ABSTRACT
A 53yr old male patient reported with a chief complaint of missing teeth causing difficulty in speech and mastication. On examination, the maxillary arch was completely edentulous and in the mandibular arch 33, 34, 43 and 44 were present. Discussion: Conventional mode of treatment for patients with few remaining teeth was to render them completely edentulous and provide a complete denture prosthesis. However with the advent of overdenture concept, this trend changed thereby preventing alveolar bone resorption, providing better load transmission, maintain sensory feedback and achieving better stability of denture with emphasis on psychological benefit of not being completely edentulous. An overdenture fabricated with balanced occlusion, besides providing increased retention also enhances the stability of the prosthesis. Conclusion: This case report describes the fabrication of a tooth supported characterised overdenture with bilateral balanced occlusion.

Keywords: Tooth supported overdenture, stability, retention

INTRODUCTION
An overdenture is a complete or removable partial denture that has one or more tooth roots or implants to provide support. The concept of overdentures was first presented at the World Dental Congress in 1861 by Butler, Roberts and Hays and the current concept was presented at the American Dental Association during the 1970 annual meeting in Las Vegas. This procedure significantly prolonged the life of remaining teeth in comparison with the conventional complete dentures prosthesis. Successful Endodontics of the abutment is the key to success of an overdenture therapy. It allows for short clinical crown which creates adequate space for the overlying denture base and artificial tooth. Moreover the shortened crown also changes the crown to root ratio thereby enhancing bone support. The second important factor is the added retention for the denture by retaining the root and at the same time there is significantly lower resorption of the alveolar bone.

Overdenture therapy has certain merits and demerits. Preeminent among the merits are conservation of natural teeth and concomitant reduction of residual ridge atrophy. Stability and support of the overdenture also can be better in comparison with a conventional complete denture prosthesis. In addition, sensory feedback of the periodontal receptors is maintained and masticatory performance is also enhanced. Demerits of the overdenture treatment include
the need for inevitable treatment which requires additional time and increased cost\(^3\).

A comparative analysis of the chewing efficiency of patients revealed that with natural dentition, the chewing efficiency was measured to be 90\%, 59\% for complete denture wearers and 79\% for patients with overdentures\(^4\). A tooth supported overdenture with bilateral balanced occlusion, besides providing good retention also enhances the stability of the prosthesis. Balanced occlusion makes possible the greatest use of masticatory power so that the food may be properly prepared for digestion.

**Case report:**
A 53-year-old male patient reported with a chief complaint of missing teeth causing difficulty in chewing and speech. Clinical examination revealed completely edentulous maxillary arch and partially edentulous mandibular arch. Teeth present in the mandibular arch were 33, 34, 43 and 44 (fig 1). Periodontal findings of the remaining teeth revealed gingival recession but no pocket formation and mobility. Hence it was concluded that these teeth could serve as potential abutments for the overdenture.

The treatment plan was divided into two phases. In phase 1, the remaining teeth were treated endodontically and phase 2 included prosthodontic intervention.

**Steps in fabrication:**
After intentional endodontic therapy of the abutments, primary impression was made using appropriate stock trays with irreversible hydrocolloid impression material (Zelgan plus-Dentsply). Diagnostic casts were mounted on a semi-adjustable articulator to analyse the inter-arch space and treatment was planned accordingly. Due to inadequate inter-arch space treatment with only primary coping was planned. All the four abutments were prepared to receive the copings with torpedo shaped diamond bur (Diamond Point, C&FG, Dentsply, U.S.A.) (fig 2). Single stage impression was made using putty and light viscosity vinyl polysiloxane impression material (3M ESPE, Express, U.S.A.) and the working cast poured with dental stone (Type III). Wax patterns for the copings were fabricated on the master cast and casted. The copings were trimmed, polished and cemented over the prepared abutments with a permanent luting cement (GIC type I, GC Corporation, Tokyo, Japan).

Maxillary and mandibular impressions were made with irreversible hydrocolloid alginate (Zelgan plus-Dentsply). Customised special trays were fabricated on the casts obtained from these impressions using acrylic resin (DPI-cold cure). Border moulding and secondary impression was made using putty and light viscosity vinyl polysiloxane impression material (3M ESPE, Express, U.S.A.) respectively and master casts were obtained. Base plate and occlusal rims were fabricated on the casts. Jaw relations along with face bow transfer was recorded and transferred to an Non-Arcon semi adjustable articulator. Teeth arrangement was carried out to attain a tentative bilateral balanced occlusion and centric relation was recorded using alu wax to verify the predetermined centric position and a protrusive record was also made at 6mm protrusion. This protrusive record was then used to determine the condylar guidance. A condylar guidance of 30° on right and 35° on left side was obtained. The lateral guidance for each side was calculated using Hanau’s formula and was found to be 16° and 18° for right and left side respectively. Using these values the tentative arrangement of teeth and their angulations were altered to attain a proper bilateral balanced occlusion. Dentures were processed after try-in of the waxed up dentures. The prosthesis was characterised using acrylic stains at the packing stage to simulate natural appearance and enhance esthetics. After
remounting and correction of occlusal discrepancies, the denture was trimmed, polished and denture insertion was carried out (fig 3, 4, 5, 6, 7).

**DISCUSSION**

Edentulism leads to impairment of both esthetics and functions hence having a psychological impact on the patients. In the past, patients with minimum teeth were rendered completely edentulous with the fabrication of complete dentures. But now, preventive Prostodontics emphasises on the importance of any procedure that can delay or eliminate future problems. The basic concept of overdentures is based on the preservation of residual hard and soft tissues. Overdentures are designed to distribute the masticatory load on the edentulous ridge and the abutments. An overdenture transfers occlusal forces to the alveolar bone through the periodontal ligament of the retained tooth roots and thereby enhancing the proprioceptive reflex. It maintains teeth as a part of the residual ridge aiding in added support. Instead of soft, movable tissues, the denture rests on tooth pilings enabling the denture to withstand much greater occlusal load without any movement.

Crum and Runey in a 5-year study found that retention of mandibular canines for overdentures led to preservation of alveolar bone and Rissin et al found that patients with overdentures had a chewing efficiency which was one-third higher than that of complete denture wearers.

Although an overdenture therapy has various advantages, certain disadvantages include caries susceptibility or periodontal breakdown of the abutments due to poor oral hygiene, abutment encroach the inter-occlusal distance, bony undercuts and at times esthetics can also be compromised.

Historical literature recommends atleast one tooth in each quadrant for cross arch stabilisation of the overdenture. Here, an overdenture supported by four natural teeth (two in each quadrant) was provided with bilaterally balanced occlusion. Bilateral balance help to seat the denture in a stable position during mastication, swallowing thereby enhancing the retention and stability of the denture and health of the oral tissues. Even during bruxing activity, a balanced denture is more stable.

**CONCLUSION**

The concept of overdentures provides means of reducing resorption of the denture foundation area. The key to successful overdenture therapy lies in proper case selection, abutment evaluation and preparation, patient motivation, home care instructions as well as periodic recall. A prosthesis so designed provides a functional and esthetic solution to the edentulous state of the patient.

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**REFERENCES**


FIGURES:

Fig 1: Pre-operative picture of mandibular arch showing the selected abutments

Fig 2: Abutments after crown preparation to receive the copings

Fig 3: Centric relation

Fig 4: Contacts on protrusion
Fig 5: Contacts on left lateral movement

Fig 6: Contacts on right lateral movement

Fig 7: Post-operative