement of teeth with narrow clinical crowns and for limited interdental and interim plant spaces such as in the upper lateral or lower incisor areas.⁵However NDI finds another indication for its use, namely, with thin ridges. Indeed, following tooth loss bone collapses in a three-dimensional pattern. The horizontal deficiency or width loss develops in a larger extent.⁶

Here, the clinician has two options, either to perform horizontal ridge reconstruction procedures or to place an NDI in case of moderate horizontal bone loss.⁷In order to avoid invasive ridge management techniques, in cases of limited ridge width is the use of NDIs, therefore broadening their indications.⁸Most of the studies^{6,7,8} that evaluate the survival/success rate of NDIs in the posterior jaws, demonstrated an equivalent success rate to standard diameter implants.⁹The systematic review of Assaf et al¹⁰ demonstrated that implant therapy using NDIs in the posterior jaw is a reliable modality provided that the clinician follows certain guidelines. These were as follows:

1. Bone thickness between 5 and 7 mm.
2. Vertical bone length of 12mm above the inferior alveolar canal or 10 mm below the sinus allowing a placement of at least 10 mm height NDI.
3. NDI position in bounded molar region or free end saddle.
4. Bone quality type 1,2 or 3 according to the classification of Lekholm and Zarb.
5. NDI with appropriate macro and microgeometry that is an external design allowing an acceptable initial stability and optimal surface preparation to enhance bone implant contact.

This paper describes the situation in which NDIs from dentium implant system are used to replace missing 36(Left mandibular first molar), as an alternative viable option in the treatment of moderately resorbed posterior ridges where lateral bone augmentation is not accepted by patient.

II. CLINICAL REPORT:

NDI position	Dia/length	Type of prosthesis	Loading protocol	Free end or bounded saddle	Bone management	Follow up period
38, Male patient	2.8×10mm, conical shape Dentium implants	Single friction fit monolith zirconia crown	3 months	Bounded saddle	No	6 months

38-year-old male patient visited our Department of Prosthodontics and Implantology for replacement of missing posterior tooth. During clinical and radiographic examination, it was evident that the available bone height was 12mm and available width was 5mm only. There was no significant medical history. Patient was clearly explained of existing bone conditions and treatment options given. Patient opted for implant therapy without bone augmentation. Patient consent for treatment was obtained. Patient was treated under strict sterile conditions. Pre-surgical oral rinse with Chlorhexidine mouthwash undiluted (Rexidine plus, Septodont, India), followed by Povidone pre surgical clean up (Povidone iodine, India) of surgical area done.2ml of local Anesthesia (lignocaine with epinephrine, 1:100,000, Lignox, India)is used. Full thickness flap design and usual surgical protocols were followed. Two NDI were placed according to manufacturer's drilling recommendations and protocol. Hemostasis was achieved immediately after surgery, and post operative instructions were given to the patient. Primary stability was good for both the implants. Following surgery, antibiotic Amoxiclav 625 mg tds for 3days, Dolo 650 mg od (only to be taken if pain is of persisting nature) was prescribed.

Immediate provisional implant crown using cold curing resin (DPI, cold cure, India) was provided. No provisional cement was used. Fit was good and clinically acceptable.

Final prosthodontic rehabilitation was carried out 3 months after implant placement. Osseointegration was confirmed with X ray and clinical inspection was carried out. Final impressions were made using one stage extra heavy and light body addition silicone impression material (Provil, Putty, light body, USA). Partially translucent monolithic zirconium crown was placed on the dual implants without use of any definitive cements. Friction fit was said to be the main reason for not choosing any kind of permanent cement. This fit was obtained in the laboratory by avoiding usage of any kind of spacers on the master casts over implants.

Follow up visits

Patient was recalled for clinical examination after one month and then at end of six months. A panoramic x-ray was taken. Implant success assessed according to the criteria defined by Busser et al.¹⁰ Implants were considered successful if the following criteria were met:

1. The absence of any peri-implant infections with suppuration.
2. The absence of persistent subjective complaints of pain.
3. The absence of continuous radiolucency around the implant.
4. The absence of any detectable implant mobility.

III. FIGURES

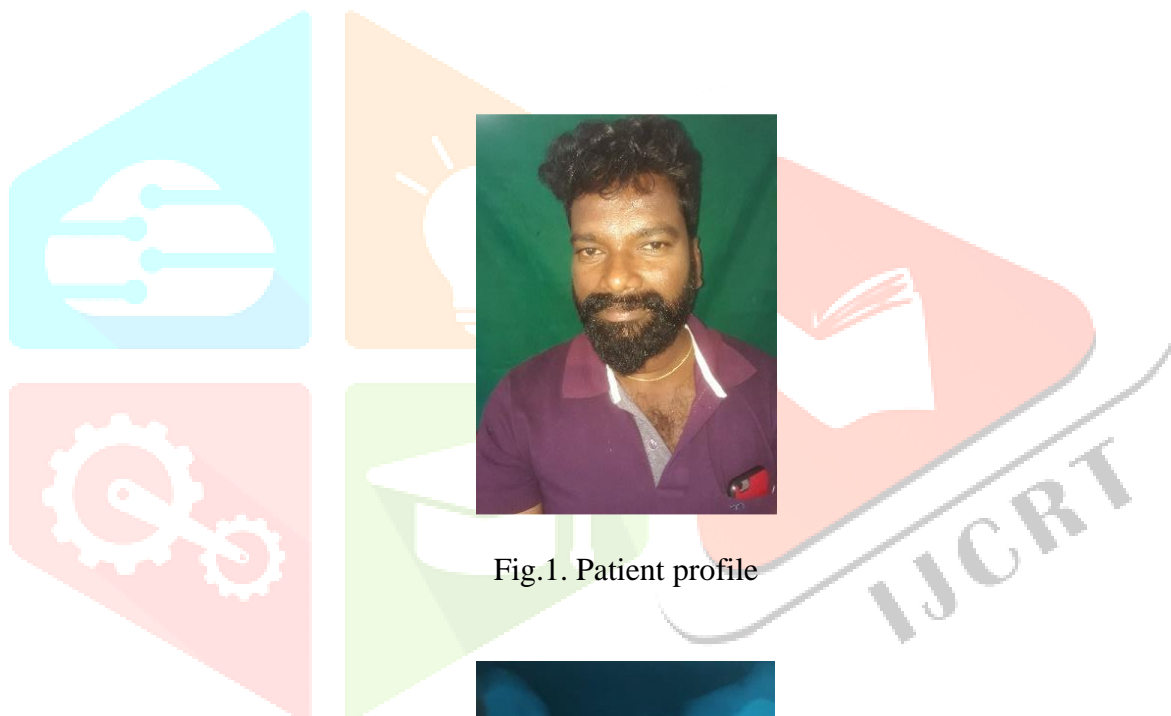


Fig.1. Patient profile



Fig.2. Radiograph showing two single-piece narrow diameter implants in 36 region



Fig.3. Single stage putty light body impression of 36 region



Fig.4. Provisional crown fabricated on cast in 36 region



Fig.5. Monolithic Zirconia crown



Fig.6. Final monolithic zirconia crown in 36 region

III. DISCUSSION

The use of dental implants for single posterior tooth replacement has become a predictable treatment modality.¹¹Single regular diameter implants might be incapable of predictably withstanding molar masticatory function and occlusal loading forces.¹²Wide diameter implants are not always a treatment option for replacing a single molar, especially when the buccolingual dimension is deficient. The use of two implants might also provide better prosthetic stability and prevent rotational forces on the prosthetic components.¹³The patient had no signs and symptoms for parafunction. The NDIs are restored with single zirconia crown. Strict occlusal considerations are applied such that slight contact in centric occlusion and no contact in lateral movement.⁹One significant barrier to the widespread use of this concept is the limitation of the size of implants and their associated prosthetic components. Nevertheless, when using narrow diameter implants 2 implants could be used even when the distance between adjacent teeth are limited.¹⁴

The replacement of a single molar with 1 implant has been shown to be an effective treatment modality in short term studies.^{15,16}However, this presents a biomechanical challenge. Occlusal forces are greatest in the molar region, leading to possible increased stress on the implant components as well as the surrounding bone.¹⁷A logical solution to implant overload is the use of 2 implants to replace the roots of a missing molar.¹¹The use of two implants provides more surface area for osseointegration and spreads the occlusal loading forces over a wider area while reducing a potential bending force that would exist in a single molar restoration.^{18,19,20}

This clinical report provides an evidence for the usefulness of two narrow diameter dental implants serving as a viable treatment option providing good and predictable results. This patient is still under recall protocol and will be examined again at end of one year and subsequent visits.

IV. CONCLUSION

In case of moderate horizontal bone resorption, NDI is a reliable option to replace a molar. Replacing a single missing molar with two narrow diameter implants might serve as a viable treatment option providing good and predictable long-term results. Further observational and randomized controlled studies could provide deeper evidence based conclusions concerning the use of NDI in the posterior jaw.²¹

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