

TOOTH SUPPORTED OVERDENTURE IN OLD PATIENT WITH DENTURE CHARACTERIZATION- A CASE REPORT

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ABSTRACT

Tooth loss can occur by progressive caries, accidents, and gum problems. This can affect the beauty, smile, and chewing efficiency of an individual. This can be corrected by replacing the teeth with an artificial denture. Overdenture is a treatment option for individuals with very few teeth. So, preserving the root under the denture will maintain the proprioception, preserve the alveolar ridge by preventing residual ridge resorption and maintain denture stability. Though there are new developments in dental implantology the conservation of existing root structure and placement of overdenture over them is still authentic. This will help to transfer the occlusal force along the tooth long axis and prevents the dislodgement of denture. This clinical report describes the fabrication of a characterized overdenture retaining the maxillary central incisors. An artificial denture can be contoured and characterized to give a more esthetic lifelike appearance. So individuals with a minimum number of teeth can be rehabilitated with characterized Overdenture to improve the positive effect on patient confidence and self-respect.

Key words: Overdenture, Characterization, Coping, Artificial teeth.

Introduction

A natural dentition (dentate) becomes an artificial dentition (edentulous) following a series of undesirable tooth loss events including caries, trauma, periodontal problems, multiple extractions with a series of agenda such as gradual deficit of typical bone anatomy, a decline in distinct tooth equilibrium, the oral mucosa gets overloaded with the masticatory forces transmitted from the teeth and resulting in the mislaying of an individual's self-confidence which is the most painful consequence [1]. In this advanced era, innumerable treatment options are available for replacing a missing tooth in individuals. Factors such as mastication, speech, and esthetics are very important and given utmost consideration when a dental prosthesis or procedure is planned to attain the maximum success for the outcome of treatment [2]. Preservation of a tooth leads to safeguarding the bone which renders the upcoming issues related to the rehabilitation of missing teeth. A tooth-supported overdenture plays a vital role in preventive prosthodontics as a method to preserve the existing natural teeth which also reduces bone disintegration [3]. A timely planned therapy leads to hindering bone destruction and maintains the denture-bearing areas as well as shoots up chewing ability. As an alternative to surgical removal, a dentist shall protect, and preserve the existing firm teeth in support of prostheses which provides numerous advantages such as yielding support, maintaining equilibrium, increasing self-confidence as well as affordable [4-6]. Bone begins to disintegrate spontaneously in the absence of teeth or retained roots, thus preservation of tooth is directly equivalent to the preservation of bone [7, 8]. Tooth-supported overdenture obligates accurate evaluation of the distance available

between the ridges. Therefore, enough volume must be available for coronal tooth structure, copings, attachments, denture base as well as artificial teeth without affecting the strength of the denture [9].

Case report

A seventy-eight-year aged male person came to the Prosthodontics department of SRM Dental College and Hospital, Chennai, and reported a primary issue of missing multiple teeth in upper and lower arches and because of this, he was facing problems in chewing food. After clinical evaluation, the patient was diagnosed with a completely edentulous mandibular arch and partially edentulous maxillary arch with only central incisors present. Kennedy's class I partially edentulous condition was present in the upper arch (**Figure 1**).



Figure 1. Preoperative photograph

Following are the various treatment options recommended for this patient

1. Extraction of both the central incisors and removable conventional complete dentures in both arches.

2. Extraction of both the central incisors and implant-supported overdenture in both arches.
3. Tooth-supported maxillary removable overdenture opposing removable complete denture in the mandibular arch.

Both central incisors had sufficient periodontal support without any signs of mobility, so they were not advised for extraction. Finally, the treatment plan proposed for the patient was a maxillary removable tooth-retained overdenture and mandibular complete denture. On his first visit, a diagnostic impression was made, diagnostic casts were fabricated and inter-occlusal space was evaluated for fabricating an overdenture. Then the incisors were endodontically treated and tooth reduction was done for the cementation of metal copings. A definitive impression was made, casts were poured, the wax pattern for the copings was fabricated, invested, and cast, and the metal copings were sandblasted, trimmed, and polished. On the next visit, the metal copings were evaluated intraorally and cemented in relation to the right and left central incisors of the upper arch (**Figure 2**). The patient was called a day later for making the final impression using the special tray made from the diagnostic casts. Then, we registered the jaw relations with the help of bite rims on the denture base made of auto-polymerizing acrylic resin and articulation followed by teeth arrangement. In the next appointment, a try-in was done. After waxing up, flasking was carried out till the first pour, and putty was adapted over the waxed denture base and followed by the second pour. After dewaxing pigments and clear acrylic were mixed with monomer. Four different color pigments like brown, red, melanin and yellow (Milestone healthcare, Chhattisgarh) (**Figure 3**) were mixed with heat cure acrylic monomer and this was used to characterize interdental papilla, marginal gingiva, attached gingiva, root portion, and denture base area. This was applied in layers on the respective regions in the mold space and it was frequently wetted by monomer and followed by packing was done by using heat cure acrylic resin. After completing denture processing, the dentures were trimmed, finished, and polished, and evaluated intraorally for retention, aesthetics, occlusion, comfort, and any sharp margins or irregularities (**Figure 4**). Finally, the dentures were delivered and their maintenance guidelines were advised. The patient was reviewed a day later, after 1 week, and after one month (**Figure 5**).



Figure 2. Cementation of metal copings



Figure 3. Characterisation pigments



Figure 4. Characterised overdenture after processing



Figure 5. Post operative photograph

Results and Discussion

Surgical removal of teeth affects the reduction of the height of the alveolar process [8]. so, typical tooth-retained overdentures must have always been preferred over the extraction of remaining natural teeth to halt alveolar bone loss [10]. Retaining the extant permanent tooth confers maintaining equilibrium, intercepts bone disintegration, provides emotional support tend to enhance denture stability and adequacy [2, 11]. though only two teeth were present in the arch, they provide remarkable upgradation of prosthesis outcome. Hence, it was finalized to safeguard the existing incisors in favor of overlay dentures. If teeth were preserved then their periodontal membrane also gets preserved which further results in safeguarding the proprioceptive impulses and developing superior neuromuscular coordination, appreciating sensation with finer chewing ability [12, 13]. Auxiliary retentivity could be obtained by incorporating numerous attachment structures readily accessible based

upon demands and conditions according to each individual [14-16]. These attachments were expensive and the location and the abutment teeth were to be considered. In the event of overdentures without copings, there will be more chances for the abutment tooth to breach. So, here, in this case, we had opted for metal copings cemented over the central incisors which are comparatively economical solutions.

Alveolar bone is an active tissue that rapidly disintegrates with the absence of teeth. Deposition of bone increases when an external force is impacted on bone. This is due to the transfer of these stresses to the underlying bone through the periodontal fibers of teeth which maintain the equilibrium and safeguard the alveolar bone [17]. Hence, overdentures can be preferred over a conventional complete denture [18].

- According to GPT 9: any removable dental prosthesis that covers and rests on one or more remaining natural teeth, the roots of natural teeth, and/or dental implants;
- also known as overlay denture, overlay prosthesis, or superimposed prosthesis [19].

The basis for overdenture

- surgical removal of all the existing teeth and rehabilitation with a complete denture is not an ethical procedure.
- Preventive treatment procedures render the upcoming prosthodontic complications.
- overdentures can be employed to delay the conversion of a partial edentulism to a complete edentulism [20-23].

Indications

- Persons with a smaller number of existing teeth
- misrelated ridge cases;
- individuals requiring a single denture with a high palatal vault;
- patients with adverse tongue positions and muscle attachments
- adult patients
- severe attrition cases
- Cleft palate cases
- Amelogenesis imperfecta and dentinogenesis imperfecta
- Patients requiring dentures who met with maxillofacial trauma.
- Microdontia and partial anodontia patients [24, 25].

Contraindicated

- patients with poor oral hygiene
- medically compromised patients
- individuals with insufficient inter-arch distance.
- Unwilling patients
- under-motivated patients
- Mentally and physically challenged individuals
- Patients who cannot bear the expense [26, 27].

Endodontic consideration

Assets of endodontically treating the abutment teeth are

1. Crown root ratio made more pleasing

2. Clinical crown reduction contributes to interocclusal clearance for denture base and artificial teeth arrangement
3. For procuring attachments.

Types of overdentures

Immediate overdenture is a type that is made for insertion immediately after the extraction of natural dentition.

Transitional overdenture is obtained by transforming an existing removable partial denture into an overdenture [28].

According to Heartwell, depending upon the method of abutment preparation overdentures are classified into overdentures with coping, overdentures with simpler tooth modification without coping, overdentures with attachments, and overdentures with immersed roots into the alveolar bone.

Coping

- Short coping – 2-3 mm long and require endodontic therapy
- Long coping – 5-8 mm long [19, 29]

Attachments are connected to the abutment by a cast coping. The main aim is to intensify the retentiveness of dentures [29-31].

Clinical procedure

1. Surgical removal of teeth with a hopeless prognosis
2. Periodontal treatment
3. Endodontic treatment of abutment teeth
4. Crown reduction of abutments
5. Fluoride application over prepared teeth
6. Impressions and subsequent procedures are similar to conventional complete dentures
7. Areas adjacent to the gingival margin have to be trimmed on the intaglio surface to avoid impingement and later use a resilient liner [32, 33].

Advantages

- maintenance of bone,
- a cost-effective treatment option.
- increased stability and retentiveness of denture
- provides auxiliary assistance for the prosthesis
- preservation of the vertical proportion of the face
- preservation of the oral proprioception with its tooth structure,
- used in persons with congenital absence of six or more teeth
- advised for cleft palate, cleidocranial dystosis, and Class III occlusion patients.
- Could be transformed into a conventional complete denture later [27].

Disadvantages

- diligent oral hygiene is important.
- over contoured and voluminous

- invasion of inter-arch distance

Conclusion

The approach of typical overdentures with the preservation of natural teeth may be a straightforward and economic treatment when compared to other expensive treatment options such as implant-supported overdentures. In case of barely one or two teeth remaining in an arch, and the teeth are also firm could be preserved which may be preferred as abutments in support of an overdenture. It aids in reinforcing the retention and stability of the final prosthesis markedly. In everyday clinical practice, overdenture should even be considered a treatment procedure for a patient who has few teeth present in the oral cavity. This design helps in impeding a partially edentulous patient and transforming into a completely edentulous patient with the maintenance of the normal anatomy of bone. Finally, it also persuades the patient to rehabilitate the missing teeth along with the existing natural dentition.

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