

Implant Supported Overdenture- An Overview of Different Attachment System and Attachment Selection Associated With It

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Abstract

For patients who have some teeth or roots remaining, are edentulous, or wear traditional overdentures, implant overdenture treatments are one of the therapeutic choices available. Dental implants that have been incorporated into the bone will stabilise the prosthesis, reduce bone resorption, increase patients' psychological well-being by making them more confident in their appearance while also increasing their quality of life.

Overdenture therapy is an option to traditional dentures in terms of retention and stability, as well as an alternative to full arch fixed prosthesis in terms of cost, according to clinical and scientific studies on the issue, previously thought that lack of consistency in procedures, prostheses design, and attachment systems was critical to effective outcomes, but this has now been shown incorrect. In this review, we look at the benefits and drawbacks of implant overdentures, as well as the indications and contraindications, attachment selection, and overdenture maintenance.

Keywords – Conventional complete denture, Implant retained Overdenture, Implant supported Overdenture, Overdenture

Introduction

Tooth loss can be caused by trauma, caries, periodontal disease, iatrogenic treatment, and congenital anomalies. Masticatory function, beauty, and self-esteem are all negatively affected by tooth loss. All of these tooth replacement options, including implant-supported dentures and implant-supported partial dentures, are functional and aesthetically pleasing, but their differences in masticatory force, phonetics, and aesthetics remain unknown.^{1,2,3}

Preserving bone ridge for aesthetic reasons as well.

The edentulous patient is still here. Even if the prevalence of edentulousness has declined, the total proportion still cannot be ignored. The edentulous patient is one who has lost all of his or her teeth in the classic sense of the word. Mandibular denture is a type of denture that is worn on the lower jaw. Despite the fact that this treatment is reasonably affordable, adaptation is superior than fixed implant-supported prostheses. It takes a long time to become used to traditional complete dentures, and it takes a long time to get used to them.

When seen from a somatic and psychological standpoint.

In the long run, even individuals who initially adjust well to wearing full dentures may become unresponsive to them due

to changes in physiological parameters within the mouth and the emergence of abnormal muscle patterns.^{4,5,6}

An overdenture is a removable or full denture that is supported by one or more implants. In terms of biting force, chewing efficiency, and force discrimination, overdenture dentures outperform traditional complete dentures. Patients with natural dentition had a chewing efficiency of 90%, complete denture wearers had a chewing efficiency of 59 percent, and patients with overdentures had a chewing efficiency of 79 percent.

The necessity for unavoidable treatment, which takes more time and costs more money, is one of the disadvantages of overdenture treatment.^{7,8,9,10}

It is defined as a dental prosthesis that covers and partially supports natural teeth, natural tooth roots, and/or dental implants; also known as an overlay denture, overlay denture, overlay prosthesis, or overlaid prosthesis. An overdenture is a denture that is kept in place by dental attachments that are custom-made. It is possible to introduce the overdenture attachment into either the roots of the teeth that have been saved or the dental implants that have already been implanted.^{11,12}

Attachment Selection

When it comes to implant-supported overdenture therapy, a variety of attachment methods are available, each with its own set of clinical concerns and laboratory procedures. A variety of methods are used to classify attachments. According to the facts, it may be classified. In the first place, implants and soft tissue support and implant-borne (must be in a position that allows for the fabrication of a straight bar). Can place one to five implants, with two or four being the most usual number inserted. Two implants were often needed for the second operation, which was entirely implant supported.^{20,21,22,23}

The attachment system could be based on attachment resiliency.

Alternatively, the abutment and implant might be connected in a way that does not allow for any movement between the two. Strict, non-resilient attachment assembly provides no respite to supporting implants while receiving 100% of all chewing forces. Allows for varying degrees of rotation and angulation corrections. Resilient attachments will also be offered, including limited Vertical Resilient Attachments that reduce the strain on the supporting implants by 5 to 10 percent and allow the prosthesis to move up and down without lateral, tilting or rotational movement.

Hinge Resilient Attachments

These attachments are resistant to lateral tipping, rotation, and skidding pressures. The supporting implant receives nearly 30–35 percent load alleviation thanks to hinge robust attachments. A round bar, such as a Hader bar, can be used to create hinge resilience.

Combination robust attachments allow for infinite vertical and hinge mobility. Increasing the prosthesis' tissue support during mastication is made possible with the usage of this particular connection.

This type of connection relieves the supporting implants of 45–55 percent of their weight. The egg-shaped Dolder bar joint is a collection of sturdy attachments. Vertical and rotational movement are possible using Rotary Resilient Attachments (RRAs). Rotary resilient attachments deliver masticatory pressures to the residual ridge in both the vertical and horizontal directions.

This form of connection often eliminates 75–85% of the stress on the supporting implants. Some of the stud attachments have rotary resilience (prefabricated individual attachments).

Attachments That Are Universally Resilient Vertical, hinge, translation, and rotation movements are all possible with these attachments. The supporting implants are relieved of 95 percent of their load with this sort of attachment.

The finest example of ubiquitous robust attachments is magnetic attachments [24-28]. Various attachment mechanisms are classified based on mechanical attachment. O-ring retentive ball anchors include magnets, durable attachment methods (Zest Locator and Sterngold ERA attachments), custom-fabricated components, and bars.^{24,25,26,27,28}

Comparison between different attachment mechanisms

In terms of retention, bar attachments outperform ball/O-ring and magnetic attachments; however, the load in bar attachments is transferred to the implant fixture, whereas ball/O-ring and magnetic attachments give better load transfer to the bone^{29,30,31}. With bar-retained overdentures, it is possible to splint implants and hide significant residual ridge atrophy and implant loss (20.6 percent). Implant loss was 38.8% with a ball-retained overdenture³². Attaching a bar to a denture base took up more room than attaching a ball or an O-ring. Bar attachment outperforms ball/O-ring attachment in terms of masticatory performance, while magnetic attachment has the least masticatory performance of all.



Figure 1- locator attachment



Figure 2- ball attachment

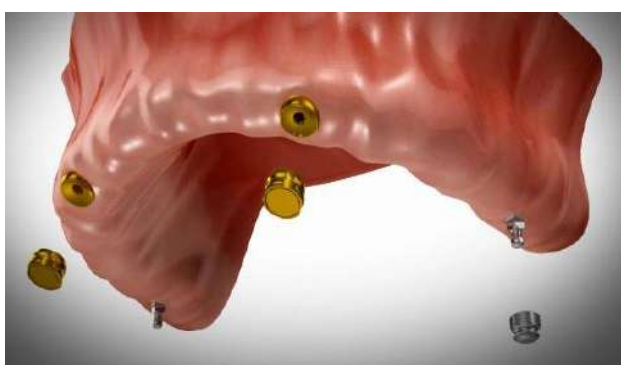


Figure 3- Magnetic Attachment



Figure 4 -Bar Attachment

Attachment Selection Criteria

There are a number of factors to consider when selecting an attachment technique, including how much bone is available in each jaw, what the patient's prosthetic expectations are, and the patient's financial capacity to pay for treatment^{33,34}. Dentists make decisions based on their own personal preferences as well as their professional expertise. An

additional factor to take into account is how much space is required in your denture because of your attachment, how thick your acrylic is, and whether or not you have housings with replaceable matrices. You should also think about the location of your implants, how many of them you have, and how long they are.

Prosthetic Maintenance for Implant Overdentures

Overdenture treatment has not been shown to have a positive outcome in clinical trials. This is the subject of several clinical trials, since the kinds and levels of maintenance remain unsure. Many aspects of a prosthesis, according to David M. Davis³⁵, need attention, such as the plastic retainers used to maintain retention and an overdenture held in place by bar-mounted metal clips, as well as reactivation of clips and relining.³⁶

Matrix replacements in the maxilla and mandible after 5 years, according to Cehreli MC. After the first year, the ball-attachment group had more dislodged, worn, or loose matrix or its related housing than the other attachment systems. An unsplinted implant overdenture was studied for more than 15 years in a long-term research. Every three years, prosthetic maintenance was required, including attachment system replacement due to wear.

Every four years, implant overdentures must be relined. As a result of resin tooth deterioration, splinted implant overdentures need to be replaced every 12 years on average. Over the course of five years, O-rings will need to be replaced.^{37,38,39,40}

Discussion

Because of the easy laboratory processes and cost-effectiveness of implant overdenture treatments, the rehabilitation of the edentulous condition has substantially improved since the debut of implant overdenture procedures in the mid-1980s. As a result, it has become an increasingly popular therapeutic option in the rehabilitation of total edentulism. Implant overdentures have been the subject of several clinical research and papers, making them the first-choice treatment option for edentulous people.¹³

In terms of stability and retention, implant overdentures outperform traditional complete dentures, and they improve patients' function, aesthetics, and phonetics while also reducing residual ridge resorption. Patients have a restricted ability to maintain cleanliness. Other benefits include increased psychological status and quality of life (McGill University has proven improvements in nutrition, psychosocial status, and quality of life as a result of overdenture treatment).^{14,15,16,17}

This treatment, without exception, has several drawbacks that make it an unsuitable treatment for some people. Postoperative haemorrhage, numbness if the mandibular nerve is disrupted, infection, and osseointegration are all hazards associated with the surgical surgery. It's also a time-consuming treatment that necessitates the practitioner's technique-sensitive skill as well as the cooperation of patients. An overdenture's retentive mechanism loosening (33%), implant loss with a maxillary overdenture (21%), an overdenture that has to be relined (19%), and an overdenture clip/attachment fracture have all been reported as implant difficulties (16 percent)

Patients who are unable to endure dentures due to emotional reasons, gag reflex, or palatine deformity should consider an

implant overdenture. A problematic regulation of saliva motions between the prosthesis and the maxillary gum causes phonological issues. Aesthetic demands are high, but financial resources are limited. All of these factors necessitate the use of an implant overdenture.^{19, 20}

CONCLUSION

Overdentures are one of the therapy options for individuals who have a few teeth/roots left, or who are entirely edentulous with or without a traditional complete denture. In comparison to standard removable dentures, implant-supported overdentures give predictable results, enhanced stability and function, and a high level of satisfaction, according to the research and clinical experience.

Maintaining overdentures is an ongoing process that must be addressed in detail with patients throughout the treatment planning stage in order to determine the frequency and extent of maintenance required. Over time, we have discovered that the implant overdenture strategy is more effective than other options. When it comes to oral health, patients with implant overdentures have better oral hygiene than those without, and plaque collection is believed to have only a modest effect on implant Performa.

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