A Simplified Technique to Duplicate a Denture for an Implant Surgical Guide

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Abstract: A complete denture, worn and validated by a patient, constitutes a reference for evaluating the implant treatment feasibility for implant-retained overdentures. The use of a complete denture duplicate as a radiographic guide or surgical template is described in the literature. A simple technique is presented to make a duplicate of the patient's complete denture to plan and fabricate a maxillary implant-retained overdenture.

Key words: Implant Surgical Guide, Duplication of Denture.

INTRODUCTION

A duplicate of an existing prosthesis is often used as a surgical guide to assist in surgical placement of a dental implant. Various duplication methods have been described in the literature. Generally, the existing denture is evaluated and determined to be adequate for esthetics and function, embedded in an impression material, retrieved, and the space inside the mold is filled with an acrylic resin. The duplicate denture provides advantages over using the patient’s existing complete denture. First, the use of a duplicate removes the risk of altering or weakening the original denture when creating reference landmarks (drilling, grooves). Also, the original denture’s esthetic appearance and surface texture are preserved when radiopaque materials, such as gutta-percha or zinc oxide cement, which serve to indicate ideal implant locations, are used. Alternatively, a barium sulfate-based radiopaque duplicate enables visualization of the essential elements required for implant planning, directly from the radiographs.

A procedure for duplicating an existing interim removable partial denture (IRPD) using irreversible hydrocolloid impression material and a plastic container has been described.

PROCEDURE

1) Evaluate the existing IRPD for its use as a surgical template for implant placement, and clean the prosthesis in a stain-removing solution in an ultrasonic cleaner. (fig1)
2) Make a small hole in the bottom of a plastic container using tungsten carbide burs to assist in removing the hydrocolloid from the container after it sets. (fig2)
3) Mix irreversible hydrocolloid impression material to a fluid consistency using 1.5 times the amount of water recommended by the manufacturer, and pour the mixed material inside the plastic container, until the container is half full. Place the IRPD with the intaglio surface down into the hydrocolloid and allow the impression material to set. (fig3)
4) Apply a blast of compressed air into the hole at the bottom of the plastic container to separate and lift the body of hydrocolloid from the container. Cut 3 V-shaped index notches into the hydrocolloid in the premolar and distal areas using a surgical blade to permit orientation of the subsequent mold section, and coat with a thin layer of petroleum jelly. (fig4)
5) Attach 3 wax sprues, 1 inch tall, extending vertically from the denture base area. Place 1 sprue in the middle to introduce the duplicating material and the others on the distal of the denture base to vent air. Reorient the indexed hydrocolloid body into the then pour a second mix of the hydrocolloid to engage the indices and to cover the exposed denture surface to produce a mold of the prosthesis. Do not cover the sprues. Separate the mold from the container after the hydrocolloid sets. (fig5)
6) Gently separate the 2 halves of the hydrocolloid mold and retrieve the IRPD prosthesis and wax sprues from the mold. Reassemble the mold sections by matching the indices, and return the mold to the container. (fig6)
7) Mix clear autopolymerizing acrylic resin, and pour the acrylic resin into the mold through the sprue channel in the middle. The other channels allow the air to escape when the acrylic flows into the mold. Place the mold containing acrylic resin in the pressure pot in 37.8°C water at 25 psi for at least 10 minutes. Remove the mold from the plastic container, separate the 2 halves of the mold, and retrieve the duplicate denture.
8) Remove the acrylic sprues, finish, and polish the denture. Modify the duplicate denture as necessary to assist in surgical placement of the implants.

CONCLUSION

Clinical evaluation of prosthesis quality is essential for preoperative diagnosis and treatment planning. The duplicate denture provides advantages over using the patient’s existing complete denture. This duplicate serves 3 different functions. It can be used as a radiographic guide, surgical template, and custom tray adapted to the patient’s occlusion. Advantages of the technique described are twofold: it is cost effective and makes use of equipment and materials commonly found in dental practices.
DISCUSSION
A complete denture, worn and validated by a patient, constitutes a reference for evaluating the implant treatment feasibility for implant-retained overdentures. In clinical situations of partial edentulism, the surgical template is anchored to the remaining dentition to provide precision in the placement of the implants. The use of a complete denture duplicate as a radiographic guide or surgical template is described in the literature. Advantages of the technique described are twofold: it is cost effective and makes use of equipment and materials commonly found in dental practices. The duplicate denture provides advantages over using the patient's existing complete denture. It is easy to fabricate from materials commonly available in dental offices. Through the template, the previously determined emergence profiles and screw-access holes can be maintained. Clinical evaluation of prosthesis quality is essential for preoperative diagnosis and treatment planning. As a radiographic guide for highly resorbed arch, it allows selection of optimal implant sites while meeting prosthetic and anatomical requirements. As a surgical guide, it allows implant alignment along planned prosthetic axes during implant surgery and ensures good visual access for the surgeon.

REFERENCES

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LIST OF PHOTOGRAPHS

FIG 1 - Existing interim removable partial denture

FIG 2 - Plastic container with small hole in bottom

FIG 3 - IRPD prosthesis placed in irreversible hydrocolloid

FIG 4 - V-shaped index notches

FIG 5 - IRPD prosthesis placed in hydrocolloid with wax sprues attached

FIG 6 - Separated hydrocolloid molds