

Segmented Arch Versus all on 4 Implant Design: A Case Report of Severe Bite Object

Mukesh Kumar Singhal^{1*}, Aditi Rathi², Akash Raut², Anagha Waghmare², Shalini Chauhan² and Vishwajyoti Singh²

¹Professor and Head, Department of Prosthodontics, Institute of Dental Sciences and Research Centre, Bareilly, UP, India

²3rd Year Post Graduate Students, Institute of Dental Sciences and Research Centre, Bareilly, UP, India

***Corresponding Author:** Mukesh Kumar Singhal, Professor and Head, Department of Prosthodontics, Institute of Dental Sciences and Research Centre, Bareilly, UP, India.

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Abstract

Treatment of severe bite cases comprises thorough history, oro-facial examination and radiographs as OPG and CBCT. The adults' treatment is often part of periodontal, restorative and/or temporomandibular joint therapy. The current report of very severe deep bite state was discussed here and bite was opened through use of 5mm incremental increase in every 3 weeks by hard removable splint which was followed unto 15 mm in 3 months. Some highly worn maxillary teeth were restored as #13, #14, #23, #24. In mandible, 8 implants were placed. All implants were kept for bone osseointegration for 3 months. During this intermediate period of 3 months, a hard bite acrylic polymer splint was given to maintain the VDO. Three segmented arch section, implant multiunit, DMLS (Co-Cr metal with ingredients of Mo, W, silicon, cerium, Mg and carbon) with PFM prosthesis design and group function occlusion were considered and fabricated i.e. One section in anterior region (#33-43) and two section in posterior region (#34-37 and # 44-46). Present design could be stake claim therapy in future in contrary to All-on-4 creation.

Keywords: OPG and CBCT; Deep Bite; Bite Object

Introduction

Deep bite is one of the most common malocclusion seen in adults. Bishara (2016) defined Deep bite as malocclusion in which the mandibular incisor crowns are excessively overlapped vertically by the maxillary incisors when the teeth are in centric occlusion. Sequels of deep bite are periodontal involvement, improper mastication, temporomandibular joint disturbance [1]. Severe tooth wear causes decrease or no decrease in the vertical dimension [2]. The GPT9 defines as "Freeway space (FWS) is the difference in vertical dimension between when the mandible is at rest and when the mandible is in occlusion [3]. The treatments of deep bite is surgical therapy in adults and restorative procedures over any stage of life [3]. The presentation shows segmented arch versus all on 4 implant design: a case report of severe bite object.

Rationale and philosophy

A force is applied over a body develops complex or multiple stresses. It is difficult to induce just a single type of stress. These may be a combination of tensile, shear or compressive stresses. Wire, beam and bridge is stretched, the predominant stress is tensile but shearing and compressive stresses will also be present because the subjects are getting thinner (compressed in cross-section) as it elongates (Figure 1A) [4].

Freyssinet (2011) designed bridge expansion joints for continuous traffic between structures while accommodating movement, shrinkage, temperature variations on reinforced pre-stressed concrete, composite, and steel structures. Joints stop the bridge from bending out of place in extreme conditions and also allow enough vertical movement to permit bearing replacement without the need to dismantle the bridge expansion joint. Expansion joints prevent build up of resonant frequencies, which dangerously amplify the swaying motion of bridges. Without such joints, bridges are liable to collapse as Tacoma Washington (Figure 1B) [5]. The same philosophy occurs at the time of occlusal forces over implants.

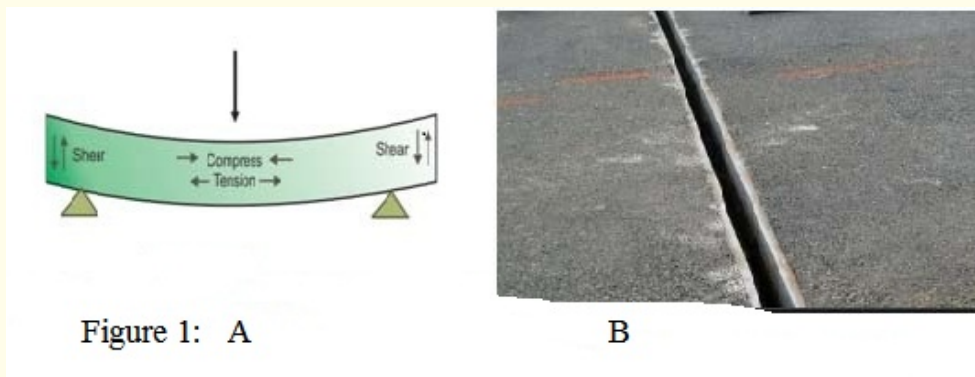


Figure 1

Case Report

A 50 year old male patient was visited with a chief complaint of chewing, esthetics and missing teeth. A dental and medical history was obtained. The medical history was insignificant. He had no TMD or pain in the masticatory muscles. A severe anterior deep bite at centric occlusion was observed, and upper incisor teeth were in contact over with the lower incisal labial tissue.

Intraoral examination revealed maxillary arch having proximal caries #23, #24 and highly abraded #13, #14. These teeth were restored with RCT and PFM crowns. Extraction of #17, #27 was advised. Debilitated mandibular anterior dentition with missing teeth #36, #37, # 42, #46 and root stumps #38 was present. Anterior dentition had severe attrition in mandibular arch (Figure 2A). A written consent was obtained.

Clinical procedure: Opening of deep bite

Impressions were made with an irreversible hydrocolloid material. It was poured in type III dental stone. The hard splint was planned for three months at incremental increase of VDO i.e.5 mm over every 3rd week (Figure 2B).

Teeth #47, #48 was restored with PFM crown at increased vertical height.

Placement of implants

Following increase in the OVD by occlusal splint, 8 implants were planned. Dimension of each implant had been decided by CBCT scan (Figure 3A). Eight endosseous screw type implants (Adin, Israel) were placed in #33 (3.5 mm W/13 mm L), #35 (3.5 mm W/11.5 mm L),

#41 (3 mm W/13 mm L), #43 (3.5 mm W/13 mm L), #44 (3.5 mm W/11.5 mm L) as immediate implants along with bone graft (Figure 3B) while rest #36 (4.2 mm W/10 mm L), #37 (4.2 mm W/10 mm L) and #46 (3.0 mm W/10 mm L) were normally placed. Following radiographic confirmation of osseointegration after 3 months, second stage surgical procedure was undertaken and healing caps on implants were placed. Four weeks later, impression was taken with the addition silicone of the mandibular arch with single step putty wash technique. Implant analogues were attached to the posts and the impressions were poured with type IV dental stone (Kalrock, Kalabhai).



Figure 2: A

B

Figure 2

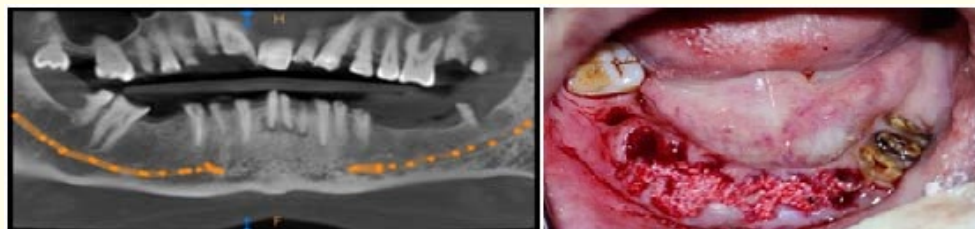


Figure 3: A

B

Figure 3

Jaw relation was recorded followed for provisional restoration (Self Cure polymer). It was cemented for 21 days with ZnO Eugenol at increased VDO (Figure 4A).

Fabrication of permanent prosthesis

Multiunit abutments (Adin, Israel) were placed to all 8 implants with impression posts and checked with radiographs for the precise fit (Figure 4B). Customised acrylic impression tray was used with open tray impression technique. Final impression was made with single step putty wash technique with addition silicon rubber base material (Virtual Ivoclar, Germany). Casts were mounted on a semi adjustable articulator with facebow record and bite registration paste record. Castable abutments were splinted and setup wax-up trial was done to evaluate the occlusal relation of definitive fixed prosthesis (Figure 5A). Metal CAD-CAM DMLS framework was fabricated and checked (Figure 5B) i.e. canine to canine (Anteriorly), first premolar to molar each on either side (Posteriorly). Finally, group function occlusion, segmental retrievable implant supported PFM prosthesis were delivered (Figure 5C and 5D).



Figure 4: A

B

Figure 4



Figure 5: A



B



C



D

Figure 5

Discussion

Implants have become an integral and versatility part of edentulism [6-8]. Ergun G, Yucel AS (2014) suggested use of removable acrylic resin occlusal splint for an increase in OVD [3]. In current object, the authors have increased the OVD as 5 mm in 3 weeks upto 15 mm. It is necessary to accommodate TMJ joint, hard and soft structure along with the masticatory muscles.

The advocated sectioned implant prosthesis is better option in concern to All-on-4 design which is a single superstructure while in present case it is in 3 segments that provide easy masticatory force distribution and ease of maintenance [5]. The advantages is no cantilever, easy retrievability, correction of prosthesis with divergent angulations of implants [9]. Substantially, loss of one implant may not result in loss of the entire superstructure reconstruction [10].

Conclusion

The rehabilitation of edentulism by means of fixed prosthesis has always been a priority. The paramount longevity of the rehabilitation should be the concern for the clinician. Segmented full arch three multi unit implants prosthesis on implants is a viable epitomic and cut edge alternative for increased survival of the prosthesis with across of technical and biological complications.

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