ThermaSystem Plus

**DESCRIPTION**
ThermaSystem Plus is for obturation of the root canal.

**INDICATIONS FOR USE**
For the obturation of the root canal.

**CONTRAINDICATIONS**
None Known.

**WARNINGS**
- This product may contain dry natural rubber.
- Reuse of the single use devices may result in cross-contamination, infection and/or failure of the dental procedure.

**ADVERSE REACTIONS**
Patients with latex sensitivity may experience allergic reactions to gutta-percha, which may contain dry natural rubber.

**PRECAUTIONS**
As with all new products, you must exercise caution until you become proficient in its use. While we have implemented safeguards against possible misuse, there are several important points to remember: The obturator oven is intended for use in heating gutta-percha coated obturators only. Do not insert anything other than an obturator into the oven.

**STEP-BY-STEP INSTRUCTIONS**
Read this booklet to gain a complete understanding of the system and the technique. If you would like to speak with one of our staff clinicians, please call 1-800-662-1202, and we’ll provide one-on-one assistance.

**REVIEW OF ENDODONTIC PRINCIPLES**
Successful endodontic treatment depends on proper radicular access, debridement, cleansing, shaping and obturation of the root canal space. Although the Thermafil® Plus endodontic obturation system speeds up the process considerably, there are certain procedures you must follow carefully.
CREATE STRAIGHT LINE ACCESS

It all begins with proper access opening, which should be divergent from pulpal floor to occlusal surface.

The benefit of this is straight-line access into the canal, permitting you to freely use working instruments from the access opening to the apical constriction (Fig. 1).

TIPS FOR PREPARATION

• Shape the coronal and middle portions of the root canal before refining final working length distance. This lets you explore the delicate root end area unhindered.

• Use a lubricant, such as ProLube® Root Canal Conditioner, when working in the apical region. Lubricants will emulsify debris, helping to remove rather than encouraging a buildup of materials which lead to blockage. Lubricants also ease the passage of an exploratory instrument through canal complexities.

• You must maintain patency of the apical constriction throughout the treatment process. Recapitulate the apical opening with a small hand instrument before you introduce each instrument size, particularly when you’re working in the middle and apical canal portions.

• Once you reach working length, enlarge the apical preparation to an appropriate size.

• Irrigate frequently, alternating sodium hypochlorite and EDTA.

CROWN-DOWN CANAL SHAPING

There are three phases of crown-down canal shaping which correspond to the following three radicular areas: the coronal, mid-root and apical portion.

CORONAL

You should preflare the coronal one-third, or straight portion of the canal. After locating the orifice of each canal, begin enlarging and flaring the coronal portion. A variety of instruments may be used to this end. Sonics and Lexicon hand instruments are also effective tools used to preflare the coronal one-third of the canal.

CAUTION: Be aware of instrument location and root morphology. Lateral root perforations can be prevented with visualization, knowledge and careful technique.

Shape canal – crown down

Starting with the chamber orifice, the final canal preparation should be continuously tapering in appearance, ending at the apical constriction. A reliable and recommended way to consistently achieve this, regardless of case difficulty, is to begin shaping efforts in the coronal portion of the root canal (“crown-down”) (Fig. 2) and proceed apically in a similar manner with progressively smaller files until working length is reached.

CAUTION: At an estimated three-fourths of the canal, establish exact working length to avoid insult to the periapical tissues by inadvertent over-instrumentation.

TIPS FOR ACCESSING

• On severely inclined teeth, make the access preparation before you place the rubber dam to compensate for distortions.

• Before rubber dam placement, be sure to check the working length reference points (usually cusp tips) for occlusal prematurities and reduce. This will help the working length remain constant for the duration of therapy.

• When treating badly broken-down teeth, clamp the gingiva, if necessary, to secure the rubber dam.

• In highly calcified molars where the location of the canal orifice is difficult, remove the entire mesiobuccal cusp to make visualization easier.

Remember, the use of a rubber dam is the standard of care for endodontic procedures.

MID-ROOT

By using a series of successively smaller files in progression toward the apical constriction, a continuous tapering preparation evolves. Using rotary variable taper files will predictably produce a tapered funnelform-shaped canal.

Use rotary instruments, sonics and/or hand instruments to shape, and frequent irrigation with sodium hypochlorite to cleanse.

CAUTION: Be aware of instrument location and root morphology. Lateral root perforations can be prevented with visualization, knowledge and careful technique.

SHAPE CANAL – CROWN DOWN

Visualize continuously tapered canal starting at access opening and terminating at apical constriction

Convenience form allows straight-line access into root

Thermafil Plus Clinical Technique

Coronal

Fig. 1

Mid-Root

Apical

Fig. 2
WORKING LENGTH

Working length should extend to the end of the root canal (apical constriction) (Fig. 3).

As the above figure illustrates, the apical constriction is the smallest diameter of the primary root canal space. It is very important because it essentially defines the boundary between pulp (compromised blood supply) and supporting (periradicular) preparation tissue (copious blood supply).

You should end the root canal preparation at the apical constriction, which is an appropriate stopping point for the obturating material. Clinically, you should determine and confirm working length by radiographic interpretation, tactile sense or electronic apex locator.

APICAL PORTION

With mental imaging and tactile awareness, begin probing for the apical constriction.

Using a chelating agent such as EDTA or Prolube® Root Canal Conditioner, prepare the apical remainder of the canal by delicately advancing the remaining instruments in increments to the full working length. Nickel titanium hand and rotary instruments are designed to prepare the canal in a delicate fashion, maintaining the original canal anatomy.

THERMAFIL® PLUS OBTURATING PROCEDURE

To become familiar with the Thermafil Plus obturating procedure, we recommend you practice using plastic blocks and extracted teeth before you use it clinically.

1. ADMINISTERING ANESTHESIA

Before obturating, properly anesthetize the tooth as you would for other dental procedures to avoid possible patient discomfort upon placement of the obturator. On maxillary teeth, palatal anesthesia is also advised.

2. DETERMINING FINAL WORKING LENGTH

After you have completed debridement, cleansing and shaping procedures, confirm the final working length measurement using the appropriate size verifier that reaches the apical constriction passively, with no significant resistance or twisting. The size verifiers are made of nickel titanium and are fluted, making them excellent for minor apical shaping, if necessary. If the size verifier is slightly short of your working length, you can use it to enlarge to your working length by rotating it in a clockwise direction while exerting slight apical pressure.

It is necessary to use the size verifier with Thermafil Plus obturators.

NOTES

• Because of previously attained canal shaping, cleansing the apical area should be done through the use of irrigants rather than overly aggressive instrumentation.

• By protecting the integrity of the apical constriction, trauma to the periradicular tissues from over-instrumentation and excessive extrusion of canal materials (factors contributing to postoperative pain) is minimized.

The cleaning of the shaped root canal system is accomplished primarily through the use of copious irrigation with NaOCl. Irrigants are activated using a cavitation and acoustic streaming device or ultrasonic irrigation needle. The activated irrigants improve debridement and disrupts the smear layer and biofilm inside the canal, promoting deep cleaning and disinfection of lateral canals, fins, webs, isthmuses, anastomoses, and dentinal tubules. Dry the canal thoroughly using absorbent points.
3. SELECTING OBTURATORS

**IMPORTANT**

Thermafil® Plus plastic carriers DO NOT need to be precurved.

Using variable taper instruments produces optimal canal shapes for obturating with Thermafil Plus carriers as well as for other obturating methods. Select a Thermafil Plus obturator of the same size as the size verifier that fits passively at working length. The size verifier must be used to determine accurate size of Thermafil Plus obturator.

You can achieve a predictable flare with variable tapers. If using conventional hand files, a step-back flaring technique is indicated.

![Obturator groove for better backflow and retreatment.](image)

**MEASURING WORKING LENGTH ON THERMAFIL® PLUS**

Using the calibrations on the Thermafil Plus carrier, adjust the silicone stop to coincide with the working distance taken from the tooth (Fig. 4). DO NOT use a finger ruler to measure working distance.

![Working Length](image)

**Note:** The calibration rings **MUST** be used to set the working length distance on the Thermafil Plus carrier. Working length based upon a measurement from the tip of the gutta-percha will be incorrect. Calibrations are set at the following working lengths (in millimeters): 18, 19, 20, 22, 24, plus 27 and 29 on the plastic handles. There may be times when the gutta-percha obscures the calibration rings. If necessary, trim off the excess gutta-percha with a Bard-Parker blade and measure from the rings, setting your rubber stop as a measurement guide.

![Fig. 4](image)
6. MIXING THE SEALER

While the obturator is heating, prepare the root canal sealer using package directions. We recommend using ThermaSeal® Plus Ribbon® sealer, a noneugenol-type sealing agent. ThermaSeal® Plus Ribbon® sealer is a paste formula that is biocompatible and easy to use. It has properties that provide excellent lubrication and adhesion, ample working time and long-term stability.

7. DRYING THE CANAL AND APPLYING SEALER

Use sterile paper points to completely dry the canal before you apply the sealer, making sure not to extend past the working length. With a paper point or file, brush a very light coating of sealer onto the canal walls to the working length (Fig. 5). Thermafil Plus obturates the root canal space with a dense, homogeneous, three-dimensional filling. Excessive sealer is neither necessary nor desirable for this technique.

If obturating more than one canal in a single tooth, place sealer in all the canals at the same time. This facilitates removal of excess gutta-percha by preventing the gutta-percha from sticking to other orifices or dentin.
8. OBTURATING THE CANAL(S)

A. After the first signal “beep” of the ThermaPrep® Plus Oven the obturator is ready for use. Push the obturator holder and guide the holder with your finger. Take the obturator carefully out of the holder by first lifting it up a little and then pulling it toward you.

B. You can leave the obturator in the ThermaPrep Plus Oven for up to 90 seconds after the first signal “beep.” It will keep the obturator at the right temperature and ready for use. The oven will “beep” every 15 seconds to remind you that the obturator is still in the oven. After 90 seconds, the oven will switch off automatically.

C. If you want to heat more obturators, you can alternate using the left and the right holders so you can continue your work efficiently. After the signal “beeps” for the first holder, you can start the other one. The “start” button of the first holder must be pushed down before the second holder is ready to heat the obturator. Insert carrier directly into orifice of canal. Avoid touching the walls of the occlusal opening (Fig. 6).

9. REMOVING THE SHAFT AND HANDLE

PLASTIC

While stabilizing the carrier with your index finger, sever the shaft level with the orifice using a Prepi® bur or an inverted cone bur in a high-speed handpiece. Optionally, a round bur in a high-speed handpiece can be used. We don’t recommend using a flame-heated instrument (plugger, old caries spoon, etc.) to sever the plastic shaft because the instrument cools too rapidly and may cause inadvertent obturator displacement from the canal (Fig. 7).

Note: If the canal has been properly shaped and the gutta-percha properly heated, the obturator should seat to place without twisting or forcing. To avoid overextension, don’t force the carrier beyond the working length.

You will note a backflow of sealer and gutta-percha resulting in an accumulation at the orifice. This is to be expected, especially in multirooted teeth, because the obturator is designed with excess gutta-percha to accommodate even the most widely flared canals. To prevent excess gutta-percha from obscuring access into other canals, place a paper point or small pellet of cotton into the other orifices. In addition, you can trim some of the excess gutta-percha off the shaft (toward the handle portion of the carrier) before heating.
10. CONDENSING THE GUTTA-PERCHA
Insert a small segment of gutta-percha, 4-6mm long, alongside the shaft of the carrier
with a lubricated plugger or spreader and condense. The gutta-percha segment
compacts the heat softened gutta-percha and becomes an integral part of the filling.
This will also prevent inadvertent removal of gutta-percha from the orifice with an
inadequately lubricated plugger, as well as compensate for the lack of gutta-percha in
uncommonly large canals or those with internal resorption defects (Fig. 8). Due to the
tacky nature of the plasticized gutta-percha, you must use a lubricant such as ProLube®
Root Canal Conditioner, sealer, alcohol, etc., on the plugger or spreader.

11. REMOVING EXCESS GUTTA-PERCHA
Using an endo spoon excavator, explorer, etc., remove any excess gutta-percha that
may block access to the chamber and other canals.
Repeat all of the above steps on each canal of a multirooted tooth. If necessary, protect
adjacent canal orifices from debris and gutta-percha with tiny cotton pellets or a paper
point until time for obturation. When obturations are completed and the chamber is free
of excess gutta-percha, prepare a base covering for the canal orifices and chamber
floor. The tooth is now ready for temporization or restoration and a post-op radiograph.

12. CREATE AN OCCULUSIAL LEAKAGE BARRIER
Clean the canal chamber. Create an occlusial leakage barrier with a composite
restorative.

Fig. 8

Fig. 9

Fig. 10

THERMAFIL PLUS OBTURATING PROCEDURE
WITH POST SPACE PREPARATION.

CREATING POST SPACE (SEE FIG. 9)

Here’s how it works:
1. Upon completing the obturation
   procedure and after taking and
   viewing your post-op radiograph,
   you may begin your post
   preparation. Trim carrier just below
   the orifice with a Prepi or round
   bur.
2. To drill post space, select the largest
   drill necessary to remove the
   Thermafil Plus plastic core (Fig. 9).
   The Pro-Post drill’s eccentric cutting
tip will ensure that it stays centered
in the canal while creating better
post space (Fig. 10).
The Pro-Post® system is a remarkable advancement in prefabricated post systems. Pro-Post is acid-etched and fits passively in the root, resulting in fewer root fractures caused by stress. When used with a self-curing resin cementing agent in a canal with acid-etched walls, the etched metal and dentin surfaces bond closely with the resin cement to form a bonded unit with superior strength and retention.

1. For best results, you should first isolate the tooth with a rubber dam.
2. To drill post space, select the appropriate Pro-Post drill.
3. Using the Pro-Post drill, remove endodontic filling material to desired depth — 4-5mm of filling material should remain in the apical area to ensure an adequate seal (Fig. 12).
4. Check post hole for size and depth with the appropriate size verifying tool. The tool must be inserted easily without binding. If the verifier does not seat to place, you will need to shorten the post from the apical end, or select a short post*. To shorten a post, remove the post from the capsule, grasp it firmly with a hemostat and sever an appropriate apical portion. Place handle back on post and back in the capsule.

*The short post is available in replacement packs, but is not included in the starter kit.

1. Look for the groove in the Thermafil Plus carrier. If visible, this will create a natural access point for a file.
2. Use a ProFile® .04 taper rotary instrument at 1,500-2,500 rpms alongside the carrier very delicately, until resistance is met. The frictional heat will melt the gutta-percha allowing the instrument to advance.
3. Use a size smaller .04 taper instrument at regular speed (250-300 rpms) and advance until resistance is met, OR use the same size ProFile® .06 taper instrument. The instrument will bind between the plastic carrier and the dentin, exerting an extracting force.
4. If necessary, work small hand files apically alongside the core. If you cannot remove the carrier, add chloroform into the space created to soften the gutta-percha surrounding the shaft.
5. Once you have taken the hand files as far as you can go apically, take a hedstrom file into the space created with firm apical pressure into the softened gutta-percha to engage the plastic core. Remove the core by pulling in an occlusal direction. Alternately, you can use variable taper nickel titanium rotary files with minimal pressure to achieve a successful retrieval.
6. Or, insert a second hand instrument to approximately the same depth as the first hand instrument. “Braid” or twist files together and pull.
5. Irrigate the post space with sodium hypochlorite to remove any debris.

6. Rinse, then dry the canal wall with air or paper points.

7. Apply any acceptable etchant to the canal space and coronal root structure.

8. Thoroughly flush the canal with water.

9. Use your three-way syringe to air-dry the canal, followed by a paper point to ensure the canal walls are dry. Use care not to damage the matrix you have just created.

10. Mix an appropriate self-curing resin cement according to instructions and work it in the canal post space using an appropriate instrument.

11. Grasp the colored post handle and remove it from the attached capsule. Coat the post surface with cement. Avoid touching or rubbing the etched surface with your hands (Fig. 13).

12. Insert the post into the canal space with gentle finger pressure. This will provide enough hydraulic pressure to force the cement into all irregularities of the etched surfaces and dentinal tubules. Once seated, remove the colored applicator handle by simply bending it to the side. This will dislodge it from the post (Fig. 14).

13. The core buildup may be completed after removal of the excess cement.