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The Hard and Soft Chairside Denture Reline

A Peer-Reviewed Publication
Written by Ian E Shuman, DDS, MAGD

Abstract

Complete and partial removable dentures can become ill-fitting. This can be due to alveolar ridge resorption, wear and damage to the denture base, among others. Chairside denture relining or repairing broken areas can correct many of these problems. Chairside procedures provide immediate resolution, avoiding the edentulous period of time accompanying laboratory relines. This course will demonstrate the evaluation, treatment planning and implementation of chairside denture relining in a variety of scenarios.

Educational Objectives:

At the conclusion of this educational activity participants will be able to:

1. Learn current trends in the denture market.
2. Identify the various reasons for an ill-fitting denture.
3. Discuss the options available for chairside denture relining.

Author Profile

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Publication date: June 2014
Expiration date: May 2017

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Complete and partial removable dentures can become ill-fitting. This can be due to alveolar ridge resorption, wear and damage to the denture base, among others. Chairside denture relining or repairing broken areas can correct many of these problems. Chairside procedures provide immediate resolution, avoiding the edentulous period of time accompanying laboratory relines. This course will demonstrate the evaluation, treatment planning and implementation of chairside denture relining in a variety of scenarios.

Introduction

When presented with an ill-fitting denture, there are two main options for correction: the hard or soft reline. The selection of the appropriate material is based on various conditions such as the state of the alveolar ridge, the presence of teeth and/or implants and whether the denture base is acrylic or metal.

Common Uses

Chairside materials are used for relines, repairs, border extensions and immediate dentures. These materials should accurately adapt to the denture-bearing surface, be highly polishable, demonstrate low heat generation during intraoral curing and have high mechanical strengths. They should also have easy handling and minimal chemical irritation, odor or taste. Additionally, they should cure rapidly and be ideal for long term denture reline applications.

Common Causes of Denture Failure

In a study by Hummel et al,[1] 65% of defective dentures had at least one defect. Lack of stability was the most prevalent. Mandibular removable partial dentures (RPDs) had retention problems whereas maxillary RPDs had problems related to reline material integrity. Tooth wear defects were significantly associated with patient age.

In some cases the denture base may be damaged, or the vertical dimension of occlusion has changed. Occlusal changes can be caused by denture tooth wear resulting in worn, ineffective surfaces. Carlsson's 1967 studies showed a dramatic loss of bone during the first year after a tooth extraction that continued over the years, even without a denture on the tissue surface.[2, 3]

In 1972, Tallgren's 25 year study showed that denture wearers have continued bone loss over the years. Occlusal forces on the gingival tissues irritate bone that resorbs. This results in a decrease in bone volume and density.[4]

Chairside Denture Reline Challenges

There are many challenges in the chairside denture reline process. In the past, material handling, integrity and lifespan have been an issue. Also, the question of whether a chairside reline is as effective as a laboratory reline over the long term was a concern.

Research

A 2014 study evaluated the bond strength of chairside reline resins.[5] The results were compared with lab-processed resins. The failure sites were examined by scanning electron microscopy and showed the bond strengths to be equal among all techniques.

Also, the clinical properties of resilient denture lining materials may be influenced by the methods used to polymerize them.[6] Other studies investigated temperature rise during intraoral polymerization that can cause discomfort,[2-8] and the durability through flexural strength[9] has also been measured.

In addition, areas with poor reline adhesion or roughness are potential sites for candidiasis development. A study was conducted between resin and silicone liners measuring the presence of candida. Resin surfaces presented sharp valleys and depressions, while silicone based specimen surfaces exhibited more gentle features.[10]

The Hard Reline: Case History

In this case, the patient presented with the chief complaint of an ill-fitting upper denture and that it was causing her gums to hurt. In addition, the denture had a persistent odor and her jaws were sore after chewing.

Diagnostics

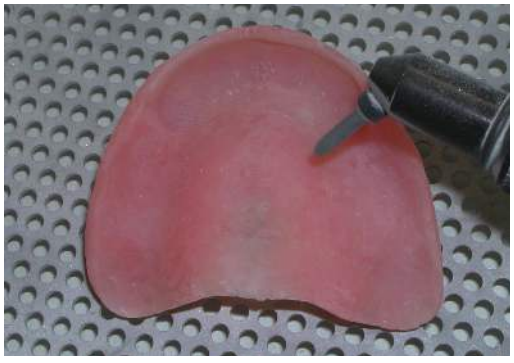
Following a comprehensive examination it was determined that the tissue bearing surface of the maxilla was erythematous. The vertical dimension of occlusion was insufficient due to generalized ridge resorption. The tissue bearing area of the denture had been previously relined but the reline material was peeling, causing the persistent odor.

Figure 1

Treatment

The existing reline material was removed and fresh resin was exposed using a lab bur. Following this, air abrasion with 90 micron aluminum oxide powder was used to microetch the resin.

Figure 2



This last step is not necessary but does help to enhance the adhesion of the new reline material. The prosthesis was rinsed, dried and a reline adhesive (Tokuso Rebase II Adhesive®, Tokuyama Dental) was applied in two coats to all areas of the denture to be relined.

Figure 3

Once dry, a separating medium such as petroleum jelly was applied to all areas where reline adhesion is not desired.

Figure 4

Once completed, the hard denture reline powder and liquid were mixed (Tokuyama Rebase II®) and dispensed onto the denture intaglio.

The denture was then inserted against the upper arch and the patient instructed to gently bite until the correct vertical dimension of occlusion was reached. As the resin began to harden, the necessary treatment of the muscles was performed to properly mold the borders. When the resin became harder than paste, the denture was removed from the patient's mouth and any excess material trimmed. The denture was then inserted in the patient's mouth until final hardening was complete. Once cured, any remaining flash (Figure 5) was removed and the flanges contoured with a series of lab burs (Komet Dental®) and polished. (Figure 6)

Figure 5

Figure 6

To complete hardening of the cured denture reline, a hardener was used. Tokuso Resin Hardener II® was dissolved in water at 104-140°F and the denture was completely immersed in this bath for three minutes. This improves the surface hardness and final polish of the denture base by curing the air inhibition layer of the tissue bearing surface. The denture is then removed, rinsed, and polished.

Figure 7

The procedure of relining is not complete unless a number of issues are addressed. These include the evaluation of fit and stability, esthetics, phonetics, occlusion (Figure 8) and finally giving the patient home care instructions.

Figure 8.

The Soft Reline

The most common type of failure with soft relines is the adhesion between the silicone reline and the denture acrylic. In a study published by the Journal of Applied Oral Science , it was determined that the use of a specialized primer (Sofreliner®, Tokuyama Dental) increased the bond strength between the acrylic resin denture base and the silicone reline material.[11]

Another area of concern is the tear strength of silicone liners. Santawisuk et al studied the dynamic viscoelastic properties of experimental silicone soft lining materials.[12] Results showed that the silicone elastomers demonstrated acceptable dynamic viscoelastic properties to be used as denture soft lining materials. The resiliency of soft reline materials is also of concern, especially since patients tend to use denture cleansers on a daily basis. However, this had no effect on the hardness of the resilient denture liners evaluated after two years of in vivo simulated conditions of hygiene. Sofreliner® was the smoothest material before and after all treatments.

The Soft Reline: Case History

In this case, the patient presented with a request for a soft liner for his lower denture. His goal was increased comfort, chewing ability and improved fit to his lower jaw.

Diagnostics

Following a comprehensive examination it was determined that the tissue bearing surface of the mandible was sore to palpation in various areas. The remainder of the exam was within normal limits.

Treatment

Approximately 2-3mm of acrylic was removed from the tissue bearing surface of the lower denture and the flanges were prepared with a 90° lip. (Figure 9) This provides the reline with sufficient thickness to prevent tearing and peeling and allows enhanced comfort against the vestibule. The prosthesis was rinsed, dried and a reline adhesive was applied in multiple coats to the newly exposed acrylic. (Figure 10) (Sofreliner Tough®, Medium Viscosity, Tokuyama Dental, Tokyo, Japan). A separating medium is not necessary as the excess reline material is easily removed with a scalpel and scissors, as well as specially designed cutting burs and polishers. Once dry, the Sofreliner® was injected onto all adhesive surfaces (Figure 11,12) and the denture was inserted onto the lower arch (Figure 13). The patient was instructed to gently bite until the correct vertical dimension of occlusion was reached. As the silicone liner begins to set, minimal muscle manipulation is required and this is particularly true in the lower arch. Once set, excess material and flash was removed using scissors, scalpel (Figure 14) and specialized burs as previously mentioned. The denture is then delivered (Figure 15).

Figure 9.

Figure 10.

Figure 11.

Figure 12.

Figure 13.

Figure 14.

Figure 15.

Conclusion

According to R. Sarka "Complete Dentures are an all-inclusive, full-mouth reconstruction that functions in a dynamic, anatomically sensitive, and demanding environment. They are a singular reconstruction that simultaneously restores function, esthetics, phonetics, facial support, and patient self-esteem."[13]

Understanding this, it is no wonder so many dentures become ill-fitting. The challenges are many and the solutions complex. However, it is the task of our profession to provide our patients with functional, comfortable and aesthetic removable prostheses. Chairside denture relining is a highly effective, successful treatment that can achieve these goals.

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Author profile

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Questions

1. In a study of defective dentures by Hummel, the most prevalent single defect was:
   a. Lack of stability
   b. Damaged acrylic
   c. Warping of the denture base
   d. Lack of adhesion
2. Occlusal changes can be caused by:
   a. Excessive chewing
   b. Denture tooth wear
   c. TMD
   d. Porcelain
3. Tallgren's 25-year study showed that denture wearers have continued bone loss over the years resulting in a decrease in bone:
   a. Height and width
   b. Density and vasculature
   c. Thickness and support
   d. Volume and density
4. A biofilm of candida albicans will occur in areas where:
   a. The reline does not adhere
   b. The material is smooth
   c. There is polished metal
   d. The reline is fixed
5. A chairside denture reline is needed most commonly for:
   a. Immediate dentures
   b. Implant healing
   c. Following any type of oral surgery
   d. None of the above
6. When selecting a reline material, which one of the following features is not desired?
   a. Highly polishable
   b. Low heat generation
   c. Chemical irritation
   d. Easy handling
7. With hard reline procedures, a separating medium is applied to which areas of the denture?
   a. Palatal
   b. Intaglio
   c. Denture teeth
   d. Both a and c
8. With a soft reline the denture flanges were prepared with a lip of:
   a. 90°
   b. 45°
   c. 15°
   d. 10°
9. A separating medium is not necessary for silicone liners as the excess reline material is easily removed with:
   a. Nail trimmers
   b. Specialized burs
   c. Scalpel and scissors
   d. Both b and c
10. When delivering the denture after relining, which of the following is performed?
    a. Phonetic evaluation
    b. Occlusal adjustment
    c. Home care instructions
    d. All of the above

Notes

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