

Modified technique to improve the bond strength of soft liner and denture base resins – A case report.

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Abstract

Indications for soft denture liners include patients with thin, non-resilient mucosa, persistent xerostomia, and acquired or congenital abnormalities, resorbed ridges. Soft denture liners may be inserted either when constructing a new denture or even when relining an existing denture. Patients benefit from chairside relining operations since they spend less time in the chair and don't lose their dentures. Patients experience significant discomfort when forced to leave with their dentures, even for one day. This case study presented a modified technique to improve the bond between soft liners and denture base resins.

Keywords- Denture relining, Mollosil, Soft liners.

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Introduction

Resilient lining materials (RLMs) are required in difficult cases for treating patients who are completely dentate as well as when fabricating obturators and epitheses. Many dental professionals do not advocate these materials because of their considerable drawbacks.^[1-4]

Conventional dentures are difficult to retain and frequently traumatise the tissue in cases with severely depressed, knife-edge, or extensively resorbed ridges. Relining is recommended in cases where there are resorbed ridges with fragile, sagging tissue, or congenital defect areas that have been treated with obturators.^[7]

Increased retention in ridges with inadequate vestibular depth can be achieved by making direct contact with the underlying tissues and sandwiching a layer of resilient permanent silicone soft liner within the denture base.^[8] This can also reduce the trauma encountered by residual ridges. The resilient layer serves as stress distributor during function by absorbing some of the load and distributing

the remaining stress effectively, decreasing the impact force on the denture base.

Case reports

Case report No. 1

A 63 year old male patient reported to the department of Prosthodontics, KD Dental College with a chief complaint of trauma of mandibular denture bearing tissues and loose mandibular denture. Clinical examination revealed thin knife edge mandibular posterior ridge and well-designed complete dentures with proper vertical dimension and centric relation coinciding with centric occlusion (Figure 1).

Case report No. 2

The chief concern of an 82-year-old male diabetic patient was difficulty chewing as a consequence of loose, ill-fitting dentures and persistent stress to the underlying tissues (Figure 2).

He desired a denture with good retention and no trauma of denture-supporting tissues

during function. Clinical examination revealed grossly resorbed mandibular ridge with tooth supported lower denture (Cu-Sil denture)

Case report No.3

A 49-year-old woman came forth with her main concern of difficulty in chewing as well as trauma of the tissues related to mandibular overdenture. Her oral examination revealed severe bony undercut in mandibular anterior region.

Clinical steps

Around 2 mm of acrylic were removed from the lower tissue surface of denture for improved comfort against the edentulous ridge and provides the soft reline sufficient thickness to prevent tearing and ripping.

Modified Technique

The denture's surfaces were cleansed, and the denture base's surfaces received a protective layer of MMA.

Alumina-particle sandblasting was used to prepare the surfaces that would be adhered to the liner. A nozzle with a diameter of around 1.0 mm was used to sandblast aluminum oxide particles at a pressure of 0.62 MPa for 30 seconds while remaining in close contact with each specimen (Figure 4).

Mollosil (Mollosil Detax GmbH, Ettlingen, Germany) was packaged by combining the two tubes in a 1:1 ratio (Figure 5).

After being cleaned and dried, the prosthesis' newly exposed acrylic received several coatings of a mild reline primer (adhesive). The soft liner was applied to them and the denture was pressed on the lower arch once all adhesive surfaces had dried.

Lower denture was removed, and the excess soft liner was cut and the denture was placed in hot water / resin hardner for few minutes.

Working time: 90 seconds

Setting time: 5 minutes (in the mouth)

Steps summary

1. Check adaptation or fit.
2. Removal of denture surface, MMA application, sand blasting.
3. Application of adhesive - Apply 2 or 3 coats - Air dry if needed (Figure 6).
4. Mix 1:1 ratio according to manufacturer's instructions (Figure 7).
5. Application to the tissue surface of the denture (Figure 8).
6. Insert denture in mouth wait for 5 minutes
7. Remove excess resin
8. Remove the denture
9. Soak denture in Resin Hardener (for more than 3 mins)
10. Rinse denture with water
11. Adjust and apply Lustrol gloss varnish (Figure 9).
12. Occlusal adjustments and denture delivery

Finishing and polishing is done followed by occlusal adjustment and denture delivery within 20-30 minutes. The patient was recalled after six months and one year for follow up (Figure 10-13).

Same procedure is followed for lower Cu-Sil denture in Case No. 2 (Figure 14-16) and implant overdenture in Case No. 3 (Figure 17-19).

Discussion

Failure of the prosthesis' and liner's adhesion will jeopardise the procedure's durability and encourage microbial colonisation. Bonding agent failure may be associated to adhesive

failure. Solvents help to increase the silicone-based liners' retention to the PMMA base.

Several experiments, including the peel, tensile, shear bond strength, and creep test, were performed to determine the bond strength of soft liners with acrylic denture bases. Due to its chairside usage, simple application, and lack of laboratory procedures, autopolymerized soft lining materials are currently preferred by the majority of doctors over heat cured soft lining materials.

Numerous researchers who had conducted extensive research compared the study's findings to those of earlier studies and reached the conclusion that the MMA wetting's effects on the denture base's outer layer swelling and the improved bonding between the denture base and soft liner due to adhesive's better penetration of the pores created.

Y. Sinasi Sarac et al. employed MMA immersion as a pretreatment for the denture base resin and airborne-particle abrasion to study the impact on microleakage between silicone-based resilient liners and denture base resin.^[10] The researchers claim that MMA wetting increased swelling and deeper adhesion at the outer denture base, which more effectively prevented fluid leakage at this interface.

Duygu found employing silicone-based resilient liners reduced microleakage and improved the bonding when the denture base resin surface was treated with methyl methacrylate for 180 seconds before adding adhesive.^[11]

The adhesion of the conditioning materials and the denture base resin, however, still a major concern, and if this bond between the liner and denture base breaks, it could provide a potential area for micro leakage.

Conclusion

In comparison to previous years, patients are more engaged in both leisure and professional activities. It can be considered as an impossible request for a dentist to request a patient to remove the prosthesis for a few minutes, let alone all day. The bonding and endurance of the soft liner with the denture foundation may therefore be improved by using this modified approach with long-lasting silicone soft liners (chairside). Because of their excellent mechanical and performance qualities, soft denture lining materials ensure a significant improvement in wearers' comfort.

Future research is required to enhance the functional properties of LTSDLs and their resistance against microbes.

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FIGURES



Figure 1



Figure 2



Figure 3



Figure 4



Figure 5



Figure 6



Figure 7



Figure 8



Figure 9



Figure 10: Before



Figure 11: After



Figure 12: After 6 month



Figure 13: After 1 year



Figure 14: Pre Operative



Figure 15: Post Operative



Figure 16: After 1 year



Figure 17: Liner application



Figure 18: Post Operative



Figure 18: After 1 year