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## A Maxillary Tooth Supported Immediate Overdenture Opposing A Bar Retained Mandibular Overdenture: A Case Report.

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### ABSTRACT

Clinical decision making in the case of a partially edentulous patient with only a few teeth remaining is a challenge. There is always a social and psychological fear of being edentulous after the extraction of remaining teeth. The position and number of teeth in the arch will decide the type of treatment like extraction of the remaining teeth and fabrication of a conventional complete denture, a removable partial denture, an overdenture or an immediate denture. Custom bar supported overdenture is a good alternative treatment modality because of its improved retention, stability, better chewing efficiency and decrease in alveolar bone resorption. It also prevents the patient from the anxiety and distress associated with the extraction of remaining teeth. This case report presents the management of a patient with a bar retained mandibular overdenture opposing maxillary immediate over denture.

**Key words:** overdenture, immediate overdenture, bar supported over denture, bar overdenture, bar attachment.

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## INTRODUCTION

Achieving excellence in esthetics, stabilization and retention of the prosthesis with favourable distribution of forces for the preservation of remaining oral structures is a challenge in Prosthodontics. One of the most effective way of preserving the residual ridge and the proprioceptive feedback is by retaining the roots and fabricating an overdenture [1].

Partially edentulous patients with very few teeth remaining, especially anterior teeth are very difficult to treat satisfactorily with a RPD and there are very few options left with the clinician. Loss of teeth leads to an inevitable resorption of the alveolar ridges with subsequent loss of vertical dimension and loss of occlusal contacts. Several studies have shown that 20-30% of denture wearers were dissatisfied and had problems with their dentures especially mandibular dentures due to the anatomical factors such as reduced denture bearing area and the presence of tongue. Overdentures as a treatment option have improved the satisfaction as well as the quality of life of the patients. Nowadays, with the possibility of oral rehabilitation with overdentures, the satisfaction level and masticatory function have improved significantly [2].

Overdentures or immediate overdentures inserted immediately after extraction of hopeless teeth and retaining some to act as overdenture abutments, gives great psychological comfort to the patient as there is no period of edentulousness. To make the transition from natural dentition to complete denture a gradual process an overdenture, immediate denture or immediate over denture is recommended by prosthodontists [3]. Overdenture treatment modality provides an aesthetic and functional result that allows proper access for hygiene and maintenance [4]. The bar attachments are commonly used for overdentures. Overdenture attachments can also be functionally classified as rigid or resilient. Because periodontal support of the remaining teeth is mostly compromised, the resilient attachment is used more often for overdenture therapy. The resilient attachment divides the functional load over both the retained root structure and the edentulous ridge. They provide a splinting mechanism between the overdenture abutment teeth and increase the stability and retention of the prosthesis [5].

### **Bar Overdenture:**

A bar overdenture is an excellent prosthetic option that many patients choose over other treatment modalities for a number of reasons like having more retention than a conventional denture, providing better support than a tissue-supported prosthesis, functioning better because it is more stable and moves less, being more comfortable to the patient.

Although there are some prerequisites for the patient to be a candidate for a bar overdenture. There must be an interarch space of about 15 mm, but in case there is not enough space, an alveoloplasty would create the space necessary if the ridge height permits.

Attachments used to retain overdenture prostheses are classified according to shape as stud and bar. Stud attachments are probably the simplest of all attachments; they connect the

overdenture to individual roots for increased retention of the prosthesis. Bar attachment retainers have the dual role of acting as splints for roots spanning the edentulous space and providing overdenture retention. Because the bar is positioned close to the mandibular alveolar bone, torquing forces applied through the bar will be less than the torquing forces applied through the occlusal rests of a mandibular removable partial denture.

This case report explores the treatment of a patient with a tooth supported bar retained mandibular overdenture opposing a maxillary immediate overdenture.

### Case Report

A 45-year-old male patient reported to the Department of Prosthodontics and Crown & Bridge. The patient wanted the replacement of missing teeth in the upper and lower arches.

On examination teeth remaining in mouth were 11, 14, 21, 24, 26, 31, 32, 33, 34 and 41, 42, 43 [Fig1 – 2]. Of these teeth 24, 34 were extremely mobile having grade III mobility; 26, 31, 32, 41, 42 were having grade II mobility.



Fig 1: Maxillary Pre-operative view



Fig 2: Mandibular Pre-operative view

Supplemental diagnostic aids like OPG and IOPA radiographs revealed that 11, 14, 21, 33 and 43 were having good alveolar bone support without any periapical pathology and were planned to be retained as abutments for overdenture. Primary impression of both arches were made with irreversible hydrocolloid impression material (plastalgin) and casts were prepared. Diagnostic mounting was done to evaluate the space present in mandibular anterior region for placement of bar attachment. Based on the availability of adequate interarch distance it was decided to fabricate a maxillary immediate overdenture and mandibular bar and double sleeve retained overdenture. Meanwhile extremely mobile teeth were extracted. Elective endodontics was carried out for the remaining abutment teeth. After healing and endodontic treatment patient was recalled for abutment teeth preparation for overdenture. Both the retained mandibular canines were prepared for coping and bar attachment [Fig 3]. They were prepared in a dome-shaped contour and hemispherically rounded in all directions for metal coping and bar attachment.

After the mouth preparation phase intra radicular dowel extension for both the canines was planned and the canal space was prepared accordingly making them parallel. Final impression was made with addition silicone elastomeric impression material and cast was

poured in die stone [Fig 4]. Wax pattern for metal coping with prefabricated plastic retentive bar [Fig 5] was prepared on 33 and 43 respectively [Fig 6]. Wax pattern was invested and casted. They were retrieved, finished and polished and verified for fit by placing on the cast [Fig 7]. Patient was recalled after a week for cementation of coping with cast retentive straight bar with a single metal sleeve on 33 and 43 with glass ionomer luting cement (GC Fuji 1) [Fig 8, 9].



Fig 3-Prepared dome shaped mandibular canines



Fig 4-A putty-wash, two-step impression with putty and light body consistency (addition silicone) to transfer the impression posts

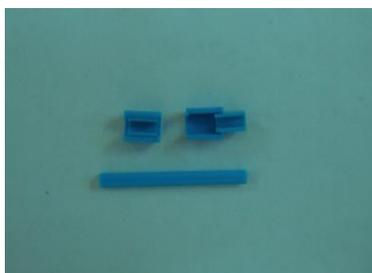


Fig 5-A preformed bar and nylon sleeves (Hader Bar)



Fig 6- Inlay coping with Bar



Fig 7-Cast Hader bar placed on the cast



Fig 8-Large sleeve is casted and second sleeve is plastic to provide resiliency



Fig 9-Cemented Bar with plastic and metal sleeves



Sectional impression tray made for maxillary arch without covering remaining anterior teeth and full arch impression tray is made for mandibular arch. Border moulding of both arches were done and secondary impression was made with medium body addition silicone impression material (Aquasil). For maxillary dual impression [6] technique was followed. Record bases were fabricated on master cast and occlusal rims were made followed by a face bow transfer and mounting on a semi-adjustable articulator.

After teeth arrangement posterior try in was done first. Maxillary anterior trial was not possible and patient was informed about it. Trial denture bases were transferred back to articulator, maxillary anterior teeth were removed from the cast and remaining teeth were arranged [Fig 10]. Maxillary teeth which are used as abutment are prepared for amalgam plug [Fig 11]. Proper wax up and carving was done. The maxillary and mandibular trial dentures were processed, finished and polished. Once the dentures were ready, the two sleeves- one cast and the other plastic sleeve were placed on the mandibular bar and were evaluated for proper fit. The custom cast metal housing fitted well on the blue coloured plastic sleeve. Patient's teeth (24, 26) were removed and sutures placed and maxillary dentures were inserted into patient's mouth. After adjustments the blue sleeve with metal housing were relined in the tissue surface of the lower denture [Fig 12]. Esthetics, occlusion and denture borders were verified and corrections were made accordingly and the final prosthesis was inserted in the patient's mouth [Fig 13]. Patient was given all the post-insertion instructions and was recalled for follow up.



Fig 10- Completed teeth arrangement



Fig 11-Prepared teeth with amalgam plug



Fig 12-Sleeves embedded in denture



Fig 13-Final Denture

## DISCUSSION

Edentulism results in loss of proprioception, progressive irreversible alveolar bone loss, the transfer of all occlusal forces from the teeth to the oral mucosa, and esthetic impairments. By retaining natural teeth for an overdenture, we can preserve some of sensory inputs from the periodontal mechanoreceptors which are more precise than that obtained from the oral mucosa. These periodontal receptors by their proprioceptive feedback mechanism actively influence muscles of mastication and thereby the cyclic temporomandibular joint movements [7].

Studies show that anterior teeth exhibit more sensitivity and discrimination of forces than posterior teeth. By retaining mandibular canines in overdenture, the resorption of the

alveolar bone surrounding these teeth was reduced by eight times. [8] Kruger and Michael in 1962 found that canine had more neurons than any other teeth and they are the most important proprioceptive organ [9].

Considering these factors an immediate over denture and bar retained over denture is planned for the patient which provides simplicity of fabrication, ease of maintenance, stability, retention and good patient response. More importantly it helps in the preservation of the remaining oral structures (as a result of distribution of forces) [10].

Overdentures are generally indicated for patients few healthy teeth are remaining in the mouth, patients with poor prognosis for complete dentures like in case of severely resorbed residual ridges, high palatal vault, cleft palate, ectodermal dysplasia and deformities of the maxilla and mandible [11,12].

Overdentures are contraindicated in uncooperative patients, patients having severe mobility of teeth, decreased vertical dimension of occlusion, severe hard and soft tissue undercuts and teeth that cannot be treated endodontically. The mandibular bar-retained overdenture provides a sense of proprioception. It also reduces torqueing of the remaining root structure because crown-root ratio is decreased. The bar affords adequate retention without unduly torqueing the bar and canine abutments. Further, the patient can more easily perform plaque-control procedures because access is unimpeded. Last, the abutments are less susceptible to caries because the cast dome coping covers the exposed tooth structure [11, 12].

The use of the straight bar joint offers periodontally involved teeth an improved crown-to-root ratio and splinting of the teeth. Because the bar is close to the alveolar bone, forces of mastication exert much less leverage to the teeth [13]. Finally, the bar joint offers slight vertical and rotational movement of the denture as well as a stress breaker action because of resiliency provided by plastic sleeve. Bar exhibited more cross-arch involvement than the Zest anchor and allowed occlusal forces to be shared between the abutments. Retention of bar can be increased by increasing the number of plastic sleeve used and is limited by the length of the bar. Immediate overdenture patient should be motivated to properly maintain the retained teeth with home care and understand the importance of periodic follow-up care by the dentist [3].

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