A Dual Impression Technique for Implant Overdentures

Sina Jannesar, DDS, MSc;[1] Hakimeh Siadat, DDS, MSc;[2] and Marzieh Alikhasi, DDS[3]

This article describes a technique for a two-stage selective pressure impression with a custom tray for implant-retained, tissue-supported overdentures.

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IN SOME aspects, such as force direction and distribution, implant-retained overdentures are similar to bilateral distal extension removable partial dentures (RPDs) (Kennedy Class I).[1] Occlusal forces on RPDs must be distributed uniformly to the supporting teeth and residual ridges. Some authors believe that the difference in the displaceability between teeth and residual ridges cannot be captured by a single impression procedure.[1,2] Dual impression techniques were introduced to produce a "corrected cast" whereby the teeth will be registered in their anatomic position and the residual ridge will be recorded in their functional form.[2-4] This can be used in implant-retained overdentures as well.

Two categories of dual impression techniques have been described in the literature. These are: (a) physiologic techniques and (b) selective pressure techniques.[2]

The physiologic impression techniques record the ridge portion in its functional form by placing an occlusal load on the impression tray during the impression procedure. Three physiologic impression techniques are: (a) McLean-Hindels method (i.e., recording the tissues of the residual ridge in the functional form using a custom tray and then making a dual impression using a stock tray), (b) functional reline impression technique (i.e., adapting a wax or metal spacer over the ridge on the cast before processing the denture base, replacing with light-bodied polysulfide rubber base during a reline impression that will be substituted with denture base material), and (c) fluid wax method (i.e., registering the residual ridge by painting the fluid wax on the tissue side of the impression tray).[2]

The selective pressure impression technique equalizes support between abutment teeth and soft tissue and directs the forces to the portions of the ridge that are most capable of tolerating the forces. This is accomplished by relieving the tray in some areas, while allowing the impression tray to contact the ridge in other areas. Greater soft tissue displacement will occur in areas where relief is not provided.[4,5]

This article describes a technique for a two-stage selective pressure impression technique using a custom tray for implant-retained overdentures. Although the technique is described in conjunction with the Straumann® Dental implant system, it can be applied when other implant systems are used as well.

Technique

1. Remove the healing caps, place diagnostic abutments (Institute Straumann AG, Waldenburg, Switzerland) into the implant

[1]*Assistant Professor, Department of Prosthodontics, School of Dentistry, Tabriz University of Medical Sciences, Tabriz, Iran*

[2]*Assistant Professor, Department of Prosthodontics, Implant and Dental Research, School of Dentistry, Tehran University of Medical Sciences, Tehran, Iran [Correction added after publication 23 April 2007: Dr. Siadat's title was amended to Assistant Professor.]*

[3]*Assistant Professor, Department of Prosthodontics, School of Dentistry, Hamedan University of Medical Sciences, Hamedan, Iran*

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Correspondence to: Hakimeh Siadat, Tehran University of Medical Sciences – Prosthodontics and Dental Implant, Tehran University of Medical Sciences, Tehran, 141555583, Iran, Tehran. E-mail: hsiadat@tums.ac.ir

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Figure 1. Diagnostic abutments on the implants.

Figure 2. Relieved abutments on diagnostic cast.

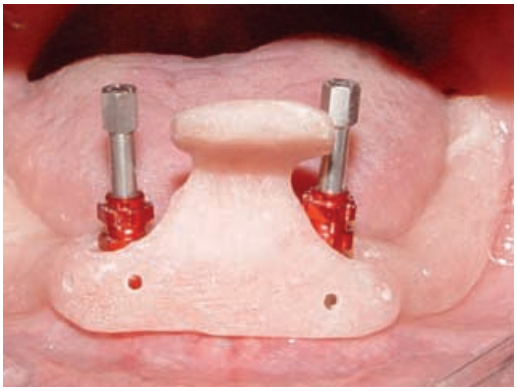

Figure 3. Custom tray in the mouth; note the holes in the anterior section.

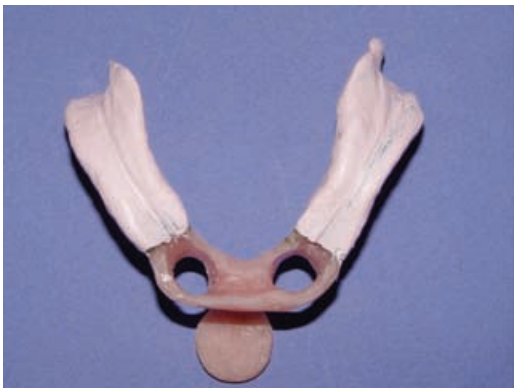

Figure 4. First stage impression with zinc oxide eugenol paste.

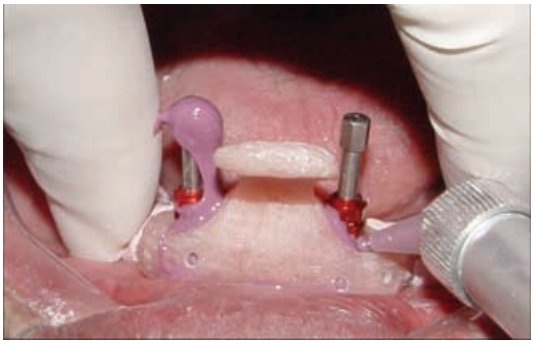

Figure 5. Injection of the second impression material into the holes.

Figure 6. Completed definitive impression with selected pressure technique.

fixtures, and make a preliminary impression with irreversible hydrocolloid impression material (Alginoplast, Heraeus Kulzer, South Bend, IN) (Fig 1).

2. Pour the diagnostic cast with Type III dental stone (Quickstone®, Whip Mix Corporation, Louisville, KY).
3. Relieve the residual ridge by adding a thin layer of melted baseplate wax (Truwax, Baseplate Wax, Dentsply International, York, PA) except on the primary stress bearing areas (i.e., buccal shelves).
4. Adapt one or two layers of baseplate wax (Detrey Division, Dentsply Limited, Weybridge, Surrey, England) on the abutments to

maintain the space for the elastomeric impression material (Fig 2).

5. Make a custom impression tray using autopolymerizing or light polymerizing acrylic resin material (GC, GC United Kingdom Ltd. Newport Pagnell, UK.). Use a carbide bur (Carbide bur 703, Mani Inc, Tochigi-Ken, Japan) to make holes on the anterior portion of the tray for injection of the elastomeric impression material (Fig 3).
6. Try-in the tray and border mold the tray distal to the abutments using a low-fusing (green or gray) modeling plastic impression compound (Impression Compound, Kerr, Salerno, Italy).
7. Make the impression of the residual ridge using zinc oxide eugenol paste (Luralite, Kerr) (Fig 4).
8. Remove any excess material that is extended into the abutment region.
9. Inject the elastomeric impression material (Impregum F, 3M ESPE, St. Paul, MN) through the holes to make the impression of the abutments while applying finger pressure to the distal portion of the tray (Fig 5). This will record the soft tissue of the residual ridge under pressure and the abutments in their anatomic position (Fig 6).

Discussion

Soft tissue displacement of distal extension residual ridges creates a challenge in removable prostheses. Several methods, such as the McLean-Hindels technique,[4] have been introduced to register underlying tissues under load in distal extension RPDs. They can be used in implant-retained overdentures.[5-7]

Gregory and Labarre introduced a two-step pick-up impression technique that uses a tray to make a conventional impression. Two holes are drilled in the tray the implant impression copings will pass through. The impression is seated in the mouth, and then the copings are attached to the tray by adding autopolymerizing acrylic resin;[6] however, there are some disadvantages to this method, including loss of impression details around the copings. In addition, extra clinical time is required for drilling the holes and splinting the implant copings with resin intraorally.[6]

Some articles suggest single anatomical impression procedures,[7] but use of the one-stage impression technique is not recommended for tooth-tissue supported RPDs, because different portions of the ridge vary in displaceability under functional loads.

Selective pressure impression techniques are introduced to register primary stress bearing areas under the load,[8] but need additional clinical time. Our technique uses a custom tray to make an accurate selective pressure impression in implant-retained overdentures in two stages. It saves material and chair time, and this technique can be used in both bar and ball attachment overdentures.

Summary

This modified dual impression technique uses a custom tray to make a selective pressure impression in two stages at the same appointment. The technique uses two impression materials that register the residual ridge under the load and record the implant abutments in their anatomic position. This method can be used for all implant systems.

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