Creating Physiologic Contours Using a Modified Geller Cast Technique

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For a restoration to be successful clinically it needs to satisfy several criteria:

- mechanical/structural requirements (ie, durability) of both the tooth and the restoration;
- esthetic requirements of position, form, and color; and
- biologic requirements of pulpal health, prevention of caries, and gingival health.

One of the crucial aspects of successful esthetic restorative dentistry is controlling gingival contours. Physiologic contours or emergence profiles are important for gingival health, as overcontoured restorations can lead to gingival inflammation (Figure 1).

Controlling the contours of final restorations begins with pre-planning before ever picking up a handpiece and bur. Final 3-dimensional tooth positioning, the type of restoration, and the desired color change from the existing clinical situation dictate tooth structure removal and were discussed in the two previous articles in this series.1,2 This article will discuss how to control the gingival contours of the final restorations in the laboratory.

Ideally, the ceramist should work on a master cast that has the gingival elements intact (ie, not trimmed away). Many techniques have been discussed, from using a solid untrimmed cast (Figure 2) to using casts that use pink flexible silicone materials (Figure 3) that allow the ceramist to visualize the relationship of the free gingival margin to the cervical contours of the restoration. Both work, but with slight difficulties. The solid cast does not use the actual dies, which makes them impossible to use in a foil or refractory technique. The only way to use this technique is after the dies are divested or removed from the foil; they then must be “fit” to the solid cast. If there are problems with contour or fit it is very difficult to correct. The “soft tissue cast” technique allows the use of the master dies, but the authors and many of their colleagues express dislike for using this material with veneers or anterior crowns because this material is very difficult to adjust. This article will discuss the authors’ modified Geller cast technique that allows...
removable dies and interchangeable refractory dies, and maintains the soft tissue elements in die stone.

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Final impressions should be generated with an elastomeric impression material that allows multiple pours, e.g., Impregum™ Garant™ Soft Light Body Impression Material by 3M ESPE (St. Paul, MN) (Figure 4). At least two pours of the impression will need to be made. When pouring impressions multiple times, sometimes the marginal area of the impression will tear because of the thinness of the impression material in this area. To avoid this, sticky wax can be built up to fill in where the free gingival margin is; this supports or blocks out the thin area of impression material that went subgingival during the impression process (Figure 5). This will allow multiple pours without tearing. The authors make two master-die pours in this fashion (Figure 6). The dies should be sectioned (Figure 7) and then trimmed and tapered so that there are no undercuts (Figure 8). For veneers, the lingual soft tissue should not be cut away; this helps stabilize the die in the cast and acts as an anti-rotation or seating device (Figure 9). The margins are marked with a red pencil and the dies are sealed (Figure 10). The master dies are then mounted on a duplicating device (Figure 11). A low-viscosity polyvinyl siloxane (PVS) duplicating material should be poured into the ring around the dies (Figure 12).

Next, the duplicated master dies can be die-spaced with one coat of die spacer on the part of the die that is subgingival (Figure 13). It has been found by the authors

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that one coat of die spacer is necessary to compensate for the slight expansion of the refractory die. This die should be sealed, the die separator placed on it, and the dies placed back in the master impression (no wax is used at this point in the procedure) for an appropriate amount of die spacer on the preparation area just short of the margin.
impression so as to reproduce all of the gingival contours in stone) (Figure 14). Die stone is then poured into the full impression around the dies that have been lubricated. The master cast with fully intact gingiva and removable dies is demonstrated in Figure 15 and Figure 16. It can be seen at this point how much easier it would be to visualize correct gingival contours than with a conventional pinned-die technique.

To create interchangeable refractory dies for the master cast, the original master dies are duplicated, but should not be otherwise used up to this point. These dies should be spaced with the appropriate amount of die spacer on the preparation area just short of the margin (Figure 17). The dies can be placed in a duplicating ring and duplicated as before (Figure 18). Note that these dies had no die spacer on the neck or root of the die. The dies that were used in the master cast have one coat of die space on the neck or root to make the socket or hole the die fits in slightly larger than the die. This allows for the slight expansion of the refractory material and allows the refractory die to seat in the master cast properly. Once the master die with die spacer only on the preparation area is duplicated, it is poured with a refractory material that is specific to the porcelain used (Figure 19). The dies will fit back in the master cast and will be interchangeable with the duplicate master dies (Figure 20).

The refractory dies should be sealed with a material that is specific to the porcelain system. The porcelain is built up similarly to other techniques, but as seen in Figure 21, because of the stone replication of the gingival, it is much easier to create esthetic and physiologic contours. Figure 22 through Figure 24 represent the preoperative condition, conservative preparations, and the final esthetic outcome of veneers placed on teeth Nos. 6 through 11.

REFERENCES