ESSIX® APPLIANCE TECHNOLOGY UPDATE

A Scientific Journal on the Fabrication, Alteration & Retention of Essix Appliances

SPRING 2003
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Essix plastic has been accepted worldwide for its strength, clarity, size and cost. It’s proven, consistent and guaranteed.

impressions

The hallmark of the Essix appliance is the accuracy of the impression, thus, Raintree Essix recommends a polyvinyl siloxane (PVS) impression system. They are a bit more expensive, but the negligible increase in cost is more than justified by better fitting appliances and fewer remakes.

Raintree’s PVS system is dispensed in two parts

Part 1. The base and catalyst of heavy bodied putty are mixed together to comprise a base layer. Press the putty into the anterior tray.

Part 2. The second layer, called a “wash”, may either be dispensed directly onto the undercuts gingival to contact points and then seat the tray with the putty in it (Fig. 1).

Or, the wash may be dispensed onto the tray with the putty and then seated in the patients mouth (Fig. 2).

TIP: Squirt a small amount of wash on the patient’s wrist to test for setting.

When removing the tray, always dislodge the tray from the posterior, not the anterior handle (Fig. 3).

(Cavex Alginate #CA37 is recommended for those practices that insist on using an alginate.)

casting

Prepare the impression before pouring the stone into it.

1. Spray the impression with Essix Debublizer #21008 (Fig. 4). Shake out excess.

ANTERIOR CAST TIP: Block off the impression, distal to the cuspsids, with pop-top tabs retrieved from cola cans. Angulate them in the impression so that when the cast is poured, the distal ends will taper from the base of the cast to the occlusal plane (Fig. 5).

Essix Die Stone #16005 is the hardest, most dimensionally stable stone on the market.

Once the cast is dry, remove the pop-top tabs and use the Essix Cast Removing Instrument #18742 to pry the cast from the impression (Fig. 6). Trim the cast to minimal dimensions with distal ends tapered toward the occlusal plane. The long axis of the incisors should be perpendicular to the base of the cast (Fig. 7). Do not block out undercuts unless they are severe. Likewise, if the undercuts are a bit swollen, they can be accentuated by scraping the cast. Cast discrepancies such as incisal edge chips should be filled in with acrylic or Block Out Compound #18300. Do not use wax – it will melt during thermoforming.

NOTE: If the gingiva is excessively swollen, it may be best to use a conventional appliance until the swelling recedes.

continued...
thermoforming

Raintree Essix recommends a vacuum thermoforming machine for all its applications. The Essix Machine #85000 (Fig. 8) is not only compact and inexpensive, but need only be plugged in – no compressed air is necessary. (The Essix machine has been specifically designed to allow optimal suction beneath the cast.) The VACUUM MAXIMIZERS™ #85999 further enhance the suction beneath the cast depending on the cast size (Fig. 9).

When heating any plastic, preheat the machine before using! Heating times may vary with current fluctuations or length of time the heating element has been on.

Essix C+®

Features
◆ 1.0mm (.040") thickness
◆ Contact clarity
◆ Flexible
◆ Durable
◆ Withstands bruxing
◆ Will not crack or bubble
◆ Up to 2 years of wear
◆ Does not accept bonding agents
◆ Excellent for:
  • Retention
  • Tooth movement

Basic Retainer Vacuum Instructions
1. Pre-heat the vacuum machine for at least 3 minutes or until the heating element is a solid orange color.
2. Place the plastic into the frame on the vacuum machine and the model on the base plate. Do not place model directly in center, offset 1/4”.
3. Swing the heating element over the plastic. Observe the plastic as it heats.
4. Essix C+ rises toward the heat source, then becomes wavy as it lowers from the raised position (Fig. 10).
5. The waves will start to flatten out into its original flat position – this is the optimal thermoforming time. Do not let Essix C+ sag.
6. Move the heating element away from the plastic.
7. Turn on the vacuum, then lower the plastic over the model.
8. Push into the plastic at each undercut with the Essix Accentuator #18943 (Fig. 11).
9. Immediately spray the plastic encased model with Essix Freeze Spray #22000 (Fig. 12). This is an essential step. Not only does it cool the plastic, prohibiting further thinning, but it “shrinks” the material around the cast, realizing a tighter fit.
10. Let vacuum continue to run until plastic is cool.

Essix A+™

Features
◆ 0.5mm (.020”) to 3.0mm (.120”) thickness
◆ Protective blue film on both sides
◆ Brilliantly clear
◆ Rigid
◆ Accepts bonding materials
◆ Up to 6 months of wear
◆ Excellent for:
  • Retention
  • Tooth movement
  • Bite planes
  • Splints made with acrylic

Basic Retainer Vacuum Instructions
1. Pre-heat the vacuum machine for at least 3 minutes or until the heating element is a solid orange color.
2. Remove the blue film on both sides of the sheet of plastic before thermoforming.
3. Place the plastic into the frame on the vacuum machine and the model on the base plate.
4. Swing the heating element over the plastic. Observe the plastic as it heats.
5. Essix A+ should sag approximately 1/2” to reach optimal retention.
6. Move the heating element away from the plastic.
7. Turn on the vacuum, then lower the plastic over the model.
8. Let vacuum continue to run until plastic is cool.

<table>
<thead>
<tr>
<th>Thickness</th>
<th>Vacuum Heat Time</th>
<th>Biostar® Code</th>
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</thead>
<tbody>
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<td>40 seconds</td>
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<td>2.0mm (.080”)</td>
<td>45 seconds</td>
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</tr>
<tr>
<td>3.0mm (.120”)</td>
<td>50 seconds</td>
<td>193</td>
</tr>
</tbody>
</table>

 Thickness Vacuum Heat Time Biostar® Code

FIG 8

There are more holes and the holes are bigger than most other vacuum machines.
Essix Embrace®

Features
◆ 0.75mm (.030") and 1.0mm (.040") thickness
◆ Clear and Rigid
◆ Up to 16 months of wear
◆ Accepts bonding agents
◆ Excellent for:
  • Retention
  • Minor splints
  • Bite planes

Basic Retainer Vacuum Instructions
1. Pre-heat the vacuum machine for at least 3 minutes or until the heating element is a solid orange color.
2. Place the plastic curved side up into the frame on the vacuum machine and the model on the base plate.
3. Swing the heating element over the plastic. Observe the plastic as it heats.
4. Essix C+ rises toward the heat source, then becomes wavy as it lowers from the raised position.
5. The waves will start to flatten out into its original flat position – this is the optimal thermoforming time. Do not let Essix C+ sag.
6. Move the heating element away from the plastic.
7. Turn on the vacuum, then lower the plastic over the model.
8. Push into the plastic at each undercut with the Essix Accentuator #18943.
9. Immediately spray the plastic encased model with Essix Freeze Spray #22000. This is an essential step. Not only does it cool the plastic, prohibiting further thinning, but it “shrinks” the material around the cast, realizing a tighter fit.
10. Let vacuum continue to run until plastic is cool.

<table>
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<th>Thickness</th>
<th>Vacuum Heat Time</th>
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<tr>
<td>1.0mm (.040&quot;)</td>
<td>40 seconds</td>
<td>143</td>
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Essix U-C-Me™

Features
◆ Same characteristics as Essix C+ only it glows in the dark

Basic Retainer Vacuum Instructions
1. Pre-heat the vacuum machine for at least 3 minutes or until the heating element is a solid orange color.
2. Place the plastic into the frame on the vacuum machine and the model on the base plate. Do not place model directly in center, offset 1/4”.
3. Swing the heating element over the plastic. Observe the plastic as it heats.
4. Essix C+ rises toward the heat source, then becomes wavy as it lowers from the raised position.
5. The waves will start to flatten out into its original flat position – this is the optimal thermoforming time. Do not let Essix C+ sag.
6. Move the heating element away from the plastic.
7. Turn on the vacuum, then lower the plastic over the model.
8. Push into the plastic at each undercut with the Essix Accentuator #18943.
9. Immediately spray the plastic encased model with Essix Freeze Spray #22000. This is an essential step. Not only does it cool the plastic, prohibiting further thinning, but it “shrinks” the material around the cast, realizing a tighter fit.
10. Let vacuum continue to run until plastic is cool.

troubleshooting

The retainer fits the cast, but does not fit the patient. The problem lies with the impression.
1. If/when using an alginate impression material, the mold must be poured immediately (within 5 minutes). Otherwise the impression will expand, thus distorting the duplication.
2. The stone used must be dry. Store stone in a closed container in a dry room. Stone will absorb atmospheric humidity and expand the cast.
3. Casts should be trimmed properly – no more than 3/4” (Fig. 13). Trim away the palate of full arch impressions.

The plastic did not adapt well to the cast.
1. Always use a VACUUM MAXIMIZER for vacuum machines.
2. If using a Biostar, do not embed the cast in beads. Use the flat base plate.
3. Cast should be trimmed properly – no more than 3/4” (Fig. 13). Trim away the palate of full arch impressions.

The lingual, palatal edge lifts away from the cast.
1. Plastic must be cooled immediately, spray with Freeze Spray after thermoforming.
2. Or, use Gordon contouring or Weingart pliers to bend the edge toward the palate.

trimming an essix appliance

Anterior Retainers
1. Cut away the excess plastic using the Essix Mayo Scissors #18001. Then cut out a “tab” on the lingual and labial (Fig. 14) to pull the plastic away from the cast.
2. Cut the distal ends off using the Essix Lab Knife #18800 (Fig. 15).

3. Pull the tabs to remove the cast from the plastic.

4. Cut straight across from canine to canine. Approximately 1mm on the gingival of the lingual and 2-3mm on the gingival of the labial (Figs. 16a & 16b).

5. Round out the edges cutting towards the incisal edge of the canines (Fig. 17a). Resulting retainer (Fig. 17b).

**Full Arch Retainers**

1. Trim away all excess plastic (Fig. 18).

2. Cut off the distal third of the terminating molar (Fig. 19) using the Essix Precision Electric Heat Knife #88550, the Essix Wheel Saw #18320, or cut the distal ends off using the Essix Lab Knife #18800.

3. Trim the plastic to approximately 1mm onto the gingiva on the lingual and labial. This can be done using a Wheelsaw #18320 on a Dremel #DR001 or a Precision Electric Heat Knife #88550 and cutting the plastic directly on the cast (Fig. 20). Or, first removing the plastic from the cast and trimming the edge with Mayo Scissors #18001.

4. The plastic can be gently pried from the cast with the Essix Cast Removing Instrument #18742 working from the molars towards the canines (Fig. 21).

5. Have the patient seat the appliance and bite down on double-sided articulating paper. Grind away any high spots on the retainer in order that the anteriors will occlude (Fig. 22).

6. The edges of the retainers can be polished using the Essix Border Polishers #18970 or Essix Polishing Brushes #18981, #18982 and #18983 on a Dremel #DR001 (Figs. 23 and 24).

Contraindications and Limitations of Essix Appliances

Essix appliances should be coincident with patient behavior. If the patient has displayed poor hygiene and a casual attitude about treatment, it might be better to place a bonded appliance, wait for the tissue to normalize (and perhaps for the patient to mature a bit) and use an Essix as an exit appliance, i.e. after the bonded appliance is removed.

If the patient displayed severe pretreatment rotations of the anterior teeth, it would be advisable to consider fiberotomies, and retain with a bonded cuspid-to-cuspid appliance. This precludes the incisor jiggling between non-wear during the day and the wear while sleeping. Again, it would be prudent to use the Essix as an exit appliance – after the bonded appliance or Hawley is discontinued.
help your patients care for their Essix appliances

The Essix How to Care for Your Appliance Brochure #99S60 is a perfect handout to give to patients. Included on the back of the brochure is an area to imprint your office information, as well as a handy wearing schedule where the orthodontist may indicate how the appliance should be worn. The text of the brochure is as follows:

Don't Blame Your Dog . . .

The number 1 reason for retainer loss is pets. If left out, animals will often chew up the appliances. Other causes of retainer loss are due to melting (placing the retainer too close to curling irons and hot curlers) or misplacement (from wrapping the appliance in a napkin that is mistakenly thrown away). To avoid these hazards, always keep your appliance in the case provided by your doctor.

Why Wear Retainers?

Retainers, as the name implies, retain the teeth in the corrected position. Failure to wear retainers as directed, even for a short period of time, may cause the teeth to shift into pretreatment position. It is very important that you follow the specific instructions given to you to maintain satisfactory results.

Your Wearing Schedule

It is imperative to adhere to your retention schedule. If not followed, your teeth may shift to the extent that you may need to be retreated. Consult back panel for your wearing schedule.

Cleaning

Do not brush appliance with toothpaste – it dulls the plastic and may crack the appliance. To maintain the brilliance of your appliance, use soap and water* or Essix Retainer Brite® #RB-TP. For best results, follow your doctor’s recommendation.

*Not hot water

Retainer Tips

1. Retainers should not be worn while eating.
2. Always bring your retainers with you for each appointment. If a retainer is lost or damaged, you will be charged for replacements or repairs.
3. If you miss a few nights, wear the retainer full time and bite down to seat if fully. The teeth may be a little sore, but should realign in a short period of time. If they do not, call your doctor.
4. If your retainer ever becomes loose (if you can flip it out with your tongue), discontinue wear and call your doctor immediately.
5. Do not chew gum – it sticks to the plastic.

continued...
essix retention letter to patients/parents

Raintree recommends giving your patients written instructions for the care and schedule of wear for their retainers since, often times the patient will forget verbal instructions. A simple letter to the patient like the one to the right or the Essix How to Care for Your Appliance Brochure is perfect as well.

Sample letter:

Dear Patient/Parent,

I would like to thank you for your efforts in helping us treat your malocclusion. The appliances are off, your smile is delightful, and I trust you are as satisfied as I am with the results. However, to maintain the finished result, it is imperative that you adhere to your retention schedule. If it’s not followed, your teeth may shift to the extent that re-treatment, with additional expense, would be involved. As we discussed, this can be avoided by simply wearing your retainers as directed. My staff and I will help you to adhere to the following guidelines:

◆ Follow the prescribed schedule of wear (insert specific instructions). Retainers may not be worn while eating or drinking – certain foods will stain your appliance.

◆ When wearing the retainers at night only, they must be worn every night.

◆ Clean the retainer with Retainer Brite cleaning tablets. Do not brush the retainer with toothpaste, it will cause the plastic to crack and dull.

◆ If an edge of the retainer irritates your gums, trim with a scissors or smooth with an emery board.

◆ Store the retainer, in the case that was supplied by the office, when it is not in your mouth.

◆ If the retainer is lost, call the office immediately (insert phone number). Replacement retainers can be provided at a nominal fee.

◆ If you miss a night or two, wear the retainer full time, and bite down to seat it fully. The teeth will be sore, but will soon realign.

◆ Place a bead of fluoride gel in the retainer once a week (prior to bedtime) and leave in overnight. This will make your teeth stronger.

◆ If your retainer becomes too loose, call us immediately and discontinue wearing.

Again, my thanks for being a wonderful patient. Be sure to beam that delightful smile on everyone.

Sincerely,

Dr. (Insert signature)
Retention By Telephone

Let the patient know that the reason you are checking retention by phone is because the Doctor respects their time, but is concerned about how they are maintaining their finished results.

The person making the call should be familiar with the patient’s history, i.e., when they finished treatment and any special comments that the Doctor noted when retention was initiated. Be prepared for some chitchat.

The following items should be checked during the phone conversation:

◆ Are they wearing the Essix appliance as prescribed?
◆ Does the appliance still fit well?
◆ Are they cleaning the appliance with Retainer Brite or warm water? Remind the patient not to use toothpaste or a toothbrush that has toothpaste on it – this will dull the plastic and possibly crack it.
◆ Are there any spots where the appliance has cracked or worn through?
◆ Are they still seeing the General Dentist for routine check-ups?
◆ Do they, for any reason, wish to schedule an appointment with the Doctor? If so, schedule the appointment. If it is the Doctor’s choice to see the patient at the next recall time, tell the patient that they should call the office in a few months to schedule an appointment.

◆ The patients should be informed not to wait for the next retention call if any problems should arise – they should call the office immediately.

At the conclusion of the call, again mention the Doctor’s concern for maintaining the finished result and remind the patient that you will be contacting them again in a few months.

Note: Although retention could possibly be checked via e-mail, a dialogue with a staff member is more meaningful and establishes a more personal contact.
Getting the Perfect Fit

The characteristic of a properly fitting Essix appliance is:

The plastic adapts comfortably to the gingival contact points.

The fit of an Essix appliance is dependent on the plastic adaptation into the retentive undercuts gingival to contact point (Fig. 1). If they are not well defined the appliance will be too loose. If the plastic is adapted too excessively, the appliance will be too tight. Adjusting the fit of an Essix appliance at chairside involves increasing or decreasing the plastic adaptation into these undercuts.

**too loose?**

If a snug, comfortable fit is not evident when seating the appliance it can be quickly tightened at chairside utilizing the Hilliard Undercut Enhancing Thermopliers #82510 (Fig. 2). This tool can tighten an appliance in approximately 10 seconds and can be used on all Essix plastics. The technique is simple:

1. Heat the wedge tip of the thermopliers on the APT II Dental Burner #82580 (Fig. 3). The desired temperature depends on the plastic being used. The temperature can be measured on the Hakko Digital Thermometer #82591 (Fig. 4).

2. Place the thermopliers tip into a retentive undercut gingival to contact point, then squeeze the handles together (Fig. 5). Accentuate one undercut at a time, trying the appliance for adaptability with each adjustment.

3. The depth of the adjustment may be altered as well to obtain a desirable fit by using the hex screw to increase the depth the tip will intrude into the plastic (Fig. 6).

**too tight?**

The Essix retainer should gently flex in and out of the undercuts. If undue force is required to remove the appliance, it’s usually due to plastic adaptation into excessive interproximal undercuts gingival to contact points. These undercuts should have been blocked out on the cast prior to thermoforming. Nevertheless, the existing tightness in the appliance can be resolved by using a scalpel to cut off the intrusions at the contact points in the interior of the appliance. These undercuts should be altered one at a time, with a “try-in” after each adjustment, to preclude making the appliance too loose.

---

**Essix C+**

- 200ºF (93.3ºC)

**Essix A+**

- 175ºF (70.4ºC)

**Essix Embrace**

- 240ºF (115.5ºC)

---

**FIG 1**

**FIG 2**

**FIG 3**

**FIG 4**

**FIG 5**

**FIG 6**
gingival discomfort?

If the appliance impinges on the facial tissue, causing it to blanch (Fig. 7) at the superior part of the labial border of the appliance, reduce the excessive gingival height of the plastic with a curved Mayo Scissors #18001 to no more than 1.0mm onto the facial gingiva rather than the conventional 2.0-3.0mm (Fig. 8). However, do not trim the appliance to conform to the cervical line. This would eliminate the plastic adaptation to the retentive undercuts.

minor relapse?

Slightly maligned teeth can be realigned without resorting to fixed appliances, or constructing another Essix appliance. Because of the resiliency and flex-memory of Essix plastic, it consistently returns to its original thermoformed state, thereby returning the teeth to their debonded position when worn for a sufficient time. If, for whatever reason, the teeth have shifted slightly, the appliance usually will seat, albeit somewhat awkwardly. The patient’s cooperation is mandatory. They must wear the appliance full time until the appliance seats comfortably and the teeth have realigned – usually within 2-3 weeks. After alignment, it’s back to the usual night only regime.

Teeth can also be realigned chairside by utilizing the existing Essix Retainer and the appropriate Hilliard Thermopliers (see page 12). The patient must wear the modified Essix Retainer full time until the teeth have realigned. Then a new Essix Retainer can be fabricated to be worn at night only.
Precautions To Be Aware of With Clear Plastic Appliances

There has been a flurry of interest in clear plastic appliances to align teeth without the esthetic compromise associated with fixed appliances. However, there are precautions that the clinician should be aware of when using clear plastic appliances, and these are: (1) to avoid the possibility of demineralizing enamel, and (2) grossly disrupting the occlusion.

Demineralization

Any plastic appliance that covers some or all of the teeth is, in effect, a tray. When fluoride is placed in the appliance, the enamel becomes more resistant to decay likewise when bleach is placed in it, the teeth become whiter. However, when acidic beverages are retained in the appliance, it becomes an acid-containing trench causing the enamel to become susceptible to demineralization. This is one of the reasons that clear plastic retainers are to be worn only at night, after brushing and flossing – to preclude the possibility of demineralization of acid-containing beverages that could be retained in the appliance.

When any full-arch clear plastic appliance is used, it is incumbent on the clinician to inform the patient of the dental side effects of acid-containing beverages when wearing these devices full-time, and to flush the mouth with water immediately after drinking acid-containing beverages (soft drinks, fruit juice cola beverages etc.) Daily fluoride rinses, such as Essix’s Home Gel #74400, are also recommended. These precautions may prevent incisal edges from being marred by unsightly decalcification (Figs. 1A & 1B).

Disturbance in Occlusion

Additionally, if a full coverage plastic appliance is used to move teeth, or is used as a full-time retainer for extended periods, it should be equilibrated. If not equilibrated, it could cause significant premature occlusal contacts in the posterior teeth and, in turn, induce an anterior open bite due to the “1 to 3” prosthetic concept. 1mm of bite-opening on the terminal molars will induce 3mm of bite-opening on the incisors because prior to translation the initial opening movement from centric relation is purely rotational with a hinge-axis (center of rotation) around the condyles. When a full coverage plastic appliance is seated, the thickness of the appliance between the terminal molars will inevitably cause a hinge-axis interference, and will induce a disproportionately larger anterior open bite (Fig. 2A). This dilemma is avoidable – simply equilibrate full-arch clear plastic appliances when they are initially seated. If only one device is needed, equilibrate it. If upper and lower appliances are worn concurrently, place one and equilibrate it. Then place the other and equilibrate it until reasonable occlusal and incisal bites are established (Fig. 2B).

In summation, the clinician should be aware of the potential for demineralization, and/or the occlusal and incisal disruptions that full time appliances can generate, no matter what their purpose. Then, the steps necessary to nullify, or at least diminish these effects can be initiated.
Moving Teeth with Essix Appliances

Using the Hilliard Thermopliers

the basics

Tooth movement up to 3mm with Essix appliances is simple, inexpensive and clinician controlled. Tooth movement requires force and space. The Hilliard Thermopliers for tooth movement provide force to move teeth by creating a bump directly into an Essix appliance.

heating the hilliard thermopliers

The thermopliers are heated and then placed on the Essix® appliance at the desired tooth position.

1. The wedge tips of the pliers are heated to a temperature that will thermoform Essix plastic. The recommended heat source is the APT II Dental Burner #82580 (Fig. 1).

2. Exact temperatures can be determined by a digital readout on a Hakko Digital Thermometer #82591 (Fig. 2). The desired temperature will vary depending on the plastic being used.

<table>
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<th>Essix C+</th>
<th>Essix A+</th>
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<td>200°F (93.3°C)</td>
<td>175°F (79.4°C)</td>
<td>240°F (115.5°C)</td>
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3. Once the pliers are heated, place the tip where the bump is indicated. Slowly squeeze the handles together. A projection will develop into the appliance* (Fig. 3).

4. This “bump” can be increased for further movement at subsequent appointments in 1-mm increments using the hex screw** provided with the pliers (Fig. 4).

*When using C+ plastic, cool the bump with Freeze Spray prior to removing the thermopliers.

**All thermopliers, except for the Slot-forming Thermopliers, are fully adjustable with the supplied hex wrench.

creating space in an essix appliance

The targeted tooth must have space to move into. Any one of the following methods can obtain this. **TIP: Always create the space before making the bumps.**

METHOD I:
Creates a “bubble” inside the appliance into which the targeted tooth can move. **No Triad or stone is needed.**

1. Heat the Bubble tip of the Bubble-forming Thermopliers. Slowly squeeze the pliers into the targeted area of the appliance starting near the interproximal. Work the pliers around the area that the tooth will be moving into, bellying out the plastic as much as needed (Fig. 5).*

It will be necessary to re-heat the pliers with each application, as it will cool.**

*It may be necessary to first use the Micro-ramp Thermopliers to start the edges of the bubble that will be created on the incisal edge and interproximal region.

**When using C+ plastic, cool the bump with Freeze Spray prior to removing the thermopliers.

Creating Space

Heating the Hilliard Thermopliers

FIG 1
APT II dental burner to heat the tips of the thermoforming pliers.

FIG 2
HAKKO digital readout thermometer.

FIG 3
Thermoforming pliers inducing a bump in an Essix appliance.

FIG 4
Adjusting the size of the thermoformed bump with the hex screw.

FIG 5
Using the Bubble-forming Thermopliers to create a bump from the inside of the Essix appliance.

continued...
METHOD II:
Creates a “bubble” inside the appliance into which the targeted tooth can move. This method requires Triad or stone to achieve the bubble, and more time to form.

Materials Needed: Acrylic, Stone or Light-cured Composite

1. Place a thickness of acrylic, stone or light-cured composite, on the surface of the target tooth on the model that is proportionate to the amount of projected tooth movement (Fig. 6). This will form a bubble in the thermoformed appliance.

METHOD III:
Creates a “window” for the targeted tooth to move into. It is essentially a hole cut into the appliance.

Materials Needed: Essix® Window Bur, Scalpel or Lab Knife

1. Use the Window Bur #18925 to drill through the inside of the Essix® appliance on the opposing side of the target tooth, creating a hole into which the tooth will move.

bodily tooth movement

1. Pre-treatment tooth alignment. Blocked-out incisor requires more space than can be obtained by stripping its proximal surfaces (Fig. 8).

2. Insert separators* one contact away from the blocked-out incisor to create an open field for better visual access. See the patient no more than 5 days after placement (Fig. 9).

3. Use ARS to create space (0.5mm – 1.0mm) (Fig. 10).

4. Use separators (slightly larger than in Step 2) to move teeth into space created in previous step (Fig. 11). Again, see the patient no more than 5 days after placement.

5. Use ARS to create additional space (0.5mm – 1.0mm) adjacent to the target tooth (Fig. 12).

6. Construct an Essix appliance over the working cast.

7. Create a facial window (space within the appliance) for the tooth to move into (Fig. 13).

8. Use Hilliard pliers to create force in 1mm increments to move the tooth into the facial window. Maxillary Pliers #82520 (bigger tip) is used for moving upper teeth. Mandibular Pliers #82530 (smaller tip) is used for moving lower teeth.

NOTE: 24-hour wear, except while eating, is recommended. Estimated results are 1mm per month (Fig. 14).

9. Finished result. Retain with a new conventional Essix® retainer (Fig. 15).

*Use S2 separators for posterior teeth. For anterior teeth, use small “O” plastic rings typically used for ligating a wire into a bracket slot.

Creating Space, continued

Bodily Tooth Movement

FIG 6
Blocking out the cast to create space for the target tooth to move into.

FIG 7
Cutting a window to generate space for the target tooth to move.

FIG 8

FIG 9

FIG 10

FIG 11

FIG 12

FIG 13

FIG 14

FIG 15

Space on facial provides space for target tooth to move into.
**rotation**

The depth and position of the bump and space in this technique are dictated by the amount of and type of rotation the clinician wants. This technique utilizes the Micro-ramp Thermopliers #82560.

1. Insert separators on either side of the tooth to create an open field for interproximal reduction (Fig. 16).

2. Use ARS to create additional space between teeth (Fig. 17).

3. Construct an Essix® appliance over the working cast (Fig. 18).

4. Create space for the rotation to move into by one of the following methods:

   A. Cut the window into the appliance with the Window Bur #18925 and scalpel (Fig. 19A).

   B. Block out the space with Triad prior to thermoforming the appliance, thus the space will be contained within the retainer (Fig. 19B).

   C. Use the Bubble-forming Thermopliers #82590 to create a bump from the inside of the Essix appliance (Fig. 19C). No cuts are made in the appliance, which could be a source of irritation to the tongue.

5. **EXAMPLE 1**: Mesial-lingual rotation of an upper central (on one side only) – the mesial aspect of the tooth is to be rotated and the disto-labial surface is to remain stable. A 10% portion of the disto-lingual should not be included in the space for the rotation. The bump is placed on the mesio-labial of the appliance. The disto-lingual surface acts as a hinge allowing only the mesio-labial portion of the tooth to rotate (Fig. 20A).

**EXAMPLE 2**: Rotation on both sides of the arch – In order to rotate from the lingual and the labial surfaces of the tooth, space is needed on either side. Likewise, a bump is required on both sides of the tooth as well (Fig. 20B).
torquing
1. Pre-treatment tooth alignment (Fig. 21).
2. Construct an Essix® appliance over the working cast (Fig. 22).
3. Create space for the tooth to move into (see page 12, Creating Space) leaving an incisal edge cap (Fig. 23).
4. Using the Maxillary Pliers #82520, place a 1mm bump near the gingival border. (For lower teeth, use the Mandibular Pliers #82530.) Use the Micro-ramp Pliers #82560 to induce a bump close to the gingival margin (Fig. 24) if the Maxillary and Mandibular Pliers are too thick.
5. Dotted line indicates new tooth position (Fig. 25).

4. Using the Maxillary Pliers #82520, place a 1mm bump near the incisal edge. (For lower teeth, use the Mandibular Pliers #82530.) Use the Micro-Ramp Pliers #82560 to induce a bump close to incisal margin (Fig. 29) if the Maxillary and Mandibular Pliers are too thick.
5. Increase the depth of the original bump on subsequent visits for additional tooth movement. Use the hex-screw adjustment on the pliers to make this happen (Fig. 30).
6. Dotted line indicates new tooth position (Fig. 31).

---

**Torquing**

- [Fig. 21]
- [Fig. 22] Torque Window
- [Fig. 23] Force Inducing Bump Incisal Edge Cap
- [Fig. 24] Window
- [Fig. 25]

**Tipping**

- [Fig. 26] Window
- [Fig. 27] Window
- [Fig. 28] Window
- [Fig. 29] 1mm bump = 1mm tooth movement
- [Fig. 30] 2mm bump = 2mm tooth movement
- [Fig. 31] 3mm bump = 3mm tooth movement
mesial and distal movement

Triad gel #30009 is placed on the working model on the side of the tooth the lateral movement is to occur on. This creates a space, like a channel, in the thermoplastic for the tooth to move into when a force is created on the opposite side. This technique utilizes the Mesial-Distal Thermopliers #82630.

If a lower central incisor is to move to the mesial…

1. Triad gel is placed on the mesial of incisor on work model (Fig. 32). This inhibits obstruction of tooth movement due to contact with the thermoplastic appliance.

2. The force for the desired movement is provided by either of the following methods:
   A. a bump preparation in the plaster on the distal of the incisor (Fig. 33).
   B. a bump formed in the thermoplastic with the Mesial-Distal Thermopliers after the appliance has been fabricated (Fig. 34).

Additional force from a larger bump in the thermoplastic (either at insertion or at subsequent adjustments) can be made with the appropriate Hilliard Thermopliers. The Bubble-Bump technique allows several teeth to be moved at the same time in the mesial-distal direction. The capability to move in the mesial-distal direction can be combined with other movements on the same appliance to allow movement of teeth in all three planes of space.

Space created by relief on the work model

Relief needs to be placed in such a manner as to consider the overall desired movement.

**METHOD I:** At the incisal edge the relief must be even or slightly above the incisal edge of the incisor or the relief will strike the inside of the Essix® appliance as it tries to rotate. Any contact with the plastic will stop the tooth from moving when the appliance is in the mouth. When first applying the relief material, it may be beneficial to use a straight edge resting on the incisal edge to the incisor and parallel to the occlusal plane in order to judge whether or not sufficient material has been placed.

**METHOD II:** Another method is to add the Triad relief and then place the retainer model on a flat surface with the incisal edge towards the flat surface. Gravity will move the Triad gel toward the flat surface. The Triad gel then is light cured. This technique generally will help the orthodontist that is starting to use this technique so that they do not inadvertently block the desired movement of a specific tooth.

Depth of the Space Relief

The depth of the space relief placed on the plaster cast has to take into consideration the anticipated tooth movement. It is important to remember that contact with the plastic of the Essix® retainer will stop tooth movement. It is better to have a slightly larger bubble than needed rather than a smaller bubble than needed.

The orthodontist has to consider such additional factors as the opposing occlusion and comfort to the patient. If the appliance is too uncomfortable the patient will have more difficulty wearing the appliance than if the appliance is comfortable. The bump depth is determined by evaluating the distance the tooth has to be moved and what is tolerable by the patient on the initial placement.

---

**Mesial-Distal Movement**

![FIG 32](image1)

![FIG 33](image2)

![FIG 34](image3)
**anterior intrusion**

**Materials Needed: Triad Light-curing Gel**

In order to intrude a tooth using an Essix® appliance, relief must be provided on the lingual and labial surfaces of the target tooth in the appliance. Then a bump is created on the occlusal surface of the target tooth. The goal is to have light, continuous force on the target tooth as opposed to heavy pressure. The relief allows this to happen. Triad gel #30009 is added to the working model to provide this relief.

1. If an upper tooth is to be intruded, Triad gel is added in a spherical form on the labial and a pear shape on the lingual to help prevent interference with the lower anterior teeth (Fig. 35).

2. If a lower tooth is to be intruded, Triad gel is added in a pear shape on the labial surface and a spherical shape on the lingual surface (Fig. 36).

3. The target tooth is notched on the working model (1mm to 2mm in depth) to generate the intrusive force in the gingival direction (Fig. 37).

4. For the most efficient intrusion of a particular tooth, the intrusion appliance should be worn full time or as much as possible in order to keep the light continuous force on the tooth.

5. At the subsequent appointment, a small window is prepared in the lingual of the appliance so that the Micro-ramp Thermopliers #82560 can be inserted to make the additional intrusion adjustment.

**NOTES ON INTRUSION:**

1. Intrusion adjustments work well on a single tooth. It is possible to intrude two teeth at the same time but it becomes progressively more difficult to seat the appliance if more than two teeth are intruded at the same time.

2. It may be necessary to increase the retention of the Essix® appliance if there is not sufficient retention.

3. The pathway for the tooth that is to be intruded needs to be clear of obstruction. ARS, separators or tooth movement may be necessary before the impression is taken for fabrication of the intrusion appliance.

---

**Anterior Intrusion**

![Intrusion - Upper (side view)](image1)

- **Labial** - Triad Gel applied in a pear shape.
- **Lingual** - Triad Gel applied in a spherical shape.

![Intrusion - Lower (side view)](image2)

- **Labial** - Triad Gel applied in a pear shape.
- **Lingual** - Triad Gel applied in a spherical shape.

![Intrusion - Incisal edge notch](image3)

- **Labial** - Triad Gel applied (labial view).

---

<continued>
increasing adjustments

In a case where there the initial “bump” is not quite covering enough surface area for the desired movement, an adjustment can be made to it to increase its size. These pliers will not stretch/thin the previously formed bump. The Small Circle Thermopliers #82620 and Large Circle Thermopliers #82610 allow the entire surface area of the bump to have the same thickness.

1. Heat the tip of the Large or Small Circle Thermopliers (Fig. 38).

2. Place the heated tip around the initial “bump” and squeeze (Fig. 39). When using C+® plastic, cool the bump with Freeze Spray #22000 prior to removing the thermopliers.

**FIG 38**
**FIG 39**

**FIG 40A**
**BEFORE:** Initial “bump” in appliance.

**FIG 40B**
**AFTER:** Resulting “bump” after using the Large Circle Thermopliers.
There are two methods for making an Essix bite plane. One method uses acrylic, the other does not.

**bite plane with hilliard thermopliers**

1. Thermoform an Essix anterior appliance and trim as usual. Essix A+™ or C+® plastic may be used.
2. Seat the appliance in the patient’s mouth. Have the patient bite down on single-sided articulating paper.
3. Remove the appliance from the patient’s mouth.
4. Heat the tip of the Hilliard Bite Plane Thermopliers #82540 to the appropriate temperature. The Hakko Digital Thermometer #82591 will give the exact temperature of the pliers (Fig. 1).

<table>
<thead>
<tr>
<th>Essix C+</th>
<th>Essix A+</th>
<th>Essix Embrace</th>
</tr>
</thead>
<tbody>
<tr>
<td>200°F (93.3°C)</td>
<td>175°F (70.4°C)</td>
<td>240°F (115.5°C)</td>
</tr>
</tbody>
</table>

5. Place the bulb tip inside the appliance toward the markings (Fig. 2).
6. Squeeze the plier’s handles together.
7. A “bump” will form on the outer, lingual surface of the appliance.
8. Proceed with making “bumps” on all the marked spots (Fig. 3).
9. Seat the appliance in the patient’s mouth.

continued...
**bite plane using acrylic**

1. Using Essix A+™ plastic, thermoform a basic anterior retainer and trim as usual. (Cannot use Essix C+® plastic as acrylic will not bond to it.)

2. Choose either Triad Provisional Material #31006 or Triad Light Cure Gel #30004 to bond to the plastic (Figs. 4a & 4b).

3. With the retainer on the cast, scratch a line on the lingual surface from cusp–to-cusp (Fig. 5).

4. Remove the retainer from the cast, and then from its internal surface make 2 perforations in each tooth (Fig. 6).

5. Roughen the surface on the external side of the perforations using the Essix Trimming bur #18901 (Fig. 7).

6. Place the retainer back on the cast. Paint cold cure acrylic monomer with a small brush over the roughened area (Fig. 8).

7. If using the Provisional material, cut a 1/2” piece, roll it on a flat surface until it is approximately the length of the anterior retainer and 1/4” wide (Fig. 9). If using the Triad gel, proceed to step 8. Apply a second coat of acrylic monomer to the retainer. Mold the rope of Provisional material to the scratched surface of the appliance.

8. If using Triad gel, squeeze a rope onto the retainer from cusp–to–cusp on the roughened surface after the second application of the acrylic.

9. Light cure the Triad. Since the chemical reaction between the plastic and the Triad is incomplete at this time, leave the model for at least 30 minutes (Fig. 10).

10. Remove the appliance from the cast and seat in the patient’s mouth. Final adjustments for vertical and incisal contact should be made.
Closing Re-Opened Extraction Sites

After extraction: (Fig. 1)

1. Thermoform a full arch Essix® appliance with C+® plastic.

2. Cut the appliance at the site of the extraction (Fig. 2).

3. Create a hook on either side of the extraction space of the appliance on the facial and lingual surfaces. There are two ways to incorporate hooks into an Essix® appliance.

   **A. Cutting the plastic to form a hook**
   
   1. Cut a horizontal line on the gingival third with a scalpel (Fig. 3).
   
   2. Cut a vertical line very close to the interproximal (Fig. 4).
   
   3. Cut a horizontal line parallel to the first cut (Fig. 5).
   
   4. Round out the edges for patient comfort.
   
   5. Flex away the hook from the body of the plastic.
   
   6. A thin walled elastic (20g) is attached to the appliance (Fig. 6).

   **B. Thermoforming a hook into the plastic with the Hilliard Thermoforming Pliers.**
   
   1. Heat the bulb tip of the Hilliard Hook-forming Thermopliers #82550 and measure the temperature on the Hakko Digital Thermometer #82591 according to the plastic being used (Fig. 7).
   
   2. Insert the Thermopliers into the retainer where the bump is indicated and squeeze toward the exterior surface (Fig. 8).
   
   3. Heat the “lipped” edge of the Hilliard Slot-forming Thermopliers #82570. Use the Hakko Thermometer to measure the exact temperature appropriate for the plastic being used.
   
   4. Place the heated edge of the pliers on the side of the “bump” where the elastic will attach and squeeze (Fig. 9). The orientation of the hook should be in the same direction as the force vector of the elastic. A thin walled elastic is attached to the appliance.
   
   5. A thin walled elastic can now be attached to the hooks.
   
   6. The extraction space is now closed, a new Essix® appliance must be made.
Forced Amplified Retention

for Holding Corrected Anterior Open Bites Closed

John J. Sheridan DDS, MSD  
Jason McFall DDS  
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There seems to be no shortage of treatment options for closing an anterior open bite. Orthodontics, surgery, magnets, growth alteration devices, or combinations of these techniques are effective.1-4 Keeping it closed is quite another matter. The tendency to return to the pretreatment status is formidable and unpredictable. It could be a matter of time.

The resolution of anterior open bite is usually accomplished during the final stages of treatment. Although, the patient may be in appliances for two years, the open bite correction is usually resolved during the last few months. That’s precious little time for form to adapt to function. The untreated open bite exists for years in adolescents, or decades in adults. To presume that the teeth, orthodontically held in a corrected position for a relatively short period, will alter this established biomorphology would seem improbable.5,6 However, we can’t arbitrarily extend treatment times for the sole purpose of achieving a more stable result. There’s simply no data indicating how long that would be. Force amplified retention was conceived to address this dilemma. It can hold the corrected open bite closed (Fig. 1a).

Retention is thought of as the static phase of treatment. However, it may have to be supplemented with a force vector, placed when needed, to counter the relapse tendency of open bite correction. Force amplified retention can do this. It involves conventional upper and lower cuspid-to-cuspid lingual retainers, low profile bonded lingual hooks*, intraoral elastics. The lingual wires must be bonded to each tooth to insure that the elastic force is distributed to all anterior teeth (Fig. 1b). The advantages of force amplified retention are:

- Correction of anterior open bite can be maintained until the bite appears stable.
- Trial periods, without the vertical elastics, indicate if the corrected bite is stable. If there is relapse, the elastic wear can be resumed.
- There is no need to alter or change the appliance.
- The appliance is esthetic. There are no visible appliances, and night only wear is suggested.
- The effect of the vertical elastics can be varied by changing their size, the duration, or both.

The appliance has dual application: with a vertical elastic force, the appliance will maintain, or correct, an open bite. Without the elastics, the bonded cuspid-to-cuspid wires are conventional static retainers.

continued...
case report

Pretreatment status

A 29 yr. old male presented with a Class I malocclusion, and minor incisor crowding in both arches (Figs. 2 & 3), and a 3mm anterior open bite. The upper central incisors were ramped lingually, camouflaging the extent of the open bite on the frontal view (Fig. 4). The severity of the open bite is realized when viewed from the side (Fig. 5).

He was advised, by other specialists, that resolution could involve surgery, the removal of permanent teeth, or both, and there was a significant degree of relapse associated with any method of open bite correction.

The patient elected to have the open bite closed with vertical anterior elastic force, and the crowding resolved with Air-rotor Stripping (ARS). The resolution of the crowding by expansion was considered a poor treatment option. This would have exacerbated the open bite.

Treatment

Space to correct upper and lower crowding, and slightly retract the maxillary cuspids, was created by ARS. Both arches were bonded from second premolar to second premolar (Fig. 6). There was no apparent need to bond/band molars.

The open bite was resolved by sectioning the lower arch distal to the cuspids after the arches were aligned. Up-and-down elastics correlated incisal coupling with smile line esthetics. In effect, the lower incisors were extruded more than the upper incisors. The appliances were removed when the anterior bite was closed, all crowding resolved, and the quality of occlusion was acceptable (Figs. 7-9). Treatment time was 5.5 months.

Post-treatment retention

An amplified retention system was constructed with instructions to use vertical elastics at night only (Fig. 10). They exerted a slight force (100gm) when the teeth were in centric occlusion. The awkwardness of placing the lingual elastics was resolved with minimal trial-and-error efforts, and the use of an elastic placement tool. The patient had no difficulty sleeping with the elastics in place.

After two months, the elastics were discontinued for stability appraisal. The anterior bite opened slightly. Night time vertical elastic wear was resumed, and the bite closed within one week.
The patient continued sleeping with vertical elastics in place for an additional two months. Again, elastic wear was discontinued for stability evaluation. The bite remained efficient, and is so currently. The bonded wires and cleats will be removed if the bite continues to be stable. If there is reopening, elastics can be resumed.

**Conclusion**

Force amplified retention is a sensible option for maintaining the incisal efficiency of a corrected anterior open bite, or for a stand alone treatment option. The vertical elastic force can be initiated at any time, and for as long as the clinician deems necessary. This extended time-line may allow form to adapt to function, reducing that variable in the multifactorial etiology of anterior open bite. Data indicate that the surgical correction of anterior open bite is somewhat more stable than orthodontic resolution. However, due to recent restrictions in insurance coverage, most orthodontic surgical procedures are not eligible for treatment, financially restricting the availability of this option. That means that orthodontic correction of anterior open bite will be more prevalent, and more efficient methods of retention will be necessary. Force amplified retention is a step in that direction.

**References**


* Caplin hook. GAC International. 185 Oval Dr., Central Islip, NY 11722.
** Elastic Placer. GAC International. 185 Oval Dr., Central Islip, NY 11722.
Essix Temporary Anterior Bridges

The basic Essix® appliance can be modified to serve as temporary anterior bridges. The Essix technology provides a simpler, more efficient way to retain and replace missing anterior teeth. Exceptionally aesthetic bridges can be fabricated quickly and inexpensively in the office.

**technique**

1. Fit a pontic of appropriate size and color into the edentulous area. Trim the base of the pontic to approximate the ridge (Fig. 1).

2. Cut a trench into the lingual surface of the pontic (Fig. 2A) with the Essix Trimming Bur #18901.

3. Secure the pontic to the cast with Blockout Compound #18300 (Fig. 2B). Pink acrylic can be used in the gingival area. Do not use wax, it will melt during thermoforming.

4. Thermoform the Essix plastic sheet over the cast.

5. The pontic will dislodge from the cast and mechanically lock into the appliance (Fig. 3).

6. Trim the appliance as usual.

**NOTE:** For children with minimal pronounced undercuts, we recommend Essix A+™ .030" and .040". In all other cases, use Essix C+.

*continued...*
**case reports**

**Case 1:** A patient with a congenitally missing upper right lateral incisor had been wearing an upper Hawley retainer with a pontic for two years after removal of fixed appliance. The retentive ball clasp of the retainer opened a 2mm space between the upper right second bicuspid and the first molar. And the patient was also concerned about a loose fit. An Essix bridge was fabricated with little, if any disruption of the buccal occlusion.

**Case 2:** An adolescent patient had congenitally missing upper lateral incisors. After orthodontic treatment, the edentulous spaces were filled with pontics in an Essix bridge.

**Case 3:** A preadolescent patient lost all her maxillary incisors when she bit into an electrical cord. An Essix bridge incorporating both central and lateral incisor pontics was constructed. Unlike most Essix bridges, this one was extended distal to the first molars for added stability and retention.

**Case 4:** An adult lost both maxillary central incisors in a car accident. After orthodontic treatment, an Essix bridge was fabricated to replace the missing teeth. The patient wears a conventional Essix lower retainer.

**conclusion**

We have found the Essix temporary bridge to be superior in all respects to conventional devices. It is an inexpensive and aesthetic appliance that not only replaces missing anterior teeth, but also serves as an efficient retainer.
Posterior Stabilization Appliance

**technique**

1. On the working cast, scribe a line with a felt-tipped pen across the posterior palatal extent of the appliance.

2. Stop on both the left and right at the disto-lingual line angle of the last molars (A & B) (Fig. 1).

3. On the right and left, continue the line following the gingival scallop to the mesio-lingual line angle of the right and left first bicuspids.

4. Draw a connecting line between both the left and right bicuspids, running across the anterior. This is the outline for the first layer of this appliance (Fig. 2).

5. Thermoform an .030" Essix A+™ plastic sheet over the scribed cast.

6. Cut away the excess plastic. Using a 5/8" or a 1/2" circular wheel saw, cut out the outlined area of the palatal plastic, discard the remainder of the plastic (Figs. 3a & 3b).

7. Smooth and finish this first layer with a sharp scalpel and/or a brass 5/8" wheel saw (Fig. 4).

8. Place the first layer on the cast, apply a 1/4" wide coat of quick cure acrylic, like Triad Provisional Material #31006, in the shape of a horseshoe or “U” from side to side on the palate. The open end of the “U” should be adjacent to the last molars left and right (Fig. 5). — Do not paint the liquid closer than 1/4” from the edges of the plastic.

9. Immediately apply a rope of Triad Provisional Material #31006 to conform to the applied acrylic configuration.

10. Quickly light cure the Triad (Fig. 6).

continued...
11. With the first plastic layer in hand (off of the cast) liberally apply a coating of acrylic liquid on the outside of the plastic and Triad. Do not allow the monomer to flow to the underside of the plastic (Fig. 7).

12. Replace the cast on the machine. Thermoform a second layer of .030” Essix A+™ plastic over the plastic (Fig. 8).

13. Allow the acrylic-plastic “sandwich” to cure for at least one hour.

14. Cut away the excess plastic. With a circular wheel saw cut away the buccal and occlusal plastic from the mesial of the first bicuspids left and right (Figs. 9a & 9b).

15. That which remains should be a double .030” sandwich reinforced with Triad with a single layer of .030” plastic covering the lingual, incisal and labial surfaces of the cuspid-to-cuspid area.

16. The rough trimmed appliance is now removed from the cast and trimmed so the posterior segment conforms to that of the first layer.

17. The anterior section of the retainer is trimmed to the outline of the basic cuspid-to-cuspid retainer (Fig. 10).

18. Final trimming is achieved using the following: Essix Mayo Scissors #18001 and/or Crown & Bridge Scissors #18002, Essix Lab Knife #18800, Essix Border Polishers #18970.

19. The finished appliance (Fig. 11).
Intrusion of Excessively Erupted Teeth

The basic Essix® appliance can be modified to rapidly intrude individual, or groups of teeth without affecting reciprocal movement of adjacent teeth. An Essix intrusion does not require any clasps or metal elements.

**METHOD I: Opening Occlusal Surface**

The intrusion of teeth that have passively erupted into an extraction site in the opposing arch can be a biomechanical challenge. Intrusion, without significant extrusion of adjacent teeth can be accomplished with the following technique.

1. Thermoform a basic full arch Essix® appliance. Trim as usual.

2. Cut away the occlusal surface of the extruded tooth (Fig. 1).

3. Use the Hilliard Hook Forming #82550 and Slot Forming Thermopliers #82570 to create two buttons, one on the buccal and one on the lingual, of the appliance to attach elastics.

   A. Heat the bulb tip of the Hilliard Hook-forming Thermopliers and measure the temperature on the Hakko Digital Thermometer #82591 according to the plastic being used (Fig. 2).

   B. Insert the Thermopliers into the retainer where the bump is indicated and squeeze toward the exterior surface (Fig. 3). Repeat this step for the second button.

   C. Heat the “lipped” edge of the Hilliard Slot-forming Thermopliers. Use the Hakko Thermometer to measure the exact temperature appropriate for the plastic being used.

   D. Place the heated edge of the plier on the side of the “bump” were the elastic will attach and squeeze. Repeat this step for the second button (Fig. 4).

   E. The elastic can now be attached to the buttons (Figs. 5a & Fig. 5b).

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**CASE STUDY**

Super erupted molar into a long-standing extraction site. Molar intruded without any extension of the bordering teeth.

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**Essix C+**

200°F (93.3°C)

**Essix A+**

175°F (79.4°C)

**Essix Embrace**

240°F (115.5°C)
METHOD II:
This method will require a wire threader (made from .030 stainless steel) to pass the elastic through the appliance from one side to the other so that the holes in the appliance may be kept small.

1. Construct a full arch Essix® appliance over the working cast (Fig. 6).
2. Heat the Elastic Hook-forming Thermopliers #82550 (Fig. 7).
3. Place the heated thermopliers at the desired location on the appliance and squeeze gently to create the initial bump (Fig. 8). Remove the thermopliers with a rolling motion rather than pulling it straight out.
4. Heat the Slot-forming Thermopliers #82570.
5. Place the “lipped edge” around the base of the bump previously formed with the Hook-forming Thermopliers and squeeze the handles together (Fig. 9A, result Fig. 9B).
6. It is necessary to orient the Slot-forming Thermopliers along the vector force of the elastic.
7. Repeat steps 2 through 6 on the opposing side of the arch.
8. Cut a small hole on the labial and lingual gingival to the occlusal edge.
9. Thread the elastic through the holes and attach to the elastics on either side of the arch.

This method may be preferable to Method I if the open occlusal edge is a source of irritation to the tongue or lips.

---

**FIG 6**

**FIG 7**

**FIG 8**

**FIG 9A**

**FIG 9B**
The technology for fabricating an Essix bridge can be modified to isolate an implant while it is integrating with alveolar bone.¹

**technique**

1. The oral projection of the implant post will be blocked out to create an isolation chamber (Fig. 1).
2. The implant post needs to be protected from direct and transmucosal forces (Fig. 2).
3. Cover the orally exposed part of the implant on the working cast with a 2mm layer of acrylic.
4. Trim the base of the pontic to conform to the acrylic base on the alveolar ridge.
5. Cut a large and deep trench on the lingual of the pontic to mechanically lock it into the thermoformed plastic.
6. Thermoform Essix C+® over the cast.
7. Remove the plastic from the cast and trim as usual.

When the appliance is placed, there will be an isolation space between the base of the pontic and the implant due to the acrylic layer placed prior to pontic adaptation and thermoforming (Fig. 3). The implant, while it is integrating with alveolar bone, will be isolated from direct and transmucosal forces. During this interval the patient can enjoy the esthetic appliance.

Whitening Trays

Blocking out casts for whitening trays is timely, unnecessary and costly since much of the dispensed bleach is wasted (Fig. 1).

There are three types of plastic being used by most practitioners who prescribe at-home whitening:

1. .020” (1/2mm) Coping material – a hard, thin, opaque material that features a low melt temperature and excellent thermoforming.

2. .040” (1mm) EVA – a soft, clear material easily vacuum formed and trimmed.

3. .020” (1/2mm) Tray-Rite® – a semi-soft, clear material easily vacuum formed and trimmed. It does not shrink under heat and is nearly impossible to bite through.

Raintree recommends the Tray-Rite material for general use (Fig. 2). Tray-Rite is smooth and comfortable to wear. It clings to the teeth providing better coverage. Thus, the bleaching gel covers the entire tooth surface and doesn’t spill over onto the gingiva.

**Technique**

1. Pre-heat the vacuum machine for at least 3 minutes or until the heating element is a solid orange color.

2. Spray the model with Tray-Rite Release Spray #21004 to prevent tray material from sticking to the model (Fig 3).

3. Place the plastic into the frame on the vacuum machine and the model on the base plate.

4. Swing the heating element over the plastic. Observe the plastic as it heats.

5. Essix Tray-Rite will become wavy then flatten to its original position – this is the optimal thermoforming time.

6. Move the heating element away from the plastic.

7. Turn on the vacuum, then lower the plastic over the model.

8. Immediately spray the plastic encased model with Essix Freeze Spray #22000 (Fig. 4). This is an essential step. Not only does it cool the plastic, prohibiting further thinning, but it “shrinks” the material around the cast, realizing a tighter fit.

9. Let vacuum continue to run for approximately 30 seconds or until plastic is cool.

10. Trim the tray on the model using the Trim-Rite Electric Knife #88500. Place the tip of the blade exactly where the tooth meets the gingiva and allow that ridge to guide your movements (Fig. 5).

11. Seat the whitening tray to check for tissue contact. Best results are obtained when the tray is cut 1mm short of the soft tissue.

12. Give the model with the tray on it to the patient for their safekeeping (Fig. 6).

**Tip:** Instruct your patients to dispense the gel on each tooth lingual to labial for less waste (Fig 7).
Bleaching Teeth During Supervised Retention

introduction

Bleaching effectively brightens and whitens the teeth without causing any significant detrimental side effects. It can be logically included during supervised retention, because it's relatively devoid of complexities, requires minimal chair time, can usually be achieved in two to three weeks and, especially in adults, demonstrably improves the esthetic quality of the case.

However, orthodontists are not in the bleaching business, nor should they be. Bleaching should be limited to a one-time retention phase, esthetic augmentation. In that context it makes sense. Bleaching does not last forever. It must be redone periodically, usually every two-to-three years, when diet and life styles inevitably cause re-staining. However, that's the responsibility of the referring dentist. The orthodontist initiates the bleaching effect and the family dentist supervises it from thereon. With this format, it would be difficult to construe specialist bleaching as an infringement upon the purview of the general dentist. In fact, the specialist has created a clinical service requiring long-term maintenance by the referring dentist.

the physiologic rationale for bleaching

Bleaching, when done according to established guidelines, is safe and condoned by the American Dental Association. Several clinical trials have been published attesting to its non-pathological effect on teeth and tissues. There is no change in enamel hardness and the bacteriostatic properties of the bleaching gel inhibit caries during the bleaching process. In a recent survey 91% of dentists stated they used vital tooth bleaching with minimal side effects. 62% of these noted only mild transient tooth sensitivity in 11% of their cases. 46% of the clinicians reported minor soft-tissue irritation in 5.5% of the time and less than 2% reported minimal systemic effects. The apparent symptoms were controlled by simply altering the strength of the bleaching agent and/or adjusting the time of application.

Teeth can be bleached with heat and chemicals, in-office light and chemicals, and in-office lasers. However, the least complex, most effective and simplest technique for the orthodontist is professionally fabricated trays coupled with at-home carbamide peroxide bleaching. It's used by 63% of dentists and would be the most logical choice for orthodontists because it is practically devoid of complications, can be easily synthesized with supervised retention and requires minimal chair time.

Hydrogen peroxide is the only active ingredient in all tooth-whitening products. When this oxidizing agent is combined with urea, carbamide peroxide is formed. This compound, initially used as an oral antiseptic for wound healing, has been sanctioned by the FDA for use as a non-prescription oral antiseptic since 1974. The gel consistency is established when hydrogen peroxide separates from the urea, penetrates the enamel, and oxidizes (bleaches) the stains. The urea (a naturally occurring chemical) is absorbed non-toxically by the body's system.

Bleaching gel strengths can be as low as 5% carbamide peroxide and reach as high as 44%. The most popular strengths for at-home bleaching are 10% and 15%. The higher of these strengths is used to whiten the more prominent stains. Gels that contain less than 10% carbamide peroxide don't seem to be very effective. Gels that contain 18% or more should be used carefully and probably not by orthodontists because, although treatment time may be reduced, there's a greater risk of complications without any significant increase in the degree of induced whiteness.

bleaching sensitivities

Thermal and tissue sensitivities are the usual complications, but are usually mild and transient in nature with at-home bleaching. The causes are a pre-existing sensitivity to glycerin, propylene glycol or flavoring.
overexposure to the whitening gel, or an ill-fitting tray that irritates the tissue. The patient’s history should be checked for sensitivity to glycerin or propylene glycol. They should be asked about reactions to hand and facial creams, makeup foundations, lipsticks, deodorants and processed food. Glycerin and glycol are commonly used in these items. A strong indicator of reactions to these products is if the patient has to use non-allergenic cosmetics.

Exposed dentin often contributes to hypersensitivity, especially among younger patients. The tissue recession and root dentin exposure that comes with age does not seem to induce discomfort. Untreated caries and restorations with open margins can also contribute to thermal hypersensitivity. To minimize, or completely eliminate bleaching gel induced tissue irritation do not dispense more than a seven-day supply. The patient can pick up an additional weekly supply or it can be mailed.

It is imperative that the bleaching schedule be limited to a two-hour application no more than twice a day. But still, if any disquieting sensitivity occurs, the time of gel application should be reduced and irritation will usually dissipate within a few days as the tissue tolerance increases. Then, a normal bleaching schedule can be resumed. Also, hot and cold beverages should be avoided for at least one-half hour following bleaching gel application and ibuprofen can be prescribed. Bleaching gel application should be resumed very slowly in time and frequency when sensitivity has dissipated. Additionally, untreated perio problems should be resolved and recent surgery allowed to heal before initiating the whitening process. Although there are no clinical or empirical data establishing carbamide peroxide as detrimental to pregnancies, prudence dictates total avoidance.

Teeth discolored by aging, smoking, or chromogenic materials (coffee, tea, red wine, tobacco etc.) have an excellent prognosis from bleaching. That’s why bleaching is usually more applicable for adults – they’ve had a longer stain-exposure period. Bleaching is rarely indicated in younger patients, although it can be done on patients as young as ten years of age. There is no age limit for adults.

Single dark teeth (no endodontics done) lighten almost as well as other teeth, but it takes a while longer. Brown fluorosis discoloration responds well to whitening, but may require some microabrasion. Stained cracks in teeth clean well with no evidence of additional sensitivity. Brown-orange stains in adults bleach fastest and easiest. Blue-gray stains are more difficult and moderate-to-dark tetracycline stains bleach only slightly. Normal bleaching treatment time is usually one-to-three weeks although it could be extended for months for more intrinsic staining. No detrimental effect on teeth or patient is associated with extended treatment times. However, all areas on a given tooth do not bleach at the same rate. The incisal third of the crown is the easiest to whiten. The middle third is more of a challenge, but not much, and the cervical third is the most difficult to whiten. Non-vital teeth don’t respond well to bleaching because the discoloration is not superficial, it’s deeply intrinsic. These teeth will become lighter, but noticeably less than adjacent teeth and the whiteness dissipates more rapidly.

White spots will not bleach. Tetracycline and fever induced stains will not be completely removed, but reasonable improvement can be expected. However, treatment could be extended for up to six months or longer. It would be best to refer the few patients that display severe internal staining to the general dentist.

at-home bleaching

At-home bleaching simply involves having the patient place a whitening gel in a tray, constructed by the orthodontist, and wearing it as directed. The tray plastic is supple, relatively inexpensive, FDA sanctioned, and practically invisible when in place. More importantly it is thin, approximately 0.25 mm when thermoformed, and compressible when the patient is biting in centric. This minimizes any propping open of the bite while the patient is in retention and assures efficient ionic dispersion of the bleaching element.

Blocking out the cast, to form bleaching gel reservoirs (adjacent to the enamel surfaces to be bleached) is controversial. Whether or not the reservoir gel allows a more efficient and robust oxygenating ionic transfer can be debated. However, there is one aspect of incorporating reservoirs that
is not debatable. It involves a relatively complex and expensive laboratory procedure that is unnecessary (Fig. 1). Also, placing reservoir pockets reduces retention potential since the close adaptation at the gingival margin of the tray is compromised, which in turn increases the potential for gel leakage onto the gingiva and subsequent irritation. These undesirable side effects can be completely eliminated by not making any cast or tray modifications whatsoever.

Thermoformed bleaching trays are so thin (0.25mm) and supple that swallowing or occluding on the tray causes flexure and a consequent distribution of the bleaching gel to all covered enamel surfaces. This unique technique completely obviates cast modification resulting in appreciable savings in cost and time (Fig. 2).

The procedure is as follows: For most patients, the tray extends anteriorly from the first premolars. It can be extended distally for the exceptionally wide smile. Terminal molars rarely need bleaching, however extending the tray does improve retention. Prior to bleaching, the color of teeth, as indicated by a prosthetic shade guide, should be recorded. After bleaching is complete, the shade is also noted. Bleaching results are much more evident if only one arch, usually the upper, is treated at a time. The contrast between the bleached arch, when compared to the unbleached opposing arch gives the patient a visual analog for monitoring the improvement.

Prior to bleaching, the teeth should be prophied with Raintree Essix’s Peroxide Prophy Paste #PP30K. This jump-starts the bleaching process and can lighten the common stains (yellow-white or brown-orange) up to one shade immediately. There will be a very minor color relapse immediately after bleaching, because the oxygen trapped in the enamel (which changes the optical quality) diffuses out. That’s why teeth should not be bonded immediately after bleaching – the oxygen saturation of the enamel will appreciably decrease bond strength. Also, initially bleached teeth will appear slightly chalky but will return to normal luster in a few days.

instructions to the patient

◆ Preferably, the tray should be placed after the teeth are brushed and flossed

◆ Don’t place a bead of the bleaching gel in the bottom of the tray, because at least one-half will flow to the lingual surface where it is basically wasted. Using excess bleaching gel is simply a waste of the product and may result in tissue irritation.

◆ Place the moderately thin line of the bleaching gel on each tooth inside the tray from the labial to lingual surface (Fig. 3). Demonstrate this on one-half of the tray and supervise the patient doing the same in the other half. Instruct the patient to wipe off any excess gel, that may have extruded onto the tissue, with a napkin.

continued...
◆ The tray is to be in placed each day for no more than two periods of two hours each. There should be a rest period of three hours between the applications. The peroxide in bleaching gel is a cleansing agent and will keep the tray clean. If for whatever reason, the tray needs to be cleaned, it is done with a Q-tip and soapy water.

◆ The bleaching tray is not to be worn while sleeping. That’s when retainers are to be worn. The tray material is not sturdy enough to stabilize the teeth.

◆ The patient should return to the office for additional gel or arrangements can be made to periodically mail the required supply. It’s a mistake to provide all the bleaching gel at one time (Fig. 4). Dispense a one-week supply at a time, or else the patient will inevitably try to accelerate the bleaching process and cause undue irritation to the tissue.

◆ Bleach only one arch, usually the upper, for the first week. This gives the patient a base line progress comparison with the unbleached opposing arch. After one week, both arches can be bleached. Noticeable results will be apparent within ten days.

◆ Give the cast and the responsibility for its safe keeping to the patient for future touch-ups by their general dentist (Fig. 5).

### Conclusion

Bleaching teeth during the retention phase is an esthetic ancillary service and charging a reasonable fee is appropriate. This will, of course, vary with management policies. A guideline that may be useful is the national average fee for this service. It’s $254 for one arch and $444 for both arches. A healthy smile improves self-image and confidence projecting an aura of health to others. Studies have shown this to be increasingly important to people in both their personal and professional lives. Amplifying the esthetic benefit of our finished cases by whitening the teeth, as part of supervised retention would seem to be a patient service that should no longer be ignored.

### References


Fabricating Essix Mouthguards

**technique**

1. Pre-heat the vacuum machine for at least 3 minutes or until the heating element is a solid orange color.

2. Spray the model with separating medium to prevent the material from sticking to the model (Fig. 1).

3. Place the mouthguard material into the frame on the vacuum machine and the model on the base plate (Fig. 2).

4. Position the Essix logo approximately 3mm from the incisal edge on the palatal side of the interiors (Fig. 3). This can be tested first by lowering the frame with the mouthguard material over the cast and moving the cast into the correct position prior to thermoforming.

5. Swing the heating element over the plastic. Observe the material as it heats.

6. Mouthguard material will sag approximately 1/2” – this is the optimal thermoforming time.

7. Move the heating element away from the plastic.

8. Turn on the vacuum, then lower the plastic over the model.

9. Let vacuum continue to run for 30-60 seconds or until plastic is cool (Fig. 4).

10. Spray with Freeze Spray #22000. Do not handle the appliance while the material is hot or the appliance will distort.

11. Trim the appliance with scissors or the Trim-nite Electric Knife #88500 to free the anterior and posterior frenums (Fig. 5). The mouthguard should cover the complete occlusal surface.

12. After trimming, replace the appliance on the cast and gently swipe a butane torch around the mouthguard’s edges to smooth out rough spots (Fig. 6).

**Note:** The Essix logo within the material is a 1/8” piece of plastic that serves as a palatal brace. This anchors anterior in case of a forceful bite, sometimes caused in contact sports.

**attaching a helmet strap**

1. After trimming, replace the mouthguard onto the cast.

2. Heat the anteriors of the mouthguard using the micro torch (Fig. 1). (Do not melt the plastic, gently swipe the torch across the anteriors).

3. Heat the end of the strap (Fig. 2). Fuse (press together) the strap to the anterior section of the mouthguard.

4. While still warm, press the strap into the mouthguard to smooth out (Fig. 3).

5. Use soap and water to lubricate strap.

Run mouthguard strap over facial bar of helmet – push through slit (Fig. 4).
Frequently Asked Questions

Q. What is the difference between Essix A+™ and Essix C+® Plastic?

<table>
<thead>
<tr>
<th>Essix A+™</th>
<th>Essix C+®</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Description</strong></td>
<td>Great when wearing full time for a specified treatment goal. Crystal clear, and FDA allowed, this rugged, inexpensive plastic has excellent flex memory, and a snap-in fit.</td>
</tr>
<tr>
<td></td>
<td>For orthodontics when a patient grinds. Esthetic, but less brilliant than Essix A+. It is virtually indestructible, FDA allowed and inexpensive.</td>
</tr>
<tr>
<td><strong>Bond Acrylic</strong></td>
<td>Yes</td>
</tr>
<tr>
<td><strong>Tooth Movement</strong></td>
<td>Yes</td>
</tr>
<tr>
<td><strong>Used for</strong></td>
<td>Yes</td>
</tr>
<tr>
<td><strong>Bite Planes</strong></td>
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<tr>
<td><strong>Average Retainer Life</strong></td>
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<tr>
<td><strong>Protective Film</strong></td>
<td>Yes</td>
</tr>
<tr>
<td><strong>Abrasive Proof</strong></td>
<td>No</td>
</tr>
<tr>
<td><strong>Recommended for Full-Arch</strong></td>
<td>No</td>
</tr>
</tbody>
</table>

Q. How do you occlusally adjust a full-arch Essix appliance?

A. By equilibrating the occlusal surface. With the appliance seated, check the occlusion with equilibrating paper. If there are some high spots, reduce them by grinding the spots with the Essix Trimming Bar #18901. This does not effect the efficiency or strength of the appliance.

Q. What is the best way to remove the thermoformed plastic from the cast?

A. On a cuspid-to-cuspid appliance, a lingual and labial tab should be trimmed, then cut away the distal ends of the plastic. Using the tabs, pull the plastic away from the cast and the cast will drop out. On a full arch appliance, trim the distal ends away after removing the excess plastic. Use Trim-Rite Knife #88500. Then use the Essix Cast Removing Instrument #18742 to pry the plastic from the cast from the distal ends.

Q. Why are Essix retainers delivered in duplicates?

A. The clarity of the Essix appliance allows them to be lost easily. Giving the patient two retainers cuts down on the emergency visits and are negligible in time and cost.

Q. Why am I not getting a good fit on Essix C+ plastic?

A. Essix C+ has its own thermoforming idiosyncrasies. It does not thermoform like Essix A+ plastic. It is essential that the cast height be no higher than 3/4”. The undercuts, gingival to the contact points can be emphasized with the Essix Accentuator #18943. The plastic encased cast should be sprayed with Freeze Spray #22000 immediately after thermoforming. The vacuum machine should be fully heated prior to thermoforming.

Q. How can I get a better fit on the margins of an appliance constructed with Essix C+?

A. Follow the instructions in the previous question. The Freeze Spray #22000 is essential to reducing any lift on the lingual or labial margins.

Q. Is there a difference between Essix materials and the material I am using now?

A. Quite simply Essix materials are the best and are consistent with prices on the market. Our plastic is unquestionably the most reliable and the most consistent to thermoform than any other comparable product. All of our applicable intraoral products are FDA allowed. Our plastic is unique – Essix A+™ and Tray-Rite have their own patents, Essix C+® is patent pending.

Q. If I construct a full arch appliance, will I have the cracking and remakes that are associated with these devices?

A. No. Full arch appliances should be made with Essix C+. This material is impervious to occlusally induced fracture.
Q. Which plastic do I use for tooth movement?
A. Using the Hilliard Tooth-Moving Thermopliers, any plastic can be used to move teeth. The Thermopliers must be heated to the correct temperature depending on the plastic being used. For Essix A+ plastic the Thermopliers should be heated to 175°F (70.4°C), for Essix C+ the temperature is 200°F (93.3°C) and for Essix Embrace 240°F (115.5°C).

Q. Using the Divots and Windows technique, how many teeth can be moved at one time?
A. It is best to move one tooth at a time. However, two teeth that are not adjacent may be efficiently moved at one time. It’s best not to try to align a whole section of teeth with a single appliance. Tip: If using the Hilliard Thermopliers – two adjacent teeth can be moved using acrylic to build up the “window” instead of cutting out the window!

Q. Can Essix appliances induce an open-bite?
A. Not if the schedule of wear is followed.

Q. Does Essix have a material for model duplication?
A. Yes. Like all of our products, it is the best, consistent with price on the market. You have a choice of .040”, .060” or .080” clear mouthguard material.

Q. What if the appliance fits the model but not the patient’s mouth?
A. There is a problem with the impression. If alginate is used, it must be poured immediately, otherwise, there will be expansion. Check the quality of the stone being used – inexpensive plasters and stones have high expansion rates.

Q. Why is it important to use polyvinyl siloxane impression material?
A. The fit of an Essix appliance is directly related to the dimensional accuracy of the cast. And, the best cast can only be fabricated from the most dimensionally stable impression material – polyvinyl siloxane. It is more expensive than alginites, but more than compensated with fewer remakes and better fit of the appliance. The impression can be stored for up to 6 months before being poured initially, and can be poured multiple times without distortion. You must wait 30 minutes before pouring, however, or there will be a loss of accuracy.

Q. Why is Collene’s Micro system polyvinyl siloxane recommended over other brands?
A. The delivery system is more efficient with 30% less waste in the mixing applicator tips than compared to other products.

Q. What is the difference between the Essix pink die stone and the Essix Fast Cast?
A. Obviously their color, the Die Stone is pink and the Fast Cast is white. But the prime difference is the pink stone is 18,000 psi, has a working time of 6-8 minutes and completely dry in 4 hours. The white Fast Cast is 14,000 psi, has working time of 90 seconds and is completely dry in 30 minutes.

Q. What is the difference between Essix stones and the plaster I use now?
A. Essix Die Stone is the highest compression strength (18,000 psi) stone and is dimensionally stable. This stone sets so smoothly and dense, separating medium is not necessary.

Q. Are alginates suitable for Essix appliances?
A. Alginates are not recommended for cuspid-to-cuspid appliances, but if used must be poured immediately! Alginate is okay for full arch appliances.

Q. Why should I use Debubblizer?
A. It is helpful in reducing cast discrepancies and bubbles in the cast.

Q. Should I be using tray adhesive?
A. This is necessary for solid metal trays. It is not necessary, but recommended for perforated metal trays. Adhesives should be used for plastic, disposable trays.

continued...
Q. Is a separating liquid on the cast necessary prior to thermoforming?
A. It is always helpful to use a separating medium for ease in removing the plastic from the cast.

Q. Why do I need to use the VACUUM MAXIMIZER™ on my vacuum machine?
A. The maximizers condense the suction toward the center of the machine directly under the cast(s). This concentrates the vacuum’s power into a specific working area and insures superior plastic-to-cast adaptation.

Q. When is the Triad gel used in Essix technology?
A. It can be used to correct cast discrepancies, attach pontics when constructing a temporary bridge, to make posterior extension appliances and to fabricate anterior bridges.

Q. What is the Blazer Torch used for?
A. To smooth out the edges of the mouthguard and to attach the straps to a mouthguard.

Q. What is the purpose of the Dremel tool in Essix technology?
A. All of the Essix burs, border polishers and wheel saws are used in the Dremel tool. It is inexpensive, lightweight, rechargeable and easy to handle.

Q. Why are Essix laminated mouthguards the best?
A. Because simply put it is the strongest mouthguard material available. A hardened palatal brace is placed between two injection molded cross-woven vinyl sheets and laminated together. The custom fit allows for excellent oxygen intake – hence improved performance.

Q. What are the settings for the Biostar machine that would correspond to thermoforming Essix Plastic Sheets?
A. Essix A+ .020” = Biostar setting #93  
Essix A+ .030” = Biostar setting #103  
Essix A+ .040” = Biostar setting #113  
Essix A+ .060” = Biostar setting #133  
Essix A+ .080” = Biostar setting #163  
Essix A+ .120” = Biostar setting #193  
Essix Embrace .030” = Biostar setting #133  
Essix Embrace .040” = Biostar setting #143  
Essix C+ .040” = Biostar setting #163  
Essix Mouthguard (EVA) .040” = Biostar setting #142  
Essix Mouthguard (EVA) .060” = Biostar setting #162  
Essix Mouthguard (EVA) .080” = Biostar setting #200  
Essix Mouthguard (EVA) .120” = Biostar setting #225  
Essix Mouthguard (EVA) .150” = Biostar setting #266  
Essix Mouthguard (Laminate) .160” = Biostar setting #266  
Essix Tray Rite .020” = Biostar setting #113

Q. What size plastic sheet do I need?
A. All Vacuum Machines – 5” square  
Biostar = 125mm Square or Circle  
Ministar = 125mm Circle  
Erkopress/Drufomat = 120mm Circle
Customized Hands-on Essix Training

Learn the rationale, applications and techniques of Essix appliances.

- Retainers
- Bleaching Trays
- Bite Planes
- Temporary Bridges
- AND much, much more

Become familiar with the Hilliard Thermoforming Pliers used to generate minor tooth movement in Essix appliances.

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- Torquing, Tipping, Rotation, Intrusion
- Bite Planes
- Close Diastemas

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Our newest educational program includes a lecture and hands-on training designed to teach the orthodontic and general dental assistants with Essix techniques and products.

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- Bite Planes
- Temporary Bridges
- AND much, much more

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Full Day: You and up to 4 staff members can receive the same 6 hours of training as explained above in our lab at corporate headquarters in New Orleans. This is encouraged for offices that do not have the space or the desire to have a training session in their office.
“You have a clear choice...”

HAWLEY RETAINER

ESSIX® RETAINER

<table>
<thead>
<tr>
<th>Turn Around Time</th>
<th>3-5 days (Requires a second patient visit)</th>
<th>15-30 minutes (Usually done during the debonding visit)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lab vs. Material Costs for Upper &amp; Lower Appliances</td>
<td>$60.00</td>
<td>$1.38 (Plus any cost of your assistant’s time)</td>
</tr>
</tbody>
</table>

Essix Savings per Patient: $58.62

Annual Essix Savings on 200 Starts: $11,724

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What would your patients prefer? Wearing a bulky, traditional appliance full-time. Or wearing an Essix only at night ... a retainer that’s not the least bulky, essentially invisible, and doesn’t interfere with their speech.

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