

Fenestrated Denture: A Grace Option To Edentulous Patient

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Abstract Edentulism can lead directly to impairment, functional limitation, physical, psychological, and social disability, and handicap. Edentulism was found to have a significant effect on residual ridge resorption, which leads to a reduction in the height of alveolar bone and the size of the denture bearing area. Fenestrated denture is a concept which preserves remaining teeth. This case report discusses the advantages of exploitation few remaining teeth to minimize alveolar ridge resorption and improvement of retention and support through using fenestrated denture which overcomes many problems encountered by complete denture and removable partial denture patients.

Keywords: *fenestrated denture, bone resorption, edentulism*

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1. Introduction

Edentulism is a debilitating and irreversible condition and is described as the "final marker of disease burden for oral health" [1]. Although the prevalence of complete tooth loss has declined over the last decade, edentulism remains a major disease worldwide, especially among older adults [2].

Edentulism has a series of deleterious consequences for oral and general health. Oral consequences vary from the well-known residual ridge resorption to an impaired masticatory function, an unhealthy diet, social disability, and poor oral health quality of life. Edentulous individuals are also at greater risk for different systemic diseases and an increase in mortality rate [3].

Bone loss is an ongoing process following tooth loss [4], affecting the mandible four times more than the maxilla [5].

The emotional effects of tooth loss are devastating for some patients and have a negative impact on their life [6].

Therefore, oral health care providers should prevent tooth loss with proper dental education, oral health promotion, and a high level of dental care in an attempt to assure the existence of a physiologic dentition [3].

Preventive Prosthodontics emphasize on the importance of any procedure that prevents or delays future Prosthodontics problem [7].

Some clinical studies have shown that resilient denture liners are beneficial for complete denture wearers [8,9]. In addition, laboratory studies suggest that the mechanical properties of resilient denture liners, such as flexibility, resilience, and shock-absorbency, offer greater versatility for edentulous patients who are unable to use their dentures; this was especially true for mandibular dentures [10].

A soft lining material may be defined as a soft elastic and resilient material forming all or part of the fit (impression) surface of a denture. Elasticity ensures that the material will regain its original shape following deformation while resilience is also important because it determines the rate of recovery. This has led some to label these materials as resilient, but soft lining material is more correct, as it is the softness or ease of deformation that particularly separates them from other denture base materials. Permanent soft lining materials can be broadly classified as plasticized acrylic resins ("soft acrylics") or silicone elastomers ("silicone rubbers"). Both are subdivided into heat and auto-polymerized types [11].

This case report discusses the exploitation of few remaining teeth to minimize alveolar ridge resorption and to improve retention and support through using Chair side soft liner fitted fenestrated denture

2. Case Report

A 65 years old male patient reported to the Dental Clinic Center, Dental College, Qassim University, KSA. The patient was asked to replace his missing teeth due to difficulty in chewing and unpleasant appearance.

Intraoral examination revealed a completely edentulous upper arch opposing mandibular Kennedy's Class I partially edentulous arch with unilateral remaining lower lateral, canine and premolars (Figure 1).

Clinically, no mobility was found for remaining lower teeth. Periodontal findings were significant calculus and gingival recession, with no pocket formation.

No carious lesion was found in the remaining lower teeth. The patient was systemically free.

The radiographs revealed an acceptable crown root ratio around remaining lower teeth. No remaining roots or pathological lesion was detected in both arches.



Figure 1. Preoperative Photograph Showing completely edentulous upper arch opposing partially edentulous lower arch

The classical treatment plan consists of maintaining the remaining teeth to act as abutment for RPD or extraction of lower teeth then construction of complete denture.

Treatment plan in this case report consisted of periodontal and Prosthodontics management. The periodontal management consisted of plaque control and scaling. Teeth brushing and mouth wash were instructed as routine hygiene.

In the Prosthodontics management, a fenestrated mandibular denture and a maxillary complete denture was planned. An informed consent was obtained from the patient.

A preliminary maxillary and mandibular Alginate impression (Cavex CA37- BV 2003 RW Haarlem, the Netherlands) was made in stock tray.

A final maxillary impression was made using Zinc oxide impression material (Cavex Outline Eugenol impression paste- BV 2003 RW Haarlem, the Netherlands) in constructed special tray and final mandibular impression was made using the regular body (Aquasil , Dentsply) in constructed special tray.

The Maxillo-mandibular relations were recorded through determination of the vertical jaw relation, obtaining the face-bow record, obtaining centric and eccentric records (protrusive) using semi adjustable articulator (Dentatus Articulator- Dentatus AB /SE-163 08 Spånga/ SWEDEN).

Teeth arrangement and trial placement of the upper and lower waxed up dentures were checked (Figure 2).

The dentures were acrylised in heat cure polymerizing resin (Lucitone 199Denture base resin Powder, Liquid, Dentsply) (Figure 3).

After finishing and polishing, the maxillary complete denture and fenestrated mandibular denture were checked for support, retention, stability, extension and occlusion in the patient's mouth.

All interference between the mandibular denture and remaining lower teeth were eliminated until free insertion and removal achieved.

The mandibular denture was cleaned thoroughly and then dried.

A brush was used to apply adhesive of chair side soft liner (Softliner C.D/ Promedica Dental Material GmbH/ Domagkstrasse 31/ 24537 Neumuenster –Germany) to the fitting surface of mandibular denture and left to dry for 30 seconds (Figure 4, Figure 5).



Figure 2. Try-in stage with the waxed-up trial dentures



Figure 3. Fenestrated mandibular denture and a maxillary complete denture after being processed



Figure 4. Soft liner Kit was used to be injected into the fitting surface of mandibular denture



Figure 5. Brush was used to apply adhesive of soft liner to the fitting surface of mandibular denture

The polishing and occlusal surfaces were painted with Vaseline as separating medium to avoid adherence of soft liner materials.

The chair side soft liner (silicone elastomers) was injected into the fitting surfaces of mandibular denture, especially around the fenestrated area (Figure 6).



Figure 6. Application of Soft liner in the fitting surface of mandibular denture using a universal gun

The denture was seated in place and the patient was asked to occlude lightly against the upper denture (Figure 7).



Figure 7. The mandibular fenestrated denture lined with soft liner was seated in place until setting of lining material



Figure 8. The denture was removed the excess of soft liner was removed from the fitting surface then was finished and smoothed.



Figure 9. The mandibular fenestrated denture lined with smoothed soft liner was seated in place



Figure 10. Soft liner fitted fenestrated denture and a maxillary complete denture were seated in place

The denture was removed after 4 minutes and the excess was removed immediately with a scalpel. The fitting surfaces of the denture were finished and smoothed. (Figure 8, Figure 9, Figure 10).

3. Discussion

Despite advances in preventive dentistry, edentulism is still a major public health problem worldwide [3]. Edentulism was found to have a significant effect on residual ridge resorption, which leads to a reduction in the height of alveolar bone and the size of the denture bearing area [12].

Various studies have shown that there is a continuous resorption of the residual alveolar ridge in completely edentulous patient with complete denture and this continuous resorption may leads to serious Prosthodontic problem and cause difficulties both for the patient and the dentist in the management of complete denture [13].

Redford et al demonstrated that more than 50% of conventional mandibular denture had a problem with retention and stability and that the mandibular denture had more problems than maxillary dentures, primarily because of poor retention [14].

The soft liner fitted fenestrated mandibular denture is an excellent option. It is made very much like a complete denture, except that holes are created for the remaining teeth and the chair side soft liner was injected into the fitting surfaces of mandibular denture especially in the holes to help the denture hug the tooth.

The chair side soft liner is a layer of soft, gentle and kinder material that is fitted to the surface of a denture and

rests next to the oral tissues. It acts as a cushion or shock absorber between the hard plastic base of a denture and the tissues. This is in agreement with *Murata, et al* who stated that the mechanical properties of resilient denture liners, such as flexibility, resilience, and shock-absorbency, offer greater versatility for edentulous patients especially mandibular cases [15].

Preservation of alveolar bone is the most remarkable merit of the soft liner fitted fenestrated mandibular denture because it maintains bone volume and height to increase retention and stability. It also provides better functions, comfort and control because of proprioception.

The chair side soft liner forms an elastic retention collar, which encircle and engage the undercuts of remaining lower teeth snugly and tightly. This is in agreement with *Revathi, et al* who stated that deformation of the soft lining material on seating the denture allows the retention rings to engage circumferentially undercuts on the abutment teeth, thereby increasing the retentive capabilities of the prosthesis [16].

It is superior to a removable partial denture owing to its usefulness in improving support from remaining teeth and tissues, ameliorating retention, and patient satisfaction and comfort. This is in agreement with *Arora, et al* who stated that it is better than the removable partial denture considering its advantages such retention, taking more support from tissues rather than from periodontally compromised teeth, and the patient's acceptance. It gave better support and esthetics in morphologically compromised dental arches [17]. It is also in agreement with *Jain, et al* who stated that it aimed at preserving the remaining natural teeth and have a positive effect on retention and stability of dentures. It gives the patient psychological satisfaction of retaining the natural teeth [18].

Silicone rubbers lining are not dependent on leachable plasticizers in contrast to plasticized acrylic resins and therefore, retain their elastic property for prolonged periods. [19]. But damage of the elastic retention collar will occur over a period time in form of stiffness, cracking, and loss of bonding to the acrylic base which may lead to a potential space for micro leakage. It can be replaced with another silicon rubber chairside layer. This is in agreement with *Revathi, et al* who stated that deterioration of the retention rings will occur over a period of time, which includes changes in the physical properties of the material (hardening, roughening, cracking, or tearing), loss of adhesion to the polymethylmethacrylate base or contamination by stains, calculus. They can be easily renewed using a conventional laboratory relining procedure or by chairside treatment [16].

4. Conclusion

Chair side soft liner fitted fenestrated denture is a conservative Prosthodontic approach. It overcomes many problems encountered by complete denture and removable partial denture patients. The advantages of this approach in comparison to RPD include; decrease the stresses on

the remaining teeth, prolong their life and improve the esthetics, while in comparison to complete denture better stability and retention as well as more preservation of the alveolar bone is obtained.

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