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TECHNIQUE FOR TRIMMING COMPLETE DENTURES: A COMPREHENSIVE REVIEW

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ABSTRACT

Trimming a complete denture is an essential process for achieving a precise fit, improving patient comfort, function, and aesthetics, while also preventing irritation to the surrounding oral tissues. This review examines the principles, methods, challenges, and materials associated with trimming complete dentures, emphasizing the significance of accurate adjustments for optimal patient outcomes. Additionally, it offers an overview of recent advancements in denture trimming techniques and key clinical considerations.

KEYWORDS: Complete denture, trimming methods, denture modification, prosthodontics, dental prosthesis.

INTRODUCTION

Complete dentures are removable prosthesis that replace an entire arch of missing teeth, restoring function, aesthetics and comfort of patients with edentulism. One crucial aspect of complete denture fabrication is the trimming process, which involves adjusting the borders, occlusion, and other functional aspects of the denture after it has been fabricated in the laboratory. The goal is to ensure a proper fit, prevent discomfort, and avoid irritation to the oral tissues.[1] Proper trimming is essential to ensure the prosthesis meets the patient's anatomical and functional needs while maintaining aesthetic appeal. Modern trimming techniques have evolved significantly due to advances in materials, such as acrylic resins, and

the development of precision tools. However, understanding the historical methods of trimming offers valuable insight into the evolution of denture fabrication and the ongoing efforts to improve patient comfort and prosthetic performance. This review aims to provide an in-depth analysis of the various aspects of trimming complete dentures, discussing its significance, techniques, challenges, and the influence of different materials and methods on the final outcome. Recent advancements in denture trimming technologies will also be examined, highlighting improvements in precision and efficiency.[2]

Review of literature regarding the trimming old dentures

The practice of fabricating and using complete dentures dates back to ancient civilizations, with early examples crafted from materials such as wood, bone, and metal. The trimming process of old dentures required a combination of manual skill and tools like files, rasps, and abrasive stones. Because of the less sophisticated technology and materials available at the time, creating a comfortable and functional denture often required extensive adjustments.[3]

The practice of trimming old dentures involved methods that aimed to refine their fit, comfort, and functionality, though the techniques and materials were quite different from those used today. In ancient civilizations, complete dentures were often made from materials such as wood, bone, and metal, which presented specific challenges in terms of adjustment and refinement.

1. **Shaping the Borders:** Early dentures often had rough edges, which could irritate the gums and surrounding tissues. Trimming was performed to smooth the borders and create a more comfortable fit. In early denture-making, artisans used simple tools, such as files and rasps, to shape these borders.[3]
2. **Smoothing and Refining:** After the initial fitting, dentures required additional refinement to smooth out any rough spots and sharp edges that might cause discomfort. This was especially important for dentures made from harder materials like metal, which required significant effort to smooth. Various abrasives were employed, often in a time-consuming manual process.[1]
3. **Adjusting Occlusion**: The bite (occlusion) of old dentures was frequently adjusted by manually reshaping the occlusal surfaces. In many cases, early dentures did not align perfectly with the natural bite, so adjustments had to be made to ensure proper contact between the upper and lower denture[3] Improper occlusion could lead to difficulty chewing and speaking, necessitating further trimming.

These traditional trimming techniques were labor-intensive and less precise compared to modern methods. However, they laid the groundwork for the development of more refined prosthetic techniques. Today, materials like acrylic resins and advanced trimming tools have significantly improved the precision of denture adjustments, reducing the need for extensive manual trimming.[2]

Principles of Trimming Complete Dentures

Trimming a complete denture involves the following key principles

1. **Functional Fit:** The denture must allow for comfortable mastication and speech without causing discomfort or trauma to the oral tissues. The borders of the denture should not impinge on the soft tissues, and the occlusion should be adjusted to ensure even contact during function.[4]
2. **Aesthetic Considerations:** The appearance of the denture should reflect the patient's natural dentition. This involves proper alignment of the teeth, the shape of the gingival flange, and the overall contour of the denture base.[5]
3. **Retention and Stability:** Trimming can help optimize retention by ensuring that the borders of the denture conform to the underlying oral anatomy without causing displacement during functional activities like speaking and chewing.[6]
4. **Comfort:** The trimming process should minimize irritation to the underlying mucosa, avoiding pressure points that could lead to sore spots or ulceration.[7]
5. **Appropriate Clearance and Adjustment:** Trimming should also focus on ensuring appropriate vertical and horizontal clearance between the upper and lower arches, which is vital for achieving a functional occlusion.[8]

Reasons for Trimming Dentures

Trimming eliminates overextensions and excess material, particularly around the borders and flanges, which can cause irritation or discomfort. It also helps to relieve pressure points and creates a more comfortable fit (Boucher, 1980; Rudd & Rudd, 1994).

Trimming a denture is necessary for several reasons

1. **Relieving Pressure Areas**: Trimming helps to alleviate pressure points that could cause discomfort, pain, or irritation.[9]
2. **Preventing Tissue Irritation**: By smoothing rough or sharp edges, trimming prevents friction and discomfort to the oral mucosa.[1]

3. **Ensuring Proper Fit**: Removing excess material ensures that the denture fits properly and sits securely in the patient's mouth.[3]
4. **Enhancing Patient Comfort**: Proper trimming addresses any discomfort caused by poorly fitting dentures, improving overall patient satisfaction.[9]
5. **Improving Denture Stability**: Excess material can cause the denture to shift; trimming ensures greater stability and retention.[1]
6. **Reducing the Risk of Breakage**: Removing fragile areas reduces the risk of the denture breaking.[3]
7. **Enhancing Aesthetics**: Trimming improves the overall appearance of the denture, creating a more natural look.[9]
8. **Improving Phonetics**: Well-trimmed dentures improve speech clarity by avoiding interference with the tongue or oral cavity.[1]
9. **Reducing Risk of Infection**: Trimming removes areas where bacteria can accumulate, thus reducing the risk of oral infections.[3]
10. **Promoting Overall Oral Health**: A properly fitted and trimmed denture promotes better oral hygiene and overall health.[1]

Materials & tools for Trimming Dentures

The proper selection of materials and tools is essential for achieving accurate and efficient results. The tools used must be capable of handling the specific demands of acrylic denture material while also promoting safety and comfort for both the clinician and patient.

1. **Trimming Tools**

- **Denture Trimmers**: Scissors designed for precise trimming of acrylic dentures.[3]
- **Carbide Burs**: Rotary instruments that quickly remove excess material in the initial stages of trimming.[1]
- **Diamond Burs**: These burs are ideal for more delicate trimming and fine adjustments near the gingival margins.[9]
- **Acrylic Trimmers**: Specialized tools designed for shaping and trimming acrylic dentures with precision.[11]
- **High-Speed Handpieces:** High-speed handpieces are used for precision trimming, providing efficiency and minimizing heat generation, which can damage the denture material.[4]

- **Articulators:** Articulators are used to simulate the occlusion of the upper and lower arches, enabling the technician to evaluate and adjust the occlusion during the trimming process.[5]
- **Trimming with a Knife:** A sharp scalpel or knife is often used to refine the borders, especially in the areas of the flanges where minor adjustments are required.[6]

2. **Finishing Tools**

- **Finishing Burs**: These burs refine the denture surface after initial trimming, providing the necessary smoothness.[10]
- **Flexible Abrasive Disks**: Used for removing rough spots and contouring the denture's surface for a refined finish.[9] Different abrasives used are Pumice(mild abrasive), Tripoli(slightly coarser) and aluminum oxide(fine abrasive).

3. **Polishing Tools**

- **Rubber Polishing Wheels**: Commonly used for smoothing out the denture surface, providing a glossy finish.[1]
- **Polishing Pastes**: Special pastes that help give the denture its final shine.[9]
- **Buffing Brushes**: These brushes, when combined with polishing paste, produce a smooth, shiny surface and restore the denture’s natural appearance.[10]

4. **Safety Equipment**

- **Personal Protective Equipment (PPE)**: Dentists should always wear gloves, masks, and safety glasses to protect against debris and dust generated during the trimming, finishing, and polishing processes.[1]

Application of necessary materials and tools

1. **Denture base material**: Acrylic resin, thermoplastic materials, or composite resins.
2. **Trimming burs**: Tungsten carbide burs for rough trimming, diamond burs for finishing.
3. **Fine-grit sandpaper**: For smoothing the borders and base.
4. **Articulating paper**: To check occlusion.
5. **Polishing wheels and pastes**: For final surface polishing.
6. **Heat source for curing**: For polymerization and hardening of acrylic.

Guidelines for Trimming

- **Pre-Trimming Checks**: After the denture is completed, it is first inspected for any visible defects, such as excess acrylic, misalignment, or rough surfaces. The first step in trimming is to identify areas that need adjustments.[4]

- **Sequence of actions for trimming**

1. **Initial Denture Evaluation**: Use patient feedback and visual inspection to determine the areas requiring adjustment.
2. **Mark the Trimming Area**: Mark these areas with a pencil or marker to guide the trimming process.
3. **Select the Appropriate Tool:** Choose the correct trimming tool based on the material and area to be adjusted.
4. **Trim the Denture:** Carefully remove excess material using gentle strokes, avoiding excessive pressure to prevent denture fracture. Ensure that the denture is correctly identified and meets the patient's specifications.
5. **Excess Material Removal**: Use carbide or acrylic trimmers to remove overextensions and excess material around the borders and flanges.[3]
6. **Border Trimming:** Trimming the borders (also known as the flanges) of the denture is essential for providing a comfortable and functional fit. This process ensures the denture does not interfere with the soft tissues of the mouth while maintaining proper retention[2]
7. **Fit Verification**: After trimming, check the denture for proper fit and comfort in the patient's mouth.
8. **Occlusion Adjustment:** The occlusion should be checked to ensure that the upper and lower denture arches align properly. Adjustments are made by trimming the occlusal surfaces or modifying the vertical dimension to achieve a balanced bite.[7]
9. **Finishing of trimmed areas -** Using finishing burs, the contours of the denture should be refined, and any rough edges smoothed to ensure a precise and seamless fit.[9]
10. **Polish the Trimmed Area:** Use polishing tools to smooth and refine the trimmed surfaces.[3]
11. **Smoothening and Polishing:** Once the major adjustments have been made, the denture is smoothed and polished to remove rough areas, ensuring comfort and preventing irritation of the soft tissues.[8] To achieve a polished and aesthetically pleasing denture, use rubber polishing wheels and pastes to smooth the surface and create a natural shine [9] Follow this

with final buffing using polishing brushes to ensure a glossy finish that enhances the appearance and minimizes plaque buildup.[10]

Post-Trimming Checks

1. **Fit and Function Evaluation**: Test the fit of the denture by having the patient speak and chew. Make sure it is comfortable and stable.
2. **Check for Soft Tissue Irritation**: Look for signs of irritation in the oral mucosa, and adjust the denture as necessary.
3. **Final Adjustments**: If any further adjustments are required, perform them before delivering the final prosthesis.[3]

Step-by-Step Trimming Techniques for Complete Dentures

1. Initial Setup and Preliminary Assessment

Before starting the trimming process, a preliminary assessment of the complete denture is necessary. The denture should be examined for any obvious defects such as bubbles or irregularities in the base material.[11,1]

2. Trimming the Denture Base

The base of the denture should be carefully trimmed to ensure it conforms closely to the contours of the edentulous ridge. This step involves shaping the acrylic to follow the anatomical contours of the underlying bone and soft tissues.

Procedure

- Use a fine rotary tool with a tungsten carbide bur for rough trimming of the excess material. Hold the tool at a low speed to avoid overheating.
- Start trimming from the posterior end, working towards the anterior portion of the denture.
- Ensure that the trim follows the natural curvature of the alveolar ridge to maintain stability and comfort for the patient.[12]

3. Trimming the Denture Borders

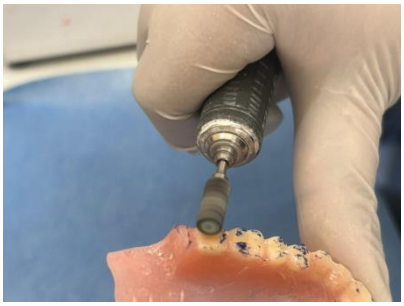
The borders of the denture are pivotal for retention, comfort, and functional stability. An improper border trim can lead to poor retention or irritation of the soft tissues.

Procedure

- Using sandpaper strips or a fine diamond bur, carefully trim along the borders. The goal is to achieve a smooth, rounded edge that does not impinge upon the surrounding soft tissues.
- Focus particularly on the labial and buccal borders, ensuring they are well-defined without being overly thick.
- Pay close attention to the vestibular areas to avoid creating undercuts that can compromise retention.[13]

4. Refining the Occlusal Surface

Occlusion is one of the most critical aspects of a complete denture, as it ensures functional biting and prevents discomfort. Refining the occlusal surfaces is essential for achieving a proper bite.



Procedure

- Adjust the occlusal surfaces of the denture teeth using a fine-grit diamond bur or finishing bur.
- Check the occlusion frequently using articulating paper, marking areas of high contact.
- Gradually adjust the bite by removing material from the high spots, ensuring a balanced, even occlusion.
- Check the occlusion in both centric and eccentric movements, ensuring that no interference occurs during lateral or protrusive movements.[1]

5. Finishing and Polishing the Denture

Once the base, borders, and occlusion are correctly adjusted, the denture needs to be polished. Proper finishing and polishing are crucial for the aesthetic quality of the denture and the prevention of irritation to the patient's oral tissues.

Procedure

- Begin by smoothing any rough edges with a fine sandpaper wheel or finishing bur.
- Apply polishing paste to a soft wheel or felt disc, and carefully polish the denture surface.
- Ensure all surfaces, including the palatal, buccal, and lingual areas, are polished to a smooth finish.
- Polish the occlusal surfaces, removing any remaining roughness that could lead to discomfort or wear on the opposing natural teeth.[13]

6. Final Evaluation and Adjustments

After completing the trimming and polishing steps, the denture should be evaluated in the patient's mouth. This ensures that the fit, comfort, and function are optimal.

Procedure

- Check the fit of the denture in the mouth and make sure that it is stable, with no movement when the patient speaks or chews.
- Evaluate the occlusion and ensure that it provides proper contact between the upper and lower arches.
- Perform any minor adjustments as necessary, particularly to improve comfort or fit.
- Once satisfied with the adjustments, the denture should be polished again for a final smooth surface.[11]

Challenges in Trimming Complete Dentures

Trimming complete dentures can present several challenges, including

1. **Over-trimming or Under-trimming:** Improper trimming can result in a poor fit, loss of retention, or discomfort. Over-trimming can lead to instability, while under-trimming can cause the denture to remain bulky and ill-fitting.[6]
2. **Tissue Trauma:** Inadequate trimming of the denture borders can cause irritation or pressure sores on the oral mucosa. This is a common complication that requires further clinical adjustment.[5]
3. **Maintaining Proper Occlusion:** Achieving an optimal occlusion is often challenging, particularly in cases with significant jaw alignment issues. Careful attention is required to balance the occlusal surfaces while preserving both aesthetics and function.[2]
4. **Material Challenges:** The material used for complete dentures, typically acrylic resin, can be difficult to trim precisely without causing damage or excessive wear to the surface. Additionally, variations in material quality can affect the ease of trimming.[4]

Advancements in Denture Trimming

Recent advancements in denture trimming have introduced new materials and techniques aimed at improving the accuracy, efficiency, and ease of the trimming process. These include:

1. **CAD/CAM Technology:** The integration of computer-aided design and computer-aided manufacturing (CAD/CAM) technologies has significantly improved the precision and reproducibility of denture fabrication. These technologies allow for more accurate and consistent trimming.[5]

2. **Laser Trimming:** Laser technology is being explored for denture trimming, offering high precision with minimal heat generation, reducing the risk of material distortion.[6]
3. **Use of Digital Impressions:** Digital impressions and 3D printing technologies offer the potential for more efficient fabrication and trimming processes, with less reliance on manual techniques.[8]

Clinical Considerations

When trimming complete dentures in the clinical setting, several factors must be considered:

- **Patient Feedback:** The dentist should monitor the patient's comfort during the trial stages and make any necessary adjustments to improve fit, function, and aesthetics.[7]
- **Follow-Up Appointments:** After initial trimming and fitting, follow-up appointments are crucial to ensure that the patient's adaptation to the denture is progressing well, and further adjustments can be made if necessary.[4]
- **Long-Term Care:** Dentures may require periodic adjustments as the oral tissues change over time, necessitating re-trimming for a proper fit.[2]

CONCLUSION

Trimming, finishing, and polishing are essential steps in ensuring the overall quality of complete dentures, directly impacting their fit, comfort, and appearance. By carefully refining each stage of the process, dental professionals can minimize issues like poor fit and irritation. With the integration of advanced technologies such as CAD/CAM and laser trimming, the accuracy and efficiency of these procedures continue to improve, resulting in better patient outcomes. As research and innovation in denture fabrication progress, these practices will continue to enhance both the art and science behind creating optimal dental prostheses.

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