



Blending Material and Realism: Internal Denture Characterization for Melanin Pigmentation- An Innovative Technique

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ABSTRACT:

In partially edentulous patients, achieving a natural and harmonious appearance between the prosthesis and the existing natural dentition is often challenging. This difficulty is particularly evident when fabricating a single complete denture opposing natural teeth exhibiting melanin pigmentation. While characterization in complete dentures allows for uniform gingival tone and symmetry, matching the internal characterization of a single denture to blend seamlessly with the surrounding natural tissues and pigmentation presents a far greater aesthetic challenge.

The denture's appearance largely depends on two essential components - the denture teeth and the supporting denture base. Although function and comfort can be predictably restored through conventional techniques, replicating the complex variations in color, translucency, and texture seen in naturally pigmented tissues requires advanced artistic and technical precision. Proper internal characterization enhances the realism of the prosthesis and contributes significantly to patient satisfaction and psychological confidence.

This paper describes a simple and novel laboratory method in which acrylic stains and absorbent tissue paper are embedded into the heat-cured resin during the packing phase to create internal characterization of the denture. This method enables the reproduction of natural melanin pigmentation within the denture base, providing a durable, economical, and aesthetically enhanced outcome that closely mimics the opposing natural dentition.

1. INTRODUCTION:

Denture characterization refers to altering the shape and shade of the denture base and prosthetic teeth to enhance their natural and lifelike appearance.^[1] Prosthodontists aim not only to restore lost teeth and adjacent soft tissues but also to address patient expectations regarding

function, esthetics, and financial considerations. By applying characterization techniques, dentures can be made to resemble natural oral tissues more closely, resulting in improved esthetics and patient satisfaction.^[2]



Hardy stated that for dentures to appear natural, the artificial teeth should closely replicate the patient's original dentition. Frush and Fisher further highlighted that the surrounding tissue representation is just as significant as the teeth themselves, indicating that both the denture teeth and the denture base contribute equally to the final esthetic outcome and patient satisfaction.^[3] Enhancing the denture base with characterization techniques improves the lifelike appearance of the prosthesis, positively influences the patient's confidence, and promotes better social acceptance of the denture.^[4]

Various methods for denture characterization have been documented in the literature, including the brush-on technique, the use of pigment-impregnated polymer-monomer combinations during denture packing, custom pigmented veneers. However, these techniques often demand above-average technical expertise to achieve optimal results.^[5]

The current procedure incorporates the use of absorbent tissue paper as a component of the denture characterization process. Its primary function is to retain acrylic stains within the denture base, thereby achieving the desired level of characterization and enhancing the prostheses natural appearance.

2. TECHNIQUE:

1. The waxed-up prosthesis was tried in the patient's mouth to confirm proper fit and overall esthetics. The patient was allowed to evaluate the esthetics, and the procedure continued only after their consent was obtained upon satisfaction. (Fig.1)



Figure 1: Trial of Waxed Denture

2. A piece of tissue paper was secured over the labial and buccal areas of the wax pattern and sculpted to resemble the natural gingival scalloping seen around tooth margins (Fig. 2)



Figure 2: Waxed denture with a tissue paper strip positioned in place.

3. Acrylic pigments were brushed onto the tissue strip positioned over the labial and buccal gingival regions of the denture, replicating the patient's natural melanotic pigmentation on the mandibular gingiva (Fig. 3)



Figure 3: Painted Tissue Paper Representing Melanin Pigmentation

4. The stained tissue paper strip was gently lifted and removed from the waxed denture.

5. Flasking and dewaxing were carried out conventionally, followed by the application of a separating medium to the mold.

6. The stained tissue paper was gently positioned and adapted onto the labial and buccal gingival areas within the mold space. Once its fit and adaptation were confirmed, the tissue paper was carefully removed to proceed with the subsequent steps of the processing procedure. (Fig.4)



Figure 4: Stained tissue paper adapted within the mold space

7. A thin layer of the heat-cured acrylic denture base resin was carefully adapted over the mold's labial and buccal gingival regions (Fig. 5)



Figure 5: Adaptation of a thin layer of heat-cure acrylic resin dough over the mold surface.

8. The stained tissue paper strip was positioned over the resin layer and gently adapted to the mold and around the cervical areas of the acrylic teeth using a brush (Fig. 6)



Figure 6: Tissue paper strip with applied stains positioned inside the mold

9. The remaining portion of the mold was then packed with heat-cure denture base resin dough, and the flask was closed under vacuum pressure.

10. After curing, the denture was removed from the flask, followed by conventional finishing and polishing procedures (Fig. 7)



Figure 7: Characterized final Prosthesis

DISCUSSION:

The characterization of a complete denture can be achieved in two main ways:

1. By carefully choosing, positioning, and modifying the artificial teeth.
2. By adding color or stains to the denture base

In 1951, Pound introduced the concept of colouring acrylic denture bases. His technique accounted for variations in gingival shade among individuals and across racial groups, enhancing the natural appearance of dentures. [6,7]

Kemnitzer reproduced gingival melanotic pigmentation by applying a blend of blue and brown staining materials. Dirksen suggested incorporating plastic veneers with stippling on the labial and buccal denture surfaces, which reduces surface shine and light reflection on the polished flanges, ultimately improving the natural and aesthetic appearance of the prosthesis. [3]

The advantages of this technique lie in its ability to achieve natural-looking gingival characterization while preserving the functional integrity of the denture base. Incorporating acrylic stains during the packing stage ensures that the pigmentation is deeply embedded within the denture base resin. This internal integration prevents the stains from being removed or faded during finishing and polishing procedures, ensuring long-term aesthetic durability. The use of absorbent tissue paper as a carrier allows precise control over the distribution and intensity



of the stains, maintaining their pattern and reducing unwanted colour dispersion. Importantly, after being enclosed in the resin, the tissue paper cannot be seen and does not alter the denture's appearance or function because it remains completely protected from contact with oral fluids. As a result, the embedded material retains its form and function over time. Collectively, this technique enhances the esthetic appeal of the prosthesis while maintaining its structural integrity and biocompatibility.

CONCLUSION:

Denture characterization is essential in treatment planning, enhancing speech, aesthetics, and providing psychological and social benefits. Meeting patient expectations through personalized prosthesis design improves satisfaction and self-esteem. The internal characterization technique using tissue paper and acrylic stains during the packing stage allows deep pigment integration within the denture base. This prevents stain loss during finishing, maintains colour integrity, and minimizes spread. It ensures natural gingival appearance while preserving material stability. The method results in lifelike, durable, and patient-centered prostheses, offering both functional and esthetic success in complete denture fabrication.

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