Simplified Technique for Incorporating a Metal Mesh into Record Bases for Mandibular Implant Overdentures

Antonio Godoy, DDS, MS¹ & Sharon C. Siegel, DDS, MS²

¹Department of Prosthodontics, Nova Southeastern University, Davie, FL
²Health Professions Division, College of Dental Medicine, Nova Southeastern University Davie, FL

Keywords
Implant-retained overdenture; metal mesh; complete dentures; jaw relations; occlusion rim.

Correspondence
Antonio Godoy, Department of Prosthodontics, Nova Southeastern University, 3200 S. University Dr., Fort Lauderdale, FL 33328–2018. E-mail: agodoy@nova.edu

The authors deny any conflicts of interest.

Accepted September 16, 2014
doi: 10.1111/jopr.12270

Abstract

Mandibular implant-retained overdentures have become the standard of care for patients with mandibular complete edentulism. As part of the treatment, the mandibular implant-retained overdenture may require a metal mesh framework to be incorporated to strengthen the denture and avoid fracture of the prosthesis. Integrating the metal mesh framework as part of the acrylic record base and wax occlusion rim before the jaw relation procedure will avoid the distortion of the record base and will minimize the chances of processing errors. A simplified method to incorporate the mesh into the record base and occlusion rim is presented in this technique article.

Frequently, a metal mesh framework needs to be incorporated into the mandibular implant-retained overdenture to prevent it from fracturing. This report presents a simple, practical technique to incorporate the reinforcing metal framework into the record base to be used during the maxillomandibular relation appointment. At the same time, when processing the prosthesis in the laboratory, this technique proves to be easy when separating the metal reinforcing frame from the waxed denture during the time of investing and processing the final denture.

The prosthetic treatment option for the rehabilitation of the edentulous mandible has traditionally been the fabrication of a conventional complete denture. With the advent of implants, it has become the standard of care for patients to have the edentulous mandible restored using dental implant-retained or implant-supported mandibular overdentures.¹,² The advantages of implant-retained overdentures over conventional complete dentures include decreased bone resorption and reduced movement of the prosthesis.³

The standard protocol for the restoration of the edentulous mandible in the predoctoral clinic at Nova Southeastern University, College of Dental Medicine (NSU-CDM), Ft. Lauderdale, FL, is to include as the ideal treatment option the two implant-retained mandibular overdenture. A high number of patients in this particular clinic accept this treatment option so that the predoctoral students are exposed to the fabrication of at least one mandibular implant overdenture. As part of the protocol, the incorporation of a metal mesh framework in the mandibular implant overdenture is required to avoid a fracture and the subsequent refabrication of the prosthesis.⁴,⁵

One of the most important and critical steps of the process during the fabrication of dentures is the recording of the maxillomandibular relation to articulate the working casts on an articulator. This is done using conventional methods.⁶,⁷ First, maxillary and mandibular record bases are fabricated using a light-cured resin denture base material (Light Pink Fibered Triad; Dentsply, York, PA) upon which baseplate wax occlusion rims (NeoWax; Dentsply) are attached. The maxillary cast is related to the articulator using the maxillary record base and occlusion rim and the facebow record (Whip Mix, Louisville, KY). The mandibular cast is then articulated against the maxillary cast using a patient-generated centric relation record made on the mandibular rim using aluminum containing wax recording material (Aluwax Bite and Impression wax; Aluwax Dental Products Co., Allendale, MI).

Patients treatment planned for implant-retained mandibular overdentures may require a reinforcing metal mesh in the denture for strength and to prevent denture fracture.⁸ When fabricating the record base for patients with a mandibular implant-retained overdenture, incorporating a reinforcing metal framework may offer some chances for inaccuracies or even procedural errors.

Previously, the method proposed by the Department of Prosthodontics at NSU-CDM consisted of embedding the metal frame in wax; the entire record base and occlusal rim was made...
Technique to Incorporate a Metal Mesh into a Record Base

Godoy and Siegel

Figure 1  Block any undercut using baseplate wax.

of wax. It was noted that in some cases there was distortion of the occlusal rim/record base complex when using this method. Alternative techniques consist of embedding the metal frame directly in the light-curing resin. This technique results in a risk of distortion of the metal reinforcing frame or other difficulties at the time of separating the invested trial dentures prior to packing the acrylic during heat processing of the denture.

The NSU-CDM predontal clinic has developed a protocol for fabricating the occlusal rim on a record base and incorporating the reinforcing metal frame to reduce the risks for deformation and distortion of that base. The method combines the use of light-curing denture base material (Light Pink Fibered Triad) and baseplate wax maintaining the metal frame in place at the same time. This offers a practical way of recovering the reinforcing metal frame at the time of denture processing and allows easy replacement of the frame within the record base over the mandibular master cast.

Technique

1. Generate the master cast for the mandibular implant-retained overdenture from the final impression using Type III Stone (Microstone, Whip Mix).
2. Send the master cast to the dental laboratory with a prescription to fabricate the metal mesh framework from a chrome-cobalt alloy (Vitallium 2000 Plus, Dentsply). There should be circular openings provided for the Locator attachments, and the metal mesh must cross the midline.
3. Once the cast and the metal mesh framework have been returned, identify the undercuts on the mandibular master casts from the surveyor and block out with baseplate wax (NeoWax) using the carving instrument from a cast surveyor (Ney Surveyor, Dentsply). Careful adherence to proper blockout procedure allows retrieval of the record base without fracturing the cast. It also prevents over blockout, which can result in an unstable record base (Fig 1).
4. Lubricate the cast (Triad Model Release Agent, Dentsply), removing any excess (Fig 2).
5. Adapt the pink-fibered VLC resin baseplate material (Triad) to the cast. Prior to light curing, cut out the area to create a “window” for the metal framework using a Bard Parker knife (Fig 3). Apply the air barrier coating (ABC, Dentsply) to the surface of the resin baseplate and cure for 10 minutes in the Triad curing unit (following manufacturer’s instructions).
6. Adjust and finish the borders with acrylic burs to ensure smoothness and full stable seating of the record base seats on the master cast (Fig 4).
7. Place the metal mesh framework back on the master cast through the cut-out window (Fig 5). If any interference exists, adjust with acrylic burs.

8. Remove the record base and the metal framework from the master cast. Burnish (dead soft) 0.001” tin foil (Tin foil rolls; Buffalo Dental, Syosset, NY) over the master cast. Replace both the record base and the metal mesh framework back on the cast over the mandibular ridge.

9. Flow baseplate wax (NeoWax) over and through the mesh of the metal framework and onto and over the record base. This allows for the resin record base and metal mesh framework to become one entity with easy removal from the master cast (Figs 6 and 7).

10. Fabricate a wax occlusion rim using sticky wax (Miltex sticky wax, brown; Integra, York, PA) to adhere the baseplate wax (NeoWax) over the record base (Figs 8 and 9).

11. Seat the record base in the mouth to ensure there is no interference in the complete seating of the record base. A poly(vinyl siloxane) disclosing medium (Fit Checker; GC America, Inc. Alsip, IL) is applied to the intaglio of the occlusion rim to determine fit.

Figure 5 Metal framework and cut-out record baseplate not contacting each other seated on the final cast.

Figure 6 Both record base and metal framework kept together with wax, using tin foil as separating medium.

Figure 7 Ensure the record base and metal framework can be removed as a whole without locking on the cast.

Figure 8 Occlusal rim is fabricated and attached to the record base.

Figure 9 Lateral view of the finished record base.
Technique to Incorporate a Metal Mesh into a Record Base

12. Jaw relation records can be performed at this stage as well as the remaining steps in denture fabrication and processing.

Conclusion

In this technique article a simplified method to incorporate the metal mesh framework into the record base and occlusion rim was presented. Integrating the mesh as part of the acrylic record base and wax occlusion rim before the jaw relation procedure avoids the distortion of the record base and minimizes the chances of processing errors.

Acknowledgment

Thank you to Valdez Laboratory, Ft. Lauderdale, FL, for the laboratory work done for this article.

References