

PROSTHODONTICS



The Art of Reline

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The chairside reline of the complete removable prosthesis has proven to be a useful clinical technique. Its benefits include but are not limited to:

- The ability to fill the void between an existing denture unit and the edentulous ridge caused by ridge resorption
- Improved denture base stability, with increased prosthetic retention
- Interim correction of vertical dimension of occlusion during new denture fabrication
- Immediate correction allowing the patient to have his dentures corrected without delay.

This procedure can be accomplished using a variety of chairside reline materials. The variations in these materials include differences in texture, chemistry, bond strength, color, and working time, among others. In the past, many of these materials have demonstrated a variety of drawbacks that include, but are not limited to, the following:

- Poor clinical longevity due to bond failure between the denture base and the liner¹
- Heat generated from the curing acrylic
- Disagreeable taste and odor
- Potential allergic reactions to the resin material
- Difficulty mixing and dispensing



Figures 1a and 1b. The upper and lower dentures on presentation. It would appear that the lower denture was a partial at one time and that the last tooth to be replaced was the lower left second molar.

- Dimensional changes due to the shrinkage of the acrylic material
- Material porosity and water absorption.

In order to be considered a superior material for direct denture relining, a material must exhibit the following properties:

- Nonirritating and nonheat producing
- Good color matching
- Good handling properties
- Durability
- Dimensional stability (ie, no polymerization shrinkage)
- Adhesion to the denture base
- Adequate working time

Two such series of materials are the hard reline Tokuso Rebase and the soft reline Sofreliner MS and Sofreliner S kits (Tokuyama Corp). In regard to the hard Rebase material, some of the more desirable characteristics are a significantly lower heat production (approximately 30°C, or 86°F, cooler than conventional methyl methacrylates).² This is possible because the monomer is free of methyl methacrylate, thereby reducing heat and chemical irritation, allowing the material to cure in the mouth without

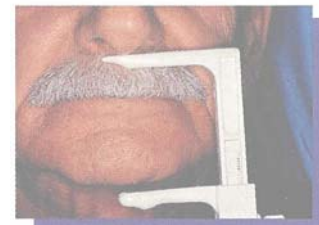


Figure 2. Set to the correct vertical dimension of occlusion, the Craniometer reveals that there is a deficiency of approximately 5 mm.

demonstrating any clinically significant shrinkage.³ Part of the success of this material is the application of the Rebase Aid, a methylene chloride which, when applied to the denture base prior to placing the hard reline material, ensures a long-term retention of the reline to the original denture surface.

In contrast to the hard liners, soft liners are compliant, viscoelastic materials used to form all or part of the fit surface of a denture.⁴ They serve to distribute the forces of mastication more evenly and to absorb energy.

Historically, soft denture liners have been difficult to manipulate and lacked the critical durability needed for long-term use.⁵ The longevity of the liner is a critical issue, and is mainly dependent on microleakage at the denture/liner interface, which ultimately causes debonding to occur.⁶ In addition, soft reline materials that are mixed by the powder/liquid method have a historical problem with porosity that hampers accuracy and reduces tensile strength.⁷ To reduce porosity, Tokuyama Sofreliner is

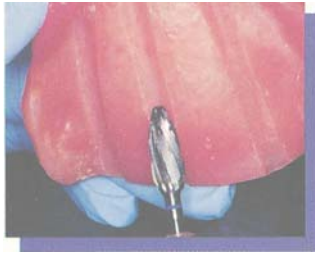


Figure 3. The denture base is evenly reduced. The cut "lines" are then joined.

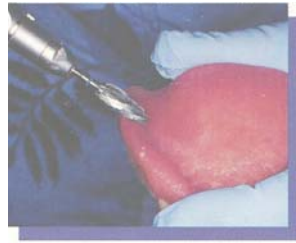


Figure 4. A 45° internal bevel is made in the denture rim. This is done for a hard reline.



Figure 5. A 45° external bevel is made in the denture rim. This is done for a soft reline.

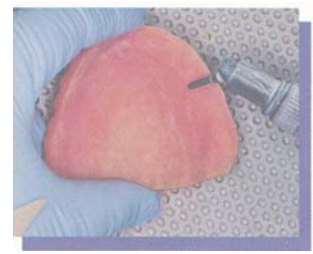


Figure 6. The unit is then microetched with 50 um aluminum oxide powder.

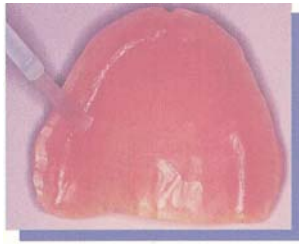


Figure 7. The next step in the hard reline is the application of Tokuso Rebase Aid, used to chemically bond the reline to the denture base.

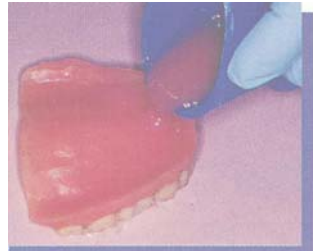


Figure 8. The hard liner is poured into the upper unit once it has reached a honey-like consistency.

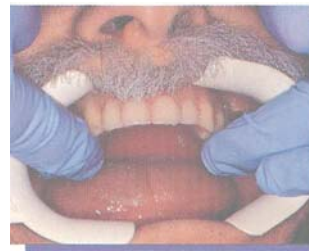


Figure 9. Using cheek retractors, the upper unit is placed intraorally.



Figure 10. The upper unit following removal and gross trimming.



Figure 11. Following base and rim reduction, retention holes are placed in the denture base that will receive a soft reline.



Figure 12. The Sofreliner MS material is dispensed into the denture base with a mixing tip and gun.



Figure 13. Excess soft liner is removed and trimmed back.



Figure 14. The completed hard upper reline.

dispensed in an auto mix cartridge. The soft reline materials are able to create a cushion against the often delicate soft tissues of an edentulous arch, especially in the vestibule and transmucosal vestibular area.

To clinically demonstrate the use of these materials, a case is presented where a patient has existing complete dentures and has demonstrated a loss of vertical dimension. This can be readily diagnosed when viewing the patient's profile, often presented as a protrusive mandible and angular cheilitis. This is often due to ridge resorption or hypoplasia of the edentulous arches, as a natural result of edentulism and wear of the occlusal surfaces of the denture teeth.

CASE REPORT

The patient, a 70-year-old male, presented with the chief complaint of ill-fitting dentures. He was completely edentulous and his existing current dentures were over 20 years old (Figures 1a and 1b). Following a complete oral exam, with appropriate radiographs and study models, it was concluded that the patient had suffered from primary maxillary and mandibular hypoplasia because of long-term edentulism. It was directly because of this factor that the existing dentures no longer fit properly. In addition, the oral commissures were red, cracked, and bled easily, indicative of angular cheilitis, a common Candida infection related to loss of vertical dimension of occlusion (VDO).

In order to transition this patient to new upper and lower complete prostheses, it was decided that relining his existing dentures was imperative. This would increase and correct the height of vertical dimension, allow traumatized intraoral and commissure tissues to heal, and allow the neuromuscular complex to readapt to

proper functional, proprioceptive pathways. Psychologically, this would also be an opportunity to improve the patient's overall expectations and confidence in his treatment outcome.

DETERMINING PROPER VDO

Initially, the proper VDO must be determined. In this case, the Craniometer was used (Craniometrics Inc) (Figure 2), which is a device that measures the distance between the auditory meatus and the outer orbital rim. This measurement is directly equivalent to the correct VDO minus 3 mm for freeway space.⁸ This measurement can be verified easily by instructing the patient to verbalize the letter "M", and then allow the lips to remain parted in their relaxed state. This relaxed state minus approximately 3 mm is accepted as one of several methods for establishing the proper VDO. Once VDO is established, the dentures are removed, and approximately 1 mm of acrylic is removed from the denture base and the vestibular areas using an acrylic carbide lab bur, the H251-070 (Brasseler) (Figure 3).

PREPARING THE UNITS

Perhaps the most critical part of preparing the units is the proper trimming of the vestibular rims, which differs for hard and soft relines. To receive a hard reline, the vestibular rim is beveled to a 45° internal angle (Figure 4). This allows for a natural, smooth transition from hard liner to existing base. For a soft liner, the opposite is the case, with an external 45° bevel (Figure 5). This allows a bulk of soft liner to be placed and transitioned to the vestibular portion of the unit. This technique also prevents peeling of the material, thereby enhancing long-term retention. Once the units have been prepared, the reline-bearing

surfaces are microetched with 50 um aluminum oxide powder (Figure 6). This step is not required, however it accomplishes two things: a thorough cleaning of the freshly cut acrylic surface, and an increase in surface area, which ultimately can improve bondability. The units are then thoroughly rinsed and dried.

HARD RELINE The Upper Unit

A liquid reline-bonding agent (Rebase Aid) is first applied to all freshly exposed denture base material (Figure 7). It must be applied to the reline-bearing surface and allowed to dry. Any areas that should not be bonded, such as the denture teeth, are coated with a thin layer of petroleum jelly (not included with the Tokuso Hard Reline kit). The Tokuso Hard Reline material is mixed until it has reached a honey-like viscosity, and is then dispensed into the upper denture (Figure 8). It is spread evenly over the entire denture-bearing surface and placed intraorally.

Cheek retractors (J Morita) allow the unit to be inserted intraorally, thus preventing the reline material from dragging against the lips and pulling reline material out of the denture base (Figure 9). Once inserted, the retractors are removed and the denture is held to place once the correct incisal lip line is verified. The denture can then be border molded by applying firm, even pressure when pulling the upper lip and cheeks. It is removed upon achieving a proper initial set, excess is trimmed with scissors, and the denture reinserted intraorally to complete the curing cycle. The unit is then removed and any remaining excess material is trimmed following complete setting of the material using a carbide acrylic lab bur, the H251FS-060 (Brasseler) (Figure 10).



Figure 15. The completed soft lower reline.

Because of its unique chemistry and material properties, the hard reline material cuts more like composite resin than traditional acrylic materials. That means there is no gumming of material while trimming, and it can be easily polished using either silicone polishing burs or wet pumice with a rag wheel.

The Lower Unit

Approximately 1 mm of denture base is trimmed back to create sufficient bulk for the soft liner. Additional retention is created by making retentive holes, which are cut into the denture base using a H71E-023 laboratory tungsten carbide cutter bur (Brasseler) (Figure 11), and the entire bonding surface is sandblasted with 50 um aluminum oxide. A liquid reline-bonding agent, Sofreliner Primer, is then applied to the reline bearing surface and allowed to dry for 1 minute. This step is imperative for an excellent bond. Then, any areas that should not be bonded, such as the denture teeth, are coated with a thin layer of petroleum jelly (not included with the Tokuso soft reline kit).

The Tokuso Sofreline material is dispensed from an automix cartridge and spread evenly over the entire denture-bearing surface (Figure 12). To avoid bubbles in the reline, the mixing tip is kept within the material as it is dispensed. Once it is placed into the denture, it is ready for immediate intraoral insertion. With the upper denture in place intraorally, the lower denture is seated and the patient is instructed to close into occlusion, up to the point that the corrected VDO is reached. This is verified and the patient is instructed to



Figure 16. Preop profile. Note the short distance between the nose-chin and the neck and orofacial muscle strain.

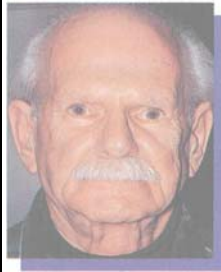


Figure 18. Preop facial view. The corners of the mouth are downturned, the chin is tense, and the lower lip is barely visible.

remain in this occlusal position until the soft reline material is completely set. During this time, the unit is border molded and then removed from the mouth. Any excess material is trimmed following complete setting of the material, using the lab bur and polishing buff included in the Tokuso Sofreline kit (Figure 13). This is a revolutionary improvement over past trimming/polishing systems, which often left tags and edges instead of smooth, rounded transitional relined areas.

The completed dentures (Figures 14 and 15) are then inserted intraorally and the occlusion is adjusted as necessary. Properly relined dentures are easily viewed by extra oral observation. A view of the patient's before and after profiles and facial views clearly demonstrates that the correct VDO has been recaptured, allowing for an easier progression to new complete denture therapy (Figures 16 through 19).

CONCLUSION

To many patients, the perception of their ill-fitting dentures is that the dentures have become the problem, not the changes that have occurred to the bony and soft-tissue architecture. However, once the patient



Figure 17. Post-reline profile. The nose-chin ratio has improved with the newly regained and corrected VDO.



Figure 19. Post-reline facial view. The corners of the mouth are even, the chin is relaxed, and the lower lip is now visible.

understands the natural causes, results, and progression of edentulism, they are better able to deal with and take ownership of their problem. Helping the patient transition from an ill-fitting to a new denture takes skill, care, and understanding. Perhaps one of the finest techniques in aiding this transition is to allow the oral system to become accustomed to a well-fitting "interim" prosthesis, and this is exactly where a reline of the existing denture units becomes invaluable. Not only do the tissues heal, but the musculoskeletal system can now adjust to what the new dentures will feel like. As mentioned, this is an invaluable aid in the transition to a new denture.

References

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