

The Workflow for 2 Implant Supported Bar Overdentures

by



Luigi Vitale, DT

The primary concepts involved with the fabrication of complete dentures are of fundamental importance for the correct realization of removable implant-supported bar overdentures, which should include a combination of aesthetics, function and hygiene capability. As a matter of fact, as opposed to fixed prostheses, the patient in this removable situation is able to clean both the prostheses and the underlying frameworks, as the areas surrounding the implants are too often the subject of copious bacterial plaque deposits.

INTRODUCTION

When the patient arrived at the dental practice, he presented with a severely compromised condition (Fig.1-2) due to previous prosthetic work that was inappropriate to his skeletal class III situation and severe atrophy of his lower ridge. The patient's main problems were unacceptable aesthetics and non-existent function, which compromised normal social relations and relationships.

In the following case, complete dentures with adequate lip support to camouflage the patient's skeletal class III, secured to implant bars with an OT equator attachment system were in order after obtaining the patient's approval.

MATERIALS AND METHODS

The plan was to first extract all the patient's remaining teeth and then place 8 upper and 4 lower implants.

The plan was executed, and upper and lower temporary prostheses were made to re-establish the correct vertical dimension and centric relation while waiting for the implant osseointegration period to end. After the osseointegration of the implants, the dentist took two alginate impressions which were poured allowing us to make two individualized impression trays (Fig.3-4). Once the individualized impression trays were made with light-curing resin, the dentist took another two impressions using Impregum (3M ESPE). Soft tissue silicone was injected in the areas adjacent to the implants in order to create a gingival mask (Fig.5), and then Class IV plaster was applied as a base, which was vacuum-mixed



Fig. 1 — Initial photo – occlusal view



Fig. 2 — Initial photo – frontal view

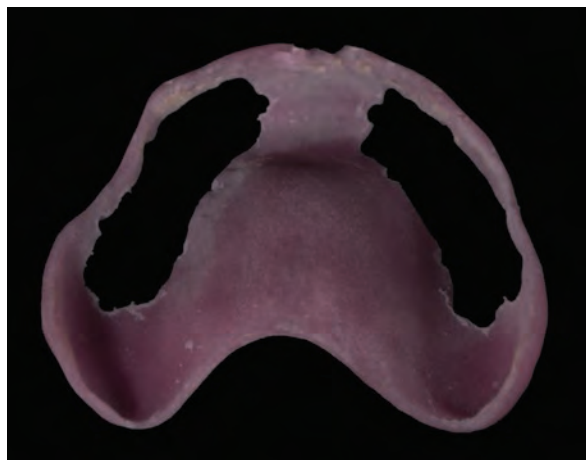


Fig. 3 — Individualized upper impression tray

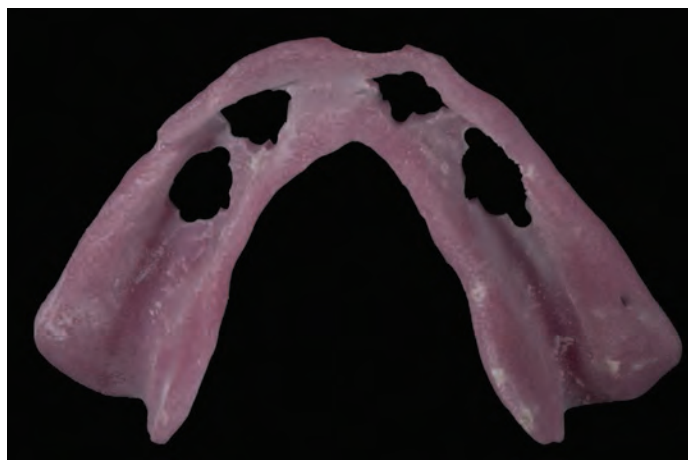


Fig. 4 — Individualized lower impression tray



Fig. 5 — Impregum impression with gingival mask formation



Fig. 6 — The wax rims on acrylic resin baseplates

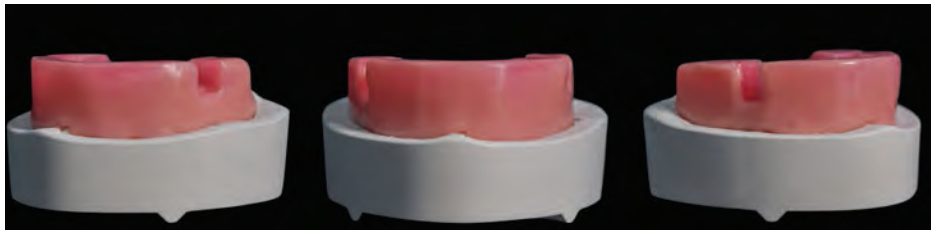
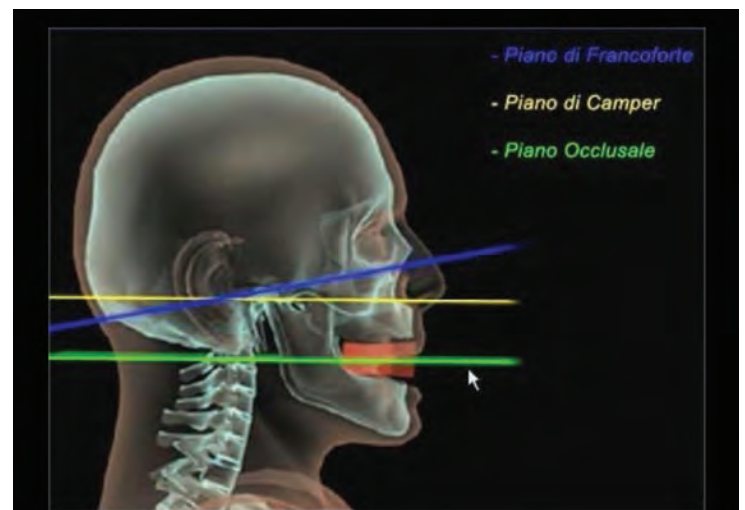


Fig. 7 — Notches made



Fig. 8 — Fox plane

Fig. 9 — Frankfurt plane in blue
Camper's plane in yellow
Occlusal plane in green



to avoid the formation of air bubbles and to ensure its uniformity. Once the plaster had hardened, the models were trimmed, and 2 wax rims were made using auto-curing resin as the baseplate material, with wax then being fused onto it over top of it. The choice of acrylic resin as a baseplate material (as opposed to wax) ensures greater stability during the various registration phases performed by the dentist.

It was ensured that the wax rim measurement details were consistent with standard guidelines established by the literature. For example, 1) 22 mm should be the occlusal height of the maxillary wax rim measured from the deepest part of the sulcus adjacent to the midline frenum 2) the maxillary wax rim should stick out 8-10 mm anteriorly measured from the midpoint of the incisive papilla 3) both rims should have an inclination of 10-15 degrees in order to try to simulate the position of the teeth 4) the mandibular occlusal rim should be 18 mm tall, measured from the depth of the sulcus lateral to the labial frenum in the region of the canine eminence 5) the width of both maxillary and mandibular occlusion rims should be 3-5 mm in the incisal region, 5-7 mm in the premolar region and 7-8 mm in the molar area (Fig.6). Four notches were created in the molar/premolar areas so that centric relation can be properly captured by the injection of bite registration material (Fig.7).

We sent the wax rims to the dentist who used a fox plane to adjust the maxillary occlusal plane anteriorly in line with the interpupillary line (Fig.8), and then proceeded with phonetic tests, making sure that posteriorly the occlusal plane was parallel to Camper's plane (Fig.9). Marking the midline, marking the position of the

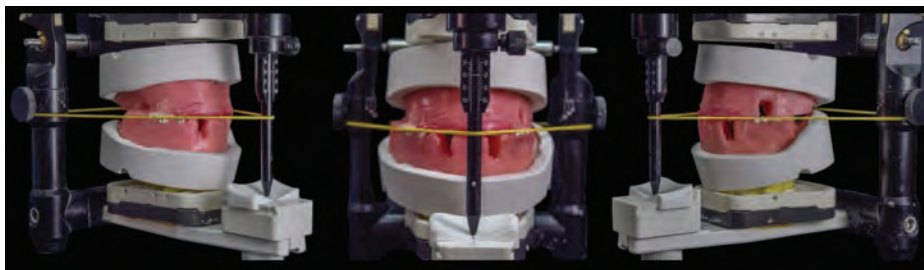


Fig. 10 — Models on the articulator ready to be mounted



Fig. 11 — Mounted models on the articulator

canines using the outer alae of the nose and marking the smile line were also all fundamental parameters for a correct aesthetic assembly.

After having received the wax rims, we proceeded with using them to mount the base-notched models onto an articulator with the help of an elastic band around notches in the condylar regions of the articulator and around the incisal pin, simulating the Bonwill triangle. The mandibular model was supported by modeling wax (Fig. 10) and then the upper model was secured to its articulator plate with thick consistency Class III stone first before the mandibular model. After the

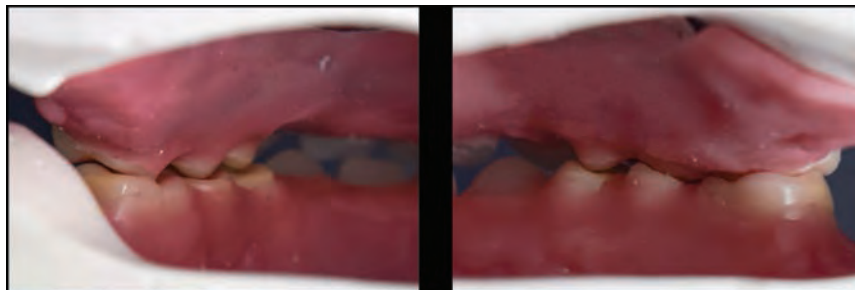


Fig. 12 — Lingualized contacts



Fig. 13 — Finished wax-ups



Fig. 14a — Models and wax-ups scanned

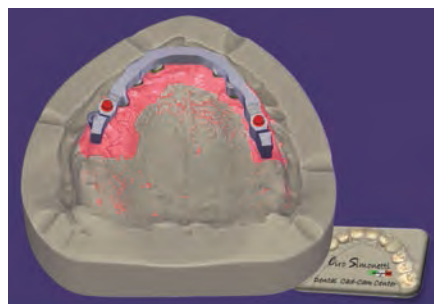


Fig. 14b — Upper bar designed

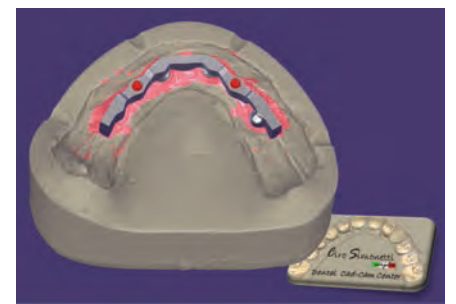


Fig. 15 — Lower bar designed

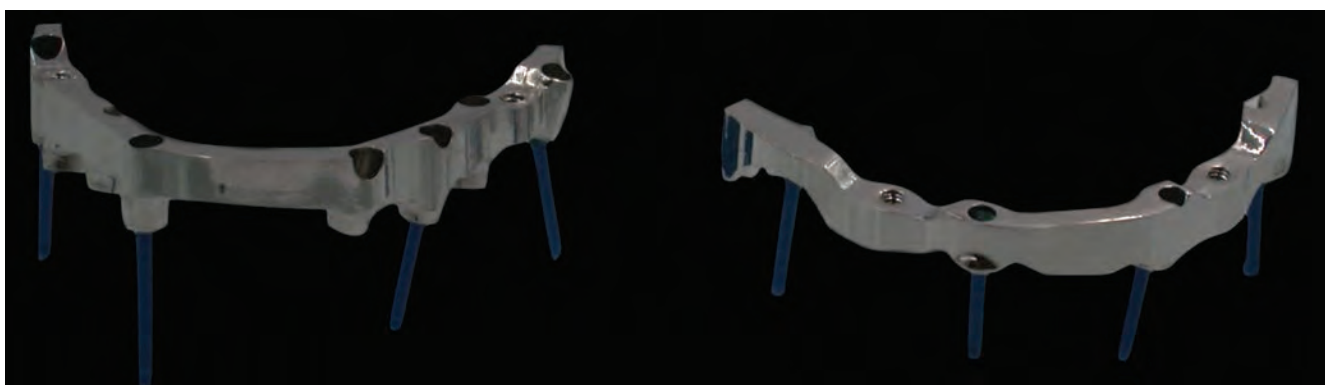


Fig. 16 — Completed bar designs

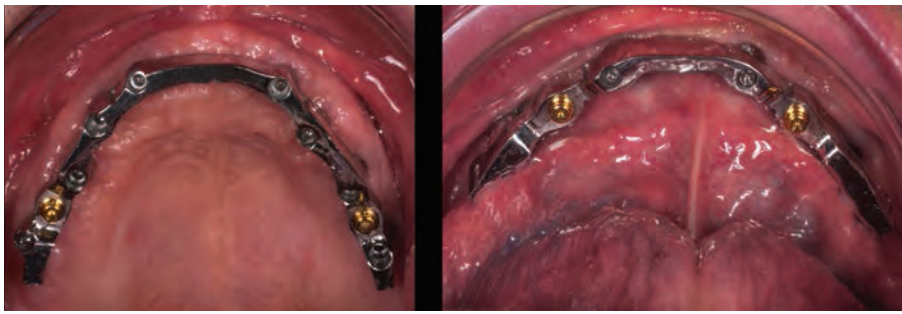


Fig. 17 — Bar try-ins intraorally

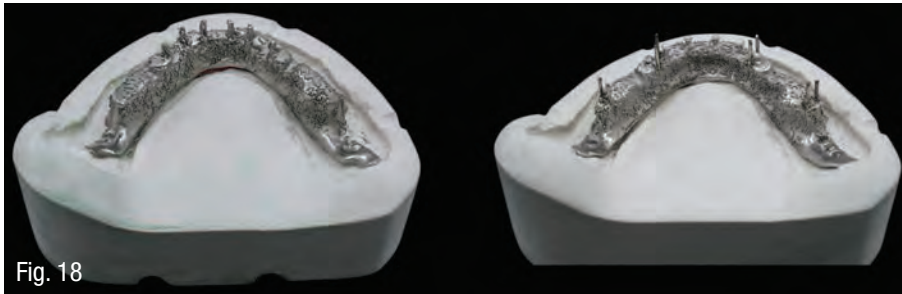


Fig. 18

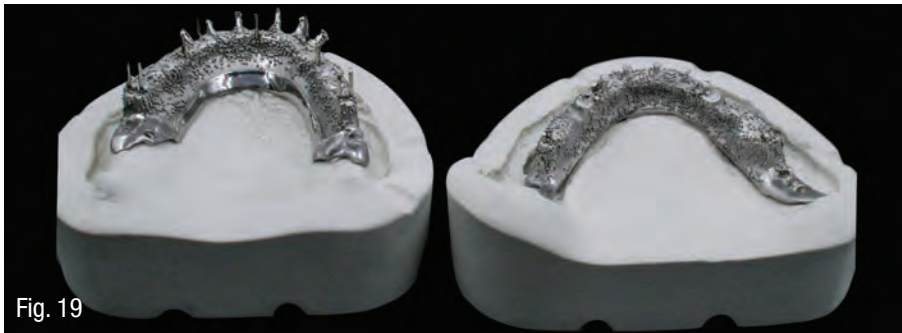


Fig. 19

Figs. 18 - 19 — The fabrication of the superstructures on the models



Fig. 20 — A close-up view of milling detail

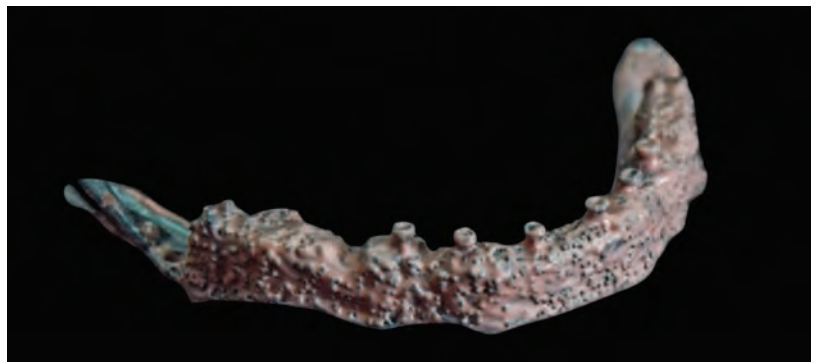


Fig. 21 — Opaquer applied to the superstructures



Fig. 22 — Finished dentures

stone had set, it was smoothed without excess (Fig. 11).

We began our tooth assembly after a model analysis, starting with the upper anteriors from canine to canine and then sent the assembly to the dentist to perform phonetic testing and to obtain preliminary aesthetic approval from the patient. The posterior teeth were then set in the laboratory according to the occlusal scheme of Prof. A. Gerber which has the posterior teeth occlude lingually (Fig.12), an inverse mirror image of the condyle-fossa relationship.

Once ready, we resent the prostheses to the dentist who carried out final phonetic tests and, in the end, obtained final functional and aesthetic approval from the patient (Fig.13).

2 silicone putty masks were made to capture the position of the mounted teeth, and then everything was sent to the CAD/CAM technician for the design and milling of the bars (Fig.14a-14b-15-16). We decided to use the Rhein 83 high performance OT Equator low profile attachment system on the bars which allows one to obtain excellent results even in situations of poor vertical space.



Fig. 23 — The completed work intraorally



Fig. 24 — A close-up look. A peripheral seal was accomplished



Fig. 25 — The patient without his implant bar-supported overdentures



Fig. 26 — Our work delivered



Fig. 26 — Our work delivered

The bars were tried in and a perfect fit was verified (Fig.17). The superstructures were then designed and milled with maximum precision in order to guarantee perfect coupling with the bar/male OT equator attachments (Fig.18-19-20).

With the guidance of the previously created silicone masks, we poured in wax to join the teeth to the superstructure and then modeling was carried out in a definitive way. We sent the work to the dentist for a final try-in before final processing, and then proceeded with the transformation from wax to resin that, in this case, was performed with a resin injection muffle system.


Prior to adding the resin, the muffles, including the superstructures were opened and degreased, and then a pink opaque light-curing wash was applied to the superstructures to hide as much as possible the metal that would potentially show through the resin (Fig.21). The muffle covers were inserted and then closed, and then the resin was injected.

Once cold curing was complete, the muffles were opened and the models with the prostheses were remounted on the articulator. A final check of the prostheses proceeded along with their finishing and polishing. Meticulous polishing by the laboratory technician, especially along the denture flange borders helped to avoid the formation of bacterial plaque (Fig.22-23-24).

The completed work was sent to the dentist who verified fit and ensured the occlusion was correct with full arch articulator paper. Ideal lateral, protrusive and retrusive contacts were also verified. The patient was very happy with the result (Fig.25-26-27).

Conclusion

In my opinion, implant-supported bar overdentures are a prosthetic choice that is much more appropriate than full-arch bridges because in the former, both the bar frameworks and the dentures are able to be thoroughly cleansed in between meals.

In conclusion, I believe that the patient's satisfaction is our satisfaction and that ideal results are achieved only through teamwork. 

THANK YOU NOTE

I would like to thank Dr. Fabio Marzocca for his trust in our handling of this case, my colleague Ciro Simonetti for the CAD-CAM portion involving the bars, my colleague Mario Ricchezza for the construction of the superstructures and Claudio Iacono who was responsible for the graphics created.

References available upon request