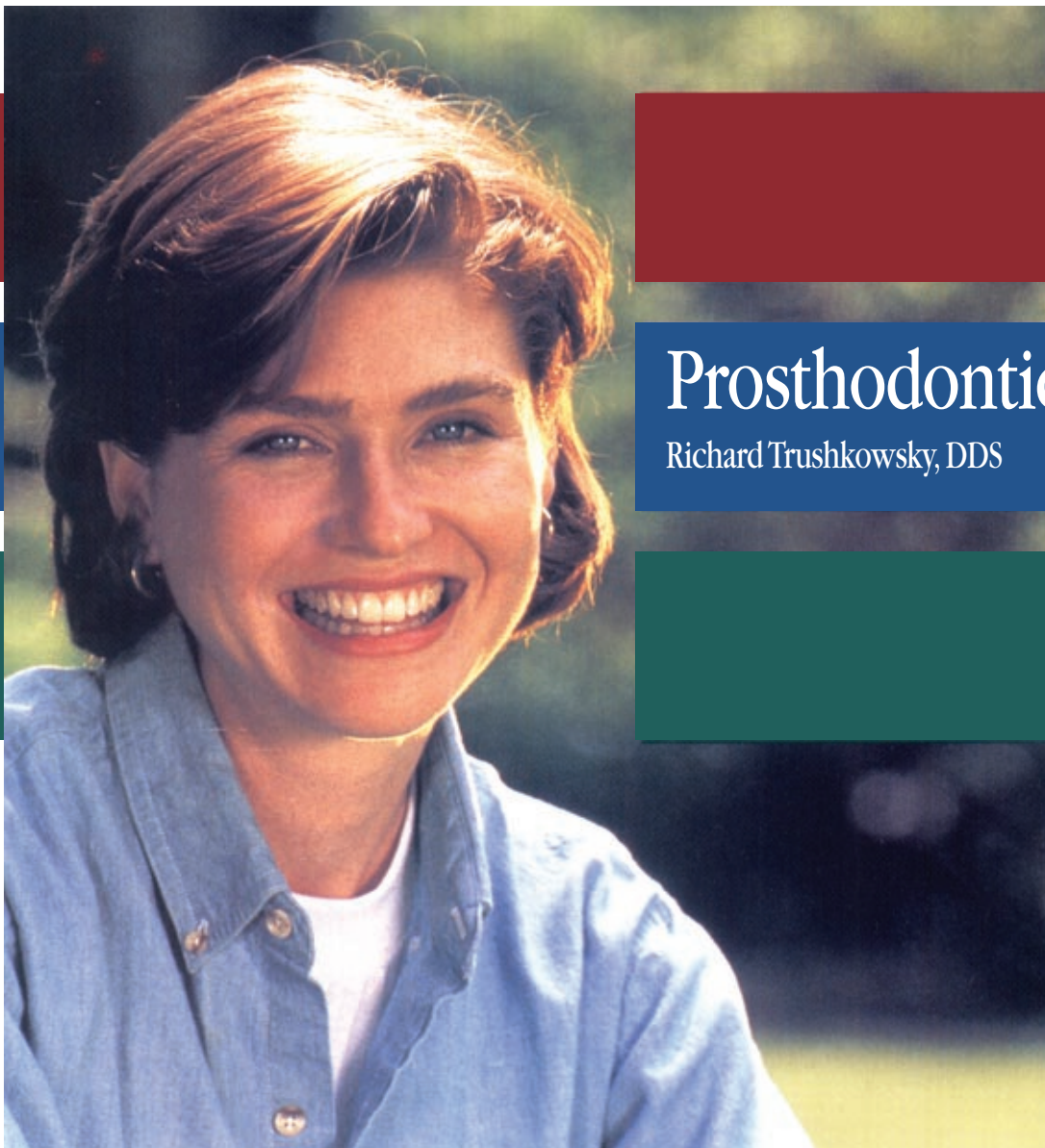


DIALOGUES

IN *Esthetic* DENTISTRY™



Prosthodontics

Richard Trushkowsky, DDS

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Prosthodontics

FACILITATING THE TRANSITION TO A FULL DENTURE WITH ERA[®] ATTACHMENTS

An overdenture has been described as “a removable partial or complete denture that covers and rests on one or more remaining natural teeth, the roots of natural teeth, and/or dental implant.”¹ It can also be called an overlay denture, overlay prosthesis, or superimposed prosthesis.¹ The literature contains ample evidence to demonstrate the biomechanical advantage of overdentures vs extraction and conventional dentures.²

Tooth loss usually results in gradual increases in bone loss. This loss of supporting bone combined with the reduced manual dexterity of the elderly patient creates a dental challenge for the patient.

An overdenture allows the patient to retain teeth that would not be able to support a conventional prosthesis. Retention of the remaining teeth is accomplished by reducing the coronal height of the teeth and improving the crown-to-root ratio, which reduces torque on the supporting teeth, resulting in increased life expectancy for these teeth. Retention of the natural teeth will retard the resorption of the ridge, thereby increasing retention and stability of the prosthesis.³

However, the retention of roots alone will do little to improve the retention of overdentures. A variety of attachments, which can be resilient or nonre-

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➤ **Figure 1**—All of the patient's remaining teeth, except two premolars, will be extracted after the anterior bridge is sectioned.



➤ **Figure 3**—From left to right: spade drill, pilot drill with plastic reference ring, and countersink drill.



➤ **Figure 2**—Stainless steel female attachments are available in a variety of post angles.



➤ **Figure 4**—Plastic handles placed in female attachments to demonstrate parallelism.

silient,⁴ are available to improve overdenture retention for both remaining roots and implants. Resilient attachments provide some vertical and rotational movement of the denture base, which allows for distribution of occlusal forces between the abutments and the edentulous ridge. There are distinct advantages and disadvantages to various attachments, including the cost, ease of replacement, and degree of stabilization. The attachment that provides adequate func-

tion for the patient depends on the medical history, clinical and radiographic examination, and mounted study casts.⁵

Case Report

The patient, a 64-year-old woman, had

her remaining maxillary teeth (Nos. 6 and 11) removed several years ago and a complete denture fabricated. The roots of teeth Nos. 6 and 11 had been maintained without attachments, and most of the remaining mandibular teeth had severe periodontal involvement (Figure 1). The patient had two fixed bridges on teeth Nos. 18 through 20 and teeth Nos. 22 through 27, however, because of severe bone loss, support could not be provided for a future restoration. Several options were considered: a complete lower denture, a Cu-Sil[®] denture, an implant-supported overdenture, or a conventional overdenture with two attachments (Stern ERA^{®b}) in the premolar region. The latter option was selected because, with reduced crown-to-root ratio, these attachments could support a denture.

Satisfying the esthetic needs of the pa-

^a Regent Labs, Inc, Deerfield Beach, FL 33442

^b Sterngold-Attachments, Attleboro, MA 02703

tient required removal of the posterior teeth distal to the first bicuspid. An interim immediate overdenture allowed the remaining teeth to be extracted and provided for the insertion of an esthetic provisional. An implant-supported overdenture can be fabricated in a similar manner and could eventually be converted to a fixed restoration.

Endodontic treatment was completed on tooth No. 21, treatment on tooth No. 29 had been completed previously, and teeth Nos. 22 and 27 were extracted with the bridge pontics. Teeth Nos. 21 and 29 were reduced in height to 1 mm supra-gingival. The immediate complete denture was inserted with the proper jaw relationship and required base extension.

The Stern ERA[®] overdenture attachment was selected because of its resiliency, retention, low cost, and because the parts are easily available when wear decreases retention. The female sections of the overdenture attachment are available in two designs: (1) a plastic pattern that is incorporated into the wax pattern for a post-and-root cast coping and cast in a hard alloy; (2) the Stern ERA[®] direct-placement overdenture attachment is manufactured in surgical stainless steel and is cemented into the prepared root following the manufacturer's instructions. The laboratory uses a metal jig to incorporate the male attachments into the acrylic denture base.

Placing Female Attachments

The stainless steel female attachments are available in 2 post diameters (1.3 mm and 1.7 mm) and 4 post angles (0, 5, 11 and 17 degrees) (Figure 2). The direct-placement female attachments are coated with titanium nitride. The attachments come in a retentive device that is available in a variety of resistances to movement.

Color-coding indicated the degree of retention from light to heavy (white, orange, blue, and gray, respectively). The male attachment is 2.6 mm in height and has 0.4 mm of vertical resiliency. The laboratory positions the attachment using a black-fabrication component with a built-in spacer. The metal housing for ERA[®] attachments provides a more durable receptacle for the nylon male attachment and reduces the chance of



➤ **Figure 5**—Orange male attachment in denture provides resilient attachment



➤ **Figure 6**—From left to right: coring bur and seating tool, used to change male attachment.

acrylic fracture caused by limited attachment space. The metal jackets come pre-loaded with black-fabrication male attachments, which are removed on insertion. Then the attachments with the appropriate degree of retention are inserted. Adequate retention for patient comfort without undue stress on the remaining root structure determines the degree of retention used.

The crowns of the premolar are amputated so that the root surface is 1 mm from the gingival margin.⁶ If the roots are divergent, the overdenture surface should be modified so that the roots are perpendicular to the path of insertion. The special spade drill provided in the starter kit is used to remove the desired amount of gutta-percha (Figure 3). The plastic depth reference ring is set on the pilot drill to a depth slightly exceeding the length of the final post (Figure 3). If needed, the post can be shortened. The canal is sized with the pilot drill. The alignment of this initial preparation will follow the direction of the canal. Using angled attachments can rectify the divergence of angled roots.

Countersink the root surface with the countersink drill to a depth that is equal to the thickness of the collar of the drill. The depth of the countersink will vary depending on the angle between the root surface and the canal preparation. The countersink depth should be minimal at the high point, and the top surface of the final base would remain above the root surface, so that the nylon male attachment can snap in without interference.

If necessary, the full depth of the original canal preparation can be reestab-

lished. The plastic handles are placed into the 0-degree female attachments and then positioned into the preparations. Approximate parallelism should be verified at this time (Figure 4).

If the plastic handles are not parallel, an angled abutment should be chosen to bring the attachments into alignment. The female attachments are rotated in the abutment until approximate parallelism is achieved. If an angled attachment is used, a small index mark should be made on the female attachment and on the

root surface. This allows the female attachment to be returned to the same position during cementation. The plastic handles in the female attachments can also be used to verify parallelism. The direct female attachments are luted into position with composite cement (ERA[®] lock cement[®]).

Placing Male Attachments

The laboratory can create a space for a pick-up of the black fabrication male attachments in the processing model. Over each coping that has been created by the laboratory, a lingual window should be prepared into the recess created in the acrylic denture. A black fabricating male attachment is then snapped into each female attachment. (The remaining exposed root is blocked out so that when the self-cured acrylic is added and cured it will not contact the root. This small space allows for the resilient function of the attachment.)

The overdenture is seated to verify

Resilient attachments provide some vertical and rotational movement of the denture base, which allows for distribution of occlusal forces between the abutments and the edentulous ridge.



► **Figure 7**—Denture after insertion and snapped into position.



► **Figure 8**—After the cast-root coping is fabricated, it is luted into position.

that it is not touching the root or the black-fabricating female attachment; a self-cure or a dual-cure acrylic resin is then placed over the tops and sides of the attachment. The external retention ridge on the outside of the cylindrical housing of each male attachment should be covered with resin. The recesses in the overdenture are filled, and the prosthesis is seated back in the mouth. While the acrylic is curing, the patient should be in light occlusion. The black-fabricating male attachments are replaced with an orange male attachment (Figure 5). A special bur is used to core out the black male attachment, and a blade is then used to remove the remainder (Figure 6). The new male attachment can be snapped into position in the metal housing with a seating tool (Figure 6). Occlusion is verified in centric relation and lateral and protrusive excursions. After the extension of the borders is verified, the denture can be polished and given to the patient for insertion (Figure 7). The clinician should demonstrate appropriate insertion and removal techniques for the patient.

The laboratory also can insert the male attachments with a processing jig. An alternative is to prepare the teeth for the female attachments, place a plastic burn-out post in the prepared canals, and take a pick-up impression. A plastic female pattern is used, which becomes part of a cast-root coping, seen here in a different case (Figure 8).

Discussion

Edentulism results in loss of tooth proprioception, progressive alveolar bone loss, the transfer of all occlusal forces

from the teeth to the oral mucosa, and esthetic deficiencies. The use of an overdenture provides simplicity of construction, ease of maintenance, stability, retention, stabilization of existing structures, less trauma to the supporting tissues (as a result of distribution of forces), esthetic excellence, good patient response, and can serve as a transitional appliance toward a full or implant-supported denture. Overdentures should be recommended only if another method of treatment will not provide a satisfactory result.

Edentulism results in loss of tooth proprioception, progressive alveolar bone loss, the transfer of all occlusal forces from the teeth to the oral mucosa, and esthetic deficiencies.

The Stern ERA® attachments provide simple and effective retention, using a variety of color-coded retention attachments. When necessary, these attachments can be easily removed or replaced. The Stern ERA® male attachments, mechanically anchored in the denture base, provide vertical resiliency and universal hinge movement. Worn male attachments can be removed

from the metal housing with a special bur, and a new attachment can be snapped into place. Male attachments have a approximate 3-year life span.

Teeth that normally would be removed for routine restorations may have an excellent prognosis when used for an overdenture. Proprioception is not entirely lost and tactile sensory perceptions to masticatory forces prevent occlusal overload. Psychological trauma resulting from complete tooth loss can be relieved or greatly reduced by providing an overdenture.⁷⁻⁹ ■

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