Content available at: https://www.ipinnovative.com/open-access-journals

IP Annals of Prosthodontics and Restorative Dentistry

Journal homepage: https://www.aprd.in/

Original Research Article

Beyond traditional dentures: Navigating the world of overdentures and attachment advancements

Shafali Agrawal[1]*, Madhura Titar[2], Alcina Fernandes[3], Jeewan Dhinsa[4], Venkata Mungara[5]

[1]*Dept. of Prosthodontics and Crown and Bridge, Government Dental College, Cuddalore, Tamil Nadu, India*
[2]*Dept. of Prosthodontics Crown and Bridge, Oracare Multispeciality and Dental Clinic and Implant Center, Kharghar, Navi Mumbai, Maharashtra, India*
[3]*Consultant Prosthodontist and Implantologist, Ponda, Goa, India*
[4]*Consultant Prosthodontist and Implantologist, Delhi, India*
[5]*Dept. of Prosthodontics and Crown and Bridge and Implantology, CKS Teja Institute of Dental Science and Research, Tirupati, Andhra Pradesh, India*

ARTICLE INFO

Article history:
Received 29-05-2024
Accepted 19-07-2024
Available online 16-08-2024

Keywords:
Overdentures
Dental prosthetics
Implantsupported dentures
Toothsupported dentures
Attachment systems

ABSTRACT

Background: Traditional dentures, though widely used, have several limitations such as unreliable retention, discomfort, and acceleration of jawbone resorption. Recent advancements in dental prosthetics, particularly in the development of overdentures and sophisticated attachment systems, have addressed many of these issues, offering patients improved stability, comfort, and oral health outcomes.
Aim/Objective: To explore the advancements in dental prosthetics, specifically focusing on the development and benefits of overdentures and modern attachment systems compared to traditional dentures.
Materials and Methods: A comprehensive review of the literature and recent innovations in dental prosthetics was conducted, examining the limitations of traditional dentures and the functional improvements provided by tooth-supported and implant-supported overdentures. The study also analyzed various attachment systems, including bar attachments, ball attachments, and locator attachments, to assess their effectiveness in enhancing denture stability, comfort, and oral health outcomes.
Results: Stability and Retention: Overdentures, whether tooth- or implant-supported, provide superior stability and retention compared to traditional dentures, significantly reducing the risk of slippage.
Oral health benefits: Overdentures help preserve the jawbone and prevent bone resorption, maintaining facial structure and contributing to long-term oral health.
Comfort and functionality: Advanced attachment systems, such as bar, ball, and locator attachments, offer a secure and comfortable fit, improving chewing efficiency and speech clarity.
Patient quality of life: Enhanced stability, comfort, and functionality of overdentures lead to a higher quality of life for patients.
Conclusion: The advancements in overdentures and attachment systems represent a significant improvement over traditional dentures. These innovations provide greater stability, improved oral health, and enhanced functionality, offering patients a more reliable, comfortable, and effective solution for dental prosthetics. As dental technology continues to evolve, the options and outcomes for individuals requiring dental prosthetics will continue to improve.

https://doi.org/10.18231/j.aprd.2024.038

1. Introduction

The field of dental prosthetics has evolved significantly over the past few decades, offering more comfortable, functional, and aesthetically pleasing options for patients with missing teeth. Among these advancements, overdentures and the innovations in attachment systems stand out as notable developments that provide superior alternatives to traditional dentures.

1.1. The limitations of traditional dentures

Traditional dentures, while effective in restoring basic oral function and appearance, have several drawbacks. They often rely on suction and adhesive for retention, which can be unreliable and lead to slippage during eating or speaking. This can cause discomfort and embarrassment for wearers. Furthermore, traditional dentures can accelerate the resorption of the jawbone due to the lack of stimulation that natural teeth provide, potentially leading to changes in facial structure and further complications over time. [1,2]

1.2. Introducing overdentures

Overdentures represent a significant improvement over traditional dentures by utilizing existing teeth or dental implants as anchors. These supports provide a stable foundation, enhancing the fit and function of the dentures. Overdentures can be either removable or fixed, depending on the patient's needs and preferences.

Tooth-Supported Overdentures: In cases where some natural teeth remain, these teeth can be modified to support an overdenture. The retained teeth are usually fitted with special attachments or modified to provide a stable base. This approach helps maintain the integrity of the jawbone and offers better retention than traditional dentures. [3–5]

Implant-Supported Overdentures: For patients without sufficient natural teeth, dental implants provide an excellent alternative. Implants are surgically placed into the jawbone, where they act as artificial tooth roots. Overdentures are then securely attached to these implants, offering superior stability and function. This method not only prevents bone loss but also restores a more natural chewing ability and improves overall oral health.

1.3. Innovations in attachment systems

The success of overdentures largely depends on the quality and design of the attachment systems used. Recent advancements in this area have greatly improved the comfort, convenience, and effectiveness of overdentures. [6–10]

1.3.1. Bar attachments

A bar attachment system involves placing a bar along the gum line, which is connected to dental implants. The overdenture clips onto this bar, providing excellent stability and distribution of chewing forces. This system is particularly beneficial for patients with extensive bone loss or those who need a higher degree of retention.

1.3.2. Ball attachments

This system uses ball-shaped connectors that fit into corresponding sockets on the overdenture. The simplicity and effectiveness of ball attachments make them a popular choice. They allow for some natural movement of the denture, which can be more comfortable for the wearer.

1.3.3. Locator attachments

Locator attachments are one of the most advanced options available. They offer a low-profile design that provides strong retention and easy maintenance. These attachments allow for slight rotational movement, which can help in achieving a more comfortable fit and easier placement and removal of the overdenture.

1.4. Benefits of overdentures and advanced attachments

1.4.1. Enhanced stability

Overdentures, whether tooth- or implant-supported, offer significantly greater stability compared to traditional dentures. This reduces the risk of slippage and improves confidence while speaking and eating. [11–13]

1.4.2. Improved oral health

By utilizing natural teeth or implants, overdentures help preserve the jawbone and prevent the bone resorption often seen with traditional dentures. This not only maintains facial structure but also contributes to long-term oral health.

1.4.3. Increased comfort

The advanced attachment systems used with overdentures provide a secure yet comfortable fit. This minimizes irritation of the gums and enhances overall comfort for the wearer.

1.4.4. Better functionality

Overdentures improve chewing efficiency and speech clarity, significantly enhancing the quality of life for patients.

2. Materials and Methods

To explore the advancements in dental prosthetics, specifically the development and benefits of overdentures and modern attachment systems, a comprehensive review of the literature was conducted. The review included clinical studies, case reports, and reviews from reputable dental

* *Corresponding author*.
E-mail address: dr.shafaliagrawal@gmail.com (S. Agrawal).

journals and databases. Key areas of focus included the limitations of traditional dentures, the design and benefits of tooth-supported and implant-supported overdentures, and the evaluation of various attachment systems such as bar, ball, and locator attachments.

The methodology involved a systematic analysis of the existing evidence on the effectiveness of these modern dental prosthetics in terms of stability, comfort, oral health outcomes, and patient quality of life. The study criteria included:

Inclusion of diverse patient demographics to assess the broad applicability of these prosthetic solutions.

Comparative analysis between traditional dentures and overdentures, focusing on clinical outcomes and patient satisfaction.

Evaluation of different attachment systems for their role in enhancing the functionality and comfort of overdentures.

3. Result and Discussion

The advancements in dental prosthetics, particularly the shift from traditional dentures to overdentures with modern attachment systems, mark a significant leap forward in addressing the limitations and challenges faced by denture wearers. This discussion will delve into the implications of these advancements, considering the benefits, potential drawbacks, and future directions in this field.[14]

3.1. Enhanced stability and retention

One of the primary benefits of overdentures is the enhanced stability and retention they offer. Traditional dentures often rely on suction and adhesives, which can fail, leading to discomfort and a lack of confidence in social settings. Overdentures, whether tooth-supported or implant-supported, anchor firmly to the remaining teeth or implants, providing a secure fit. This improvement not only enhances the wearer's ability to chew and speak effectively but also reduces the risk of denture slippage, a common issue with conventional dentures.[14,15]

3.2. Oral health preservation

The preservation of oral health is another significant advantage of overdentures. Traditional dentures can accelerate jawbone resorption due to the lack of stimulation typically provided by natural teeth. In contrast, tooth-supported overdentures help maintain the jawbone structure by utilizing the remaining teeth as anchors. Implant-supported overdentures further mitigate bone loss by stimulating the jawbone through the implants, mimicking the natural roots of teeth. This preservation of bone structure helps maintain facial aesthetics and prevents the sunken appearance often associated with long-term denture wear.[16]

3.3. Comfort and functionality

Comfort is a critical factor for denture wearers, and the advanced attachment systems used with overdentures significantly enhance this aspect. Bar attachments distribute the occlusal forces evenly across the jaw, reducing localized pressure points and increasing comfort. Ball attachments provide a stable yet slightly flexible connection, allowing for some natural movement of the denture. Locator attachments, with their low-profile design and strong retention capabilities, offer an easy-to-maintain solution that improves overall comfort. These systems collectively contribute to better functionality, allowing wearers to enjoy a wider variety of foods and speak more clearly.[17]

3.4. Quality of life improvements

The combined benefits of stability, oral health preservation, and enhanced comfort translate to substantial improvements in the quality of life for patients. Wearers of overdentures report higher satisfaction levels compared to traditional denture users, citing increased confidence, better social interactions, and overall improved well-being. The psychological impact of having a secure and aesthetically pleasing smile cannot be understated, as it plays a crucial role in social and professional engagements.[18]

3.5. Potential drawbacks and considerations

Despite these advancements, there are potential drawbacks and considerations to keep in mind. The cost of overdentures, particularly implant-supported ones, can be significantly higher than traditional dentures. The surgical procedures required for implant placement also carry inherent risks and may not be suitable for all patients, especially those with certain medical conditions or insufficient bone density. Additionally, the maintenance of overdentures, though generally straightforward, requires regular dental visits to ensure optimal performance and longevity.[19]

3.6. Future directions

The future of dental prosthetics lies in further enhancing the technology and materials used in overdentures and attachment systems. Research is ongoing to develop more cost-effective solutions and minimally invasive procedures for implant placement. Advances in digital dentistry, including CAD/CAM technology and 3D printing, hold promise for creating more precise and customized overdentures. Moreover, the integration of smart technology, such as sensors within prosthetics, could provide real-time feedback on oral health and prosthetic performance, paving the way for preventive care and personalized treatment plans.[20]

4. Conclusion

The advancements in overdentures and attachment systems mark a significant step forward in dental prosthetics. They offer a more reliable, comfortable, and health-preserving alternative to traditional dentures. Patients can now enjoy improved stability, better oral health, and enhanced functionality, leading to a higher quality of life. As dental technology continues to evolve, the options and outcomes for individuals requiring dental prosthetics will undoubtedly continue to improve.

5. Source of Funding

None.

6. Conflict of Interest

None.

References

1. Emami E, De Souza R, Kabawat M, Feine JS. The Impact of Edentulism on Oral and General Health. *Int J Dent*. 2013;p. 498305. doi:10.1155/2013/498305.
2. Müller F, Naharro M, Carlsson GE. What are the prevalence and incidence of tooth loss in the adult and elderly population in Europe? *Clin Oral Implants Res*. 2007;18(Suppl 3):2–14.
3. Moreira R. Tooth-loss in adults and the elderly in Brazil: the influence of individual, contextual and geographical features [Ph.D. thesis]. Sao Paulo, Brazil: Faculdade de Saúde Pública, Universidade de Sao Paulo; 2009.
4. Medina-Solís CE, Pérez-Núñez R, Maupomé G, Avila-Burgos L, Pontigo-Loyola AP, Patiño-Marín N, et al. National survey on edentulism and its geographic distribution, among Mexicans 18 years of age and older (with emphasis in WHO age groups. *J Oral Rehabil*. 2008;35(4):237–44.
5. Allen PF, Mcmillan AS. A review of the functional and psychosocial outcomes of edentulousness treated with complete replacement dentures. *J Can Dent Assoc*. 2003;69(10):662.
6. Mojon P. The world without teeth: demographic trends. In: Feine J, Carlsson G, editors. Implant overdentures. The standard of care for edentulous patients. Chicago: Quintessence; 2003. p. 3–14.
7. Ekelund JA, Lindquist LW, Carlsson GE, Jemt T. Implant treatment in the edentulous mandible: a prospective study on Brånemark system implants over more than 20 years. *Int J Prosthodont*. 2003;16(6):602–8.
8. Rosa CDD, RL, Guerra CMF, Pellizzer E, Casado BGS, Moraes SLD, et al. Do ball-type attachment systems for overdenture result in better patient satisfaction? A systematic review of randomized crossover clinical trials. *Saudi Dent J*. 2021;33(6):299–307.
9. Rashid F, Awad MA, Thomason JM, Piovano A. The effectiveness of 2-implant overdentures - A pragmatic international multicentre study. *J Oral Rehabil*. 2011;38(3):176–84.
10. Byrappa B, Neeha P, Chabaria K, Kumar S. Prosthetic management of peri-implantitis: Analyzing risk factors and advancing preventive strategies. *IP Int J Periodontol Implantol*. 2023;8(3):140–5.
11. Kochar SP, Reche A, Paul P. The Etiology and Management of Dental Implant Failure: A Review. *Cureus*. 2022;14(10):e30455. doi:10.7759/cureus.30455.
12. Tomina DC, Petruțiu SA, Crișan B, Leucuța DC, Dinu CM. Influence of Periodontal Status and Prosthetic Treatment on Survival and Success Rates in Implant Therapy: A 5-Year Retrospective Follow-Up Study. *J Clin Med*. 2023;12(13):4275. doi:10.3390/jcm12134275.
13. Do TA, Le HS, Shen YW, Huang HL, Fuh LJ. Risk Factors Related to Late Failure of Dental Implant-A Systematic Review of Recent Studies. *Int J Environ Res Public Health*. 2020;17(11):3931. doi:10.3390/ijerph17113931.
14. Kutkut A, Bertoli E, Frazer R, Pinto-Sinai G, Hidalgo RF, Studts J, et al. A systematic review of studies comparing conventional complete denture and implant retained overdenture. *J Prosthodont Res*. 2017;62(1):1–9.
15. Chaware SH, Thakkar ST. A systematic review and meta-analysis of the attachments used in implant-supported overdentures. *J Indian Prosthodont Soc*. 2020;20(3):255–68.
16. Kutkut A, Bertoli E, Frazer RQ, Pinto-Sinai G. A systematic review of studies comparing conventional complete denture and implant retained overdenture. *J Prosthodont Res*. 2017;62(1).
17. Matthys C, Vijlder WD, Besseler J, Glibert M, Bruyn HD. Cost-effectiveness analysis of two attachment systems for mandibular overdenture. *Clin Oral Implants Res*. 2020;31(7):615–24.
18. Payne AG, Walton TR, Walton JN, Solomons YF. The outcome of implant overdentures from a prosthodontic perspective: proposal for a classification protocol. *Int J Prosthodont*. 2001;14(1):27–32.
19. Attard N, Laporte A, Locker D, Zarb GA. A prospective study on immediate loading of implants with mandibular overdentures: Patient-mediated and economic outcomes. *Int J Prosthodont*. 2007;19(1):67–73.
20. Kassebaum NJ, Bernabé E, Dahiya M, Bhandari B, Murray CJL, Marcenes W, et al. Global Burden of Severe Tooth Loss: A Systematic Review and Meta-analysis. *J Dent Res*. 2014;93(7 Suppl):20–8.

Author biography

Shafali Agrawal, Post Graduate

Madhura Titar, Private Practitioner

Alcina Fernandes, Private Practitioner

Jeewan Dhinsa, Private Practitioner

Venkata Mungara, Senior Lecturer

Cite this article: Agrawal S, Titar M, Fernandes A, Dhinsa J, Mungara V. Beyond traditional dentures: Navigating the world of overdentures and attachment advancements. *IP Ann Prosthodont Restor Dent* 2024;10(3):199-202.