

## Workshop

# BAR MODIFICATION FOR IMPROVING COMPOSITE-RESIN TO RIDGE DESIGN

New prosthetic offerings including esthetic and functional solutions with complex restorations.

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**THE PROSTHETIC PRODUCT LINE OFFERING** from dental laboratories specializing in removable prosthodontics has dramatically expanded over the last several years. Removable prosthetic dental laboratories' product lines now include complex restorations such as implant-retained and implant-supported overdentures. One of the new expanded prosthetic product services is milled implant-supported hybrid bars for which removable prosthetic dental technicians are seeing an increasing demand. There are many variables to take into consideration when planning and designing a complex implant-supported prosthesis. One variable that will be discussed is the ridge-to-resin or ridge-to-metal relationship. There are different designs for milled hybrid bars, and each must take into consideration the contour of the residual ridge in relation to the placement of denture teeth. In this article, the author will focus on the external finish lines for this type of milled bar and the methods for achieving a functional transition from residual ridge to prosthetic gingival base.

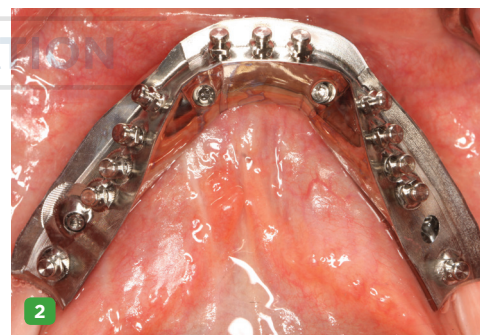
The implant-supported hybrid Montreal bar (NobelProcera™, [www.nobelbiocare.com](http://www.nobelbiocare.com)) case presented in this article was sent for processing

and setup delivery on the Montreal bar. In Figure 1, the maxillary and mandibular milled titanium Montreal bars are seen in the oral environment. Note the extension of external finish lines to the residual ridge crest. The finish lines were extended too far labially and buccally, especially on the mandibular arch. Figure 2 shows the mandibular milled Montreal bar, and Figure 3 shows the maxillary in relation to the residual ridge of the oral environment. Note the labial and buccal extensions of titanium, and visualize the teeth plus acrylic resin in these areas. Figure 4 demonstrates the placement of external finish lines in relation to gingival acrylic resin. This ledge, as seen between both the maxillary and mandibular ridge crest and bar, needed to be re-designed to create a proper contour or

**Fig 1.** Facial view of the maxillary and mandibular Montreal milled bars at try-in stage. Note the external labial and buccal finish lines in relation to residual ridge.

**Fig 2.** An occlusal view of mandibular Montreal bar. Note buccal to lingual relationship of titanium bar to residual ridge.

**Fig 3.** An occlusal view of the maxillary Montreal bar; the labial aspect of bar is where modification is necessary.



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bevel from the labial and buccal surface to the residual ridge. The Montreal bars were treated with a metal bonding interface (SR Link, Ivoclar Vivadent, [www.ivoclarvivadent.com](http://www.ivoclarvivadent.com)) (Figure 5). After the metal primer, an opaque was applied (anaxdent, [www.anaxdent.com](http://www.anaxdent.com)) in two stages, PO I and PO II. The first coat has a higher degree of opacity (PO II), and the second has a more pink gingival color (PO I). The gingival base was then invested and processed in a heat cure resin (SR Ivocap® Injection System, Ivoclar Vivadent). After processing and finishing, the problem with the external finish line became more evident. The relationship of the metal Montreal bar to the ridge created a definite food trap on the labial and buccal surfaces (Figure 6). It was necessary to redesign this ledge—as seen between both the maxillary and mandibular ridge crest and the bar—to create a proper contour or bevel from the labial and buccal surfaces to the residual ridge.

Tkktk notion is tempered by the fact that certain patients demand perfection regardless of whether anyone else sees their.

To achieve a proper contour, the titanium intaglio needed to be cut back to allow for a beveled tissue-to-tooth emergence profile, leaving the external finish line, as it created a concave intaglio instead of the desired convex acrylic or metal surface. The maxillary and mandibular titanium intaglio surfaces were cut back to the crest of the residual ridge to recreate a new external finish line. The ridge crest to the new external finish line allowed for a beveled gingival emergence to create the desired convex surface (Figure 7 and Figure 8). Figure 9 shows the intaglio of the Montreal bar before the metal was cut back. The labial aspect of acrylic resin was extended gingivally to help eliminate the food trap. The titanium bar was cut back and a new external finish line was created (Figure 10). The bar was opaqued in a two-step process (Figure 11). The exposed titanium was opaqued to mask out any



**Fig 4.** Two sets of maxillary and mandibular Montreal bars prepared with metal primer (SR Link).

**Fig 5.** Maxillary and mandibular Montreal bars with opaque PO II applied to them.

**Fig 6.** Maxillary and mandibular acrylic processed bars with the problem of over-extended labial and buccal external finish lines.

**Fig 7.** Maxillary labial and buccal metal cut back to residual ridge crest.

**Fig 8.** Mandibular buccal cut back to residual ridge crest.

**Fig 9.** Intaglio view of the mandibular before the metal was cut back.

**Fig 10.** Intaglio view of the mandibular after the metal was cut back to re-create external finish line.

**Fig 11.** Anaxdent's anaxgum PO I opaque.

**Fig 12.** The opaque is applied to the cutback metal—masking out the metal to be covered by the composite.

**Fig 13.** A view of the completed, opaqued metal intaglio surface.







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**Fig 14.** A facial view of the completed composite build-up with anaxgum Flow.

**Fig 15.** A right buccal view of the completed peripheral build-up with a re-contoured gingival extension.

**Fig 16.** A left buccal view of the completed composite build-up of a re-contoured gingival extension.

**Fig 17.** A buccal view of the anterior segment. Note the mandibular gingival transition and maxillary relation to lip.

**Fig 18.** An occlusal view of the maxillary finished hybrid. Compare the labial and buccal extension to the bar in Figure 3.

**Fig 19.** An occlusal view of the mandibular finished hybrid. Compare the labial and buccal extensions to the bar in Figure 2.



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graying effect from the metal (Figure 12 and Figure 13). Anaxgum (anaxdent) bonding agent was applied to the acrylic to create an interface for the composite to bond to acrylic. The gingival base was then built up with anaxgum composite on the master cast, filling in the space between the residual ridge and the cutback of acrylic/metal. A combination of dark and light pink composite was built up in layers and light cured.

Figure 14 is an in-situ or retracted intraoral photograph showing the elimination of a labial titanium ledge and a proper gingival contour. Figure 15 and Figure 16 show the right and left buccal view of composite-to-ridge relation. It is very important to allow space for Super Floss orthodontic floss (Oral-B, www.oralb.com) and Waterpik® (Waterpik, www.waterpik.com) to maintain proper gingival hygiene habits and prevent food or plaque accumulation. When characterizing the gingival base, note that the

attached tissue just below the denture teeth has a blanched appearance compared to the unattached tissue closer to ridge crest, which is more vascular and has a darker pink or reddish tone. Figure 17 shows the finished maxillary hybrid with proper emergence gingival profile. Note the beveled peripheral border labial to the anterior implants. Figure 18 shows the occlusal view of the maxillary, while Figure 19 shows an occlusal view of the mandibular. Viewing the screw access holes makes it possible to visualize the ridge crest in relation to the metal and slight labial or buccal extension to the ridge crest.

In Figure 20 and Figure 21, the maxillary implant-supported bar is finished with the cutback shown in the anterior and left posterior areas. The titanium that opposes residual ridge and the composite, labial and buccal to ridge crest, are highly polished to create a proper transition from the acrylic resin and composite

to the tissue. The finished mandibular intaglio with the metal modification is shown in Figure 22, with the finished lingual view of the maxillary in Figure 23 and the mandibular in Figure 24.

### Conclusion

The esthetic and functional objective was to eliminate horizontal over-extensions of the bar—which would have created food traps—and to re-contour the borders to achieve a more ideal gingival emergence profile in relation to ridge crest. Ideally, this should be accomplished during the virtual design process, although sometimes problems with bar designs become evident during tooth setup or processing and need to be modified accordingly.

### Acknowledgment

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**Fig 20.** An intaglio view of the finished maxillary. The left side shows the re-contoured metal and composite borders.

**Fig 21.** An intaglio view of the maxillary right side showing re-contoured metal and composite borders.

**Fig 22.** An intaglio view of the mandibular right side showing re-contoured metal and composite borders.

**Fig 23.** A lingual view of the finished maxillary acrylic and composite implant-supported hybrid.

**Fig 24.** A lingual view of the finished mandibular acrylic and composite implant-supported hybrid.

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