ejpmr, 2025, 12(9), 373-376

EUROPEAN JOURNAL OF PHARMACEUTICAL AND MEDICAL RESEARCH

www.ejpmr.com

SJIF Impact Factor 7.065

Case Study

ISSN (O): 2394-3211

ISSN (P): 3051-2573

INNOVATIVE REHABILITATION OF AN EDENTULOUS MANDIBLE WITH T-BAR RETAINED SINGLE IMPLANT OVERDENTURE: A CASE REPORT

[1]*Dr. Ramya B. Kabbin, [2]Dr. Arvind I. Moldi, [3]Dr. Chaitra S. Bulla, [4]Dr. Pallavi Patil, [5]Dr. Eklarkar Priyanka Kalyanrao

[1,3-5]Postgraduate Student, [2]Professor [1]Department of Prosthodontics,
[1]HKE's S.Nijalingappa Institute of Dental Science and Research, Kalaburagi, Karnataka, India.

***Corresponding Author: Dr. Ramya B. Kabbin**

Postgraduate Student, HKE's S.Nijalingappa Institute of Dental Science and Research, Kalaburagi, Karnataka, India.

DOI: https://doi.org/10.5281/zenodo.17453650

Article Received on 17/07/2025 **Article Revised on 07/08/2025** **Article Accepted on 28/08/2025**

ABSTRACT

This case report examines the clinical application of a single implant-supported mandibular overdenture retained by a T-bar attachment in a patient with an edentulous mandible. Compared to traditional dentures, implant-supported overdentures provide superior retention and patient satisfaction, making them a reliable choice for the rehabilitation of edentulous mandibles. Bar attachment systems, such as the T-bar, splint the implant and permit cross-arch involvement, thereby enhancing stability and distributing occlusal forces more effectively. In this case, a single midline implant with a custom- fabricated T-bar was used to accommodate the patient's specific inter-arch space and anatomical requirements, resulting in optimal retention and function while minimizing prosthetic complications. This approach is particularly advantageous for patients with severely resorbed mandibular ridges and limited financial resources, as it reduces the number of implants required without compromising prosthetic performance. The clinical outcome demonstrated excellent functional results, with improved patient comfort, masticatory efficiency, and overall satisfaction. These findings suggest that a single implant-supported overdenture using a T-bar attachment is a cost-effective, patient-centered, and durable treatment modality, offering reliable retention, simplified maintenance, and a substantial improvement in quality of life for edentulous individuals with challenging mandibular anatomy.

KEYWORDS: Single implant, overdenture, T-bar attachment, mandibular prosthesis, implant-supported denture.

I. INTRODUCTION

Edentulism, particularly in the mandibular arch, remains a significant challenge in prosthetic dentistry due to progressive alveolar bone resorption and the resulting instability of conventional dentures.[1] Implant- supported overdentures have revolutionized the rehabilitation of edentulous patients by offering improved retention, stability, and masticatory efficiency compared to traditional complete dentures.[2] Among the various attachment systems available, bar attachments have gained popularity for their ability to distribute occlusal forces evenly and enhance prosthesis stability, especially in cases with compromised bone support.[2]

While the use of two or more implants is widely regarded as the standard for mandibular overdentures, recent studies have demonstrated that a single implant placed in the mandibular midline can provide satisfactory retention and patient satisfaction, particularly when combined with a bar attachment system.[3,4] This approach is especially advantageous for patients with atrophic mandibular ridges or those facing financial and anatomical limitations, as it reduces surgical complexity and overall treatment costs without compromising functional outcomes.[4]

The T-bar, which is less commonly discussed but still recognized, fits as a rigid bar attachment with a distinct T-shaped cross-section.

Based on cross-sectional shape, bar attachments are classified as

1. *Parallel (U-shaped) bar: rigid, suitable for four implant supports*
2. *Round bar: flexible, allows vertical movement*
3. *Oval (Dolder) bar: stress-resistant, offers flexibility*
4. *Hader bar: semi-flexible*
5. *T-bar: rigid, T-shaped cross-section, used where a broad base for clip attachment is needed.*[5, 6]

II. CASE REPORT

This case report highlights the clinical application and benefits of a single implant-supported mandibular overdenture using a bar attachment. The technique offers a viable, cost-effective, and patient-centered solution for the prosthetic management of edentulous mandibles.

A 67-year-old male presented to the prosthodontics department with chief complaints of difficulty chewing and dissatisfaction with his facial appearance, having been completely edentulous for about one year. His medical history was non-contributory, with no systemic diseases or regular medications. All teeth had been extracted due to advanced periodontal disease, and he had no prior experience with dentures, expressing anxiety about adapting to prostheses. Socially, as a businessman, he was highly motivated to improve both function and esthetics, displaying realistic expectations and a cooperative attitude.

Clinical examination revealed normal facial symmetry, healthy temporomandibular joint function, and no lymphadenopathy. Intraorally, both arches were completely edentulous, with Atwood's Class III ridges as shown in Fig-I and healthy oral mucosa. Salivary flow was adequate, and there were no mucosal lesions. Functional assessment showed normal mandibular motion and no parafunctional habits. Panoramic radiography confirmed complete edentulism with moderate residual ridge height and no pathologies as shown in Fig-II.

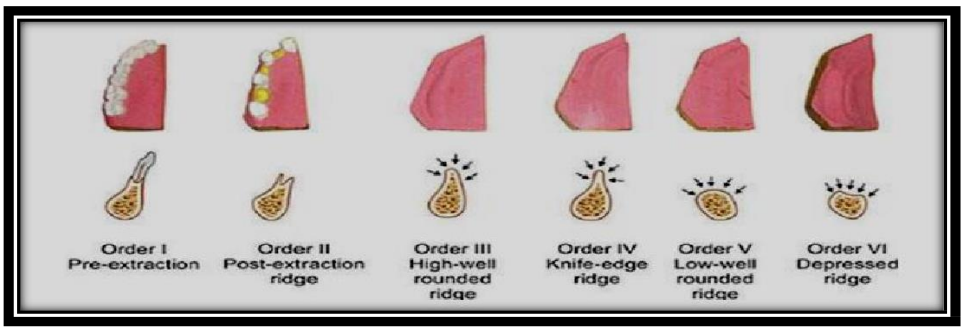

Figure 1: Atwood Classification of Residual Ridge Resorption In 1963.

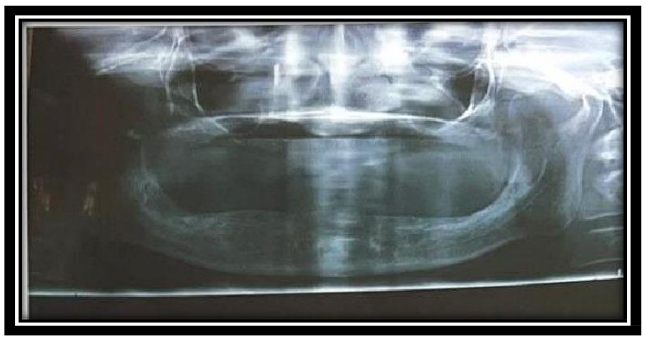

Figure 2: Panoramic Radiograph.

The diagnosis was completely edentulous maxillary and mandibular arches with well-rounded ridges and a favorable prognosis for complete denture therapy. The treatment plan involved placing a single dental implant (3 mm diameter, 11.5 mm length) in the mandibular midline (intersymphyseal region) as shown in Fig-III. After three months of healing, a 1-mm healing abutment was torqued to 35 Ncm as shown in Fig-IV. After 2 week, patient recalled for implant impression as shown in Fig-V.

Figure 3: Implant (3mm*11.5mm) placed in midline of mandible.

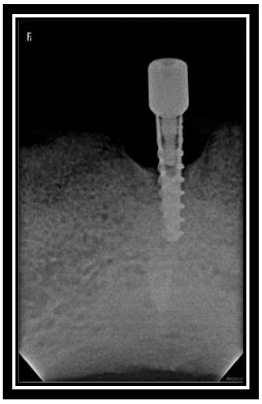

Figure 4: Healing abutment placement after 3months.

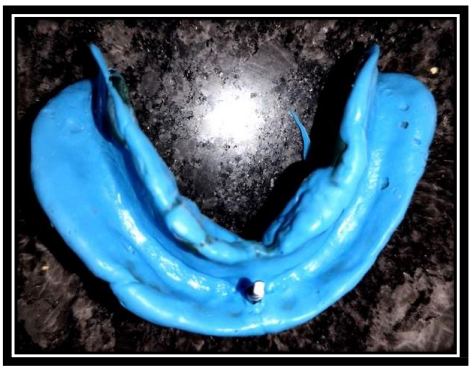

Figure 5: Implant Impression using elastomeric impression material.

Prosthetic optimization included extending the denture base to engage anatomical support areas such as the retromylohyoid curtain, buccal shelves, residual alveolar ridge, and retromolar pads, thereby maximizing tissue support and minimizing stress on the implant and bar attachment. Jaw relations were recorded using a facebow as shown in Fig-VI, and teeth arrangement done as shown in Fig-VII and verified at try-in as shown in Fig-VIII. Trial of T-bar attachment done intraorally as shown in Fig-IX. The final prosthesis containing nickel-chromium housing in lower denture for retention as shown in Fig-X was delivered after acrylization as shown in Fig-XI. The patient reported immediate and significant improvement in denture retention and stability.

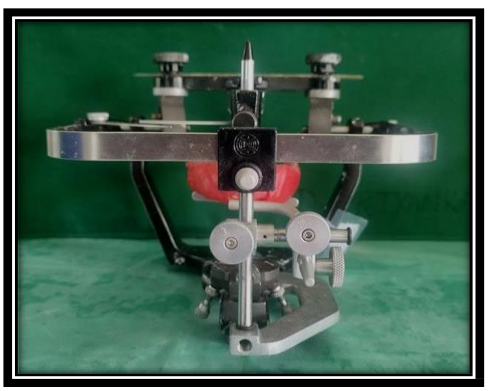

Figure 6: Jaw relation using facebow and transferring to hanau.

Figure 7: Teeth arrangement.

Figure 8: Try-in of Denture base.

Figure 9: Trial of T bar attachment.

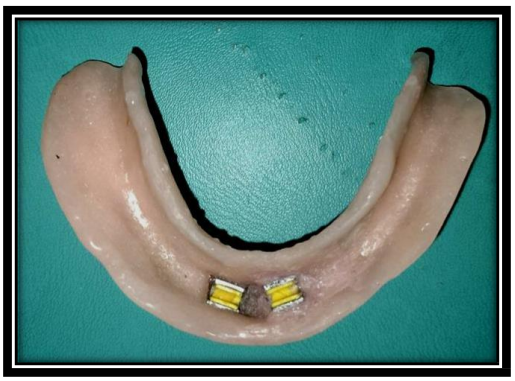

Figure 10: Nickel Chromium housing in denture base.

Figure 11: Insertion of denture.

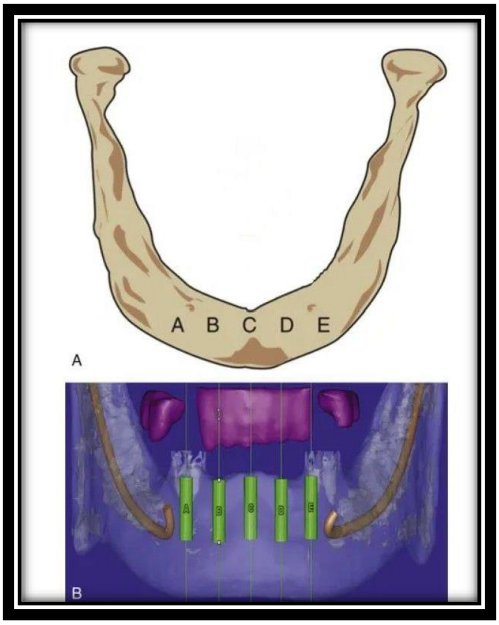

Figure 12: Mandibular implant overdenture position.

Poor oral hygiene is a significant risk factor for peri-implant inflammation and subsequent crestal bone loss, highlighting the need for patient education and maintenance protocols. Regular annual follow-ups were scheduled for two years, focusing on monitoring the occlusal vertical dimension and managing occasional peri-implant soft tissue inflammation with chlorhexidine rinses. At the two-year follow-up, the prosthesis, implant, and surrounding tissues remained stable, with no need for denture relining.

This case highlights the clinical application and benefits of a single implant-supported mandibular overdenture using a bar attachment. The approach offers a viable, cost-effective, and patient-centered solution, significantly improving stability, retention, and chewing efficiency for edentulous individuals, particularly those with financial constraints or concerns about complex procedures. Careful case selection, precise execution, and ongoing maintenance are critical for long-term success and patient satisfaction.

III. DISCUSSION

Implant-supported overdentures using bar attachments in the mandibular (C) region as shown in Fig-XII have become a widely accepted treatment option for edentulous patients, particularly those with atrophic mandibles. This approach offers significant advantages over conventional complete dentures, especially in terms of prosthesis retention, stability, and patient satisfaction. By splinting two or more implants with a rigid bar, occlusal forces are more evenly distributed, which is particularly beneficial in cases of severe bone resorption where the risk of pathologic fracture is heightened and bone grafting may not be feasible due to medical or financial constraints.[7] The placement of implants in the canine region is favored because it offers optimal support and allows for a straight bar design, which is mechanically advantageous. The bar attachment system, such as the Hader or Dolder bar, typically uses clips that engage the bar to provide mechanical retention. This setup not only enhances the stability of the overdenture but also allows for some degree of prosthesis movement, which can help dissipate functional stresses and reduce the risk of implant overload. Multiple studies have shown that bar-retained overdentures provide higher retention and stability compared to other attachment systems, such as ball or magnetic attachments, leading to better masticatory efficiency and overall patient satisfaction.[8,10] However, there are technical and maintenance considerations to address. Bar attachments require sufficient vertical and buccolingual space for proper placement and to ensure the acrylic base is thick enough to prevent fracture. Additionally, the bar structure can make hygiene maintenance more demanding for patients, increasing the risk of peri- implant mucositis if not properly managed. Therefore, thorough patient education on oral hygiene and regular follow-up visits are essential components of care.[9] Despite these challenges, the clinical outcomes for bar-retained implant overdentures are highly favorable. Both implant and prosthesis survival rates are excellent, and patients consistently report improved comfort, function, and quality of life compared to conventional dentures. This makes the approach particularly suitable for patients with severely resorbed mandibles, limited financial means, or medical conditions that preclude more extensive surgical interventions.[11] The T-bar attachment offers a valuable solution for single implant-supported mandibular overdentures, especially in patients with atrophic mandibles and limited treatment options. Unlike traditional bar systems such as the Dolder or Hader bars, which require multiple implants, the T-bar is specifically designed for single-implant cases and provides enhanced retention, stability, and resistance to rotational forces.[12] Its straightforward design and ease of maintenance make it a practical, cost- effective choice, resulting in high patient satisfaction and improved prosthesis function compared to conventional dentures.[4] Thus, the T-bar attachment stands out as a positive and reliable option when anatomical or financial limitations preclude the use of

multiple implants. Implant-supported mandibular overdentures using bar attachments in the canine region represent a reliable and patient-centered solution for managing edentulism in atrophic mandibles. Careful patient selection, meticulous prosthetic planning, and ongoing maintenance are vital for long-term success. Given the high level of patient satisfaction and clinical success reported, further randomized clinical trials are recommended to reinforce the evidence supporting this treatment modality.[13]

IV. CONCLUSION

This case study highlights the advantages of using a bar attachment to support a mandibular overdenture retained by implants placed in the canine region. The bar attachment system provides enhanced retention, stability, and improved force distribution, which are especially beneficial for patients with atrophic mandibles opposing a maxillary complete denture. This treatment modality offers a practical and effective solution for patients with limited financial means or those who are medically compromised and unable to undergo more complex surgical procedures. The improved prosthetic function and patient satisfaction associated with bar-retained overdentures make this approach a valuable option in clinical practice. Nevertheless, further randomized clinical trials are needed to validate and strengthen the evidence supporting the long-term success and patient outcomes of single or multiple implant-supported overdentures using bar attachments.

V. ACKNOWLEDGEMENT

NIL.

VI. Conflict of Interest

No.

VII. REFERENCES

1. Feine JS, Carlsson GE, Awad MA, et al. The McGill consensus statement on overdentures. Mandibular two-implant overdentures as first choice standard of care for edentulous patients. Gerodontology, 2002; 19(1): 3-4.
2. Sadowsky SJ. Mandibular implant-retained overdentures: A literature review. J Prosthet Dent., 2001; 86(5): 468-473.
3. Liddelow GJ, Henry PJ. A prospective study of immediately loaded single implant-retained mandibular overdentures: Preliminary one-year results. J Prosthet Dent, 2007; 97(6): S126-S137.
4. El-Sheikh AM, Shihabuddin OF, Ghoraba SM. A comparative study between single and two implant retained mandibular overdentures. J Adv Prosthodont, 2016; 8(3): 198-205.
5. Şahin N, Kaya N, Tekin EN. Attachment Systems in Implant-Supported Removable Dentures: Update for Clinicians. Lokman Hekim Health Sci., 2024; 4(2): 114–120.
6. Shafie H, Obeid G. Principles of attachment selection for implant-supported overdentures and their impact on surgical approaches. Selected Readings in Oral and Maxillofacial Surgery, 2011; 19(6): 1-16.
7. Ha SR, Kim SH, Song SI, Hong ST, Kim GY. Implant-supported overdenture with prefabricated bar attachment system in mandibular edentulous patient. J Adv Prosthodont,. Nov. 2012; 4(4): 254-8. doi: 10.4047/jap.2012.4.4.254. Epub 2012 Nov 29. PMID: 23236580; PMCID: PMC3517966.
8. Singh K, Gupta N, Kapoor V, Gupta R. Hader bar and clip attachment retained mandibular complete denture. BMJ Case Rep., Oct. 21, 2013; 2013: bcr2013010401. doi: 10.1136/bcr-2013- 010401. PMID: 24145505; PMCID: PMC3822056.
9. Zhou H, Jiao Y, Ma CF, Wang C, Zhao SJ, Tian M, Tay FR, Chen JH. Clinical outcomes of implant- retained mandibular overdentures using the bar and magnetic attachment systems: an up to 5 -year retrospective study. Ann Transl Med., Nov. 2020; 8(21): 1360. doi: 10.21037/atm-20-2531. PMID: 33313105; PMCID: PMC7723526.
10. Deshpande S, Chandak A, Radke U, Mahalle H, Patil PG. Effect of Ball and Bar Attachment Type on Patient Satisfaction Using Two-Implant-Retained Mandibular Overdenture: A Crossover Randomized Clinical Trial. J Maxillofac Oral Surg, Dec. 2022; 21(4): 1175-1179. doi: 10.1007/s12663-022-01727-0. Epub 2022 May 20. PMID: 36896084; PMCID: PMC9989069.
11. Papalexopoulos D, Partalis C, Lampropoulos P, Artopoulou II, Sykaras N. Incorporating Stud Attachments in the Bar Design for an Implant-Supported Overdenture. Case Reports in Dentistry, 2024; 2024(1): 2818034.
12. Al-Ghafli, S. A., et al. Attachment systems for implant overdentures: a review. Implant Dentistry, 2009; 18(3): 219-227.
13. Savabi O, Nejatidanesh F, Yordshahian F. Retention of implant-supported overdenture with bar/clip and stud attachment designs. Journal of Oral Implantology, Apr. 1, 2013; 39(2): 140-7.