

Clinical Perspectives On Denture Relining: A Review Of Literature And Current Best Practices

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Abstract:

Background: The effectiveness of complete dentures diminishes over time due to alveolar ridge resorption, mucosal changes, and wear of denture materials. These changes lead to loss of retention, stability, and patient comfort, necessitating corrective measures. Denture relining serves as conservative alternatives to full denture replacement, aiming to restore fit and function while preserving occlusal relationships and esthetics.

Materials and Methods: This literature-based review analyzes landmark studies and clinical techniques from 1952 to 2023, covering direct and indirect relining methods, material advancements such as polymethyl methacrylate and tissue conditioners, and criteria for clinical decision-making. Techniques like closed-mouth impression, remounting, and occlusal adjustments are emphasized as essential for success. Contraindications and limitations of each procedure are also outlined.

Conclusion: Denture relining remains clinically valuable procedures when executed with proper case selection and technique. While not substitutes for new dentures in severely compromised cases, they offer functional and economical benefits, particularly for patients in resource-limited settings. Ongoing research into resilient liner materials and antimicrobial properties continues to enhance the durability and success of these treatments.

Key Word: Complete dentures, Denture relining, Occlusal stability, Ridge resorption, Impression materials, Soft liners, Prosthodontic rehabilitation.

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I. Introduction

While most edentulous patients report initial satisfaction with new complete dentures, studies indicate that up to 30% experience postoperative complaints. They still experience ongoing difficulties in adaptation such as unsatisfactory appearance, wrenching pain or discomfort due to the lack of retention and stability, altered speech, accumulation of food under the denture, difficulty in chewing. These kinds of complaints may compromise the quality of life and can bring him to re consult again to solve them to address such complications, the clinical procedure of denture relining is selectively indicated based on the individual case requirements. The main purpose is to re-establish adequate adaptation of the denture base to the bearing area and to preserve the original jaw relations. This technique is primarily indicated in cases of immediate or delayed prosthetic instability resulting from physiological or pathological alveolar resorption. The clinical approach mirrors that of the final impression procedure, with particular emphasis on achieving a well-balanced occlusion, an appropriate occlusal plane, a stable centric relation, and a correct vertical dimension.[1] The term reline is defined as, "To resurface the tissue side of a denture with new base material to make it fit more accurately." [2]

II. Review Of Literature

Several researchers have explored various techniques and principles to address the issue of ill-fitting dentures. The following literature presents a historical and methodological overview of denture relining and rebasing procedures:

Jack Buckman (1952) [3] described rebasing and relining as procedures requiring precision equivalent to initial denture fabrication. He emphasized the critical need to restore and preserve the vertical dimension of occlusion. Buckman recommended peripheral adjustments and relief holes to minimize impression pressure, using a central bearing point to determine the center of tissue resistance. Both centric and eccentric relations were recorded following Stansbery's methods.

Robert R. Gillis (1960)[4] noted that while mandibular denture relining is straightforward when occlusal relationships are lost due to alveolar atrophy, many practitioners opt for new dentures, often for financial reasons. However, the relining technique he described efficiently restores vertical dimension and occlusion without

focusing on hinge axis or temporomandibular joint alignment. He cautioned against its use in cases with worn teeth or initially faulty occlusion.

Dale E. Smith, James L. Lord, and Charles L. Bolender (1967)[5] observed that many dentists consider relining a compromise, though it remains a valuable treatment when tooth positioning and vertical dimension are adequate. Two primary techniques are cited: (1) direct intraoral application of auto polymerizing resin, and (2) indirect relining using heat-cured resins. Despite their clinical utility, both methods exhibit notable limitations.

Finn Tengs Christensen (1971)[2] introduced the "wing relining" technique, a laboratory-controlled process that maintains occlusal vertical dimension during relining. His findings showed that vertical dimension changes were minimal, with 68% of cases demonstrating a variance of less than ± 0.1 mm.

John I. Shannon (1975)[6] advocated the use of a remount jig to accurately reposition maxillary dentures during relining. By employing a face-bow record, the original occlusal relationship can be maintained with confidence. This method streamlines the process, easing the clinician's burden during chairside adjustments.

Nikzad S. Javid et al. (1985)[7] used a contour meter to measure denture displacement caused by different impression materials and techniques. Their findings indicated that light-bodied polysulfide and tissue conditioners, particularly when used with closed-mouth techniques, resulted in minimal denture displacement. They emphasized the importance of remounting and refining occlusion after relining to correct any resulting occlusal discrepancies.

Carl O. Boucher (2004)[8] detailed a comprehensive approach to relining that includes achieving tissue health, evaluating occlusion, and establishing a posterior palatal seal before impression-making. He advised a 24-hour denture-free period prior to impressions and meticulous preparation of the denture base to accommodate new impression material and avoid interference with anatomical structures.

Cynthia S. Kubo et al. (2014)[9] highlighted that alveolar bone resorption post-extraction leads to denture maladaptation and discomfort. They emphasized the clinician's need for thorough knowledge of relining materials—rigid or resilient, temporary or permanent—including their indications, contraindications, and biological considerations. Long-term success relies on appropriate material selection and ongoing patient follow-up.

Ibrahim Alfahdawi (2018)[10] explored the impact of relining with a polymethyl methacrylate and thinner mixture. His technique allowed accurate adaptation of the denture base and maintained occlusion. The material was resilient, offering enhanced comfort and fit, and the method proved efficient and time-saving.

Nareudee Limpuangthip et al. (2023)[11] investigated the effects of dynamic impression lining materials on mandibular denture retention, stability, masticatory performance, and oral health-related quality of life. While improvements were observed, including reduced oral impacts, the dynamic liners exhibited clinical changes (e.g., odor, peeling, plaque accumulation) by the third month, in contrast to the more stable performance of conventional hard liners over six months.

III. General Considerations

Several key clinical considerations must be evaluated to determine whether a complete denture should be relined or replaced with a new prosthesis.:

- The occlusal vertical dimension should be satisfactory.
- Centric occlusion should coincide with centric relation; a slight discrepancy is acceptable only if it can be corrected.
- The esthetic outcome must be satisfactory to both the patient and the clinician, with particular attention to the size, shape, shade, and arrangement of the artificial teeth.
- The oral tissue should be in optimum health
- The posterior extension of the maxillary denture must be appropriately positioned and accurately defined.
- The denture base extensions are adequate
- Optimal denture base extensions are essential to facilitate the uniform distribution of masticatory forces across the maximum supporting area.
- The interocclusal distance is correct.
- Speech is satisfactory with the existing tooth arrangement.
- There are no existing hard or soft tissue conditions that would preclude the technique, such as redundant tissue or severe osseous undercuts.[12]

IV. Indications

Relining Indications:

Relining involves adding new material to the tissue-fitting surface of a denture to improve its fit. It is indicated when [8]:

- Bone Resorption: Significant bone resorption has occurred, causing the denture to become loose.

- **Poor Fit:** The denture no longer fits properly due to changes in the oral tissues.
- **Discomfort or Pain:** The patient experiences discomfort, sore spots, or pain due to an ill-fitting denture.
- **Difficulty Chewing:** The denture is unstable during chewing or speaking.
- **Sores or Irritations:** A poorly fitting denture can cause sores, infections, and prolonged discomfort.
- **Tissue Changes:** Changes in the oral mucosa or underlying bone structure (e.g., due to aging, weight loss, or illness).
- **Temporary Adjustment:** As a temporary solution before a more permanent treatment (e.g., a new denture).
- **Immediate dentures:** Immediate dentures, which are placed immediately after tooth extraction, require relining as the tissues heal and change.
- **Overdentures:** Overdentures, which are supported by remaining natural teeth or implants, may also benefit from relining if the bone or implant support has changed.

V. Contraindications

The dentures should not be relined or rebased when one or more of the following defects exist:[12]

- Unresolved temporomandibular joint dysfunction/disharmony and myofascial pain.
- Unsuccessful resolution of inflamed, abused, and pathologic basal seat mucosa.
- Mispositioning of artificial teeth that results in unfavorable mechanics, poor phonetics and unacceptable/aesthetics.
- Multiple-fractured and severely worn artificial teeth.
- A misaligned occlusal plane leads to an unsatisfactory aesthetic.
- Interceptive and deflective occlusal contacts in centric relation that are greater than 2 mm in a horizontal and 3 mm in a vertical plane.
- A vertical dimension of occlusion that must be increased more than 3 mm.
- A vertical dimension of occlusion that is excessive results in minimal interocclusal space

VI. Relining Techniques

Various relining techniques have been proposed over the years to improve the fit and function of complete dentures. Smith, Lord, and Bolender (1967) [5] categorized the primary methods into two major types: the direct intraoral technique, which uses auto polymerizing acrylic resins applied chairside, and the indirect laboratory technique, which employs heat-cured resins for better adaptation and finish. Geiger and Bailey introduced an improved indirect method that utilizes compressed air and water for curing, overcoming some of the limitations of traditional indirect methods. Christensen (1971) [2] proposed the Wing Relining Technique, a laboratory-controlled procedure known for its ability to maintain vertical dimension with minimal variation. Robert R. Gillis (1960) [4] advocated a closed-mouth relining technique for mandibular dentures, emphasizing the restoration of vertical dimension using occlusal compound records. Meanwhile, Boucher (1973) [8] detailed an open-mouth technique where impressions for both maxillary and mandibular dentures are made independently, followed by a new centric relation record. These diverse approaches demonstrate the evolving strategies aimed at achieving precise denture adaptation and long-term clinical success.

VII. Conclusion

Resurfacing of the denture base of a complete denture is a complicated procedure requiring astute clinical judgment and skill if the therapy is to be successful. In many cases, fabricating new dentures using a reliable technique is the preferred treatment—especially when denture bases are overextended, there is a significant loss of occlusal vertical dimension, or when centric relation does not correspond with centric occlusion. Currently, the use of fluid resins (tissue conditioning materials) appears to be the best option to help restore masticatory efficiency successfully an impression can be made that will often indicate extensions, especially of the lingual flanges of the mandibular denture that were not discovered otherwise. Its properties must be well understood and skills in its handling must be developed. Clinical studies indicate that using tissue conditioning material with a closed-mouth impression technique, or light-bodied polysulfide rubber with either open- or closed-mouth techniques, results in minimal denture displacement in with respect to three dimensions compared to regular-bodied polysulfide rubber or zinc oxide-eugenol impression materials. Additionally, the same impression materials used with either open- or closed-mouth techniques showed no significant difference in maxillary denture displacement. A relined complete denture should be remounted on the articulator and the occlusion refined to eliminate occlusal interferences resulting from three-dimensional denture displacement during relining. Relining is not an adequate substitute for new dentures. However, relined dentures require the same care as new ones, and patients should be recalled regularly for examination of the tissues and jaw relations. A lack of knowledge about advanced relining materials and their antimicrobial properties among general practitioners, along with improper preparatory procedures, often leads to repeated failure of relined complete dentures.

To enhance the durability and longevity of relined dentures, a systematic and scientific approach to the relining process is crucial—especially for patients of lower economic status in developing countries such as India, who may not afford new dentures. Clinical experience shows almost universal tissue tolerance for soft liners and generally acceptable patient responses. However, currently, these materials should be considered temporary solutions because no permanent liners yet match the lifespan of resin denture bases.

Ongoing research aims to enhance strength, permanent resiliency, adhesion to denture bases, resistance to microbial growth, and chemical stability. These advancements include applying surface coatings with sealants like fluorinated copolymers and incorporating antifungal agents. The ideal resilient denture liners would possess high elasticity during chewing and then behave viscously to distinguish between functional and nonfunctional forces, thus helping to relieve pain. Additionally, long-term durability in the oral environment is essential.

Due to their viscoelastic nature and superior cushioning effect, acrylic resin liners may be the most suitable choice considering inherent material properties. However, silicone liners offer better durability. Selection of a liner should not rely on any single property but must consider both material characteristics and the specific clinical situation.

While laboratory studies simulate the oral environment, no simulation is perfectly accurate. Therefore, intraoral clinical studies remain the most appropriate method to evaluate these materials.

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