

Review Article

Prosthodontic Considerations and Perspectives of Overdenture Therapy: A Review of Literature

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ABSTRACT:

Preventive prosthodontics emphasizes the importance of any procedure that can delay or eliminate future prosthodontics problems. The overdenture is logic method for the dentist to use in preventive prosthodontics. Overdenture treatment is a notion which precluded the inevitability of “floating plastics” in edentulous mouth. It has always offered a sensible and prudent appeal for dental practitioners and numerous patients have benefited its prescription. However, today with the stress on preventive prosthodontics, the use of overdenture has increased to the point where by it is now a feasible alternative to most treatment plans outlines in the construction of prosthesis for patients with some teeth remaining. This review paper was an attempt to seek various outlooks and perspectives about overdenture in Prosthodontics.

Keywords: Prosthodontics, Overdenture, Esthetic, Efficiency

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INTRODUCTION

John. F. Kennedy had rightly stated that it is not sufficient for a great nation to have added new years to life. Our mission should be to add new life to those years. The concept of overdenture is far from new.^{1,2} It is almost 150 years back when Ledger (1850) encouraged the idea of leaving roots of natural teeth to support a complete denture. In the past, when the patients presented themselves as candidates for a denture with teeth that were badly broken down, with periodontal involvement, or with not being able to financially support an extensive restorative treatment, perhaps teeth were extracted that could have been retained under more favorable circumstances.^{3,4} This of course led to complete denture with all of its pitfalls. The first denture was usually satisfactory but with each passing years & with each subsequent denture, patients become more intolerant of their prosthesis. The resorption of bone began a viscous cycle of an ill-fitting denture, causing inflammation, which in turn increased the resorptive process, creating an even more unstable base, repeating the entire process once again. The resorption of basal

bone coupled with a decline in the patient's neuromuscular function, due to decrease in proprioceptive response resulting from the loss of teeth, eventually led to failure of denture. But now these problems can be overcome with the help of overdenture. It provides better function than conventional tissue supported complete denture through a variety of parameters such as improved masticatory efficiency, preservation of proprioceptive response, better stability support and retention, esthetic excellence, less trauma to supporting tissues.^{5,6} This review paper was conducted to seek various outlooks and perspectives about overdenture in Prosthodontics.

METHODS OF LITERATURE SEARCH

In this modern era of technological advancements, various internet based means are available that can legitimately retrieve biomedical information. Some of the popular internet based popular search engines (Google, Yahoo), scholarly search bibliographic databases (PubMed, PubMed Central, MedlinePlus, Cochrane, Medknow, EBSCO, ScienceDirect,

HINARI, WebMD, IndMED, and Embase), and textbooks were searched until June 2022 using MeSH (Medical Subject Headings; PubMed) keywords such as “Prosthodontics” “Overdenture” “Esthetic” “Efficiency”. The search was limited to reviews, systematic researches, and meta-analyses in different dental journals published over the past 35 years in English. A total of 64 articles were identified; however, after investigating the titles and abstracts, this number was finally reduced to 18 articles.

PROSTHODONTICS OUTLOOKS AND PERSPECTIVES FOR OVERDENTURE THERAPY

According to Devan statement, preservation of natural teeth or root is more desirable but with the rapid development and success rate in the field of implantology, it is hesitant to prefer preservation or improved masticatory efficiency. Tiwari et al (2015) in their study attempted to resolve this dilemma about masticatory efficiency of root supported attachment retained overdenture and implant supported overdenture.⁷ The results of the study were as follows; Implant supported overdenture>Attachment retained overdenture>Root supported overdenture>Complete denture. So, therefore, Implant supported overdenture was considered best for proper masticatory efficiency. Furthermore, the concept of tooth supported overdenture is overshadowed but not yet forgotten. This could be because the concept of conventional tooth supported overdenture is a simple and cost effective treatment then the implant overdenture.^{8,9} When few firm teeth are present in an otherwise compromised dentition they can be retained and used as abutments for overdenture fabrication. This helps to improve the retention and stability of the final process significantly. Bone is a dynamic tissue and extraction of teeth results in the initiation of the bone resorption pattern. However when tensile stress is received by bone additional bone formation takes place. Such stresses occur when occlusion forces are transmitted to the alveolar bone by the periodontal ligament.^{10,11} Mostly researchers like to prefer Preservation of natural teeth though there is improved masticatory efficiency in implant supported overdenture. This is due to;

- Tooth supported overdenture will prevent bone loss which can occur after extraction of tooth.
- Implant supported overdenture is also costlier and time consuming dental procedure than tooth supported overdenture with risk of various complications. So the tooth supported overdenture is more desirable in case of presence of minimum two teeth.
- Though there is improved masticatory efficiency in implant supported overdenture, it is more important to conserve the natural structure than to increase the functional efficiency (as also mentioned in divan’s dictum).

- Proprioception is also there in tooth supported overdenture.

If the patient is completely edentulous than the implant supported overdenture is the most appropriate treatment option. As functional masticatory efficiency is still there in tooth supported overdenture though less than the implant supported, so the tooth supported overdenture is the treatment of choice according to me.

ROLE OF OVERDENTURE IN BONE PRESERVATION

Overdenture is indicated in patients with few remaining retainable teeth in an arch. It is also preferred in patients with; mal related cases of ridge, patients needing single denture, patients with unfavorable - transposition, muscle attachments and high palatal vault - which renders the stability and retention of the prosthesis difficult.¹² As disadvantage, meticulous oral hygiene is required to prevent caries and periodontal diseases.

IMPLANT SUPPORTED OVERDENTURE

Implant supported overdenture have expanded rapidly as a successful treatment modality to rehabilitate completely edentulous patients. It improves retention, stability, function and esthetics as well as preserves residual bone especially in mandible (Satish et al, 2018).¹³ The masticatory muscle in elderly patients have diminished electromyographic activity and atrophy which leads to weakened masticatory functional forces and reduce chewing which leads to poor chewing ability. Implant overdenture is the common treatment modality for rehabilitation of complete edentulous cases especially mandible with dental implants. It is primarily attributed to reduce surface area for support and retention in the mandible arch which provides retention and stability better than complete denture. Therefore, implant supported overdenture should be the treatment modality to improve the quality of life in edentulous patients. According to the Devan statement, preservation of natural teeth is more important. Researchers prefer to preservation of natural teeth because of the following reasons. Extraction of teeth results in total loss of all input periodontal ligament receptors followed by implant rather than preserving the natural tooth which will provide and preserve the better sensory feedback as it preserves the sensory input regarding masticatory performance via tooth supported overdentures. It also has economical and psychological benefits. Rather the natural anterior teeth give more discrete sensory input, retained for overdentures. It is also a major concern that after extraction in regards to implants, the patient has been seen with severe alveolar bone loss which becomes a great issue of retention. Here, the patient is left with no choice of preservation or any other option to be opted rather than Implantology, which might lead to lesser masticatory

efficiency because patients have a problem of bone loss and continued deterioration of alveolar ridge in the maxilla and mandible, can lead to severe atrophy and lack of essential support for implant prosthesis.^{14,15} This would basically hamper the support, retention and stability of prosthesis. Which will indirectly fail to serve the purpose of implant prosthesis in one hand or the other? We could first let the remaining teeth be preserved either-Endodontically, Periodontally, etc so that the patient should have psychological confidence that the implants are supported by some means. Suppose say the patient is not able to afford implants, he or she can opt or given the option of preservation, which might help him /her to be ready mentally and economically for implants in near future with proper guidance for implants and might have adequate knowledge regarding the role or actual utility of implants in oral cavity. By preserving the remaining tooth, endodontically, there will be proper sensory receptors which help the overdentures to be retained on the tooth. Periodontally, preserving will let the overdentures remain retained on the tooth for a longer period of time after which the patient would have an option for implants due to which he might get “a better & long lasting future” with implants.

PRESERVATION VS REPLACEMENT OF TOOTH

While going through a comprehensive treatment plan after a complete proper diagnosis and clinical investigations after taking into consideration the patients case history, it is a complex decision. The decision of a treatment plan depends on various aspects: Endodontic, periodontal, reconstructive aspects of teeth. Patients compliance, Economical considerations, Success probability, relevant outcomes and longevity of the treatment.^{4,8,11}

CONSIDERATIONS REGARDING PRESERVATION OF TOOTH

Perpetual preservation of what remains is important than the meticulous replacement of what is missing is the goal of preventive prosthodontics and overdenture is one of the most practical measures used in preventive dentistry. Extraction of all teeth results in total loss of all input from periodontal ligament receptors whereas retention of teeth for overdentures provides better sensory feedback as it preserves the sensory input regarding masticatory performance. Retention of teeth for overdenture has economical and psychological benefits. Most of the elderly edentulous patients wearing complete dentures are dissatisfied with limited retention and stability of their prosthesis. Preserving natural tooth for overdenture is basically to improve the support, retention and stability of the prosthesis.^{9,13,16} Placement of dental implants is associated with several biological complications that can cause functional impairment of dentition. A majority of

implant studies have used the measure of Survival instead of Success. Survival rates up to 95.5% after 1year of follow up have been reported.^{17,18} By contrast, most endodontic studies have applied strict success criteria, requiring the resolution of apical periodontitis and absence of symptoms.

CONCLUSION

The overdenture is an outstanding mode of treatment. The teeth that are used for support and retention are of critical importance for the maintenance of health. A breakdown in their structure or a breakdown in their periodontal support immediately negates an overdenture concept. Overdenture was the last line of defense that successfully kept patient from becoming edentulous. Patient could chew better, their ridges did not resorbed as quickly and they had dentures that were more stable and retentive then conventional complete dentures. Taking into considerations of endodontic, periodontal and reconstructive aspects of the entire tooth, it is better to preserve the tooth as far as you can, endodontically tooth should be treated before going for extraction. The endeavour is preserve and don't destroy the outcomes of a natural tooth to be treated. Treat it, wait, and then pave the path for replacement if it desire for...

REFERENCES

1. Samra RK, Bhide SV, Goyal C, Kaur T. Tooth supported overdenture: A concept overshadowed but not yet forgotten!. *J Oral Res Rev* 2015;7:16-21.
2. Renner RP, Gomes BC, Shakun ML, Baer PN, Davis RK, Camp P. Four-year longitudinal study of the periodontal health status of overdenture patients. *J Prosthet Dent* 1984;51:593-8.
3. Dhir RC. Clinical assessment of overdenture therapy. *J Indian Prosthodont Soc* 2005;5:187-92.
4. Brewer AA, Morrow RM. *Overdentures Made Easy*. 2nd ed. St. Louis: The C. V. Mosby Co.; 1980.
5. Rahn A, Heartwell C. *Textbook of Complete Dentures*. 5th ed. Philadelphia: WB Saunders Co.; 1993.
6. Preiskel HW. *Overdentures Made Easy: A guide to Implant and root supported prostheses*. London, UK: Quintessence Publishing Co.;1996.
7. Tiwari H, Nazir O, Pandey KK, Katiyar P, Tarranum F, Md. Farhaan. Implant supported overdenture: A case report. *IP Ann Prosthodont Restor Dent* 2021;7(1):50-54.
8. Preiskel HW. *Precision Attachments in Prosthodontics: Overdentures and Telescopic Prostheses*. Vol 2. 2nd ed. Chicago, IL: Quintessence Publishing Co.; 1985.
9. Morrow RM, Feldmann EE, Rudd KD, Trovillion HM. Tooth-supported complete dentures: An approach to preventive prosthodontics. *J Prosthet Dent* 1969;21:513-22.
10. Bambara GE. The attachment-retained overdenture. *N Y State Dent J*2004;70:30-3.
11. Rodrigues RC, Faria AC, Macedo AP, Sartori IA, de Mattos Mda G, Ribeiro RF. An in vitro study of non-axial forces upon the retention of an O-ring attachment. *Clin Oral Implants Res* 2009;20:1314-9.

12. Jain DC, Hegde V, Aparna IN, Dhanasekar B. Overdenture with accesspost system: A clinical report. *Indian J Dent Res* 2011;22:359-61.
13. Satish RP. Implant Supported Over Denture: Case Report. *IOSR J Dent Med Sci* 2018;17(8):65-68.
14. Schwartz IS, Morrow RM. Overdentures. Principles and procedures. *Dent Clin North Am* 1996;40:169-94.
15. Guttal SS, Tavargeri AK, Nadiger RK, Thakur SL. Use of an implant o-ring attachment for the tooth supported mandibular overdenture: A clinical report. *Eur J Dent* 2011;5:331-6.
16. Cohen BI, Pagnillo M, Condos S, Deutsch AS. Comparative study of two precision overdenture attachment designs. *J Prosthet Dent* 1996;76:145-52.
17. Dolder EJ. The bar joint mandibular denture. *J Prosthet Dent* 1961;11:689-707.
18. Evans DB, Koeppen RG. Bar attachments for overdentures with nonparallel abutments. *J Prosthet Dent* 1992;68:6-11.