

How Do You Treat a Severely Resorbed Mandibular Ridge?

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Abstract: *Residual ridge resorption is chronic, progressive, irreversible and cumulative condition associated with teeth loss. Management of a residual ridge with severe resorption to fulfill the patient's esthetic and functional requirements is quite difficult for the practitioner and also in the construction of an acceptable appliance. As the height of the edentulous ridge reduces the mandibular denture will be improperly function. Severe resorption of the mandibular alveolar ridge may cause instability and discomfort of the convention acrylic resin denture. Dealing with this condition requires clinical skills and knowledge. Treating the severely resorbed mandibular ridge is a challenging effort for prosthodontics. This research presents a case report on neutral zone impression technique used for treating a completely edentulous patient with resorbed ridges, in addition to using four dental implants in order to get the benefits of both occlusal harmony from the neutral zone which located the teeth in it and the support, retention from implants in bone. The use of combination of a neutral zone impression technique and the implant supported over denture for the treatment of severely resorbed mandibular ridge result in patient satisfied with the enhancement in denture retention, stability, and support.*

Keywords: neutral zone, implant, over denture, ridge resorption.

1. Introduction

Residual ridge resorption is chronic, progressive, irreversible and cumulative condition associated with teeth loss.^{1, 2} Management of a residual ridge with severe resorption to fulfill the patient's esthetic and functional requirements is quite difficult for the practitioner and also in the construction of an acceptable appliance. As the height of the edentulous ridge reduces the mandibular denture will be improperly function. Severe resorption of the mandibular alveolar ridge may cause instability and discomfort of the convention acrylic resin denture. Dealing with this condition requires clinical skills and knowledge.³

Treatment options are used in the form of prosthodontic applications and surgical procedures. A number of surgical procedures afford substantial assistance in treatment and the oral surgeon has a deep appreciation of the problems facing the prosthodontist.⁴

Most of the dental practitioners still treated their completely edentulous patients with fabrication of conventional complete dentures. These patients will complaint of instability of lower complete denture, this conventional denture is completely tissue support and all of the masticatory forces transfers to the residual ridge, and as a result the patients tend to have a significant rapid loss of the alveolar ridge. Treatment of the completely edentulous patients with implant supported over dentures is provided denture stability for the patient in addition to eliminated further bone loss. Several researches approve that the treatment with the implant supported overdenture is give better results than treatment with the conventional dentures. The edentulous patients will get the psychological and functional benefits.⁵

The objective of this case report was to describe a treatment of severely resorbed mandibular ridge with the use of combination of the neutral zone technique and implant supported over denture.

2. Case Report

A 56-year-old Iraqi female attended the Prosthodontic Department at Baghdad College of Dentistry Hospital. Clinical examination showed that she had a completely edentulous mandibular arch with a complete denture and the mandibular denture bearing area was severely resorbed, order V, according to classification by Atwood⁶, Figure (1). The state of edentulism for the mandibular arch was for the past two years and the examination of the mandibular complete denture intraorally showed signs of poor retention and stability. She also had a maxillary partially edentulous ridge treated with removable partial denture that was acceptable and she was satisfied with it.

Her main complaint was with the mandibular denture during eating and speaking and she used denture adhesives in an attempt to manage the situation.

After thorough evaluation of the patient's dental and medical history, radiograph examination and existing clinical conditions, the treatment options were discussed with the patient keeping in mind all the patient's needs and desires, Figure (2). It was decided that a new mandibular implant supported over denture would be provided using the neutral zone impression technique so that the retention and stability of the denture could be improved. Consent was obtained from the patient for the treatment chosen.



Figure 1: Intraoral examination of the mandibular or pretreatment mandible ridge, occlusal view.



Figure 2: Preoperative panoramic radiograph

Primary impressions of the upper and lower arches were recorded. The maxillary primary impression was made with the presence of the maxillary partial denture in place and the subsequent cast was used for diagnosis and articulation. The lower secondary impression was recorded using zinc-oxide eugenol impression paste. Two lower record bases were fabricated using light-cure acrylic resin; one record base plate was for bite registration and the other one for the neutral zone impression. Centric jaw registration was completed and the casts were mounted on a Dentatus semi adjustable articulator with the use of the Hanau face bow.

The second lower record base was modified with wire loops. The height of the wire loops were kept the same as the height of the mandibular wax block, (Figure 3).



Figure 3: Record base plate was modified with wire loops

The position of the wire loops was checked intra-orally. A putty type silicone impression material was applied over the wire loops and was placed in the patient's mouth. The patient was then told to perform various oral movements of his lips, tongue and cheek. These movements included sucking, swallowing, pursing lips, pronouncing E and O

sounds and protruding the tongue to simulate physiological movements. The shaping of the impression material facilitated the recording of the neutral zone when patient performed various oral movements. During function of the lips, cheeks, and the tongue, the forces exerted on the impression materials molded it into the shape of the neutral zone. The base-plate was removed along with the finished neutral zone impression which was sent to the laboratory following disinfection. Maxillary teeth were set-up in the laboratory and silicone putty indices of mandibular base-plate were made. The wire-loops along with the impression material were removed and were replaced with modeling wax using the putty indices and mandibular teeth set-up was carried out. These were then returned chair-side so that trial could be carried out conventionally, Figure (4&5).



Figure 4: Finished neutral zone impression with silicone indices



Figure 5: Putty indices of the finished neutral zone impression

Trial of mandibular denture was performed. The trial dentures were then returned to the laboratory for processing and finishing as usual.

The denture was inserted into the patient's mouth. During this patient was prepared for implant surgery, which

included placement of narrow implant of diameter 2mm and length of 12mm in order to improve the retention of the denture. After three month the intraoral examination and the radiographic examination (Figure 6) of the dental implantsshowed no sign or symptoms of any pathological condition or complications, however the lingual and the buccal vestibule were very shallow and it interfere with the buccal and lingual flanges of the finished denture (this may be related to the suturing technique as I see when the surgeon do it do elevation of the soft tissue and make the vestibule shorter, Figure (7).

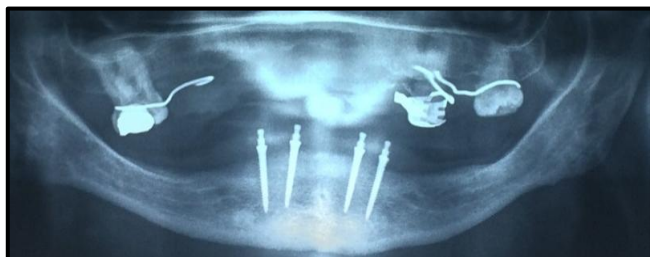


Figure 6: Postoperative panoramic radiograph



Figure 7: Intraoral examination after three months, the lingual & buccal vestibule were very shallow

The buccal and lingual borders of the denture wereadjusted and an additional modification, vents, was performed in the tissue side at the area of the narrow implants. The ball attachment and the O-ring were sited over the implant. The self- cured resins was add over the tissue side of the denture inserted in the mouth and ask the patient to close in centric until setting of the self-cured resin. After curing the excess material was removed and the denture was finished and polished. Then the modified denture was inserted, Figure (8&9).



Figure 8: Tissue side of the implant supported over denture



Figure 9: Insertion of mandibular complete denture in mouth

After the insertion of the modified complete denture the patient was instructed about how to insert and remove the mandibular overdenture. The patient has to remove the denture at night and for cleaning and she has to carefully clean around the ball attachments. she have to return to dental clinic for another visit to allow the dentist examine the denture in mouth regard the centric relation, phonetic, and esthetic considerations or if there is any other compliance or pain. At this point, her temporary denture will be given a new reline. This will allow it to be used as a backup denture in case you lose or break your new over denture. The patient have to know that the rubber O-Ring need to be replace after continuous use since it will wear after a period of time.

At 6 months after insertion the patient have to return to the office for follow-up appointment. Occlusion, phonetics, and esthetics were again approved by the patient and author. At this appointment we asked the patient to answer several questions regarding her opinion of the modified denture fabricated for her. She stated that the modified denture was lighter in weight and comfortable for her. She was entirely satisfied. The modified denture was more stable than the conventional old denture. She found it easier to speak and she won't have to worry about the denture becoming loose or falling out of her mouth. She was able to eat foods that she could not eat before.

3. Discussion:

How to treat a severely resorbed mandibular ridge? The answer for this question is quite difficult. However in this case report we try to demonstrate a treatment option that could be used to solve the case to obtain a patient satisfaction regarding the denture retention and stability during chewing and talking.

In this case report we try to get the benefits from the combination of the use of the implant supported over denture and the use of neutral zone impression technique in order to improve the support, retention, and the stability of the denture more than from the conventional denture that occasionally used by the dentist which may result in patient dissatisfaction. This may agree with the finding of Pan et al. (2010)⁷ who found that the senior edentulous patients may acquire benefit more from mandibular implant supported over denture than from the conventional completedentures. This may be related to the fact the chewing efficiency and the bite forces of the implant supported over denture will be better and higher than the

conventional complete denture, also the masticatory performance may be similar to that find in persons with natural dentition.^{8,9}

Also the patient's dissatisfaction with the conventional complete denture may be increased as the amount of mandibular ridge resorption increase as was found by Riga (2015).¹⁰ This may related to the fact that the amount of the bone resorption and the tonus of the surrounding muscles may be affected by the period of the edentulous and this may lead to reduction in the stability of the conventional denture. The neutral zone impression technique could use to produce more stable complete denture than the conventional denture.¹¹

The finished prosthesis was acceptable and the patient was very satisfied. The main complaints the patient came with was eliminated. The retention was very good due to the presence of the implants and also the support and stability. Thus, during function and speech there was no difficulty. Also the placement of the teeth in the neutral zone area gave the denture more stability during the movement of the different muscles. The type of food the patient could eat was enhances as she was able to eat a more diverse range of foods due to the increase masticatory force that can be exerted during mastication and the decreased sensation of pain under the denture due to the presence of the implants as the main supporting elements.⁵

4. Conclusion

The use of combination of a neutral zone impression technique and the implant supported over denture for the treatment of severely resorbed mandibular ridge result in patient satisfied with the enhancement in denture retention, stability, and support.

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