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Overdentures in prosthodontics: Case reports on tooth-supported and implant-retained overdentures

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Abstract

Overdentures, supported either by natural teeth or dental implants, have become a cornerstone in modern prosthodontics due to their significant benefits over conventional dentures. These benefits include enhanced stability, improved masticatory performance, and greater patient satisfaction. Tooth-supported overdentures utilize natural teeth to improve prosthetic retention and stability, while implant-retained overdentures offer superior retention for fully edentulous patients. This manuscript presents case reports illustrating the application of both treatment modalities.

Keywords: Ball attachments, implant supported overdenture, locator attachments, overdenture, tooth supported overdenture

Introduction

Any removable dental prosthesis that covers and rests on one or more remaining natural teeth, the roots of natural teeth, and/or dental implants; a dental prosthesis that covers and is partially supported by natural teeth, natural tooth roots, and/or dental implants (GPT 10). As they are supported by either natural teeth or implants, overdentures enhance masticatory performance, preserve alveolar bone, and boost psychological well-being^[1]. Tooth-supported overdentures retain proprioceptive feedback and bone structure, while implant-retained overdentures, especially with two implants in the mandible, provide superior retention for edentulous patients^[2, 3]. Ball attachments, bar attachments, locator attachments are used in overdenture fabrication which offers retention and comfort but require careful maintenance to prevent complications⁴. This manuscript presents case reports on tooth-supported and implant-retained overdentures.

Case Report 1

A 60-year-old male presented with missing teeth and difficulty in chewing over the past five months. His dental history showed progressive tooth loss: upper posterior teeth lost five years ago, lower posterior teeth two years ago, and upper and lower anterior teeth five months ago. Despite this, mandibular canines remained periodontally sound. Clinical and radiographic evaluations confirmed that mandibular canines were healthy and suitable for use as abutments for a mandibular overdenture. Given the patient's dissatisfaction with dentures and the viability of mandibular canines, a mandibular tooth supported overdenture with ball attachments was proposed and accepted.

To ensure long-term viability as abutments, mandibular canines were Root canal treated and were shaped to reduce fracture risk and to accommodate the overdenture. Post Space were prepared, leaving 4-5 mm of gutta-percha. Impressions were made for custom-fabricated posts and copings with ball attachments. Impression was scanned, posts and copings were digitally designed and fabricated using Direct Metal Laser Sintering (DMLS) technology. Posts and copings were cemented, and final impressions of both arches were made. Jaw relations were recorded, and teeth were arranged in balanced occlusion using semi adjustable articulator.

The processed dentures were then checked for fit and occlusion. Metal housings with nylon sleeves were inserted onto the customized ball attachments, followed by pick-up into the denture. The patient was educated on maintenance and care. Follow-up appointments were scheduled at one day, one week, and every three months to monitor fit, function, and patient satisfaction.

The use of mandibular canines provided enhanced retention, stability and the patient expressed significant improvements in comfort and function.

Case report 2

A 62-year-old male presented with a loose lower denture, which he had worn for 10 years. Over the past five years, the denture had become unstable, affecting his ability to chew and speak. Intraoral examination revealed significant mandibular ridge resorption, causing the denture's instability and poor retention. The patient had no contraindications for implant surgery, with a history of long-term reliance on complete dentures. Clearance was obtained to ensure the patient was fit for surgery. Routine tests were performed to rule out any health risks. Maxillary and mandibular casts were made, and an OPG and Dent scan evaluated bone quality and implant placement. Two Noble regular platform implants (4.3 mm × 10 mm) were placed in the anterior mandible using the old denture as a surgical radiographic stent in B and D positions. A full-thickness flap was raised to expose the bone. Implants were positioned using the surgical stent, and the flap was sutured. The patient was advised not to use his lower denture for three weeks to allow for initial healing and osseointegration. After three weeks, the denture was relined with a soft liner to improve fit and comfort during healing. After six months, the prosthetic phase began. Noble healing abutments were placed, and soft-tissue depth was measured to select Locator abutments. Locator abutments were secured with a torque wrench at 30 Ncm. Denture fabrication was done by taking impressions of the patient's oral structures, recording jaw relations, arranging artificial teeth, and processing them. Final adjustments ensured proper fit, comfort, and function for the patient. The lower denture was adapted with Locator attachments. Auto-polymerizing resin was used to secure Locator attachments in the denture. Blue male inserts provided initial retention, with options for higher retention later. The Locator system allows easy maintenance, with caps replaceable chairside during recall visits.

Figure format

Case Report 1 Figures



Fig 1: Pre-operative

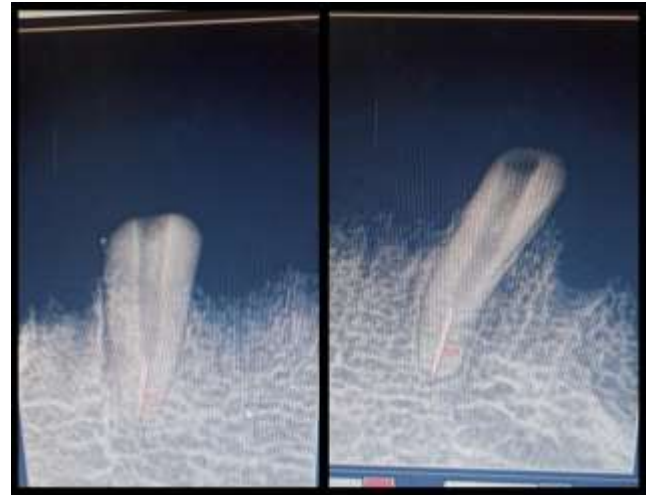


Fig 2: Post space preparation on 33 and 43

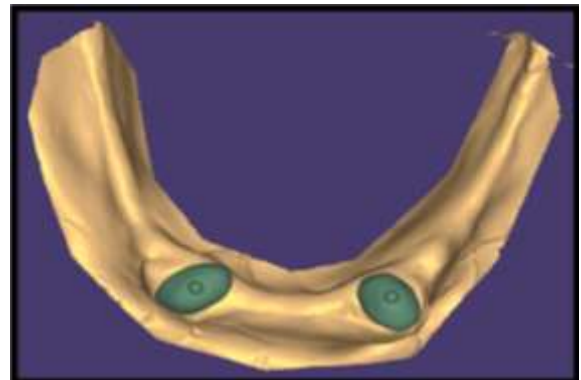


Fig 3: Designing of post copings with ball attachments



Fig 4: Insertion of metal housing with Nylon sleeve



Fig 5: Pickup of Metal Housing with Nylon sleeve



Fig 6: Mandibular Tooth Supported Over Denture Insertion

Case Report 2 Figures



Fig 1: Patient without Dentures



Fig 4: Secondary Impression



Fig 5: Pickup of Metal Housing with Nylon sleeve



Fig 6: Mandibular Implant Retained Over Denture Insertion



Fig 2: OPG showing Implants irt B and D Positions



Fig 3: Intraoral image showing Locator attachments

Discussion

Tooth-supported overdentures offer distinct advantages over conventional dentures, including improved retention, stability, and proprioception. The use of canines 33 and 43 in this case provided adequate support and enhanced patient satisfaction. Long-term success of such prostheses relies on meticulous oral hygiene and regular dental visits to monitor the abutments and surrounding tissues⁵. However, challenges such as the potential for caries and periodontal disease around the abutments necessitate rigorous maintenance protocols. Endodontic treatment of the canines was performed to ensure their long-term viability as abutments. This approach aligns with the recommendations of several authors who emphasize the importance of maintaining the health of abutment teeth to prevent complications such as fractures or infections⁶. The reduction of the canines to create dome-shaped preparations, as described by Morrow et al. (1969) [2], is well-supported in the literature for enhancing retention and reducing the risk of

mechanical failure.

Digital scanning and designing of the post and copings, followed by precise fabrication and placement, ensure a high degree of accuracy and patient satisfaction [7]. The choice of materials and techniques, such as polyvinyl siloxane for final impressions and the use of a semi-adjustable articulator, contributes to the overall success of the overdenture by providing optimal fit and function by reducing chairside.

The use of ball attachments for tooth supported overdentures has been extensively documented as an effective method to improve denture retention and stability. Ball attachments consist of a metal ball on the abutment and a corresponding socket in the overdenture. Ball attachments are used in this case because these attachments are known for their simplicity and ease of use. They generally offer good retention and can be a practical solution for patients with limited inter-arch space. The ball attachment system also allows for some degree of movement between the denture ensuring long term prognosis of the abutments, which can accommodate minor discrepancies in the fit [8]. One of the primary benefits of ball attachments is their straightforward clinical application and adjustment. They are less complex to install compared to bar attachments, which can result in reduced chair time and lower costs⁹. Additionally, ball attachments are often preferred for their ease of maintenance. Patients typically find cleaning and adjusting these attachments simpler, which can enhance their overall satisfaction with the prosthesis.

Implant-retained overdentures represent a significant advancement in prosthetic dentistry, particularly for patients struggling with the limitations of conventional dentures. These overdentures are anchored by dental implants, providing enhanced stability and retention. Unlike traditional dentures, which rely on suction and the remaining alveolar ridge for support, implant-supported overdentures are securely fixed, reducing movement and improving functionality [10]. This results in greater comfort and confidence for patients, especially when eating and speaking, as they no longer have to worry about their dentures slipping or causing irritation.

Locator attachments and ball attachments are two popular types of retention systems used in implant-retained overdentures. Both systems offer unique advantages and are selected based on patient-specific factors, clinical requirements, and personal preferences. Locator attachments are used in this case as locator attachments have a low vertical height, making them suitable for patients with limited interocclusal space. These attachments provide dual retention through both the inner and outer surfaces of the abutment, enhancing the stability and retention of the overdenture [11]. Locator attachments are designed for easy replacement of the nylon retention inserts, facilitating maintenance and adjustments [12].

Although ball attachments are more cost-effective option for many patients, locator attachments were selected in this case because of above advantages. Other type of attachments called bar attachments are also available but they typically involve higher costs due to the complexity of fabrication and the need for multiple implants [9].

When comparing the both modalities, implant retained over dentures typically provide superior retention and stability because they are anchored to dental implants, which offer a more secure fit. Tooth-supported overdentures rely on remaining natural teeth for support, which may not provide the same level of stability and may cause discomfort if the natural teeth or the surrounding tissues are not in good

condition. But tooth supported over dentures provided psychological comfort for the patient as natural teeth are retained and is economical when compared to implant supported dentures [13].

Conflict of Interest

Not available

Financial Support

Not available

Conclusion

In conclusion, both tooth-supported and implant-supported overdentures offer viable and effective treatment options for edentulous and partially edentulous patients. Each approach presents distinct advantages, contributing to enhanced prosthesis stability, retention patient satisfaction, and oral health. This case report underscores the importance of personalized treatment planning and patient education in achieving optimal outcomes. Continued research and long-term clinical studies are essential to further validate the benefits and address the challenges associated with overdenture therapies, advancing the standards of prosthodontic care. Careful patient selection, thorough treatment planning, and diligent maintenance are essential for achieving optimal outcomes.

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