QUESTION 4

If I extract a tooth, can I use its crown as a pontic for a fixed prosthesis?

Background

onding an extracted crown in place was recommended to create an early form of resin-bonded prosthesis. Initially, composite resin was applied interproximally to temporarily secure the natural tooth pontic in place until healing could occur. The tooth would then be replaced by a more conventional restoration. In cases where an interim prosthesis is not available, use of the extracted crown is effective and expedient. Various factors, including the condition of the coronal portion of the extracted tooth, the condition of the neighbouring teeth (coronal and periodontal) and the ability to adequately isolate the region, are important considerations when deciding if this interim treatment modality is to be used.

For a longer-term restoration, the conventional bonded prosthesis (resin-bonded bridge or Maryland bridge) is an attractive option, in that it requires minimal tooth preparation and can be completed relatively quickly. The success of this type of restoration depends on adequate tooth preparation, adequate mechanical strength of the restoration control of the forces placed on the final restoration and proper cementation procedures during placement of the restoration. With the development of bonding methods and materials to connect metals, ceramics, composite resins and tooth structure to each other, the resin-bonded application is not only **Clinical Case**

A 70-year-old woman presented for dental treatment. After an extended assessment of vertical dimension, her posterior occlusion was restored with conventional porcelain-fused-to-metal restorations. The patient was concerned about re-creating the natural esthetics of her anterior teeth and asked whether a lingually based restoration could be fabricated to preserve the esthetics on the buccal surface of the anterior teeth. Minimal preparation of the lingual surfaces of the anterior teeth was performed, and lingual veneers with incisal coverage were fabricated (Empress, Ivoclar, Schaan, Lichtenstein) and bonded with a dual-cure composite resin cement (Nexus II, Kerr Corporation, Orange, Calif.) (Fig. 1).

Three years after placement of the original restorations, the root of the upper right central incisor was fractured while the patient was chewing on a popcorn kernel (Fig. 2). The root had to be removed, and replacement of the tooth was indicated. The patient was concerned about matching the shade and texture of a new restoration to the original (unrestored) buccal surface. The decision was made to use the natural crown and the lingual-veneered tooth as a pontic for the long-term restoration.

A lingual groove-and-slot preparation was created through the cingula of the lingual veneers of the maxillary anterior teeth. A deeper preparation

effective but can also be esthetically pleasing, long lasting and functional. Simply bonding the crown of a tooth in place interproximally may serve as a shortterm solution, but over time, this form of prosthesis will probably fail because of debonding and fracture.

This article presents a case in which a natural tooth crown was bonded to neighbouring teeth with the intention of its being used as a longer-term restoration.



Figure 1: Buccal view of incisal extensions of the lingual veneers, which were placed to maintain new vertical opening.



Figure 2: Radiograph of tooth 11 showing a horizontal root fracture.



Figure 3: Occlusal view of the lingual veneers, with a slot preparation and deeper preparation of tooth 11.



Figure 4: Metal frame cast so as to be short of all margins.



Figure 5: Metal frame laminated with porcelain to fit all margins; it is ready for cementation.



Figure 6: Tooth 11 after extraction, ready for bonding of the restoration.



Figure 7: The extracted crown connected to the metal frame, ready for bonding to the abutment teeth.



Figure 8: The prosthesis bonded in place; esthetics have been maintained.

into the fractured tooth allowed for more accurate indexing of the future prosthesis (Fig. 3). A polyether impression was made, and a nonprecious metal frame was fabricated (Press Alloy, Swiss NF, Toronto, Ont.). This frame was designed to be short of the prepared margins (Fig. 4). The frame was opaqued and waxed to create the ideal shape for the retainer (i.e., to fit the prepared channel) and porcelain was applied using the pressing method (SNF Press Ceram, Swiss NF) and finished (Fig. 5). This porcelain-fused-to-metal frame was tried in, the fit was assessed, and the ceramic portion was etched with hydrofluoric acid (Pulpdent Corp, Watertown, Mass.).

The region of tooth 11 was anesthetized, and the crown and root were extracted atraumatically; good hemostasis was achieved (Fig. 6). The crown portion was swabbed with 100% ethanol, and a composite resin plug was bonded to the underside of the crown to seal the internal chamber of the crown. The lingual surface of the crown (lingual ceramic veneer) was then etched with hydrofluoric acid for 5 minutes. The etched porcelain-fused-tometal frame was then silanated, as was the crown, and the 2 units were bonded together with a dualcure composite resin cement (Nexus II) (Fig. 7).

The anterior teeth were then isolated using a rubber dam. The prepared lingual surfaces were cleaned with pumice, rinsed and dried. The lingual veneered surfaces were etched with hydrofluoric acid, and both the new restoration and the intraoral veneers were treated with silane and cemented with C&B Metabond (Parkell, Farmingdale, N.Y.). Occlusion was verified, and oral hygiene instructions were given (Figs. 8–10).

Discussion

This report has described use of a natural tooth pontic in an esthetically demanding area. Using the natural tooth maintains the overall esthetics and makes it simpler to ensure the ideal contour and shade. However, there is some concern about the longevity of the shade. Hydration of this type of pontic is no different than for an endodontically treated tooth, and as such the colour should not change dramatically (Fig. 11). In the case described here, the design of the previous restoration



Figure 9: Occlusal view of the prosthesis in place.



Figure 10: Anterior periapical radiograph showing the restoration in place.



Figure 11: Follow-up photograph of the region 12 months after treatment, showing excellent healing and colour stability.

made it difficult to achieve an esthetically pleasing result, and use of the extracted crown solved many potential esthetic problems. When the tooth was extracted, the crown was shaped to create an ovate pontic and thus maintain gingival esthetics. Since both abutment teeth were periodontally sound, a fixed restoration was considered ideal.

In this case, a metal-based supporting structure strengthened the prosthesis and allowed for a longer-term restoration. The patient was also interested in minimizing the amount of metal that was visible once the restoration was positioned. This was accomplished by laminating the metal with porcelain using a pressing system to develop an accurate contour. A nonprecious metal was used because of its strength in thin section and the capacity for chemical and mechanical bonding to the alloy.

In conclusion, it is possible to use extracted teeth as pontics for either short-term or longterm restorations. Key elements are the addition of a metal supporting component, adequate tooth preparation and bonding of all materials to each other under isolated conditions (rubber dam).

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