

# THE ROLE OF THE DENTAL TECHNICIAN IN FABRICATING THE SINGLE-STAGE IMPLANT PROSTHESIS

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## KEY WORDS

Dental laboratory  
Implant prosthesis  
Single stage

With the initiation of the concept of osseointegration, the use of dental implants has become a predictable and frequently used addition to comprehensive planning and treatment of edentulous patients. Implantology poses challenges for the dental laboratory not present in any other existing specialty. Single-stage implant surgery represents such an innovation.

## INTRODUCTION

The most frequently used implant systems today are based on a two-stage approach, although the single-stage technique is a viable alternative. The immediate loading of screw-retained Dolder bars changes the traditional treatment time of 3 to 6 months to 2 days. On the first day, the implants are placed into the bone and the Dolder bar is cast, finished, and tried. On the second day, the patient is able to return home with a passive fitting denture. Although this is not a common practice among most implant surgeons, our laboratory provides this 2-day service to one surgeon (Dr David M. Vassos) who follows this method regularly. Dr Vassos has been using the single-stage implant technique over the past 10 years with a success rate of 99.2%.

## METHODS AND MATERIALS

On the first day, the implants are placed into the bone and the precision margin esthetics (PME) abutments

(Steri-Oss) are attached and torqued to 35 Ncm. The transfer pins are then screwed into place. An impression is taken, followed by a bite registration; the impression is then removed. Next, the transfer pins are also removed and replaced with mushroom-shaped titanium healing caps. These specially designed healing caps restrict the tissue from riding up and covering the abutments. They also compress the tissue against the bone and help to prevent the formation of hematomas. The impression, along with the opposing model and bite registration, are then sent to the laboratory for use in the immediate fabrication of a screw-retained Dolder bar. The patient's existing denture is also sent to the lab to be hollowed out in preparation for a final impression. This enables the denture to act as a custom tray.

The patient's first appointment has to be scheduled for early in the morning, as the laboratory must receive the case no later than 10 AM in order to

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FIGURE 1. The final impression with the analogs attached to the transfer pins. The impression material used here is Impregum F, medium consistency.

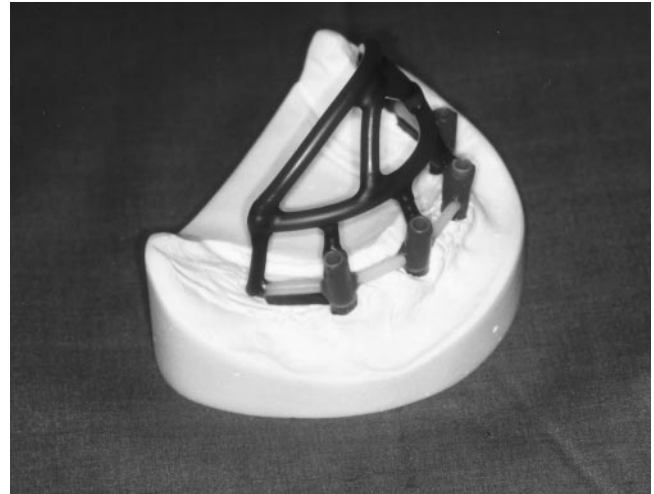


FIGURE 2. The Dolder bar is waxed using the 2146 cylinders and 2346 hex screws (by Steri-Oss).

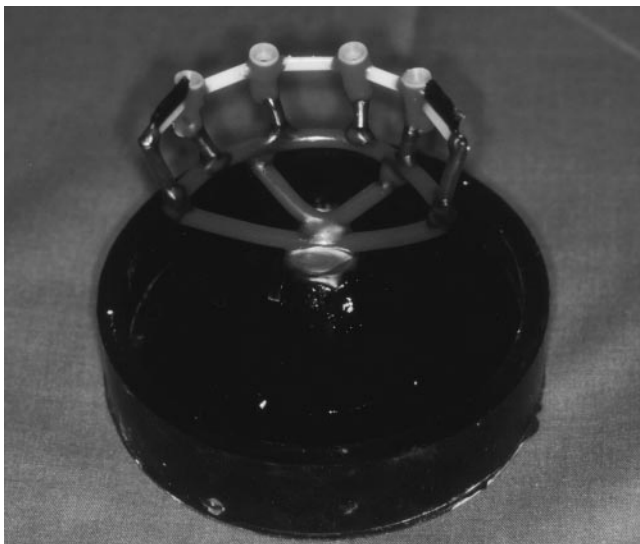


FIGURE 3. The waxed Dolder bar is supported onto the base using eight-gauge round sprue wax for the major connector and 12-gauge round sprue wax for the feed sprues.

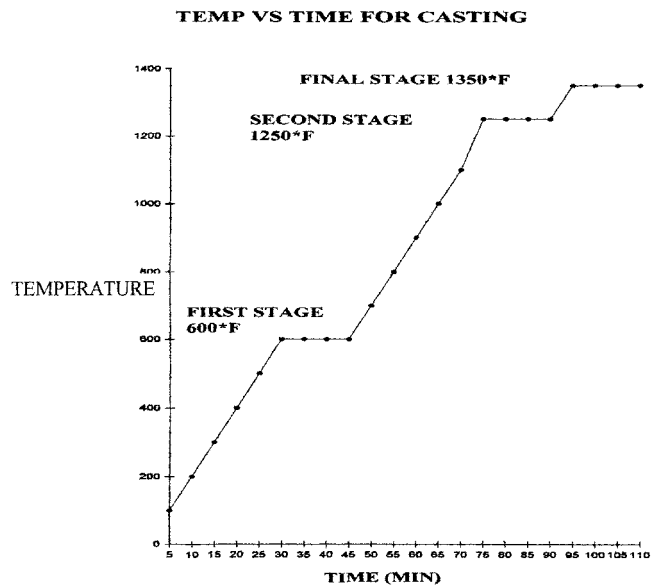


FIGURE 4. This graph illustrates the three-stage burnout: stage 1, 600°F; stage 2, 1250°F; stage 3, 1350°F.

have the Dolder bar completed for a try-in by the afternoon.

Once the laboratory receives the case, the analogs are attached to the transfer pins on the impression and the model is poured (Fig 1). Once the model is set, the impression is removed, leaving the transfer pins behind. The transfer pins are then unscrewed, leaving the analogs exposed in the model.

Now the lab technician must select the appropriate abutments to be used

on the analogs. These abutments are available in either a castable version or a premilled and castable version through Steri-Oss. (We prefer the castable version, as it is simpler to deal with just one type of metal.) The Dolder bar is then waxed, joining the fixtures with GC pattern resin (GC America Inc, Chicago, Ill). The distal extensions should not exceed 10 mm (Fig 2).

The pattern is then invested (Fig 3). The investment that we use is Cera-

Fina (Whip Mix Corporation, Louisville, Ky). The liquid/powder ratio that gives the best result is 14 mL of liquid per 60 g of powder. This is spatulated under vacuum for 2.5 minutes. The pattern is then whitewashed with investment before fully investing. After it is invested, the pattern is left to cure for 25 minutes. Next, the pattern goes through a three-stage burnout in the furnace (Fig 4). After the burnout process, the pattern is ready for casting.

Because of its density and thermal expansion, the casting metal that we prefer is IS 85 (Williams; Ivoclar North America, Amherst, NY).

Once the casting has been completed, the bar is cleaned and highly polished to a mirrorlike finish (Figs 5, 6). The screw-retained Dolder bar does not have to be sectioned or soldered to achieve a passive fit. The bar and the patient's denture (which we have hollowed out) are sent to the dental office.

The patient returns to the dental office in the afternoon (about 3:00 PM) for a try-in of the Dolder bar for verification of passive fit and accuracy. Once a satisfactory fit has been confirmed, the implant surgeon can proceed with the next step. The patient's hollowed-out denture now acts as a custom tray for the final impression of the bar and arch. This also allows the surgeon to verify the vertical opening at the same time.

The denture and bar are both sent back to the laboratory for relining and overnight reprocessing. Metal retention clips (MD riders, by the Ackermann System) are used in conjunction with a soft denture liner. The liner that we prefer is Molloplast-B (Detax), as it resembles natural gingiva, is comfortable to wear, and is resistant to mechanical pressure (Fig 7).

On the second day, after the denture has cured overnight, the lab technician deflasks, trims, and polishes it. The bar is removed from the model to check for any scratches that may have been caused by the flasking and processing. If necessary, the bar is repolished. The denture and the Dolder bar are then sent back to the dental office.

When the patient returns to the dental office, the Dolder bar is screwed into place and the relined denture is positioned. The patient is also instructed on how to remove the denture and clean the Dolder bar.

#### DISCUSSION

Clinical experience suggests that single-stage surgery yields a success rate comparable to that of the two-stage approach, provided that the newly placed



FIGURE 5. The fit of the casting after recovery. Williams Ivo-Clar IS 85 alloy was used.



FIGURE 6. Once the casting is complete, the bar is highly polished.

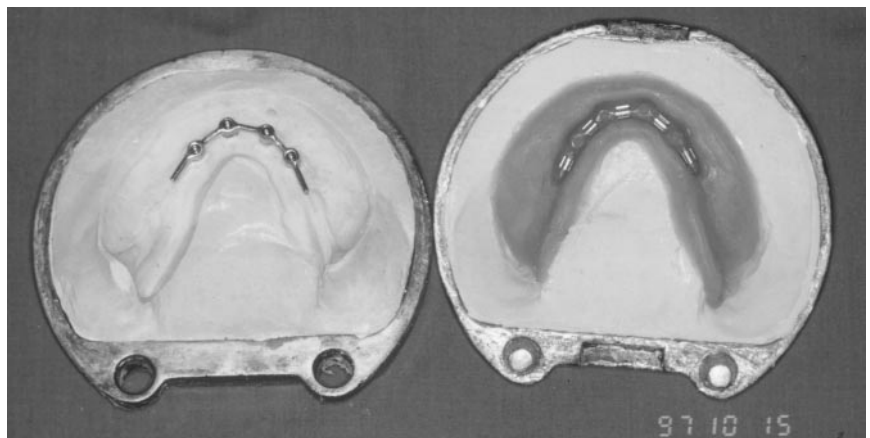


FIGURE 7. The processing of the mesial and distal Ackermann clip riders in hard acrylic. Later Molloplast B will also be cured into the denture before deflasking and the final polishing.

implants are safeguarded from excessive force. To protect the implants from excessive force, the metal retention clips (MD riders) are not activated at the time the implants are fit. They can usually be activated within 3–4 months.

Stabilizing the denture allows the patient to return to a soft diet after sur-

gery. Also, the support of the relined denture by the tissue and passive superstructure minimizes pressure on the implants, reducing postoperative discomfort and swelling.

**SUMMARY**

With the implant-supported Dolder bar overdenture becoming a popular

choice among many long-time denture wearers as well as newly edentulous patients, single-stage surgery is certainly an option. Elimination of the second surgery reduces costs, chair time, and postoperative discomfort, benefiting both the implant surgeon and the patient. ■