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TIPS FROM OUR READERS

Gingival characterization for digitally assisted denture fabrication

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The advancements in digital technology and the evolution of 3-dimensional (3D) additive manufacturing dental materials have significantly transformed the fabrication of complete dentures.[1] The use of 3D printing for complete dentures allows for precise and efficient manufacturing, with an increasing number of complete dentures being produced directly in the dental office. This in-house production provides clinicians with greater control over the workflow, reduces turnaround time, and offers a cost-effective solution for edentulous patients.[2,3]

A challenge with this approach remains the esthetic characterization of the gingival denture base, a critical element for achieving natural integration with surrounding tissues and meeting a patient's esthetic expectations.[4,5] Traditional techniques such as the use of colored composite resins and specific stains have been reported to be effective but are often complex and require specialized skills, making them less practical for in-office application.[6–11]

As the trend toward in-house denture fabrication grows, there is an urgent need for simplified, reproducible protocols that can be efficiently implemented in a clinical setting without compromising esthetic quality. This article introduces a practical technique for gingival characterization tailored to the in-office production of digitally fabricated dentures. This approach enables clinicians to deliver personalized esthetic solutions, enhancing the acceptance of complete dentures while improving the quality of life for edentulous patients.

TECHNIQUE

1. Apply a light-polymerizing resin primer (SR Connect; Ivoclar AG) to the gingival surface of the denture. This conditioner ensures proper bonding between the denture base material and the laboratory composite used for the characterization. It is important to apply the primer evenly across the gingival area in a thin layer to create a uniform bonding surface without excess material.
2. Recreate root elevations on the gingival surface using a laboratory resin (SR Nexco shade A1; Ivoclar AG). Apply the resin composite incrementally to build up the root elevations by carefully following the natural contours of the roots. Light polymerize each layer using a light-emitting diode (LED) polymerization unit (Valo Grand; Ultradent Products, Inc) for 20 seconds at each point, with overlapping light coverage to ensure complete polymerization. This step adds depth and realism to the gingival structure, contributing to the esthetic integration of the denture (Figs. 1, 2).
3. Fill the interdental spaces using the same laboratory resin composite (SR Nexco shade G2; Ivoclar AG). Do this incrementally to avoid overfilling, with each increment light polymerized as described in the previous step. Accurate contouring of the interdental spaces enhances the natural appearance of the gingiva, creating a seamless transition between the root elevations.

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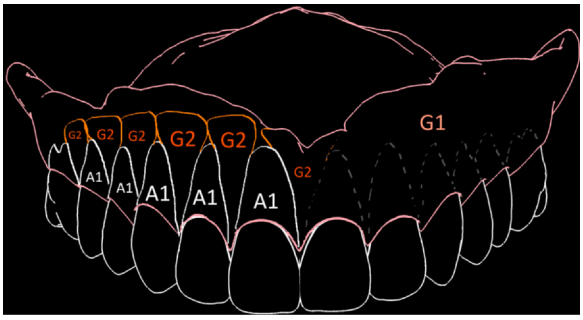

Figure 1. Mapping for gingival characterization with simulated root elevation and interdental space.

Figure 2. Application of A1 resin to root area.

4. Cover the entire buccal surface of the denture with a thin homogeneous layer of laboratory composite resin (SR Nexco shade G1; Ivoclar AG). Spread this layer evenly to avoid thickness variations and light polymerize thoroughly to ensure durability and proper bonding. This step unifies the gingival tones and creates a smooth, polished base for the definitive prosthesis.
5. Place the denture in a laboratory ultraviolet light-polymerizing (Lumamat 100; Ivoclar AG) unit for 20 minutes to ensure complete polymerization. This step strengthens the resin, enhancing its durability and resistance to wear.
6. Finish and polish the denture surface using a polishing compound (Polycril; MDC Dental). Use fine-grit polishing tools to remove irregularities and progress to finer compounds to achieve a high-gloss finish. This final step enhances the esthetic appeal and ensures that the prosthesis is smooth and comfortable for the patient (Fig. 3).

Figure 3. Definitive prosthesis with natural gingival effects.

CONCLUSIONS

The simplified technique for gingival characterization introduced in this article demonstrates a practical and efficient approach to enhancing the esthetics of digitally fabricated dentures. By leveraging modern materials and streamlined workflows, this method addresses the challenges of in-office denture production while achieving natural-looking results that meet patient expectations. The use of compatible materials, such as laboratory composite resins and light-polymerizing resin primers, ensures strong bonding and durability, while the incorporation of root elevations, interdental contouring, and gingival shading enhances the overall esthetic integration. This protocol not only simplifies the process but also provides clinicians with a reproducible solution to improve the acceptance and functionality of complete dentures, thereby restoring patient quality of life.

ETHICS

We further confirm that any aspect of the work covered in this manuscript that has involved human patients has been conducted with the ethical approval of all relevant bodies and that such approvals are acknowledged within the manuscript.

INTELLECTUAL PROPERTY

We confirm that we have given due consideration to the protection of intellectual property associated with this work and that there are no impediments to publication, including the timing of publication, with respect to intellectual property. In so doing we confirm that we have

followed the regulations of our institutions concerning intellectual property.

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