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A Method of Facilitating the Fabrication of Access Openings for Implant-Supported Complete Fixed Dental Prostheses

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Contents

Abstract 2

Technique 2

Discussion 5

Summary 5

References 6

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Abstract

This report describes a method for fabricating access openings for implant-supported complete fixed dental prostheses (ICFP) by using a dental milling machine and silicone putty matrix. The method can help clinicians achieve the accurate and precise fabrication of access openings for ICFPs without excessive grinding.

Implant-supported complete fixed dental prostheses (ICFPs) are successfully used to address problems found with complete removable dental prostheses such as instability and discomfort.[1, 2] However, one of the most common prosthetic complications has been the wear or fracture of acrylic resin teeth, requiring removal of the prosthesis for repair.[3, 4, 5, 6, 7, 8, 9] Priest et al[4] showed that fractured denture teeth or acrylic resin required repair 10 times in 5 patients. Purcell et al[5] reported that tooth fracture and wear required tooth replacement 20 times in 13 patients and that prosthesis removal led to an excessively large access opening. Inaccurate access opening fabrication could create a loss of occlusal contacts because of unnecessary or excessive grinding.

This article describes the precise fabrication of access openings for ICFPs by using a dental milling machine (AF 30; Nouvag AG) and a silicone putty matrix.

Technique

1. Adapt silicone (Aquasil EasyMix Putty Smart Wetting Impression Material; Dentsply Sirona) to the denture teeth after the tooth arrangement step and save the silicone matrix (Fig. 1).

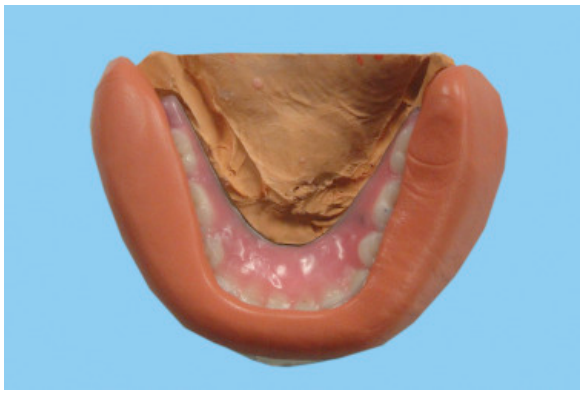

Figure 1. Adapted silicone matrix on denture teeth after tooth arrangement.

2. Remove a denture tooth and insert a guide pin (Guide Pin Multi-unit 20 mm; Nobel Biocare) in order to visualize the direction of the implant placement (Fig. 2).

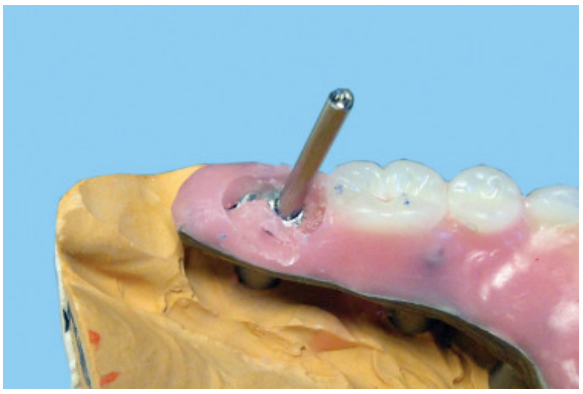

Figure 2. Guide pin inserted after removal of denture tooth.

3. Place the definitive cast on the table of a dental milling machine (AF 30; Nouvag AG) and insert a #6 round bur (H1.104.108; Komet USA) into the milling handpiece; then orient the table in order to make a guide pin parallel to the round bur (Fig. 3A). The round bur size is similar to the guide pin diameter (Fig. 3B).

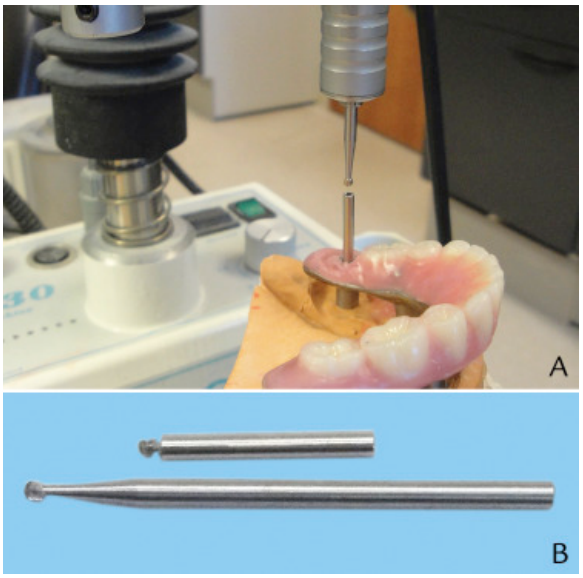

Figure 3. A, Orientation of table to make guide pin parallel to round bur direction. B, Similar size of round bur to guide pin diameter.

4. Without removing the definitive cast from the table, place the same denture tooth into the identical area by using the silicone matrix and stabilize the tooth with wax (Fig. 4A). The same bur direction is maintained during this procedure (Fig. 4B). Drill through the denture tooth to make an access opening (Fig. 4C).

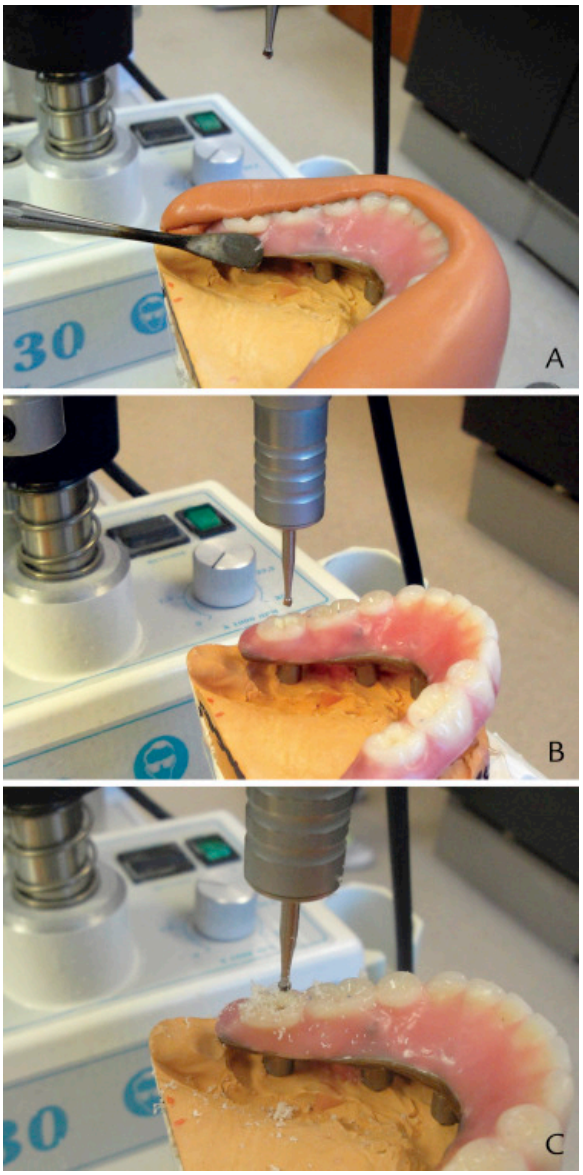

Figure 4. A, Same denture tooth placed into identical area with silicone matrix and wax. B, Maintained direction of bur after relocation of denture tooth. C, Drilling access opening through denture tooth.

5. Place a guide pin into the access opening though the denture tooth in order to verify the direction of the access opening (Fig. 5).

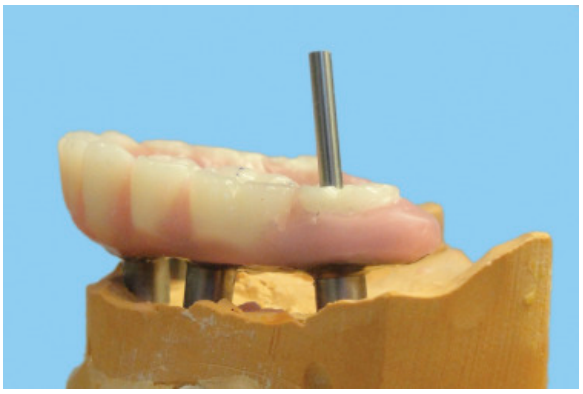

Figure 5. Verification with guide pin into access opening though denture tooth.

6. Repeat the other access openings using the same method. With this method, the precise opening though the denture teeth can be achieved without creating an excessively large opening (Fig. 6).

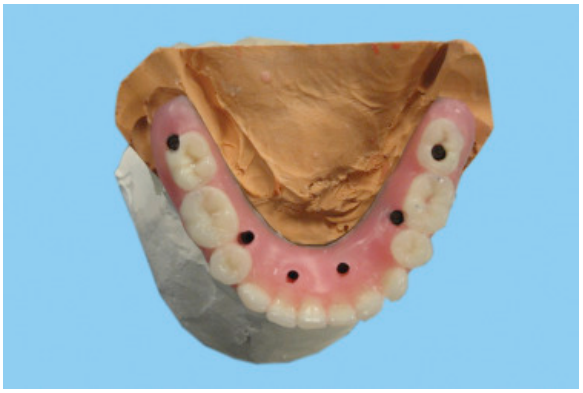

Figure 6. Access openings fabricated though denture teeth without excessive grinding.

Discussion

This article presents a method for fabricating accurate access openings for ICFPs, using a dental milling machine and silicone putty matrix.

The advantage of the method is the ability to reduce the grinding often observed with an arbitrary approach while producing an adequately sized access opening. Therefore, the method can reduce the potential fracture of the accessed denture teeth. One limitation of this technique is that the cast should be maintained in the exact same position during the whole procedure because the key to this method is the orientation of the attached bur and the cast. The cast should be secured on the milling table during grinding of the access hole. Another possible disadvantage of this technique would be the cost of the milling machine. However, this method will reduce the incidence of denture tooth fracture and chipping of ICFPs and expedite the access opening fabrication process.

Summary

A laboratory method of fabricating an accurate access opening for ICFPs by using both a dental milling machine and silicone putty matrix is described. The proposed technique not only improves the accuracy

and speed of making access openings but also reduces the chances of unnecessary or excessive grinding. This fabrication method will provide advantages to both clinicians and patients.

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