Overdenture abutments for fixed partial dentures

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Despite universal acceptance for retaining endodontically treated and filled roots for vertical support of removable prostheses, there is little evidence for the use of overdenture abutments with fixed prostheses. This article presents a review of clinical situations for using these teeth to support fixed partial dentures. These teeth provide vertical support during function and preserve alveolar bone levels. (J Prosthet Dent 2000;84:366-9.)

The realization that removal of teeth results in bone loss and potential problems with removable prostheses has been a concern of dentistry for decades.[1-8] Efforts to delay consequential bone loss can be traced back to the 1850s and 1860s.[9-11] More recently, techniques for retention of endodontically treated and filled roots as abutments beneath removable partial dentures (tooth-supported dentures or overdentures) have become extremely popular.[12-16] Research with these techniques has confirmed the value of root retention for supporting removable partial dentures.[17-20] Removable overdenture techniques are taught in most dental schools in the US and Canada, but there is evidence that more exposure is needed to emphasize overdentures at predoctoral levels.[21]

Despite universal acceptance for retention of endodontically treated roots for support of removable prostheses, little has been published on overdenture abutment usage with fixed partial dentures (FPDs). This article reviews potential situations in which endodontically treated abutments can be used with FPDs and clinical techniques to accomplish this goal.

CLINICAL ASPECTS

The primary reason to consider use of an overdenture abutment with FPDs is a problem that would render the tooth unpredictable as an abutment for an FPD. However, the same abutment may be valuable for vertical support (Fig. 1). The patient may have an economic and/or psychologic commitment to retain the abutment. The dentist may be unwilling to risk success of a prosthesis on a questionable abutment but obligated to use a tooth/root to justify the patient's commitment to retain the abutment. The dentist is more willing to use the compromised abutment as an overdenture support because the force on the overdenture abutment is commonly minimal and primarily in a vertical direction. The chances of an abutment surviving the stress are greatly improved (Fig. 2).

Fig. 1. Radiograph of hemisected molar that has value for vertical support and bone retention, but weak abutment for FPD.

Fig. 2. A, Overdenture support in mandibular anterior region shows amalgam seal of endodontic access. **B,** Anterior FPD.

Furthermore, retention of a questionable root preserves bone in an edentulous space. If the abutment fails and the prosthesis is not dependent on this abut-

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Fig. 3. A, Compromised abutment with silver point endodontics used to support cantilevered FPD. **B,** Lingual view of abutment with domed-shaped cast coping. **C,** Tissue surface of pontic.

ment, the tooth can be easily removed without jeopardizing the prosthesis.

Examples of compromised abutments are as follows:

1. Endodontic. Endodontic compromises include incomplete fill, calcified canals, severely curved roots, silver point endodontics (Fig. 3), and possible root fracture. All of these complications render the abutment for FPD questionable, despite an asymptomatic abutment.

2. Restorative. Restorative complications include short roots, horizontal root fracture that requires extensive surgery to provide post buildup, inability to provide adequate post length for a post buildup, lack of adequate ferrule around a post buildup and long-span clinical situations (Fig. 4).

3. Root amputations. Hemisected molars are suitable candidates for FPD overdenture abutments because they are commonly too weak or too difficult to restore to use as a traditional FPD abutment. However, they provide reliable vertical support beneath an FPD (Fig. 1).

4. Cantilever prosthesis. A cantilevered prosthesis commonly places excessive stress on a retentive abutment. The angular stress is diminished (Fig. 3) if a weakened but sound overdenture abutment is used under a pontic as vertical support. Periodontal surgery to reduce the effects of periodontal disease often leaves an abutment severely compromised and thus a risky retentive abutment for an FPD. The osseous support may be sufficient for an overdenture abutment but not for an FPD. However, this periodontally weakened abutment can serve as vertical support for a prosthesis to maintain the bone support in a pontic space.

5. Implants. Implants are occasionally placed at such a severe angle that they are rendered useless as an FPD abutment. In these instances, it may be prudent to use the implant as an overdenture abutment to vertically support the FPD (Fig. 5).

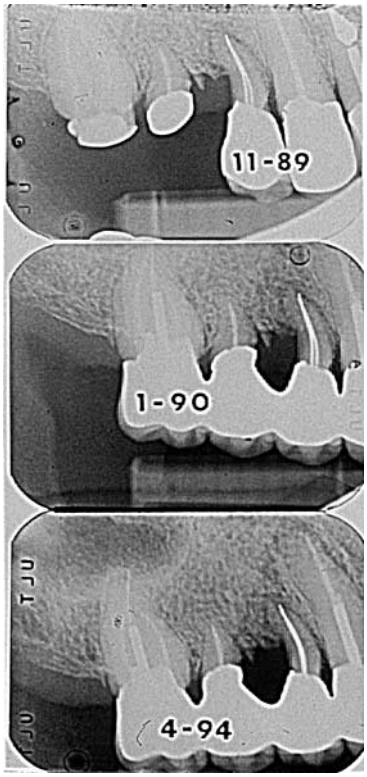

Fig. 4. Restored compromised tooth with short root and endodontic used for vertical support in long-span FPD.

TECHNICAL CONSIDERATIONS

Endodontics must be completed to use most roots as overdenture abutment. In many cases, endodontics have already been completed, either during initial therapy or many years before current prosthodontics. Dental caries has been a major problem associated with overdenture abutments for removable prostheses,[19] so it would appear that it could also be a problem with an FPD. It is recommended to place a metal coping on this abutment before construction of the FPD to reduce the potential for dental caries on the overdenture abutment. The coping should be dome shaped to provide vertical support for the prosthesis (Fig. 3, *B*). The teeth in the mandibular anterior area are small, so a cast metal coping may not be required. Amalgam to

Fig. 5. A, Implant with poor angulation of distal abutment. **B,** Master cast with dome-shaped healing cap on distal abutment that allowed this abutment as vertical support overdenture abutment. **C,** Screw-retained implant restoration with distal implant for vertical support.

Fig. 6. A, Lingual view of support abutment with domed-shaped cast coping. **B,** Facial view of pontic that rested on support abutment. **C,** Lingual view of pontic resting on support abutment. Note open access for oral hygiene.

Fig. 7. A, FPD after surgical removal of failed support abutment from beneath prosthesis. **B,** Composite addition to tissue surface of pontics. **C,** Radiograph of support abutment and FPD before and after removal of overdenture abutment.

seal the endodontic access is required if the coping is impractical (Fig. 2).

The design of the surface of a pontic that overlays an overdenture abutment should be taken into consideration to realize esthetic concerns of the patient, especially the facial surface. The gingival margin is covered 1 to 2 mm short of the lingual surface. Pontic design is concave and embrasure spaces should reflect access for oral hygiene (Fig. 6) and professional prophylactic care.[22] An interproximal brush is highly recommended for the overdenture abutment as well as retentive abutments.[23]

COMPLICATIONS

The rarest complication arises when an overdenture abutment must be removed from under the FPD. When surgical removal is required, removal of an overdenture root is accomplished without damage to the FPD (Fig. 7). The space between the pontic and the now healed edentulous ridge needs to be attended (Fig. 7). This can be accomplished with mechanical retention in the metal tissue surface of the pontic and careful placement of composite to form a completed modified-ridge-lap pontic. Another potential complication is the development of dental caries at the margin

of a metal coping on an overdenture abutment. This can be repaired with uncomplicated restorative procedures.

SUMMARY

Clinical indications for inclusion of an overdenture abutment with an FPD were reviewed. In addition, technical considerations were described and potential complications were acknowledged.

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