We’ve had many questions recently on the newer materials and techniques available for temporization, some due to patient requests and some due to the increasing complexity and length of treatment time.

Early in my career, I spent little time during the temporization stage of crown and bridge procedures because, let’s face it, it’s temporary. Instead, I spent the majority of my chair time prepping teeth, managing soft tissue, and taking a good final impression. It was not long before I realized the success of my final restorations depended greatly on the temporaries I had created and the cementation protocol I followed. The result of improper-fitting provisionals or residual temporary cement left behind meant unnecessary time adjusting or managing soft tissue health prior to cementation. Older and wiser, I’ve learned how all of these materials can interact and affect the success of a case.

In this month’s issue, we focus on how to select ideal materials for temporization outlining the differences among provisional materials and temporary cements, as well as provide clinical tips for success. We also highlight some interesting new trends in digital dentistry and the challenge of long-term temporization.

As always, I welcome your comments and suggestions; you can reach me at drbunek@dentaladvisor.com. Thanks for your continued support and reading!

———
Sabiha S. Bunek

Why is a good provisional important?

Provisional restorations are used as interim prosthesis for inlays, onlays, crowns and bridges. Their primary functions are to maintain the position of prepared teeth, protect preparation margins, seal prepared teeth and insulate them against thermal changes. Additionally, they can be used to establish proper vertical dimension and anterior guidance, aid in diagnosis and treatment planning, retain orthodontically moved teeth and act as prototypes for final restorations.

Faulty provisional restorations can result in:

- **Migration of the Prepared Tooth:** Inadequate proximal or occlusal contacts
- **Gingival Overgrowth or Recession:** Shy or overextended margins
- **Gingivitis:** Thick or rough marginal areas
- **Tooth Sensitivity:** Incorrect cementation method, high occlusal contacts
- **Poor Esthetics:** Wrong material, poor contours or incorrect shade match
**Going digital:**

**3D Printing and Milling of Temporaries**

PMMA (Polymethylmethacrylate) materials are very popular in laboratory settings because they are available in multiple shades, are easy to mill and require minimal polishing. They offer a higher strength than Bis-acryl materials, which makes them suitable for long-term temporaries. Digitally designed provisionals are very useful in cases where a tooth has fractured, and no good matrix is available for rebuilding a crown with a secure fit. Software can be utilized to ensure interproximal fit is excellent as well as occlusion and cusp design. The precision of these temporaries from a digital file is superior to traditional methods; excellent marginal fit is essential, especially in extended wear of provisionals where oral hygiene can already be a challenge. Minimal adjustment and polishing are necessary due to final processing at the laboratory. In many cases, laboratory processed temporaries can be relined to be fit in various stages over the course of longer term treatment.

Most printers in the U.S. have temporary materials available for fabricating temporaries in office or in a dental laboratory; the majority of which require post-processing by cleaning, drying and/or light curing. As materials and printers evolve, the time required to print and process 3D materials will likely decrease.

**Provisional materials** should be selected based on the clinical situation encountered. For example, when provisionals are used in long-term cases, fracture strength and wear resistance are significant factors when selecting the right materials. If anterior units are involved, color stability, color variability and stain resistance are also important features to consider.

**Bis-acryl**

The most common provisional materials used today are resin composites called bis-acryls. They are delivered as a paste-paste base/catalyst form in a dispensing gun with a variety of shades and have either a dual- or chemically cured mode of polymerization. They are generally fabricated using a stent or impression of the pre-operative tooth or made from an impression of the diagnostic wax-up. One disadvantage is that most bis-acryl materials cannot be repaired or added to. However, most can be repaired using a bonding agent and flowable composite.

**Poly (Methyl Methacrylate)**

PMMA provisional materials have been used for many years. They are dispersed as a powder (polymer) and a liquid (monomer). They are inexpensive and there is less waste because they are not dispensed in a gun. They are usually fabricated using the same techniques as the bis-acryl.

**Disadvantages include:**
- Strong odor
- Higher amount of shrinkage upon curing
- Significant heat production during polymerization
- Not as easy to use or repair

**Pre-Formed Crowns**

There are three types of pre-formed provisional crowns - aluminum, polycarbonate, and composite. Pre-formed restorations are usually used when the pre-existing condition of the tooth to be restored is such that a copy of the anatomy of the tooth is not feasible to use as a model for the provisional restoration. Aluminum pre-formed crowns are used in posterior teeth; polycarbonate tooth-colored crowns are used for canines, lateral or central incisors; composite pre-formed crowns are shaped in molar, premolar and canine forms (3M Protemp Crown Temporization Material).

**LuxaCrown from DMG America**

Long-term temporization

With the rise in integrative cases involving missing teeth, implant placement and soft tissue reconstruction, there has been an increase in available materials that are more durable and more gentle on soft tissue. These materials also possess higher strength and fracture resistance. One concern with temporization over the long-term is the difficulty in keeping the area clean. Many larger esthetic cases demand tissue healing and historically, temporary materials have not been kind to soft tissue.
**Clinical tips: Provisional Materials**

- Bacterial infiltration around the marginal areas of the provisionals can create a black discoloration. This stain can be difficult to remove, and in some cases, must be removed with pumice or even a diamond bur. To avoid or minimize this pitfall, **Gluma® Desensitizer** (Kulzer) or chlorhexidine can be scrubbed around all marginal areas to provide antibacterial effects.
- Wear nitrile gloves while working with bis-acryl provisionals to avoid discoloration caused by latex gloves.
- Paint a glaze on the surface of the completed provisional to strengthen the surface, provide gloss and prevent discoloration.
- For dual-cured bis-acryl provisional materials, light cure for only a second or two before removing from the prepared tooth. Once removed, they can be manipulated and tried in again prior to curing.
- Use clear bite materials, like Futar® Clear Fast (Kettenbach) to take an impression of the pre-operative tooth to create a stent for subsequent light curing of the provisional material.
- Flowable composite makes a great repair material for adding to or repairing bis-acryl provisionals. If the air-inhibited layer is still present on the provisional surface, a bonding agent is not needed.

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**Selection of a Temporary Cement**

When considering which type of material is best for your office or for a specific restoration, it is important to review the advantages and disadvantages of each.

<table>
<thead>
<tr>
<th>Resin</th>
<th>Zinc Oxide-Eugenol (ZOE)</th>
<th>Non-eugenol Zinc Oxide (ZONE)</th>
</tr>
</thead>
<tbody>
<tr>
<td>+ Higher strength and retention</td>
<td>+ Reduced post-operative sensitivity</td>
<td>+ Compatible with resin provisional materials</td>
</tr>
<tr>
<td>+ Better esthetics</td>
<td>+ Excellent antibacterial effect</td>
<td>+ Compatible with permanent resin cements</td>
</tr>
<tr>
<td>− High incidence of microleakage, discoloration, and odor</td>
<td>− Compromises the bond strength of permanent resin</td>
<td>− No sedative effect on pulp</td>
</tr>
</tbody>
</table>

Temporary cements are used to temporarily bond provisional restorations. In the past, zinc oxide-eugenol cements were the only type available for cementation of interim restorations. With the advent of bonding and all-ceramic restorations, other options are available. Eugenol has been shown to inhibit the bond of composite to tooth structure and zinc oxide-based cements can be esthetically unacceptable due to the opaque white color.

The rule of thumb is that if the final restoration will be bonded, either non-eugenol zinc oxide cement or resin temporary cement should be used. If the restoration is in the esthetic zone, the best choice is resin temporary cement. For traditional porcelain-fused-to-metal restorations, zinc oxide and eugenol cements work very well. They tend to be slightly more retentive than those that do not contain eugenol. Also, eugenol is antibacterial and decreases sensitivity during the interim phase.

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**Ideal Features of a Temporary cement**

- Fast setting (<2 minutes)
- Easy-to-remove excess
- Easy cleanup
- Low sensitivity
- Strong, yet easy to remove

**Preferred Product winner:**

**CEMENT: TEMPORARY**

**Temp-Bond NE™**
Temporary Dental Cement
(Kerr Restoratives)

**NoMIX (Centrix)**
Conveniently packaged in small tubes to dispense to patients.
The making of a temporary crown

Making a temporary can be a daunting task for some assistants, especially if they are new to assisting. Given that a single provisional should take about 10-15 minutes to fabricate/cement, overall fit and esthetics need to be done well and in a timely matter. The key to making a well-fitting, esthetic temporary is starting with a good detailed matrix, and having the right tools to adjust and polish the provisional.

Avoiding frustration when fabricating a temporary crown:

Tips for Assistants

- Use an explorer to pierce one or more tiny vent holes into the incisal edges of the vacuformed matrix. This allows air to escape, reducing the chance of voids in the incisal area of the provisional.
- Always check that provisional materials are dispensing evenly from a syringe or cartridge by first extruding a small amount of material on a tray cover or bib; this ensures the mix is consistent.
- When injecting provisional material into a matrix, place the tip into the deepest part of the matrix and backfill slowly to avoid bubbles and voids. Try not to overfill; once the matrix is seated, the material spreads.
- When a post and core is present and the fit is tight, use a round burr to open the inside of the temporary to avoid dislodging it upon removal.
- Place Vaseline in the matrix to avoid acrylic material from sticking to the inside of the matrix.
- Use an alcohol wipe to remove the air-inhibited layer prior to cementing a temporary.
- Avoid loosening interproximal margins too much after cementation. Tie a knot in dental floss and pull it through to ensure removal of excess cement and to avoid dislodging the temporary while checking contacts.

Some of our favorite materials & tools for provisional fabrication:

- **NTI® White Silicone Polisher** *(Axis Dental)*
  - Reduces, trims, contours or creates anatomy.
- **Hatho® Scotch Brite Brush™** *(Keystone Industries)*
  - (Medium-black) removes scratches & polishes the acrylic.
- **Mini Muslin Buff** *(Buffalo Dental)*
  - Polishes, creates a high gloss shine to the provisional.
- **Luxatemp Provisional Material** *(DMG)*
  - Fabricates the provisional material.

Considerations for using a matrix

- Ease and speed of fabrication
- Accuracy in replicating detail
- Stability for future use if a new temporary needs to be made
- Number of units
From the lab perspective, there is a huge difference among the available materials in the important properties of strength, esthetics and overall stability, which will affect how long the materials will last before fracturing or failing esthetically.

**Flexural & Compressive Strength**
Strength is usually defined by the maximum stress required to break the material in either flexural or compressive modes. Bis-acryl materials can vary widely from 70-140 MPa in flexural strength, and 250-400+ MPa in compressive strength.

**Fracture Toughness**
Fracture toughness is a measure of the stress required to break a material if a flaw or small fracture already exists. This is an important property related to the longevity of a material as there are often initially minor flaws or a build up of microfractures over time which may eventually lead to failure. Newer materials boasting a fracture toughness of over 2 MPa*m½ are blurring the lines between long-term temporary restoratives and permanent restoratives, but can still lack in long-term color stability, strength or water sorption compared to permanent restoratives.

**Color Stability & Stain Resistance**
The esthetics of these materials are continuing to improve, with a greater emphasis on color stability, fluorescence to match natural teeth, and increased polishability. One of the largest differences we have seen in our lab testing is a greater than two-fold difference in the stain resistance and color stability between some materials.

**Surface Finish**
Many materials have an added benefit of a minimal inhibition layer, which when removed reveals a surface with a high luster without requiring polishing. The materials should also allow adjustment and polishing as needed, which will lower bacterial adhesion and mimic natural tooth luster.

**DID YOU KNOW?**
Many products evaluated by DENTAL ADVISOR have free samples available to our readers. For more information, go to dentaladvisor.com/clinical-evaluations/request-a-sample
A feature of bulk-fill resin composites is to have translucency during light curing for adequate depth of cure but to become more opaque upon curing to provide better esthetics. Such a change in translucency may be accompanied by a change in the shade of the cured composite. The objective was to determine the changes in opacity upon light curing of several bulk-fill resin composites at two thicknesses. The null hypothesis was that opacity would not be affected by cured versus uncured conditions, by different thicknesses and by different composites.

**RESEARCH OBJECTIVE & RATIONALE**

Disks (n=5) 10 mm in diameter with thicknesses of 2 and 4 mm of four bulk-fill resin composites (shade A2): Material A: 3M Filtek One Bulk Fill Restorative, 3M; B: Estelite Bulk Fill Flow, Tokuyama Dental America; C: Tetric EvoFlow Bulk Fill, Ivoclar Vivadent; and D: Tetric EvoCeram Bulk Fill, Ivoclar Vivadent, were tested before and after curing for 20 s with a light-curing unit (Valo, Ultradent) at 1200 mW/cm². Translucency parameter (TP) was measured with a reflection spectrophotometer (Ci7600, X-Rite). Differences in TP between uncured (U) minus cured (C) specimens were calculated. The data were analyzed by a three-way analysis of variance and Fisher’s PLSD multiple comparison test was calculated at the 0.05 level of significance.

**MATERIALS & METHODS**

Means (standard deviations) of TP-U, TP-C, and differences in TP measured for uncured minus cured bulk-fill resin composite specimens are shown in the table. TP-C at 2 mm: A<C<D<B; TP-C at 4 mm: A=C=D=B. TP-U at 2 mm: A<D<C<B; TP-U at 4 mm: A<D<C=B and D=B. ∆TP (U-C) at 2 mm: D<A<B<C; ∆TP (U-C) at 4 mm: D=B<A=C; ∆TP (U-C) at 2 mm: D=B<A=C; ∆TP (U-C) at 4 mm: A=D<B<C. For both TP-U and TP-C, 2 mm thickness was less opaque than 4 mm thickness.

<table>
<thead>
<tr>
<th>Composite/Thickness</th>
<th>TP-U</th>
<th>TP-C</th>
<th>∆TP (U-C)</th>
</tr>
</thead>
<tbody>
<tr>
<td>A/2 mm</td>
<td>5.6</td>
<td>5.0</td>
<td>0.6</td>
</tr>
<tr>
<td>B/2 mm</td>
<td>23.3</td>
<td>12.9</td>
<td>10.4</td>
</tr>
<tr>
<td>C/2 mm</td>
<td>22.8</td>
<td>5.5</td>
<td>17.3</td>
</tr>
<tr>
<td>D/2 mm</td>
<td>7.4</td>
<td>7.9</td>
<td>-0.4</td>
</tr>
<tr>
<td>A/4 mm</td>
<td>1.4</td>
<td>1.3</td>
<td>0.1</td>
</tr>
<tr>
<td>B/4 mm</td>
<td>7.9</td>
<td>3.8</td>
<td>4.0</td>
</tr>
<tr>
<td>C/4 mm</td>
<td>7.6</td>
<td>1.5</td>
<td>6.1</td>
</tr>
<tr>
<td>D/4 mm</td>
<td>2.0</td>
<td>2.4</td>
<td>-0.4</td>
</tr>
</tbody>
</table>

†Means with standard deviations in parentheses. Means with the same superscripted letters are not statistically different at the 0.05 level of significance.

**CONCLUSIONS**

Two composites (B, C) become more opaque after light curing with large decreases in TP at both 2 and 4 mm thicknesses. Composites A and D had relatively small changes in TP after curing. TP of the cured composites ranged from 5.5 to 12.9 and from 1.3 to 3.8 for the 2 mm and 4 mm thickness, respectively. Clinically, it is desirable to have only small changes in the opacity of a resin composite restoration upon curing.
EFFECT OF LIGHT CURING ON COLOR OF BULK-FILL RESIN COMPOSITES

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1DENTAL CONSULTANTS, INC., ANN ARBOR, MI AND 2UNIVERSITY OF TEXAS SCHOOL OF DENTISTRY AT HOUSTON

dentaladvisor.com

RESEARCH OBJECTIVE & RATIONALE

A feature of bulk-fill resin composites is to have translucency during light curing for adequate depth of cure but to become more opaque upon curing to provide better esthetics. Such a change in opacity may be accompanied by a change in the shade of the cured composite. The objective was to determine the changes in color upon light curing of several bulk-fill resin composites at two thicknesses. The null hypothesis was that color parameters would not be affected by cured versus uncured conditions, by different thicknesses and by different composites.

MATERIALS & METHODS

Disks (n=5) 10 mm in diameter with thicknesses of 2 and 4 mm of four bulk-fill resin composites: Material A: 3M Filtek One Bulk Fill Restorative (A2), 3M; B: Estelite Bulk Fill Flow (A2), Tokuyama Dental America; C: Tetric EvoFlow Bulk Fill (IVA), Ivoclar Vivadent; and D: Tetric EvoCeram Bulk Fill (IVA), Ivoclar Vivadent, were tested before and after curing for 20 s with a light-curing unit (Valo, Ultradent) at 1200 mW/cm2. CIELAB color coordinates were measured with a reflection spectrophotometer (X-rite Ci7600, X-Rite). Differences in color between uncured (U) minus cured (C) specimens were calculated. The data were analyzed by a two-way analysis of variance and Fisher’s PLSD multiple comparison test was calculated at the 0.05 level of significance.

RESEARCH RESULTS

<table>
<thead>
<tr>
<th>Composite/Thickness</th>
<th>∆E*</th>
<th>∆L*</th>
<th>∆a*</th>
<th>∆b*</th>
</tr>
</thead>
<tbody>
<tr>
<td>A/2 mm</td>
<td>3.7 (0.4)</td>
<td>-1.2 (0.2)</td>
<td>-1.6 (0.1)</td>
<td>3.1 (0.4)</td>
</tr>
<tr>
<td>B/2 mm</td>
<td>12.5 (0.5)</td>
<td>0.1 (0.4)</td>
<td>0.5 (0.0)</td>
<td>12.5 (0.5)</td>
</tr>
<tr>
<td>C/2 mm</td>
<td>20.7 (0.5)</td>
<td>-3.7 (1.2)</td>
<td>0.8 (0.0)</td>
<td>20.2 (0.6)</td>
</tr>
<tr>
<td>D/2 mm</td>
<td>9.0 (0.2)</td>
<td>0.2 (0.2)</td>
<td>-3.2 (0.1)</td>
<td>8.4 (0.2)</td>
</tr>
<tr>
<td>A/4 mm</td>
<td>6.5 (0.5)</td>
<td>-6.0 (0.5)</td>
<td>-1.9 (0.3)</td>
<td>1.4 (0.5)</td>
</tr>
<tr>
<td>B/4 mm</td>
<td>9.5 (0.8)</td>
<td>-7.3 (1.1)</td>
<td>1.0 (0.2)</td>
<td>5.9 (0.6)</td>
</tr>
<tr>
<td>C/4 mm</td>
<td>15.4 (0.4)</td>
<td>-13.0 (1.2)</td>
<td>1.2 (0.1)</td>
<td>8.4 (0.2)</td>
</tr>
<tr>
<td>D/4 mm</td>
<td>7.1 (1.4)</td>
<td>-1.7 (2.3)</td>
<td>-3.2 (0.5)</td>
<td>5.8 (0.9)</td>
</tr>
</tbody>
</table>

Means of uncured minus cured of bulk-fill composites with standard deviations in parentheses. Means with the same superscripted letters are not statistically different at the 0.05 level of significance.

Means (standard deviations) of color parameters measured for uncured minus cured bulk-fill resin composite specimens are shown in the table. ∆E* at 2 mm: A<D<B<C. ∆E* at 4 mm: A=D and D>B<C. Upon curing, the composites became lighter and less yellow. All composites at both thicknesses exhibited color change above the 50:50% acceptability threshold of ∆E*=2.7.

CONCLUSIONS

There were significant differences in color change based on material, thickness, and light curing of composites, hence the null hypothesis was rejected. At 2 mm composite A had the least change in color (∆E*) after curing. Composites B, C and D had larger changes in ∆E* and in ∆b* (became less yellow) after curing. At 4 mm composites A and D had similar ∆E* which were lower than composites B and C. Overall composite C had the largest ∆E* shift. Clinically, it is desirable to have small changes in the shade of a resin composite restoration upon curing.

*Representative photographs of color change before and after light curing composites in a 2 mm black delrin ring mold. Molds were placed on a grid of varying line thicknesses to demonstrate translucency and enhanced for clarity.

Acknowledgments: Some materials were provided by the manufacturers.
BRILLIANT EverGlow™

Description
BRILLIANT EverGlow™ is a highly esthetic and user-friendly universal submicron hybrid composite. Its filler technology is designed for gloss properties such as a high polishability and long-lasting high luster. It also has convenient sculptability without slumping and good wettable for easy handling. The BRILLIANT EverGlow shade system has three translucency levels and exceptional blending properties allowing for highly esthetic and flexible single-shade and multi-shade restorations. The medium-translucent Universal shades provide an exceptional blending effect, making them ideal for seamless, single-shade restorations. Duo Shades, which match two VITA shades in one (e.g. A2/B2), help reduce decision time and the amount of material in storage. For use in multi-shade restorations, the Universal shades can be combined with opaque masses and translucent enamel masses. Each BRILLIANT EverGlow shade is available separately as a syringe (3 g) or in boxes with 20 uni-dose tips (0.2 g each). Kits containing 4 or 9 shades are also provided and include a shade guide with original material for free.

Indications
- All anterior and posterior direct composite single and multi-shade restorations
- Luting and repairing of ceramic and composite restorations

Clinical Tips
- The opaque shades match/adapt well with porcelain repairs and endodontic access opening restorations.
- For shade matching, extrude a little bit on the tooth and light cure it to check.
- Great for teeth with minimum remaining coronal structure.

Consultants’ Comments
- “Excellent consistency and handling. It is easy to dispense, flows well and doesn’t slump.”
- “Packs well, good marginal adaptation and can be sculpted.”
- “Great chameleon-like properties and one of the easiest composites to finish that I’ve tried.”
- “Great polishability!”
- “Blends well. The blended shade is brilliant for that one patient who’s in between shades.”
- “Love all the shade options.”
- “A little hard to dispense and adapt well.”
- “Layers were challenging without having visible lines/seams.”

Unique Features
- Excellent sculptability, smooth consistency and non-slumping
- High polishability and gloss retention
- Adheres to the bonded tooth surfaces rather than sticking to the instrument
- Esthetic single-shade restorations
- Versatile shade system with three translucencies

Evaluation Highlights
BRILLIANT EverGlow was evaluated by 33 consultants, and used 771 times.
- Versatile system with multiple translucency levels
- Easy to handle and place
- Good adaptability
- Esthetic and high luster
- Unique hard plastic syringe sleeve to avoid cross contamination and damage to label when disinfecting. Syringe sleeve may be wiped down with a surface disinfectant

Key Features:
- Ease of dispensing
- Viscosity and ease of placement
- Lack of slumping
- Lack of stickiness on instruments
- Ease of polishing
- Overall esthetics
- Radiopacity

Compared to Competitive Products:
- 24% Better
- 58% Equal
- 18% Worse

Percentage of Consultants Who Would:
- Recommend instead of current product
- Recommend in addition to current product
- Not recommend

Coltène/Whaledent
www.everglow.coltened.com
### Description

**G-aenial Sculpt** is a universal composite with nano-filler technology. The composite is radiopaque and very easy to pack, sculpt and polish. It is designed to be wear resistant and self-polishing to increase polish and luster over time. Due to its chameleon effect, **G-aenial Sculpt** blends with the surrounding tooth structure well.

### Clinical Evaluation Protocol

A total of 144 **G-aenial Sculpt** restorations were initially placed and 108 restorations were recalled at two years. The restorations were bonded with **G-premio Bond**. Of the recalled restorations 56% were molars, 41% premolars and 3% were anterior restorations (Figure 1). The majority (76%) of the recalled fillings were Class II, while (16%) were Class I and the rest (8%) were a combination of Class III, IV and V (Figure 2). Sixteen percent of the recalled restorations had been in function for one year, 35% were in function from one to one and a half years, and the remaining 49% were in function for about two years (Figure 3).

### Results at Two-Year Recall:

One hundred and eight **G-aenial Sculpt** restorations bonded with **G-premio Bond** were recalled at two years. These were evaluated in the following areas: esthetics, resistance to fracture/chipping, resistance to marginal discoloration, and wear resistance. All restorations were rated on a scale of 1 to 5: 1 = poor, 2 = fair, 3 = good, 4 = very good, 5 = excellent.

### Consultants’ Comments

- “The esthetics are excellent and the material blends very nicely with the surrounding tooth.”
- “Very nice results.”
- “No complaints - very nice material to work with.”

#30, 31 MOD at two years

"THE SURFACE LOOKED VERY NICELY POLISHED AT TWO YEARS."
Two-Year Clinical Performance

Summary

One hundred and eight G-aenial Sculpt restorations were recalled at two years. Overall, G-aenial Sculpt received excellent ratings in the areas of esthetics, resistance to fracture/chipping, resistance to marginal discoloration, and wear resistance. G-aenial Sculpt with G-premio Bond received a clinical performance rating of 98% at two years.

Conclusion

Over the two-year period, the clinical performance of recalled G-aenial Sculpt crowns was exceptional. Esthetics, resistance to fracture/chipping, resistance to marginal discoloration, and wear resistance were excellent.

At two years, G-aenial Sculpt received a clinical performance rating of 98%.

Esthetics

Eighty-nine out of 108 G-aenial Sculpt restorations received a rating of 5 or excellent and 19 restorations received a rating of 4 or very good. Thirteen of the restorations that received a 4 that was due to opacity, the remaining six had slight staining at the margin. Overall, the esthetics were excellent and the restorations blended very well with the surrounding tooth structure (Figure 4).

Resistance to Fracture/Chipping

At two years, all G-aenial Sculpt restorations with one exception exhibited no fracture or chipping. One restoration chipped at the marginal ridge and only required smoothing and polishing. None needed to be replaced (Figure 4).

Resistance to Marginal Discoloration

One hundred and two of the recalled G-aenial Sculpt restorations received a rating of five or excellent and only six received a rating of four. These six restorations exhibited slight staining at the margin but did not require replacement (Figure 4).

Wear Resistance

None of the 108 recalled G-aenial Sculpt restorations exhibited any wear (Figure 4).
Darby Lidocaine HCl 2% and Epinephrine

Description
Darby Lidocaine HCl 2% and Epinephrine is a local anesthetic containing 2% lidocaine hydrochloride and epinephrine 1:100,000, delivered in 1.7 mL cartridges. When used for infiltration anesthesia, the average onset time is less than two minutes and duration of anesthesia is about 60 minutes. For nerve blocks the onset time is 2 to 4 minutes, with pulpal anesthesia lasting for around 90 minutes. The cartridges are delivered sterile to prevent cross-contamination. Darby Lidocaine HCl 2% and Epinephrine does not contain methylparaben and the cartridges are latex-free, reducing the risk of allergic reactions. Cartridges are available in boxes containing 50, 1.7 mL cartridges.

Unique Features
- Cartridges are delivered sterile
- Contains no methylparaben
- 100% latex-free components

Consultants’ Comments
- “Easy to use with a quick onset time and provided profound anesthesia.”
- “Very effective local anesthesia for infiltration and mandibular blocks.”
- “I like that it’s latex-free and methylparaben-free.”
- “Excellent numbing effect.”
- “The plunger releases better from the syringe with these cartridges.”
- “Had a problem getting adequate anesthesia with mandibular nerve blocks.”

Indication
- Oral procedures requiring the administration of local anesthesia

Clinical Tip
- In place of a mandibular inferior alveolar block, infiltrate and obtain very effective anesthesia

Evaluation Highlights
Darby Lidocaine HCl 2% and Epinephrine was evaluated by 30 consultants, with 993 uses in total.
- Local anesthetic containing 2% lidocaine and 1:100,000 epinephrine.
- Fast onset.
- Satisfactory duration of local anesthesia.
- Lack of sensitivity.
- Good quality cartridges, delivered sterile.

94% overall rating

Darby Dental Supply
www.darby.com
Core.it®

Description
Core.it® is a radiopaque, auto-mixed, dual-cured, composite core build-up material with medium viscosity for easy application with controlled placement and stackability. This material offers high bond strength to enamel, dentin and posts, sets hard and cuts like dentin.

Core-it is available as a system kit containing 2, 10 g syringes (yellow), a 5 mL bottle each of EsBond and Activator, a 5 mL syringe of FineEtch, two Eco Tips, 12 core mixing tips, 12 Intraoral tips, a dispensing dish, application tool, 34 microbrush tips, and four etchant tips. In addition, it is available in boxes containing 2, 10 g syringes in yellow, blue or white composite together with two Eco Tips and 12 mixing tips. Packs containing 50 mixing tips and intra oral tips are also available.

Clinical Tips
• Take your time when placing this material and use even, slow pressure.
• Try the blue color. It’s great if the tooth ever needs a root canal retreat or crown replacement. The endodontist will thank you! Just don’t use it under an IPS e.max crown, the color will show.
• We used it for conventional cores and emergency “build-up and re-cementing” of crowns and bridges when patients couldn’t afford or stay for definitive treatment - very impressive.
• Give it an extra minute to start cutting it after curing this material.
• Dispensing gun is available for easier extrusion.
• Endo mixing tips are available for smaller spaces.

Consultants’ Comments
• “It performed well - good flowability, stackability and it did not slump.”
• “The “white” and “blue” are easy to distinguish. It’s easy to gauge when shaping.”
• “I was able to cut close to pins without any fracturing of the material.”
• “The cured finish prior to trimming seems quite smooth and dense - a pleasure to use.”
• “Simple to use and it appears to have a lower contact angle than other core materials.
• “One of the best materials I have ever used. The kit had everything.”
• “The intraoral tip was a little big for some spaces - a smaller, longer one would be useful.”
• “We had to cure in layers. I didn’t like that the adhesive is a 2-step.”

Unique Features
• Three different shades (yellow [tooth], blue, white)
• Sets hard, cuts like dentin
• High bond strength to enamel, dentin and posts
• Medium viscosity allows for maximum control during application, and stackability

Indications
• Core build-ups
• Cementation of root posts

Evaluation Highlights
Core.it was evaluated by 30 consultants, and used 448 times in total.
• Excellent viscosity for placement and stacking
• Excellent color contrast with blue and yellow shades
• Non-slumping
• Multi-step process

86% overall rating

Spident
www.spident.co.kr

BEAUTIFUL HANDLING PROPERTIES, JUST THE RIGHT VISCOSITY. ADAPTS WELL TO UNDERCUTS.

Key Features:

Compared to Competitive Products:

Percentage of Consultants Who Would:

Recommended instead of current product
Recommended in addition to current product
Not recommend

33% Better
47% Equivalent
20% Worse
V-Posil

**Description**

*V-Posil* is a vinyl/polysiloxane (VPS) impression system that is formulated to offer up to two minutes of adjustable working time, combined with a rapid snap set and short setting time. It has a low contact angle of 10°, offering hydrophilicity and is designed to also displace fluids for improved accuracy. In addition, this impression material is formulated to offer excellent tear strength and elastic recovery. *V-Posil* is available in three tray material viscosities (Putty Fast, Mono Fast and Heavy Soft Fast), and in two wash materials (Light Fast and X-Light Fast). All viscosities are available in 50 mL cartridges. *V-Posil Heavy Soft Fast* and *V-Posil Mono Fast* are also available in a 380 mL automix cartridge. Mixing tips and intra-oral tips are available as accessories.

**Unique Features**

- Adjustable working time
- Rapid snap set
- Extremely low contact angle for excellent hydrophilicity
- High tear strength
- High elastic recovery after deformation

**Indications**

- Full range of impression techniques
- Reline/rebase impressions and impressions for removable dental prostheses

**Clinical Tips**

- The heavy body material flows well around implant components.
- After a couple of impressions, I extended the setting time to 2:45 and felt that was adequate.
- Use the extra light material to check for contact binding in chairside locator housing.
- Reserve the extra light for the mandibular arch - it is too runny for the maxillary arch.
- Use retraction cord to get good margins.
- Suggest using the heavy body only for triple tray impressions.

**Evaluation Highlights**

*V-Posil* was evaluated by 34 consultants, and used 555 times in total.

- Four viscosities, two heavy and two light flowable materials
- Hydrophilic
- Good tear strength and elastic recovery
- Easy to remove once set

**Consultants’ Comments**

- “Easy to dispense, place and remove. Excellent tear strength. Great material.”
- “The two minute set time combined with the two minute working time is something I have never experienced in a VPS before - awesome!”
- “The surface detail and viscosity of the extra light body is phenomenal.”
- “I liked that the tray material is stiff and will push the wash material into the sulcus.”
- “Setting time is quick and colors are very distinguishable, making it easier to read the details.”
- “The fact that it is flavorless appealed to patients.”
- “The heavy body material was hard to extrude and it was difficult to fill the tray. It was tacky.”
- “Color contrast at the margins could be better.”
- “I did not like the dark blue color of the heavy body material - it was hard to read.”

**Key Features:**

- Excellent
- Very Good
- Good
- Fair

**Compared to Competitive Products:**

- Percentage of Consultants Who Would:
  - 68% Better
  - 32% Worse
  - 15% Recommend instead of current product
  - 62% Recommend in addition to current product
  - 23% Not recommend
Cem EZ™

Description
Cem EZ™ is a dual-cured, universal resin cement that is delivered in automix syringes with ready-to-use mixing tips. It is formulated to offer excellent bond strength to enamel, dentin and indirect restorative materials. Cem EZ can be used with a self-etch, total-etch, or selective-etch techniques. Featuring the proprietary Intellitek Technology, this universal cement provides long-term color stability and compatibility with Prelude One as well as a range of other adhesives. It can be tack cured in two seconds for easy clean-up. Cem EZ is available as a starter kit containing three 5 g syringes (one each translucent, white opaque and warm shades), 24 automix tips, 5 mL Sure Etch Gel, 12 etch tips, 5 mL Prelude One, 40 application brushes, and a reusable mixing well. Refill kits are also available containing two syringes of one shade together with 17 application brushes. Separate automix tips are available in packs of 24.

Unique Features
- Inclusive of the proprietary Intellitek™ Technology for long-term color stability and adhesive compatibility
- Protection against microleakage
- Esthetic cement with high bond strengths
- Automix delivery system

Consultants’ Comments
- "Great product and an esthetic cement for anterior teeth - good shade options."
- "Excellent viscosity for endo post cementation."
- "Clean-up was a breeze after tack-curing this cement."
- "I liked its compatibility with a variety of adhesives."
- "I never saw a finish line; Cem EZ has a chameleon effect and disappears."
- "This is a very efficient product."
- "The self-cure time seemed to be longer than other cements."
- "No post-operative sensitivity."
- "Cementation of composite seemed to have a lot of steps."
- "The working and setting times are very short. This is good for single crowns but would be an issue for multiple restorations or a long multi-unit bridge."

Indications
- Permanent cementation of crowns, bridges, inlays and onlays fabricated from zirconia, ceramics, metals and composites
- Cementation of all types of endodontic posts

Clinical Tips
- A quick two-second tack cure makes clean-up easy. Do not over-cure before clean-up.
- The laminated instruction card is very useful.

Evaluation Highlights
CemEZ was evaluated by 27 consultants, and used 429 times in total.
- Easy to automix and dispense
- Use with self-etch, selective etch and total etch techniques
- Flexible and multi-purpose
- Lack of post-operative sensitivity
- Esthetic results

Key Features:
- "Easy automix and dispensing, and good viscosity."

Compared to Competitive Products:
- 33% Better
- 67% Equaled
- 0% Worse

Percentage of Consultants Who Would:
- Recommend another current product: 70%
- Recommend our current product: 26%
- Not recommend our current product: 4%
Duo-Pen

Description

Duo-Pen is a cordless, lightweight, warm vertical compaction device. It is designed to effectively soften, spread, cut, and tightly compact gutta percha during root canal obturation. The device automatically recognizes which size of heating condenser has been inserted for use. The heating condensers are available in five different sizes and are color-coded for easy identification. The handpiece remains cool to the touch during operation and has three temperature settings (170°C, 200°C and 230°C). Duo-Pen is available in a kit containing the handpiece, charger, two heating condensers (.04-50, .06-50), one box of disposable sheaths (200 count), a power adapter, and cord. The components are also available individually, including additional sizes of heating condenser (one/box of .04-40, .04-45, .04-50, .06-50 and .08-55), and two/box of .04-50 and .06-50. Duo-Pen and Duo-Gun can be purchased together as a set called Dia-Duo.

Unique Features

• Ergonomic design
• Reaches 230°C in one second
• Display window on handpiece that shows battery power, error and setting temperature
• Smart temperature control that monitors and prevents the heating condenser from burning out
• Device can automatically recognize the size of heating condenser inserted
• Simple operation with two buttons - power/temperature and operation/heating
• High-energy, replaceable lithium-ion battery
• Color-coded heating condensers are available in 5 different sizes (.04-40, .04-45, .04-50, .06-50 and .08-55)

Consultants’ Comments

• “I like the weight of the pen, the battery life, the digital display, and the battery level display.”
• “Looks great and it’s cordless.”
• “It works great and you’re able to melt gutta percha inside the canals.”
• “Very ergonomic.”
• “It sometimes seemed to pull obturation material back up.”
• “There seemed to be a slight delay (<1 second) after releasing the ‘heat’ button to turn off the heat.”
• “I would like more tip options.”

Indications

• Warm vertical compaction of gutta percha
• Designed to be used along with the Duo-Gun during root canal filling procedures

Clinical Tips

• Find a comfortable way to get your finger on the activation button and reorient the tip as needed.
• It is critical to choose the correct tip size.

Evaluation Highlights

Duo-Pen was evaluated by 10 consultants and used a total of 254 times.
• Cordless and lightweight
• Easy to use
• Rapid heating of condensers
• Effective in sealing root canals
• Battery charges quickly

DiaDent
www.diadent.com

“EASY TO USE AND HEATS UP QUICKLY.”

Key Features:

Compared to Competitive Products:

Percentage of Consultants Who Would:

40% Recommend instead of current product
40% Recommend in addition to current product
20% Not recommend

92% overall rating
NiTin Sectional Matrix System

Description
NiTin Sectional Matrix System consists of sectional matrices, rings, wedges, and forceps. The NiTin rings are fabricated with draw-wire nickel titanium (NiTi) that has undergone proprietary heat-set processing to increase its strength and resilience, and polyether ether ketone (PEEK) reinforcement to reduce ring stretch. The ring placement forceps offer precise control during ring placement and the fully contoured sectional matrices are fabricated from polished, very soft 0.0015” stainless steel and are rigid to resist deformation. An easy placement tab is incorporated for matrix placement using the band forceps. The flexible curved wedges are designed with a curved tip to help the wedge glide interproximally to provide a marginal seal. NiTin Sectional Matrix System is available in a starter kit containing one long and one standard NiTin ring, 100 assorted matrices (premolar, molar and tall molar, with and without extensions), 100 assorted wedges (extra small, small, medium and large), 1 of each ring placement, and band forceps. A mini kit containing 40 of each assorted size matrices and wedges is available, as well as packs of matrices, wedges and separate accessories.

Unique Features
- Drawn-wire nickel titanium heat-set processed rings with PEEK overmold and tips for strength, resilience and stretch. PEEK also resists bonding of composites to the ring tips.
- Easy tab placement for controlled precise placement using ring forceps with optimized tips.
- Curved ‘ski-like’ tips on wedges help the wedge glide into position and are color-coded by size.

Consultants’ Comments
- “Easy to use. The rings fit well, the matrices go subgingivally nice and good cervical margin fit.”
- “Excellent stacking when more than one ring was needed.”
- “I like that longer matrices are available for restorations extending past the proximal line angles.”
- “The elliptical shape is a great advantage when placing the ring between 1st and 2nd molars.”
- “The best is the placement tab and forceps, which make it easy to place the matrix.”
- “Great ring forceps design for easy placement and removal of rings.”
- “Good adaptation to teeth, and doesn’t lose tension around teeth after many uses.”
- “The ring strength created a tight contact.”
- “The matrices seemed a little too large. They can be too long for an MOD on a smaller tooth.”
- “The placement tabs blocked my view of preps and got in the way when contouring composite.”

Evaluation Highlights
NiTin Sectional Matrix System was evaluated by 22 consultants and used in total 511 times.
- Soft, strengthened 0.0015” stainless steel sectional matrices
- Assorted sizes of matrices with and without extensions & wedges
- Easy placement of rings
- Stackable
- Good marginal seal

Indication
- Sectional matrix system for Class II direct composite restorations

Clinical Tips
- Trim the sectional matrix if it is too tall.
- I was able to place wedges AFTER the matrix and the ring, because the matrix pressing part is made of non-compressible polymer material. This is a very significant advantage over other systems.
- Make sure that you spread the rings a little wider so as to not upset the matrix and the wedge.
- Place the matrix band and ring, then the wedge to improve matrix stability and marginal seal.
- Double wedge and burnish the matrix band.
- Place the appropriate sized matrix band and wedge, then the proper sized ring and use a composite instrument to form a proper shape for the proximal area. This results in very little flash, if any.

Reinvent Dental Products
www.reinventdental.com
**T-Mixer Colibri**

**Description**

*T-Mixer Colibri* consists of a mixing tip with a built-in cannula that is used to directly dispense the material at the clinical site. The cannula is constructed of smooth, round medical-grade stainless steel for safe application in the gingival sulcus and root canals and it can be fully rotated 360° for easy access to sites. The cannula is also bendable, while maintaining a constant inner diameter for consistent flow of material from the tip. The *T-Mixer Colibri plus* MBT 4.2-12-N11 is fully compatible with MIXPAC cartridges containing 18 to 75 mL of material. Three other mixing tips with cannula are available - the *T-Mixer Colibri* MLT 2.5-10-N09, MLT 2.5-10-N11 and the MLT 2.5-10-N14. These three sizes are fully compatible with MIXPAC cartridges containing 2.5 to 10 mL of material.

**Indications for MBT 4.2-12-N11**
(for 18-75 mL Cartridges)

- Materials for post and core build-ups
- Materials for cementation of post and cores
- Materials for root canal impressions and for impressions of preparations

**Indications for MLT 2.5-10-N09, MLT 2.5-10-N11, MLT 2.5-10-N14**
(for 2.5-10 mL Cartridges)

- Materials for post and core build-ups
- Materials for cementation of post and cores
- Materials for bulk filling and bases/liners

**Consultants’ Comments**

- “I just loved the bending of the cannula – it made cementation more accessible.”
- “Great access with the small tip.”
- “I liked everything about this product – easy to mix, bend, place and use.”
- “The built-in cannula allows precision placement – good length and bendability to reach difficult-to-access areas and it did not over-bend.”
- “I loved these tips. It was easy to syringe my ultra-light material into the sulcus of preps. I loved the brown tips for build-ups.”
- “Too small to use for impression materials.”
- “It was cumbersome and time consuming to read which tip went on which cartridge.”

**Clinical Tips**

- Very convenient for cementing posts in a canal. It is far superior to just “spinning” a reamer or periodontal probe in the canal to place cement.
- The smaller tip size produced more accurate dispensing of the material and less waste.

**Unique Features**

- Integrated cannula made of smooth, round medical-grade stainless steel for safe application
- Fully rotatable cannula and bendable for ergonomics and access to clinical sites
- Fully compatible with MIXPAC cartridges
- Reduced waste compared to helical design mixing tips

**Evaluation Highlights**

*T-Mixer Colibri Plus* was evaluated by 24 consultants, with a total of 395 uses.

- Easy to mix, dispense and apply
- Fully rotatable and bendable cannula for improved access and easy application
- Less waste with smaller tips
- Ergonomic
- Versatile

**Sulzer**

www.sulzer.com/dental

92% overall rating

“A TRULY AMAZING PRODUCT. THE MOST EFFECTIVE WAY I’VE FOUND TO PLACE CEMENTS AND BUILD-UPS.”

**Key Features:**

<table>
<thead>
<tr>
<th>Excellent</th>
<th>Very Good</th>
<th>Good</th>
<th>Fair</th>
<th>Poor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ease of mixing and dispensing</td>
<td>Homogeneity of mixed material</td>
<td>Seaworthiness of cannulas</td>
<td>Ability to use with small tips</td>
<td>Ease of application</td>
</tr>
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**Compared to Competitive Products:**

**Percentage of Consultants Who Would:**

- Recommend instead of current product
- Recommend in addition to current product
- Not recommend

- **38%**
- **54%**
- **8%**

- **37%** Equivalent
- **63%** Better
SoftMask ClearSight Face Masks

Description
SoftMask ClearSight Face Masks are single-use, disposable, face masks designed with a built-in anti-fog strip to help prevent fogging of protective eyewear and to make wearing the mask more comfortable. They are non-irritating to skin, fiber glass-free and latex-free, and tested in accordance with ASTM 2100. The SoftMask ClearSight Standard mask is ASTM Level 1 rated. The SoftMask ClearSight Defender mask is ASTM Level 3 rated, offering extra protection. SoftMask ClearSight Face Masks are available in boxes containing 50 ASTM Level 1 rated masks (Standard) or 50 ASTM Level 3 rated masks (Defender).

Unique Features
- Non-irritating to skin
- Anti-fog strip to help prevent fogging
- Tested in accordance with ASTM 2100
- Fiberglass-free and latex-free

Indications
- A Level 1 Barrier mask is ideal for basic checkups and procedures with light amounts of fluid and spray.
- A Level 3 Barrier mask is ideal for use with ultrasonic scalers, oral surgery or any procedures with high amounts of fluid and spray.

Consultants’ Comments
- “I am able to breathe easily and see through my dental loupes with clarity.”
- “A soft feel - comfortable to wear. They hold their shape.”
- “I liked the anti-fog strip. It really works and it sealed the area at the nose well.”
- “Both the ASTM Level 1 and Level 3 rated masks are comfortable.”
- “Eliminated fogging which usually makes my mascara run and then I have to stop my procedure to clean my glasses and lose treatment time. Who would have thought a mask would help me keep to my schedule better!”
- “I liked everything about them. The fit, longer and comfortable ear elastics, no fogging, fit to the face better, and they weren’t hot to wear.”
- “They didn’t mold to the chin to create a better seal.”

Clinical Tip
- Take a moment to properly form the metal band to your face.

Evaluation Highlights
SoftMask ClearSight Face Masks were evaluated by 36 consultants and were used 1228 times in total.
- Conform to face shape
- Help to prevent fogging of eyewear
- Anti-fog strip over nose
- ASTM Level 1 and Level 3 rated masks

HEDY Canada
www.hedycanada.ca

Key Features:

Compared to Competitive Products:
- 19% Equivalent
- 42% Better
- 39% Worse

Percentage of Consultants Who Would:
- 31% Recommend instead of current product
- 42% Recommend in addition to current product
- 27% Not recommend

95% overall rating
NextGen Esthetics
A Global Outreach

10th Annual Conference of the Society for Color and Appearance in Dentistry (SCAD)

October 19-20, 2018
Renaissance Newport, Beach Hotel CA

www.scadent.org  info@scadent.org

Special Thanks to:


Laboratory Consultants:

Apex Dental Milling, MI ∙ Bullinger Dental Lab, MI ∙ Centric Dental Laboratory, TX ∙ Cornerstone Dental Studio, Inc., MI ∙ David's Dental Laboratory, NY ∙ Experti Dental Lab, MI ∙ Heritage Dental Laboratory, IL ∙ techniques Crown and Bridge, Inc., NC