

# Tips from the lab

## COMMON LABORATORY ROADBLOCKS

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The dentist-laboratory partnership is well over 100 years old, and continues to flourish because of the drive for constant improvement from both parties. At the laboratory, we send out a doctor feedback card in every case so that our clients can tell us specifically how we can improve. I am always impressed how many of our dentists call our laboratory and ask for constructive criticism regarding their preps and impressions. It is in this spirit of continuous quality improvement that we present a summary of the most common obstacles we see that stand in the way of ideal restorations.

### Occlusal reduction

The most common error seen on the lab floor is insufficient occlusal reduction. The most common way this occurs is when the occlusal portion of a posterior crown preparation is prepared flat, or parallel to the floor. While there may be enough reduction at the cusp tips, the flat occlusal table leaves no room for properly developed occlusal anatomy. As a result, many laboratories will call the doctor and ask to place a metal occlusal in an attempt to solve this problem, which may be an unacceptable option to the patient. The best way to gauge this reduction is to keep in mind that the proper amount of reduction

in the central groove area is approximately the same depth as the pulpal floor of an average Class I amalgam preparation. I often find it helpful to remove the old occlusal amalgam first and then reduce the occlusal surface to match that depth, so that the slope of my reductions match the slope of the pre-operative cusps. Using a football-shaped diamond, such as a 379-023 bur, will also help prevent flat occlusal tables.

Insufficient occlusal reduction also occurs in the area of the cusp tips, usually on the lingual cusps. It is difficult at times to look into a wet mouth and determine whether or not the reduction is sufficient, whereas once the mod-

els are poured it becomes crystal clear. To make reduction easier to judge intraorally, I rely on a product called Flexible Clearance Tabs from belle de st. clair, available through dental dealers. These flexible tabs are placed in-between the prepared tooth and the opposing tooth as the patient closes into centric occlusion. If the tab slides out easily from between the teeth, the proper reduction has been achieved. The tabs are available in 1.0, 1.5, and 2.0 mm thicknesses.

Insufficient facial reduction is also seen in the laboratory, although it does not occur at nearly the rate that insufficient occlusal reduction does. Facial reduction can be just as difficult to gauge as occlusal reduction, and facial depth cuts provide a great way of accurately measuring reduction. A bur of known diameter, such as an 847-016 tapered diamond, can be used to place depth cuts and give a uniform facial reduction of 1 mm. In the gingival third and 1.5 mm in the middle and occlusal thirds.

### Inadequate dental impressions

I recently heard Dr. Gordon Christensen comment at one of his courses that, in his communications with dental laboratories, he estimates that nearly 90 percent of all impressions lack clear, discernable margins around the entire periphery of the prep(s). In the realm of fixed prosthodontics, nothing can doom a case as quickly as a poor impression. Even with inadequate occlusal reduction there are solutions such as reduction copings, but with a bad impression the only real solution is a new impression. From studying impressions in the laboratory, most of the problems appear to be related to insufficient retraction around the complete periphery of the prep(s). There are several different techniques available to achieve the desired retraction, and it behooves the clinician to become proficient at performing at least two of the methods, since no particular technique will work in all cases. As important as fixed prosthodontics impressions are, they seem to be almost taken for



This impression not only shows accurate marginal detail, but has material that extends beyond the margin of the preparation. This makes the margin easier to identify for the technician and helps them to develop proper emergence profile.



In addition to a lack of sharp marginal detail on both abutments, the use of a double arch tray for a three-unit bridge is questionable. Double arch trays are ideal for a single crown or two adjacent crowns. For cases of more than two units, custom trays or metal stock trays are always recommended.



The entire buccal margin is missing from this impression and the double-arch tray is impinging on the maxillary tuberosity. It will be impossible to construct an acceptable restoration, without having the doctor take a new impression and a proper bite registration.



This close-up of the impression of the bicuspids abutment shows excellent marginal detail and the presence of material beyond the margin as well, making it simple to read these margins. The excellent marginal fit of this restoration can almost be guaranteed.



An impression of a fixed bridge of this size should never be taken in a double-arch tray. Much more successful is the use of a custom tray with a heavy body/light body simultaneous technique, or a perforated stock metal tray with a simultaneous putty/wash technique.



Using double-arch impressions for any bridge impressions is contraindicated due to inadequate tray rigidity and insufficient replication of enough teeth for a technician to provide proper lateral excursions.



The lack of subgingival definition, as shown on this impression, is usually indicative of inadequate retraction methods. Whether a dentist utilizes a one or two cord technique, any type of retraction is always preferable to no



Monophasic impression materials often lack the flow characteristics to capture subgingival detail. Most dentists are much more successful using a heavy body/light body simultaneous impression



As often happens as the result of the Curve of Wilson, the maxillary lingual cusps can encroach on the central groove of the preparation if the central groove is not prepared deep

make use of them. The zinc phosphate cleans up a bit easier, and the temporary will come off with a hemostat. Duralon and even more so resin-reinforced glass ionomers bond slightly to dentin and therefore clean up is more difficult.

In the anterior, my preference is to have the prototype restorations lock on the teeth. When I am doing this, I have to be careful finishing and trimming to the margins. If I can't lock the prototypes on the teeth, I'll clean the teeth with an antimicrobial and place an unfilled adhesive on the teeth and then light cure the restoration to place. On the opposite end of the spectrum, if I know that the patient is a bit more demanding, I'll really cement the temporary on by "spot" etching and using a flowable cement.

*DE&M: What role does and can the dental assistant play in temporization?*

Dr. LeSage: In my office, my dental assistant fabricates most of my posterior temporaries. Training is however the key. She can make them indirectly by taking a preimpression of the tooth with alginate or a Temporary Crown Matrix Button (seen at left, available from Advantage Dental Products, Inc.). She places the bisacrylic into this preimpression and returns the impression back to the prepared tooth in the mouth. She waits, takes it off, and trims the temporary. Lastly, she checks the fit and occlusion by using articulating paper. There should be minimal adjustments and all completed outside the

Like I said, my preference for the anterior prototypes is to have them lock on the teeth. I need to make these myself since I need to adjust mine directly in the mouth, but the dental assistant can also make them indirectly. The assistant can fill the suckdown of the wax-up with bisacrylic material and place it onto the prepared teeth. She then must wait the right amount of time for the material to be caught in the suckdown, and then take it to the lab for trimming and polishing.

*DE&M: What is the one piece of advice you could give to the general practitioner to improve his or her temporization technique?*

Dr. LeSage: It is crucial for clinicians to understand dental morphology and the relationship to smile design principles and gingival health. Too often, dentists simply don't understand dental anatomy. Where's the midline? How large should the central incisor be? What is the proper axial inclination? What is the appropriate cervical contour and where should the interproximal contact and connector be in relationship to the bone? And what effects will that have on the gingival health? These are some of the questions that need to be asked. Lastly, the knowledge and experience learned through temporary fabrication can be applied to improve the dentist's skill of recontouring final lab restorations and direct bonding cases.

*Editor's Note: You can learn more about Dr. LeSage visiting his Web site at [www.cosmetic-dentistry.com](http://www.cosmetic-dentistry.com).*

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granted by the profession, as evidenced by the nearly complete absence of CE courses dealing with the topic.

Another part of the impression technique that is problematic is the misuse of double-arch impression trays. While these trays function quite well for one or two adjacent preparations, using them for bridge preparations is contraindicated. A laboratory has its hands tied from the start when it is asked to construct a bridge on quadrant models. In larger cases like these, a perforated stock metal tray with a putty/wash combo, or a custom tray with a heavy/light body combo is ideal. You stand a much better chance of delivering a bridge that requires no occlusal adjustments just by using a full-arch tray instead of a double-arch tray.

#### **Conclusion**

By identifying some of the more common problems we see in the laboratory and presenting some solutions, it is hoped that the synergy between all members of the dental team can be enhanced, and that continuous quality improvement will be a common goal.