The prescription of conventional full dentures has long been a treatment of last resort. The pressure exerted to the edentulous ridge by complete dentures can cause severe resorption resulting in severe loss of function.

For more than a century, it has been known that the preservation of root structure can prevent or at least delay ridge atrophy. Literature describing the overdenture concept dates back to 1856 (Dr. Ledger, UK).

To add retention, stud type connectors were incorporated into the design of root cap copings. As with modern stud type attachments, one element was connected to the root while the corresponding retentive element was fixed into the removal appliance.

An overdenture is now defined as a restoration that covers at least one root or implant. Implants may be viewed as artificial roots.

Periodontally compromised teeth are often too weak to support a partial denture for the long term. The large crown to root ratio created by periodontal disease results in forces that can gradually extract the remaining teeth. Fig. 1

Reduction of the clinical crown creates a more favorable crown to root ratio to compensate for progressive bone loss. Shorter overdenture attachments have an obvious advantage in this regard. Fig. 2

Today, a multitude of stud type overdenture attachments exist in different types and sizes. The selection of a specific attachment can seem overwhelming at first, but is basically a process of elimination. The selection process is simplified once the basic considerations are evaluated.

**BASIC CONSIDERATIONS**

**Location: Radicular, Intraradicular:**

Stud type attachments may be positioned over the root/implant (radicular) or in the root/implant abutment (intraradicular) Fig. 3. Examples of an intraradicular attachment include the original Roach attachment, Zest and the Swiss Logic. Radicular attachments include the Dalla Bona, Rothermann, ORS, Uni-Anchor, Magnets, and O-Rings, etc.

**Function: Solid/Rigid, Resilient:**

To redirect occlusal stresses, stud type attachments are designed to be either solid/rigid or resilient. A solid attachment allows no movement between the male and female elements. This feature transfers stress towards the roots/implants and away from the ridge. The movement allowed by a resilient attachment transfers stress away from the roots/implants and towards the tissue. Fig. 4. For this reason, resilient attachments are selected much more frequently than solid attachments in the U.S. Many attachments such as the Rothermann, Dalla Bona, Ceka or Swiss Anchor, etc, are available in a solid and a resilient version.

**Retention:**

Frictional, Mechanical, Magnetic:

Retention can be created by friction, a mechanical undercut, magnetism, or suction. The vast majority of stud type attachments rely on mechanical retention. An exception is the solid Dalla Bona attachment with cylindrical parallel walls providing frictional retention.

**Space:**

Perhaps the most critical consideration for any attachment is the available space. When space is limited, a flat button type attachment such as a Rothermann should be considered.

**Direct or Indirect:**

Many overdenture attachments today are available in a direct or indirect version. A direct attachment is premanufactured in metal and does not require a laboratory casting. An indirect attachment is incorporated on or into a post and coping type casting.

**Cost:**

Finally, cost is always a factor. The cost of an attachment is dependent on the material composition and the complexity of the manufacturing.
Indirect Technique:
A middle-aged woman presented with teeth remaining in the #11 & #5 position and a root in the #6 position, (all teeth but molars remained on mandible). She was reluctant to lose the remaining teeth and was advised to have only the bicuspids extracted and the cuspids endodontically prepared to receive stud type attachments. Study models were articulated and a preliminary set-up was made to determine which stud type attachments would fit within the available space. Fig. 5.

Measurements verified that adequate space existed for ORS Plus attachments (order #99-443040 - includes analog). The O-Ring attachment was selected for its highly resilient function. The preliminary set-up was tried in to verify tooth position and esthetics Fig. 6. The cuspids were endodontically treated and reduced to the crest of the gingiva. Plastic impression pins were placed into the roots and were picked up in an impression. Fig. 7

Castable ORS males were luted to the post and coping wax-ups using the preliminary set-up as a guide Fig. 8. The castings were then cast in a hard noble alloy and finished Fig. 9. The sharp edge of the cast O-Ring copings were rounded slightly with a rubber wheel.

An open impression tray and acrylic transfer posts were fabricated over the ORS males to insure a positive seat during a pickup impression. Fig. 10. The transfer posts were pressed down while the impression material set. This prevents the cast males from shifting during the pickup impression. Fig. 11

The remaining bicuspids on the stone model were removed and final denture cuspids were set with the ORS retainer rings in place. The path of insertion selected for the ORS attachments followed that of the anterior tissue undercuts. Fig. 12

The set-up was flasked and boiled out in the conventional manner. ORS retainer rings with red processing O-Rings were positioned over the cast males to allow vertical resiliency, rubber latex block out material was applied as shown. Fig. 13

The acrylic was packed in a semi-soft state in one step without a trial pack. The case was processed and finished in the conventional manner. The red processing O-Rings were replaced by white final O-Rings.

Finally, the finished copings were cemented and the overdenture was seated. Figs. 14 & 15

Note: For complete preliminary protocol and more detailed instructions, refer to the Case History: Indirect Technique.
Direct Technique:

A male patient presenting with two remaining cuspids chose to receive treatment for an overdenture. The Uni-Anchor, a direct titanium version of the Dalla Bona attachment, was selected. Fig. 16.

Following endodontic treatment, the cusps were reduced creating a flat surface 90 degrees to the path of insertion. Fig. 17.

The canal was prepared progressively with a #700 Fisher bur, a #6 Round bur, and finally with a diamond sizing bur. Fig. 18.

The titanium male elements were cemented with a resin reinforced glass ionomer or composite resin cement. Fig. 19.

Recesses were created to provide adequate space for the Uni-Anchor female elements. Fig. 20.

The overdenture was then seated in light centric occlusion and the resin was allowed to set. The remaining female element was then incorporated similarly. Fig. 21.

Finally, the excess acrylic was finished and polished, purposely leaving the plastic PVC ring around the female elements.

The patient was instructed in the daily application of a topical 4% fluoride gel for preventative measure.

The retention of the Uni-Anchor or Dall Bona females may be adjusted with the activating and deactivating tools.

The overdenture was then tried in over the spacer rings and female elements in place to verify that sufficient space had been created.

A small vent hole was created and thin auto-cure resin was placed in one of the voids in the overdenture.

The Indirect or the Direct technique may also be followed for implant stud type overdentures. Fig. 22.

Acknowledgements
Case History - Indirect Method
James McKenna DDS
Palo Alto, Ca.
Brian Gintjee, CDT
San Mateo, CA
Case History - Direct Method
Daniel D. Epstein DDS
Brooklyn, NY

Implant Overdenture:
Steven Stanley DDS
Downey, CA

Products referenced
Case History - Indirect Method
Description Order Number
ORS Plus (includes analog) 99-443040
Case History - Direct Method
Description Order Number
Uni-Anchor Z-Type (1 complete) 99-451010
Uni-Anchor Straight Type (1 complete) 99-451020
Both include Male, Ti Female with Spacer and Analog.
Uni-Anchor Z-Type Kit #2 99-451002
Uni-Anchor Straight Kit #2 99-451052
Kit includes 2 complete attachments and all required tools and analogs

Activating Instrument 99-451017
Deactivating Instrument 99-451018

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Question: What is the recommended way to reline overdentures with attachments?

Answer: Following the reline impression, we recommend that the material is cut away surrounding the attachment Fig. A. Lab putty is then placed into the female attachment Fig. B. The model is fabricated and placed into the reline jig as usual Fig. C. The reline material is packed and processed leaving the putty in place. The putty is removed and the relined overdenture is finished as usual Fig. D. This technique avoids the use of jigs which can cause misalignments.

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