

Benefits of overdentures

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Abstract

Overdentures are prostheses (partial or complete) fabricated over the retained teeth/roots or implants. These teeth/roots or implants provide support to the overlying prosthesis. Overdentures overcome the harmful consequences of wearing conventional complete dentures. Due to its various advantages, the tooth supported overdentures are an excellent treatment option for maintaining the integrity of the alveolar ridge in an edentulous patient. The implant supported overdenture is a newer therapeutic concept which has even better treatment outcomes for an edentulous patient.

Introduction

Overdentures are prostheses which are fabricated over the existing teeth or roots or implants. The retained teeth/roots or an implant which are more commonly used nowadays help in preserving the alveolar ridge. Healthy periodontal ligament around the teeth maintains the morphology of the alveolar ridge¹.

Most dentists are now aware of the harmful consequences of wearing complete dentures and that these effects can be reduced by overdentures. The commonest consequences of wearing complete dentures include residual ridge resorption, loss of occlusal stability, undermined esthetic appearance and compromised masticatory function¹.

History of Overdentures

The use of overdentures in prosthodontics dates back almost 100 years². The concept of overdentures was presented at the World Dental Congress in 1861 by Butler, Roberts and Hays who presented case histories of 12 years³. By the 1960's there was sufficient information to launch the concept of overdentures as a viable treatment modality^{4,5,6,7,8,9}. In 1969, articles published by Morrow et al³ and Lord and Teel¹⁰ described simplified techniques of Overdenture treatments. It was then in the early 80's when Per Ingvar Branemark and his colleagues presented their research work of osseointegration which brought greater hope for edentulous patients^{11,12}. While the Branemark groups focused on fixed prostheses, Schroeder et al^{13,14,15} developed the ITI implant system to deal with the problems of unilateral distal extension

situations. He suggested that overdentures supported by four implants should be used in situations of complete edentulousness.

Advantages of Tooth supported overdentures

According to Robert L Defranco², the tooth supported Overdenture accomplishes three important goals.

- a) It maintains the abutment teeth as part of the residual ridge, which in turn provides more support than a conventional complete denture.
- b) When the teeth are retained, the alveolar bone integrity is maintained as it supports the abutment teeth, therefore there is decrease in the rate of resorption of alveolar bone. However when teeth are removed then the alveolar bone resorption process begins.
- c) With the preservation of the teeth, there is also the preservation of the periodontal membrane and this in turn preserves the proprioceptive impulses. When the patient wears the denture he will have the sensitive ability to be aware of occlusal contacts. The patient thus also will be able to control the forces of occlusion as he used to with his natural teeth.

Based on the above goals, Robert L Defranco summarized the advantages of complete overdentures as

- Preservation of the Alveolar bone
- Preservation of the proprioceptive response
- Support for the overdentures
- Retention of the overdenture

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- Simple approach to the problem patient; i.e. patients with congenital defects such as cleft palate, partial anodontia, microdontia, amelogenesis imperfecta etc can all be given overdentures which will be relatively fast and inexpensive mode of treatment.
- Maintenance of periodontal health
- Patient acceptance – patients accept overdentures more fast and better than the conventional dentures.
- Convertibility – if any problem occurs with the existing overdenture abutments, the teeth can be extracted and the Overdenture can be converted to a conventional complete denture.
- Cost – Despite the increased initial cost, mainly due to periodontal and endodontic treatment and also cast copings, the ease of maintenance in the years to come, the low percentage of remake and the alternative treatment of extensive fixed and removable partial denture, the cost of overdenture compares very favorably with different treatments.
- Harmony of arch form – By preserving the teeth the alveolar bone loss will be prevented/ delayed therefore maintaining the original arch form.

According to Zarb et al¹, the advantages of Overdenture include

- Maintenance of residual ridge integrity, due to the presumed improved occlusal stress distribution.
- Enhanced denture retention and stability especially the mandibular Overdenture.
- Preservation of proprioception resulting in better occlusal awareness, biting forces and consequent neuromuscular control.
- Overdenture fabrication technique is viable and simple alternative to complete denture therapy.
- Applications of Overdenture is unlimited and it depends on the dentists judgment and skill, and above all, on the patient's motivation to maintain impeccable oral environment.

According to a study by Crum and Rooney¹⁶, when mandibular canines were used as overdenture abutments, the resorption of alveolar bone around these teeth reduced by 8 times.

According to Jerge¹⁷, the periodontal receptors present in the abutment teeth actively influence the cyclic joint movements of mastication by influencing the muscles of mastication by their proprioceptive feedback mechanism.

Implant Supported Overdentures and its advantages

Implant supported overdentures can be advised to completely edentulous patients who have lost their

teeth at an advanced age, patients who are not capable of adapting to complete dentures and to old denture wearers who have lost their motor skills and are no longer capable or have difficulty in handling conventional complete dentures.

In the 1980's the standard protocol described by Schroeder¹³ and others^{18,19} was the placement of four implants. Later in 1985, it was suggested that only 2 or 3 implants were adequate for Overdenture support^{20,21}. Nowadays the Overdenture usually comprises of two or more implants which are usually placed bilaterally on an arch. An attachment device is connected to the implants and this attachment device has corresponding coupling units fixed to the tissue surface of the denture. These coupling units provide the necessary retention, stability and support to the complete dentures.

According to the study conducted by Burns RD²², there exists a clear superiority of the implant retained and stabilized overdenture than that of a conventional complete denture and there was also a significant improvement in the soft tissue health after implants were fabricated.

Thomas JM²³ conducted a study examining the effect of treatment of edentulism with implant retained mandibular overdentures and concluded that the implant retained mandibular overdentures have more positive outcomes in terms of general satisfaction and oral health related quality of life than conventional dentures. He however also stated that the magnitude of the effects remain uncertain.

It has been suggested that there is increased bite force after implant treatments^{24,25} and a patient wearing an implant supported overdenture has better psychological effects due to the improvement in retention and function of the denture. Few authors have also recorded that peoples social life have become more active, after converting to a implant supported overdenture from a conventional overdenture^{26,27,28}.

Studies conducted by Locker D²⁹ and Feine JS et al³⁰ also show that patient's perceptions of functions related to mastication improves with the use of implant supported overdentures.

Fueki K³¹ in his review of 281 articles recorded that fixed implant supported partial dentures do not provide significant improvement in masticatory performance compared to conventional removable partial dentures for Kennedy's Class I and II partially edentulous mandibles, however the combination of mandibular implant supported or retained overdenture and maxillary conventional complete denture provides significant improvement in masticatory performance compared

to conventional complete dentures in both the upper and lower arches for a limited amount of patients having persistent functional problems with an existing mandibular complete denture due to highly resorbed mandible. He in his article also revealed that mandibular fixed implant supported complete dentures provide significant improvement in masticatory performance compared to mandibular complete dentures in patients dissatisfied with the complete dentures. He also reported that implant supported mandibular resection dentures have an advantage over conventional dentures in masticatory performance on the defected side of the mouth.

The placement of dental implants and the insertion of an implant supported prosthesis in edentulous mandibles have shown to substantially reduce the alveolar bone loss in comparison to that of patients wearing conventional complete denture^{32,33}. Studies show evidence that there is more adequate frictional stimulus to the bone tissue with implant supported fixed prosthesis^{32,33}, and more recent findings suggest that patients with such fixed implant supported prosthesis demonstrate bone apposition and enhance the bone of the posterior portion of the mandible^{34,35,36,37}.

Carlsson GE³⁸ concluded in his review article of bone resorption, that the best way to prevent bone resorption of the alveolar ridge is by avoiding total extraction, preserving a few selected teeth and fabrication of abutments over the teeth. He also concluded that implant supported prosthesis will lead to less bone loss and may even promote bone growth.

Conclusion

Tooth supported overdentures which have several advantages have been providing a last line of defense to patients from becoming completely edentulous. The patients can chew better with the more stable and retentive dentures and most importantly, the alveolar ridges are preserved by the retained abutment teeth.

The advent of osseointegrated implants has opened up a series of alternative treatment among which an implant supported overdenture is a very promising treatment option for completely edentulous patients.

Tooth supported overdentures are still an excellent and economic therapeutic concept, however the concept of implant supported overdentures provide a more positive outcome to patients who can afford such treatment.

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