

Case Report

Overcoming relative contraindications for an implant supported single crown

Tanuj Minocha¹, Nupur Rathi², Puneet Mahajan³

¹ Assistant professor, Department of Periodontics, DJ College of Dental Sciences, BRAU

² Assistant professor, Department of Prosthodontics, DJ College of Dental Sciences, BRAU

³ Postgraduate student, Department of Prosthodontics, Subharti Dental College, SVSU

ABSTRACT:

The advent of implant supported single crowns have helped a clinician to choose a conservative option of replacing a tooth. However, implant supported prosthesis are not absolutely indicated in all patients, especially when occlusion is not conducive. We present a case of an adult male patient who presented with a missing left mandibular second molar. The patient after thorough clinical and radiographic investigations consented for a implant supported prosthesis. Two relative non favorable conditions of the patient were overcome during the treatment. They included oral hygiene maintenance and occlusal equilibration to impart effective canine guidance for protecting the implant supported as well as the natural dentition.

Keywords: osseointegration, two stage implant surgery, ceramic, dental alloy.

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Corresponding author: Dr. Tanuj Minocha, Assistant professor, Department of Periodontics, DJ College of Dental Sciences, BRAU

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INTRODUCTION

Conventional fixed partial denture utilizes its retention and support from adjacent abutment, for which one needs to prepare the tooth. This renders the treatment as a non conservative approach not only in terms of natural tooth reduction, but also introduces non hygienic areas within the restoration. Use of a single abutment to replace one missing tooth is not advised since the cantilever design of fixed prosthesis is not conducive to the periodontal health of the abutment. ¹ The other conservative design of fixed partial denture like using partial veneer retainers can be detrimental to esthetics as the metal backing in translucent enamel imparts grayish hue which impairs esthetics depending on subjective experience.^{2,3} Single tooth implants have provided clinicians with a more conservative approach, although the main drawback of such treatment is the time taken to

complete it. ⁴ The use of implants in the rehabilitation of single tooth gaps has become popular among dentists and patient and have gained significant importance. ^{5,6} An osseointegrated implant supported prosthesis cannot be given to all patients since some conditions have been termed as absolute contraindications, while there are some situations which are contraindicated relatively provided they can be overcome with proper patient education and motivation.

This article presents one such case where relative contraindications in the form of average oral hygiene and occlusal discrepancy were overcome through a strict oral hygiene maintenance program and occlusal equilibration procedure before completing the treatment with implants.

CASE REPORT

A young adult male patient aged 32 years reported to the department of prosthodontics with chief complaint of inability to masticate since he had a

mandibular left side first molar removed one year back. He also reported that he had a crown on an endodontically treated tooth on the mandibular right side which had added to his problem, since he was not comfortable using it during mastication. Medical, drug, social and other related investigations were non contributory to the existing treatment plan. Dental history revealed patients' usage of average hygiene maintenance devices like brush and occasional tooth picks. Extra oral examination did not reveal any negative clinical findings while intra oral examination revealed presence of a Kennedy class 3 partial edentulous situation in relation to mandibular left arch (**Fig 1a**). Diagnostic impressions using irreversible hydrocolloid (CA 37; Cavex, Haarlem, Holland) were made for both arches and the diagnostic cast thus obtained were then mounted on a semi adjustable articulator (Whip Mix series 3000; Elite Dental Services, Inc, Orlando, Fla) using a compatible facebow (Articulator #3140; Whip Mix Corp) and interocclusal records (Take 1, Kerr, Romulus, MI, USA). The occlusion was evaluated on a programmed articulator and the analysis revealed that the centric occlusion was not coinciding with centric relation, slide in centric with the mandibular anterior shift and absence of canine guidance on the left side of the arch. Treatment options presented to the patient were an implant supported single crown (subject to patients improvement in the current oral hygiene status and occlusal correction), or a three unit fixed partial denture with full retainers or a removable partial denture. The patient consented for an implant supported single crown restoration. The implant placement was facilitated by an occlusal view of CBCT (cone beam computed tomogram) (**Fig 1b**). The treatment started in phases where the first phase was a disease control phase in which the patient underwent an oral hygiene maintenance program for a period of 4 months, which was evaluated by a team of periodontist and prosthodontist. Existing occlusion was corrected through enameloplasty and it included coinciding the centric occlusion with centric relation thus eliminating the centric slide, correcting canine guidance by reducing posterior interference and providing an implant protected occlusion.



Figure 1: (a) Intra oral view of partial edentulous space (b) Occlusal view of mandibular arch demonstrating the relative position of future implant



Figure 2: (a) X ray showing osseointegration (b) Stage 2 surgery with an exposure of implant fixture (c) Insertion of guide pin/implant locator to check alignment and locate implant (d) Placement of implant abutment



Figure 3: (a) Abutment after second stage healing (b) Implant level impression (c) Metal-ceramic single crown cemented in place

The placement of an implant fixture was done as a two stage surgical procedure. In the first stage, a CeraOne implant system (Nobel Bio care, Goteborg, Sweden) was placed using a surgical splint. A healing abutment (3.4 mm by 4 mm) was placed following which post operative medication was given in the form of amoxicillin 500 mg (3 times/day) and anti-inflammatory analgesic was prescribed for a period of three days. After a period of 4 months for osseointegration (**Fig 2a**), the second stage surgery was done in which abutment over the implant was located using an implant locator (**Fig 2 c**) while the same was used for verifying its alignment within the healed bone. Abutment selected to retain the crown was the one that would retain the crown with a cement (**Fig 2 d**). After screwing the cemented abutment the area was allowed to heal (**Fig 3a**) before an implant level, definitive impression was made using elastomeric (Reprosil, Dentsply/Caulk; Milford, DE, USA) impression material (**Fig 3b**).

Routine clinical and laboratory procedures were followed for fabrication of the metal-ceramic crown on an implant cement abutment. After a metal and ceramic trial, the final single crown was cemented using a zinc phosphate cement (Harvard, Germany) (Fig 3c). The patient received a follow up protocol at a time interval of one week, one month, six months and one year respectively. During subsequent follow up the patient was satisfied with the outcome of his treatment.

DISCUSSION

The use of implants has revolutionized the conservative prosthodontic treatment procedure since the inspiring work done by Branemark et al.⁷ The standards set for the precise success of implants in dentistry have been laid out and this has led to the development of two types of patients that cannot receive a dental implant. They are categorized as absolute and relative contraindications. We present a case of a relative contraindication in which the average oral hygiene was overcome by a strict oral hygiene maintenance program and the second relative contraindication was overcome by doing an occlusal equilibration procedure. These two factors have been considered as detrimental to implant success along with other factors mentioned in the literature.⁸ The osseointegrated implants do provide prosthodontist and his patients a versatile treatment option both in replacement of fixed and removable prosthesis.⁹ Although dental implants cannot replace a natural tooth in terms of biological competence, they are at present an alternative option to natural teeth.¹⁰ During the restoration of a mandibular molar with any type of prosthesis, the role of occlusal loads has to be taken in consideration.¹¹ Natural dentition has a defense mechanism that allows particular set of teeth to bear more horizontal stress than others. One of the important aspects of this protective mechanism is the contacting of canines during lateral movements. The case presented in this paper had a single crown on the other side which had caused the canine on opposing side to lose the guidance it provided to the occlusion. Minor correction of the occlusal surface of the cemented crown placed the canine in contact with the opposing canine which in turn restored the original canine guidance. Non correction of such errors in occlusion has been shown to result in failure of natural dentition as well as implants.¹² Under all conditions, horizontal forces are detrimental to natural teeth as well as implant and therefore should be avoided.

CONCLUSION

Preservative principles of prosthodontics demand use of a single implant supported crown rather than a two

or three unit fixed partial denture. The use of implants provides patient the ease of mastication and a restoration that can last more than a conventional fixed partial denture.

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