



Robert Kreyer, CDT

Fabricating **implant surgical guides**

Offering a technical implant treatment planning service creates a valuable business profit center.

The problem in treatment planning and design of any implant-retained or -supported prosthesis is the ability to achieve parallelism and optimal placement of the implants. For attachments to engage and seat properly, we must consider placement in relation to the path of insertion, tooth arrangement, and occlusal scheme. There are various techniques that can be employed to design and create a surgical guide, including computer guided and designed. Most of the implant treatment plans I have been involved with are not computer guided. For these, a surgical guide must be designed that meets the surgeon's objectives and restorative dentist's expectations.

COLLABORATION

The increased prosthetic expectations placed upon the dental laboratory technician combined with the decreased educational requirements in the dental schools necessitates the development of a dental treatment team relationship. I have found it invaluable to work very closely with oral surgeons, periodontists, prosthodontists, and restorative dentists when developing a treatment plan for implant prostheses. We must understand the expectations and needs of each other to achieve optimal interdisciplinary clinical and technical treatment.

ANALYSIS

The most critical and least used technique in the dental laboratory is a model analysis. I hope we are past the days when dental laboratory technicians are handed a fixture-level impression with prescription that states, "Make an implant-retained overdenture." When receiving a prescription like this, always think: to what, why, and where? If we are to exceed the patient's desired expectations, then there must be collaboration and communication before the analysis and design technical process.

As explained in my previous DLP article on CT

●●● IMPLANT MODEL WORK



Fig. A Digital periapical image of implant sites #11 & #12 e-mailed by periodontist for analysis. Note angulation of roots #7 & #13.



Fig. B Master model sent by periodontist with mapped edentulous area and implant placement sites marked.



Fig. C Mounted master casts with acrylic teeth set and contoured in edentulous area.

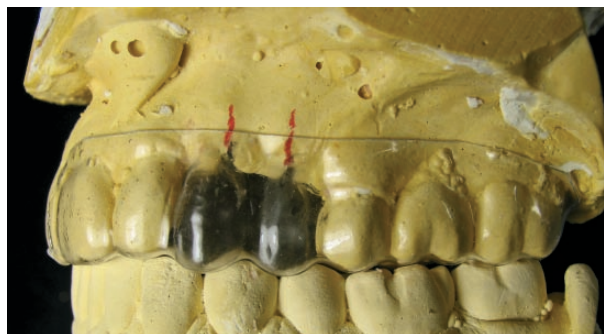


Fig. D Vacuum-formed stent created over set-up of acrylic teeth creating a visual contour of crowns in relation to implant placement.



Fig. E Site created for implant guide posts by drill press as marked and prescribed by surgeon.

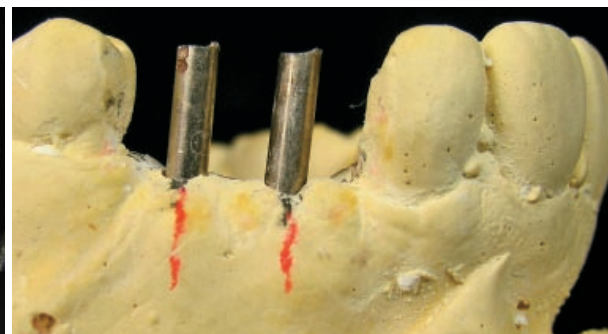


Fig. F Guide posts (bur shanks) placed in sites showing parallelism in relation to abutments.



Fig. G Titanium guide sleeves for pilot placement attached to acrylic resin surgical guide.

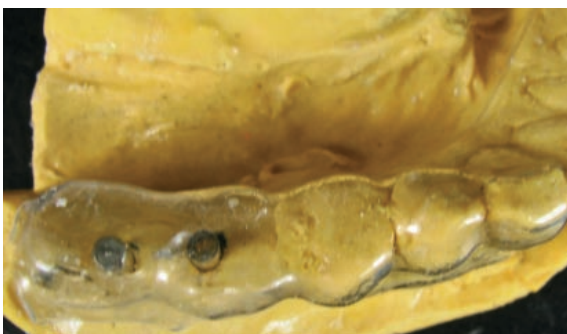


Fig. H Vacuum formed .020 stent showing placement of guide post at long axis of tooth.



Fig. I Deplaque system open guide sleeves for posterior implant placement.

scan stents (see DLP January 2008), in order to understand all the variables involved during treatment planning, we must conduct a technical analysis of the mounted master models. This will enable the dental laboratory technician to visualize the planned prosthesis while understanding, locating, and eliminating variables involved.

DESIGN

Once the technical prosthetic variables involved are understood and discussed by the dental team (surgeon, dental technician, and restorative dentist) with a thorough model and radiograph analysis, the treatment planning and design phase can begin. After communicating the patient's expectations, existing prosthesis problems, angulations of residual ridge, width of residual ridge, optimal placement of teeth, and occlusal scheme, we now can intelligently design the case.

FABRICATION

The case presented here is a partially edentulous patient transitioning from an RPD (removable partial denture) to FPD (fixed partial denture) with implants. Because the implant surgical guides involve work with acrylic resins, removable prosthetic dental laboratories should offer these implant services to their clients by extending product lines.

Because we have completed the previous treatment planning steps of collaboration, communication, and analysis through our extended prosthetic services, actual fabrication is quite straightforward and simple. A surgical guide must be retentive and stable when inserted while providing adequate access for surgical procedures according to the surgeon's prescription.

01 The surgeon sends the dental laboratory mapped master models with

implant placement site marked. Radiographs showing angulation of abutment roots are critical to placement of guide posts (Figs. A and B).

02 Mount master models on an articulator and set denture teeth in edentulous areas (Fig. C).

03 Fabricate and cut out a 0.020-micron vacuum-formed splint for reference of the crown contour in relation to the implant placement site (Fig. D).

04 Using an #8 round bur, drill a slight 1-mm-diameter reference hole with a handpiece. *Note:* This will prevent the drill bit from slipping during the drilling of the guide post site in the master model.

05 Drill a 2-mm-diameter site into the mapped model with either a drill press (small tabletop model) or a milling machine. This will ensure the parallelism of the guide sleeves (Fig. E).

06 Seat the guide posts into the implant sites. I use an old straight handpiece bur shank and cut them to size (Fig. F).

07 Seat 2.3-mm-diameter titanium guide sleeves (Attachments International; www.attachments.com) over guide posts and cure with hard self-curing acrylic clear resin to join the post together with the hard resin.

08 After the hard resin cures, I use Variflex Heat Softening Acrylic (Great Lakes Orthodontics; www.greatlakesortho.com) over the tooth surfaces, extending into buccal and lingual areas as well. The Variflex will provide retention while stability is gained from the hard acrylic resin (Fig. G).

09 Expose the mesial and distal surfaces of the abutments to enable visual alignment during surgical procedures.

10 Finish and polish the surgical guide. There are various ways to design and fabricate a surgical guide depending on the variables involved and surgical requirements. One system that provides its own drill bits, guide posts, guide sleeves, and inserts for implant placement is Guide Right by Deplaque (www.deplaque.com). Placement of the guide post in relation to the long axis of the crown is critical (Fig. H). Components of this system are shown in two finished surgical guides (Figs. I and J). *Note:* The 2.25-mm pilot guide sleeve inserts with 4.0-mm guide sleeves for implant placement.

CONCLUSION

Once you have developed this dental team relationship, understanding the surgical procedures and preferences of the surgeon is essential to meeting their expectations. They also must understand what you need to achieve their desired results. Fabrication of implant surgical guides that incorporate collaboration, communication and model analysis with the interdisciplinary dental treatment team will enable dental laboratory technicians to achieve predictability and consistency of their technical prosthetic products.

We must understand how to accomplish desired surgical and restorative prosthetic objectives and exceed our client's expectations through the exceptional services that removable prosthetic dental technicians can provide. Dental laboratory technicians offer a technical service first and fabricate the prosthesis as a byproduct. Extending your prosthetic product line to include a technical treatment planning service through model analysis will enable you to exceed expectations while developing a profit center in the dental laboratory.

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Fig. J Deplaque Guide Right system with sleeves and inserts for pilot, then implant placement. System now comes with ceramic sleeves and inserts as well.

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