Modified flasking technique for processing a maxillary resection obturator with continuous pressure injection

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It is not possible for the wax pattern of most large-volume maxillary resection obturators to be placed into a flask for conventional compression molding processing and positioning of the wax pattern. However, these wax patterns and their channel access design often can be modified and aligned in position for processing with the continuous pressure injection technique. This article describes the use of the continuous pressure injection technique to process the perpendicularly aligned wax pattern of a maxillary resection obturator. It also describes a modified channel design and a simple method to pull back the injection funnel to increase the volume of the flask. (J Prosthet Dent 2001;86:438-40.)

Numerous studies have reported various methods for processing maxillary resection obturators.[1-9] The height of the buccal extensions is very important for the retention of the maxillary resection obturator.[10] The buccal extensions of the resection obturator should fill the acquired cavity to maximize retention. When the wax pattern and cast are placed horizontally during investing for processing, the height of the buccal extensions often exceeds the limits of the internal dimensions of the flask. With some modifications, the same flask can be used by placing the wax pattern and cast vertically.

A continuous pressure injection (CPI) technique has been developed that purportedly reduces processing error and increases resin density through layered polymerization of the resin with no processing flash.[11,12] The use of prepackaged liquid/powder capsules, a mechanical mixing procedure, and injection of the mixed resin into the flask under continuous pressure during processing all help produce a homogenous denture. Improved dimensional stability, better control of polymerization shrinkage, and reduced vertical dimension of occlusion changes have been demonstrated with injection-processed prostheses compared with those fabricated with the conventional compression molding technique.[13,14]

With most injection processing techniques, it is generally recommended that the prosthesis be horizontally positioned in the injection processing flask and that the middle of the posterior border and the funnel opening for resin access be connected with a single wax sprue that is as short as possible.[11,12] Locating a maxillary resection obturator wax pattern and the access channels in this position is extremely difficult, if not impossible, primarily because of their volume. Perpendicular positioning of the wax pattern of the obturator may overcome the difficulty of placement.

Specifications of the CPI technique for processing PMMA have been investigated, with hi-gloss polished surfaces and homogenous structures being attributed to prepackaged PMMA capsules and rapid mechanical mixing.[15] Rapid mechanical mixing completely dissolves the polymer in the monomer, and the premeasured capsules deliver an exact powder/liquid ratio, thereby eliminating the possibility of excess monomer.

This article describes a modified perpendicular alignment of an obturator wax pattern in a flask, a modified injection channel design that is suitable for perpendicular alignment, and a simple way to pull back the injection funnel to increase the flask volume.

PROCEDURES

Preparation of the funnel pull-back into the injection tube

1. Remove the plastic funnel used to inject the mixed resin into the flask. Make a mix of dental stone, and pour it into the injecting tube of an injecting device (SR-Ivocap, Ivoclar AG, Schaan, Liechtenstein) (Fig. 1).
2. Replace the plastic funnel point first through the stone, but do not let it seat completely (pull-back position) (Fig. 1). After the stone spacer has set, remove the plastic funnel; clean it and replace it in the stone.

Perpendicular flasking

1. Make a final impression of the maxillary resection, and pour it in type IV dental stone to form a definitive cast.
2. After the stone sets, reduce the volume of the definitive cast as much as possible.
3. Wax the obturator pattern, and form the buccal extensions as described by Oral.[16]
4. Place a midpalatal main injection sprue and 2 auxiliary sprues (Fig. 2) to carry the mixed resin to

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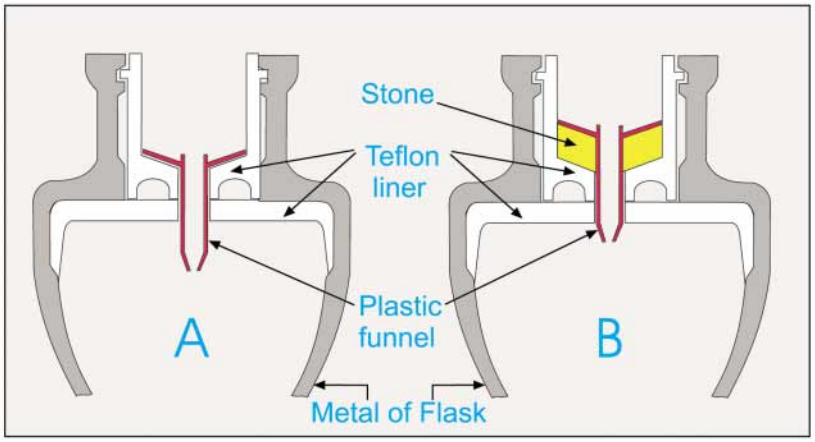

Fig. 1. Horizontal cross-section of flask shows relativity of parts. *A,* Funnel position recommended by manufacturer. *B,* Stone spacer with funnel in pulled-back position. (Flasks are not shown in their entirety.)

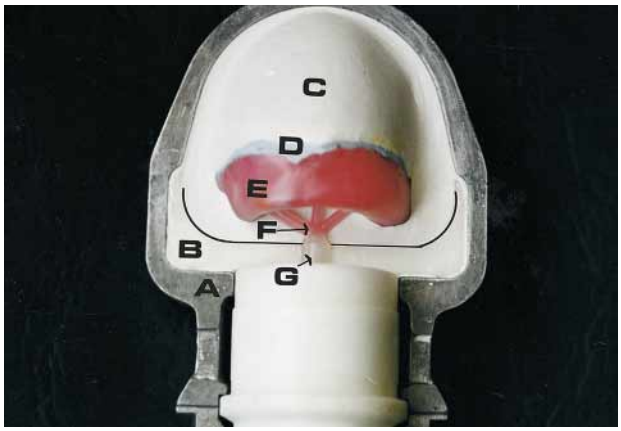

Fig. 2. Wax pattern incompletely flasked in bottom part of flask to show position of sprues. Sprues must be covered with plaster at this time. Illustration shows metal flask *(A),* fluorocarbon resin (Teflon) liner *(B),* investing plaster *(C),* definitive cast *(D),* wax pattern of obturator *(E),* main sprue and 2 auxiliary sprues *(F),* and plastic funnel in pulled-back position *(G).*

Fig. 3. Blocked-out lower part of flask ready for placement of upper part and plaster filling. Note: Sprues are covered with plaster (different color used for visibility).

the denture base and the extensions of the obturator.

5. Fill the lower part of the flask with plaster, and place the waxed obturator pattern in a perpendicular position inside the flask. Make certain that the palate and sprues are covered with plaster and all that undercuts are eliminated (Fig. 3).
6. When the plaster sets, paint it with separating medium (Separating Fluid, Ivoclar AG). Place the top part of the flask over the bottom part, and fill with plaster (Fig. 4).
7. After the plaster sets, open the flask, and flush out the wax with boiling water. Clean the sprue channels by injecting hot water through them with a plastic syringe.
8. When the flask parts have cooled, mix the capsule resin (SR-Ivocap, Ivoclar AG) for 5 minutes with a mechanical mixer (Cap Vibrator, Ivoclar AG). Inject the material into the flask with a continuous pressure injection device.
9. Polymerize the acrylic resin in a thermostatic boiler (Type 3044, Kottermann, Uetze-Hanigsen, Germany). With the pull-back funnel position, the volume of the flask content can be increased so that the water level of the boiler is increased by approximately 10 mm.
10. Recover the processed obturator from the flask. Trim and polish it in the conventional manner.

DISCUSSION

We have observed that obturators polymerized with this procedure are (1) not porous, (2) free from flash, and (3) easy to trim and polish. As with the polished surfaces, the unpolished internal surfaces are smooth, easy to clean, and not conducive to retention and impaction of secretions. These observations have led

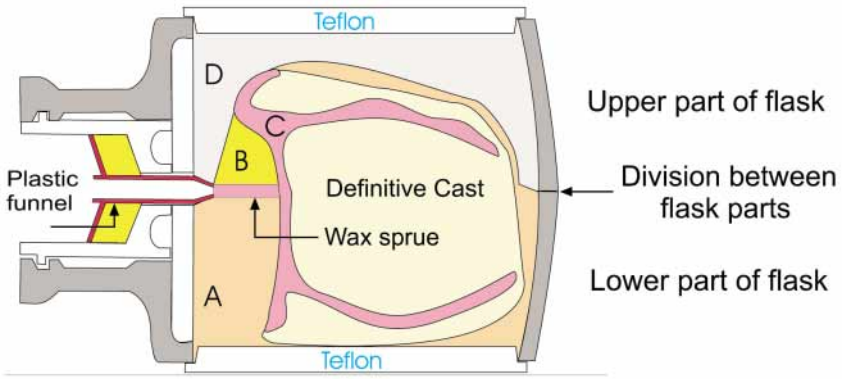

Fig. 4. Vertical cross-section of flasked, sprued obturator pattern and cast in vertical position. *A,* Plaster investment in lower part of flask. *B,* Investing plaster used to cover sprues and block out undercuts. Plaster can be placed when pattern is invested in lower part of flask or later, but undercuts must be eliminated before upper part of investment is added. *C,* Wax pattern of obturator. *D,* Investing plaster in upper part of flask. (Auxiliary sprues not shown because they are superposed. Fluorocarbon resin (Teflon) lining does not look like that in Fig. 1 because this is vertical cross-section.)

us to conclude that obturators processed with this procedure are more hygienic than those processed with the conventional pressure packing method. Most of these prostheses have been produced as buccal extension (open hollow) obturators. However, they can be converted easily into hollow bulb (closed hollow) obturators by closing the orifice with a layer of autopolymerizing acrylic resin. Furthermore, this closing lid can be polymerized with the continuous pressure injection technique at the same time as the obturator and fixed to the obturator orifice with autopolymerizing acrylic resin. The thickness of the obturator walls can be controlled easily and reduced with this technique, which can provide for a remarkable weight reduction, an important requirement for resection obturators.

SUMMARY

The pulled-back funnel described in this article permits the use of the entire volume of the flask so that large resection obturators can be processed. The pulled-back funnel is kept in position by means of the stone spacer; sprue channels completely surrounded with plaster are used to obtain continuous pressing of the mixed resin into the farthest regions of the obturator.

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