Rapid-Flow Filling Technique

Jay Marlin, DMD

Consider the following scenario: Your nickel-titanium (Ni-Ti) canal preparation is finished, rinsed, and dried. A Schilder plugger No. 8 is pre-fit in the canal, as are finger plugger Nos. 25 and 20. You have inserted one drop of sealer into the canal. You pick up your Obtura to back-fill the canal, condense with the No. 8 plugger, No. 25 finger plugger, followed by No. 20. You go back to the No. 25 plugger, then the No. 8 Schilder plugger—and voilà! You are done!

What's unusual with the above? No gutta-percha master cone. What's the advantage with this scenario? You have completed a 3-dimensional warm gutta-percha fill without a master cone in less time than it takes to fit a cone. And, with this Rapid-Flow Filling Technique, you can rely on consistent results.

The Rapid-Flow Filling Technique has become an obturation method utilized by practitioners who avail themselves of the technical advancements in endodontics. Practitioners in general practice residencies and endodontic residency programs as well as endodontists have mastered the technique with minimal direction.

HISTORY

The quest in endodontics is to fill prepared root canal systems in 3 dimensions. Various materials and techniques have been tried, with the profession continuously returning to gutta-percha. Gutta-percha meets all but 2 of Grossman's requirements for an ideal root filling material:[1] first, that it be a semisolid upon insertion, and second, that it becomes solid afterward. Solvent techniques[2] have been able to provide the semisolid property, but evaporation of the solvent has left voids in the gutta-percha fillings. Schilder's vertical condensation of warm gutta-percha,[3] and the more recent System B (SybronEndo) variation of his technique, required fitting a cone in the canal, then plasticizing the gutta-percha with heat and condensing it, with repetitions if necessary, until the material reached the apex. However, the gutta-percha is not *introduced* in a plasticized state.

The Rapid-Flow Filling Technique consistently meets the last 2 of Grossman's requirements, ie, the gutta-percha is semisolid upon insertion and becomes solid afterward. This has been made possible by Ni-Ti canal preparations, the Obtura (Obtura Spartan), and temperature-controlled gutta-percha, such as Schwed regular flow gutta-percha (Charles B. Schwed) or Obtura 150 gutta-percha (Obtura Spartan).

Gutta-percha in a perfect plastic state is injected into the ideally Ni-Ti prepared root canal space and vertically condensed until the gutta-percha has solidified. Scanning electron microscope examination demonstrates the adaptation of heat-plasticized gutta-percha to be equal or superior to fillings produced by other clinically accepted techniques.[4]

MATERIALS

ProFile series 29 0.06 Ni-Ti instruments (DENTSPLY Tulsa) used in a light touch, crown-down method provide an excellently shaped canal with a constriction at the apex and a flare at the orifice. ProTaper series 29 0.06 files (DENTSPLY Tulsa) used circumferentially in a crown-down technique also provide the needed shape. The ProTapers cut with a light, circumferential motion more efficiently coronally than the ProFile, allowing deeper penetration of the smaller sizes approaching the apex.

RC-Prep (Premier Dental Products) is used in the pulp chamber as a lubricant with Ni-Ti files, and as a mild chelating agent to help remove the smear layer. The new Obtura (Figure 1) has precise temperature settings required for gutta-percha flow through the 20-gauge and 23-gauge needles.

Gutta-percha formulations with the required flow properties at exact temperatures are necessary for successful use of the Rapid-Flow Filling Technique. Although other gutta-percha formulations will work for back-filling, they lack the flow characteristics for complete fills. With the correct formulation, gutta-percha can be drawn out to a long, hair-like strand at least 1 foot long (Figure 2). Schwed regular flow will work at 160ºC for the 20-gauge and 200ºC for the 23-gauge Obtura needles (Obtura Spartan). Obtura 150 gutta-percha will fulfill this task at 160ºC for

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Figure 1. Obtura unit.

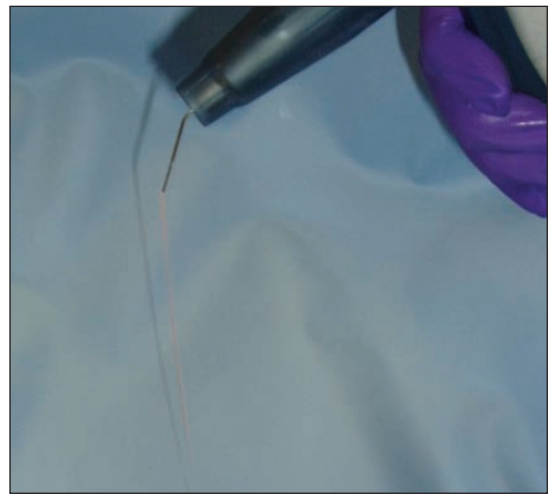

Figure 2. Correct consistency as demonstrated by the long, fine strand of gutta-percha immediately prior to canal injection.

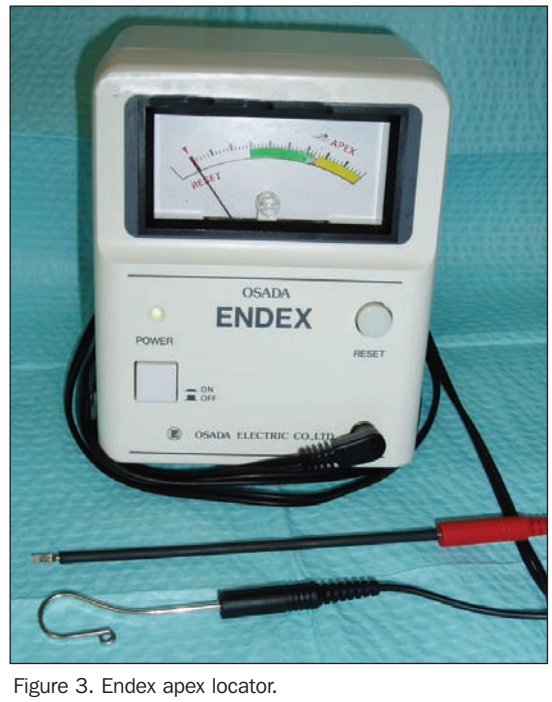

Figure 3. Endex apex locator.

Legend of the Fill

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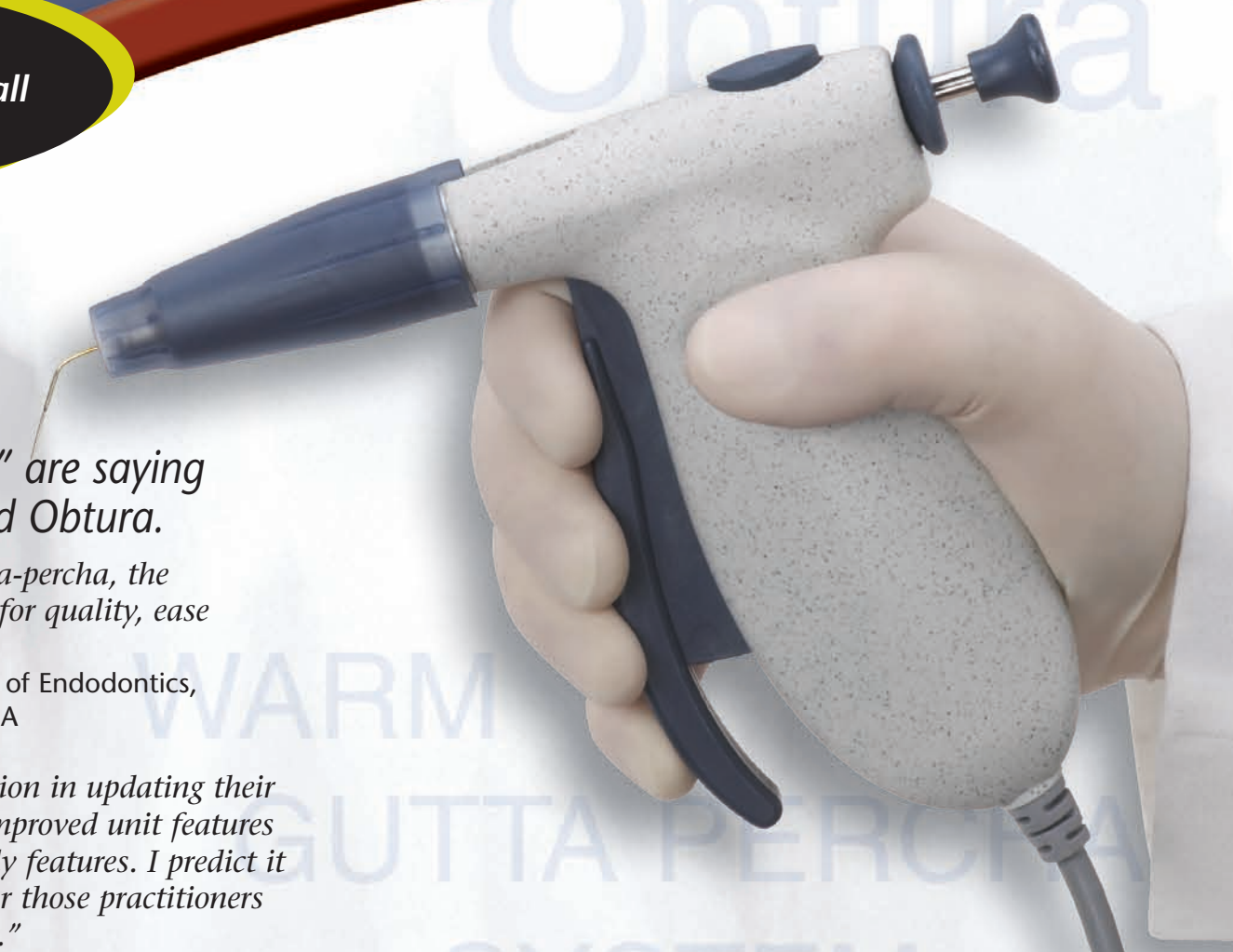

Here's what the "critics" are saying about the NEW redesigned Obtura.

"In my 25 years of using injectable gutta-percha, the redesigned Obtura sets a new paradigm for quality, ease of use, and ergonomics."
- Jay Marlin, DMD, Assoc. Clinical Professor of Endodontics, Tufts School of Dental Medicine, Boston, MA

"Once again Obtura has shown innovation in updating their classic obturation unit. The new and improved unit features better ergonomics and many user friendly features. I predict it will become an indispensable adjunct for those practitioners seeking to achieve endodontic excellence."
- Hugh Maguire, DDS, Founder, Endodontic Learning Centre, White Rock, BC

"The Obtura is my favorite device for the delivery of either gutta-percha or Resilon, because it gives me excellent control of the filling procedure. The "feel" is incomparable!"
- Marga Ree, DDS, MSc,Netherlands

"Even the most difficult canal shape is easier to fill with the new Obtura."
- Jerzy Zbozen, DDS, Kielce, Poland

"Obtura III 's new aesthetically pleasing design is less cumbersome than previous units. This ergonomic style provides excellent tactile sensitivity, so necessary for a controlled fill. The presets make using different obturation materials efficient and accurate. Personally I highly recommend the new Obtura, and will continue to use Obtura Spartan technology in my practice."
- Bobby Mallik, DMD, Green Brook, NJ

"The Obtura is a must have piece of equipment for a predictable and efficient backfill in doing root canal treatment."
- Kenneth Lee, DMD, Endodontist, Exton, PA

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Rapid-Flow...

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both size needles.

Roth 811 Elite Grade Root Canal Cement (Roth International), mixed thin rather than stringy, is the preferred sealer for this technique. In addition to its sealing properties, it must act as a lubricant to aid the flow of the plasticized gutta-percha into the canal preparation.

Schilder pluggers (DENTSPLY Maillefer) Nos. 8 and 9, and Nos. 20 and 25 stainless finger pluggers (Moyco Union Broach), *not spreaders*, are required for condensation. Alcohol prevents the condensers from adhering to the flowable gutta-percha during condensation.

TECHNIQUE

Access is accomplished, orifices located, and the largest two Ni-Ti files are used to open the orifices of the canals. Canals are irrigated with sodium hypochlorite (NaOCl), and the pulp chamber is filled with RC-Prep. An appropriately sized instrument that can negotiate the apex is measured with an apex locator such as the Endex (Osada Electric; Figure 3). Measurement is compared with digital x-ray determination. If this measurement agrees within 1 mm of the apex locator, it is considered correct; otherwise, a radiograph of the instrument is taken. Once length is determined, 1 mm is deducted, and this measurement is used as the working length. When the preparation is complete, it will be 1 mm longer than the working length, since the glide path and completed preparation removes the irregularities.

RC-Prep and NaOCl are used copiously during preparation. At the completion of cleaning and shaping, the canal undergoes a final rinse with ethylene diamine tetra acetic acid (EDTA) followed by NaOCl to remove the smear layer and to expose openings of accessory canals. The canal is dried, and pluggers are fitted to the extent that they are 1 mm short of touching two walls of the canal to prevent dentin cracking during gutta-percha compaction.

One drop of loose sealer is placed 1 mm short of the apical preparation. Using a needle that fits in the middle third of the canal (Figures 4a and 4b), the Obtura is heated to the correct gutta-percha temperature so that it can be stretched to a fine, hair-like strand (Figure 2). Excess gutta-percha is removed from the needle tip, and it is rested to its extent in the middle third of the canal. Next, with no pressure on the needle, the flowable filling material is introduced into the canal until the needle rises 2 mm from its resting position. Injection is stopped, and the needle is then removed. The gutta-percha flows half the distance between the tip of the needle and the prepared apical constriction, leaving 2 to 4 mm of distance for the condensers to complete the flow as gutta-percha solidifies (Figures 4c and 4d).

The No. 8 Schilder plugger is dipped in alcohol and introduced into the canal with firm vertical pressure short of the pre-fit reference point until the filling material feels solid. Rotate the condenser on its axis and remove. With the No. 25 finger plugger dipped in alcohol, the same motion is used until the gutta-percha is solid, then rotated on its axis and removed. The same motion is repeated with the No. 20 finger plugger. At this time the No. 25 is reintroduced, pushing gutta-percha circumferentially from the walls into the center of the canal. The Schilder plugger is likewise used and a radiograph taken. With the apex and accessory canals filled, the remainder of the canal is back-filled with the Obtura and condensed (Figures 5a to 5d).

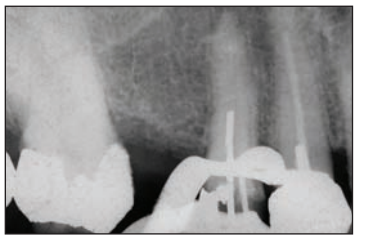

Figure 4a. A 23-gauge needle correctly located in the middle third of the prepared bicuspid canal.

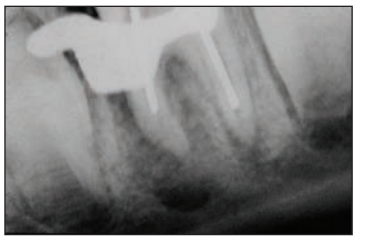

Figure 4b. The 20-gauge needles fit in the apical third of one mesial and distal canal. Due to the preparation needed in the distal canal, the needle reaches the lowest portion of the middle third of the distal canal.

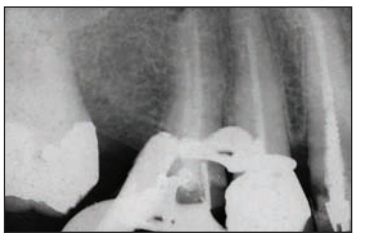

Figure 4c. Injection of gutta-percha between apical preparation and needle.

Figure 4d. Injection of gutta-percha half the distance between depth of needle placement and apical preparation.

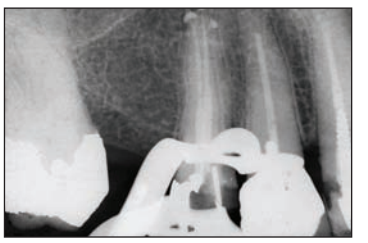

Figure 5a. Completion of condensation and back-filling. Note apical accessory canal.

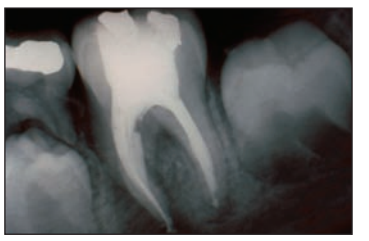

Figure 5b. Completion of root canal filling.

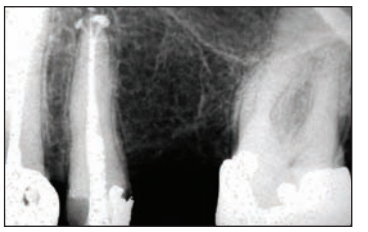

Figure 5c. Six-month postoperative recall showing apical healing.

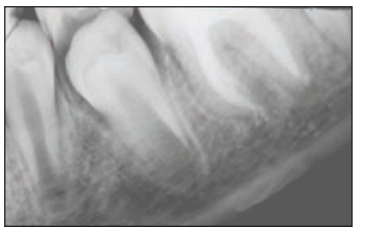

Figure 5d. Healing at 6-month recall showing extent of bone regeneration and accessory canals visible with this angulation.

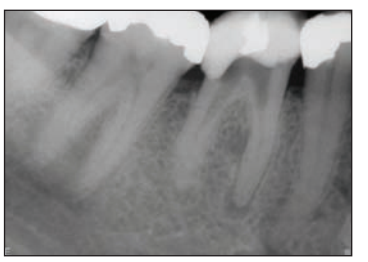

Figure 6a. Molar with periapical areas and mid-root lucency at the distal surface of the mesial root. Patient was referred due to blockages in mesial and distal canals.

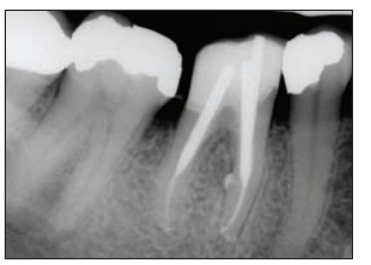

Figure 6b. Radiographic bone fill at 6-month recall.

DISCUSSION

The Rapid-Flow Filling Technique is a 3-dimensional filling process that results in a solid impression of the root canal system and all its irregularities. Cones are not required, since the gutta-percha is plasticized outside the tooth, introduced into the canal preparation, which serves as a mold, and held under pressure during solidification. The technique is similar to the manufacturing of plastic products we use every day. Due to the unique heat-retentive flow characteristics of gutta-percha, adequate time is available to fill the properly prepared root canal completely and compact the material as it solidifies. Forcing the gutta-percha into the canal intricacies is a normal advantage of this obturation method. Often, the complete filling procedure is completed in less time than is required to fit a cone.

With experience, the dentist will adapt the Rapid-Flow Filling Technique to a great variety of cases (Figures 6a to 8b).

CONCLUSION

The Rapid-Flow Filling Technique has become an obturation method utilized by practitioners who avail them-

Figure 7. Canine with Rapid-Flow Filling of bifid apex and lateral canal.

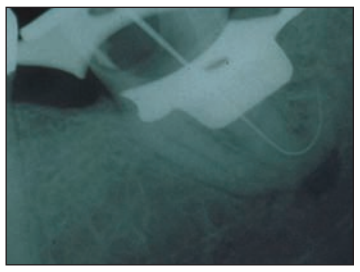

Figure 8a. Wisdom tooth with No. 8 instrument demonstrating severe curvature of distal canal. Note the radiolucency at the base of the distal convexity.

Figure 8b. Recall of tooth in Figure 8a. Mesial canals filled with lateral condensation. Distal canal filled with Rapid-Flow Filling Technique to apex showing accessory canal into previous radiolucent area. First use of Rapid-Flow Filling Technique. (Image courtesy of Dr. David Melrod.)

selves of the technical advancements in endodontics. Practitioners in general practice residencies and endodontic residency programs as well as endodontists have mastered the technique with minimal direction. Consistently accurate apex locators show apical constrictions that terminate at or just short of the apical foramen. Ni-Ti instrumentation provides ideal shapes with apical constrictions. Gutta-percha with controlled temperature ranges and the new Obtura allow introduction of filling material at the correct temperature and consistency. With the Rapid-Flow Filling Technique, condensation and obturation are the same as other established warm gutta-percha techniques[4] in significantly shorter chair time.✦

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Disclosure: Dr. Marlin has a royalty involvement with Obtura for their needles.

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