



## Endodontic Treatment 2011: Proven or Still Evolving?

**Gordon and Paul's Clinical Bottom Line:** Most endodontic treatment is accomplished by general practitioners. Unfortunately, predictable success with current endodontic procedures has been shown to be elusive. What are the most adequate materials, devices, and techniques? What makes endodontic procedures most predictable, easiest, and most efficient? In this update report, CR has evaluated the currently popular endodontic concepts and materials and made conclusions that will help you to increase success in your endodontic procedures.

- Endodontic treatment has saved millions of teeth
- Revenue produced from endodontic treatment comprises a significant portion of overall general practitioner income
- Increased indication for endo: aging population, bisphosphonates, multiple dry mouth medications, poor diet, etc.
- Some endodontic treatment could be more successful: recent study reports only about 80% success nationwide; however, reports from endodontists show 95% success
- Clinical challenges are blocked canals, breakage/separation of instruments, perforation, lingering pain or sensitivity, or outright failure
- More teeth are being extracted and implants placed instead of endodontics
- Endodontics can be simple and easy or complicated, unpredictable, and painful
- New endodontic concepts are present, but some are relatively controversial
- Additional new concepts under development appear promising

This report discusses and critiques current endodontic concepts including: diagnosis; instrumentation; irrigants; obturation and sealers; and treatments leading up to final restoration. Frequently asked questions are answered, useful products identified, clinical tips presented, and a CR survey on endodontics reported.



State-of-the-art endodontic treatment without post placement



State-of-the-art endodontic treatment with fiber-reinforced composite posts and core before crown seating

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## Provisional Cements: The Optimal One for Your Clinical Needs

**Gordon and Paul's Clinical Bottom Line:** Fixed prosthodontic procedures remain as the single most revenue producing part of general dental practice. Cementation of provisional restorations can or may not provide a comfortable, relatively esthetic, interim procedure until the final restorations are completed. CR scientists and clinicians have developed a concise and practical report for you on the differences among provisional cements, including their physical characteristics as well as a predictable clinical technique.

Provisional/temporary cements find widespread use in dentistry for cementing provisional restorations such as inlays, onlays, crowns, fixed partial dentures, and implant restorations. Selecting the best provisional cement can prevent the occurrence of provisional restoration dislodgment and subsequent emergency appointment. The characteristics of an ideal provisional cement are:

- Easy to use (dispensing, mixing, applying and clean-up)
- Excellent retention and marginal sealing for the duration desired (weeks to months)
- Elimination of sensitivity
- Acceptable flavor and odor
- Biocompatibility and compatibility with a wide range of provisional materials and final cementation materials
- Low solubility in oral environment

- Sufficient working time and reasonable set time
- Ease of removal of provisional restoration without damage to oral tissues
- Ease of cement removal from the surface of the preparation

Provisional cements can be broadly classified into: 1) ZOE (zinc oxide with eugenol, abundant), 2) Non-ZOE (zinc oxide without eugenol), 3) resin-based cements including implant cements, and 4) other cements including polycarboxylate, zinc phosphate, and glass ionomers.

This CR report includes the results of an extensive in-vitro study to characterize 28 brands of provisional cements and guides the clinician in material selection and technique. This report also evaluates the influence of the use of eugenol-based and non-eugenol-based provisional cements on the shear bond strength of final cements.

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## Products Highly Rated in CR Clinical Trials

**Harmony Dual-Arch Tray:** Unique anterior dual-arch tray that captures prepared teeth, opposing arch, bite registration, and facial midlines in one simple step, and posterior impression trays; both made with biodegradable corn starch. (Page 6)

**Total Solutions Implant Maintenance Starter Kit:** COLORVUE probes with vivid yellow and black markings provide superior visualization of depth gauge intraorally. Three IMPLACARE scaler tip designs also included. Both provide safe care of implant surfaces. (Page 6)

**Locator Implant Attachment System:** Overdenture stabilization with implants is a simple and easy way to improve patient satisfaction with dentures. Locator Implant Attachments are a popular and successful attachment for parallel and divergent implants. (Page 6)



## Endodontic Treatment 2011: Proven or Still Evolving? (Continued from page 1)

### Endodontic Challenges in 2011

- Many contradictory conclusions are present in the literature when observing meta analyses on methods for instrumentation (*hand, rotary, reciprocal*), obturation type (*gutta percha, resins, glass ionomer*), relative effectiveness of irrigants, amount of ferrule necessary (*0–2 mm*), and use of posts or not.
- **Consensus agreement—Factors influencing outcome:**
  - *Periapical lesion or no lesion* preoperatively. Reduced success when lesion or symptoms present.
  - *Root canal obturation* extending to 2 mm from the radiographic apex and not over extending filling for increased success.
  - *Quality of the subsequent restorative treatment.* High quality, well-fitting restorative treatment for increased success.
  - *Voids in the sealer reduce success.*
- **Estimated pooled success rates** completed at least one year previously ranged from 68% to 85% (see picture at right).
- **Properly accomplished endodontics on vital teeth can be 95% successful** if all internal root canal anatomy is debrided, but 3–5 times more failure on infected teeth in 5 to 10 years if excellent treatment is not accomplished.
- **Highly suspect or symptomatic teeth** should probably be treated endodontically rather than waiting until they are infected with the possible exceptions of those with apparent reversible pulpitis, primary occlusal trauma, cervical non-carious lesions, or cracks.
- **Reported endodontic success has not improved** over 40 to 50 years, but more difficult cases are being treated.



50-year-old silver point endo still in mouth

### Clinical Tips

- Use single, well-accomplished appointments for most cases unless infected and/or symptomatic.
- When encountering a “hot tooth,” opening and placing a temporary restoration is a viable alternative.
- Create straight line access and don't over enlarge canals. Leave optimum coronal tooth structure with minimal but sufficient flaring for adequate tooth build-up and post if needed especially during re-treatment.
- Use care to avoid perforations.
- Irrigation systems reduce risk of irrigant going beyond apex. EndoVac (*Dicus*), EndoActivator (*Dentsply Tulsa*), and F File (*Plastic Endo*) are popular. Use of the EndoActivator, BioPure MTAD (*Dentsply Tulsa*), and Q Mix (*Dentsply Tulsa*) have been shown to inhibit the growth of the major bacteria associated with endodontics.
- Don't over extend the root canal filling. Slight under filling is better (*within 2 mm of apex*) than over extension of underfilled canal.
- Consider using Tylenol (*325–1000 mg*) or ibuprofen (*400–600 mg*) instead of codeine. May also consider combining ibuprofen with acetaminophen.
- Radiographic identification of an optimum endodontic result. No apical lesion at one year, narrow void-free canal within 2 mm of apex, and obturation material interface with restorative material at bone level (*assuming post not used*).

### Useful Products and Concepts for Endodontics: Mandatory, Desirable, and Elective

#### Mandatory

- **Apex locator.** Current devices are accurate most of the time, but must be combined with other methods. Root ZX II (*J. Morita*) and the Foramation 13-10 (*Parkell*) are popular devices.
- **Magnification using loupes.** Ocularoptics, Designs for Vision, and Surgitel are most used. 2.0x to 4x are most used with 2.5x most popular.
- **Rubber dam.** From both clinical and legal perspectives, rubber dam use is mandatory. Latex and non-latex (*Coltene Whaledent*) are most used.
- **Adequate final restoration to eliminate coronal leakage.** Onlays or crowns are most adequate. If not financially feasible, a direct resin-based composited onlay is acceptable for an interim period.

#### Desirable

- **Continuing education.** If you feel your endodontic procedures are out-of-date, enroll in a CE course. Drs. Stephen Buchaman, Gary Carr, Barry Musikant, Cliff Ruddle, and John West are examples of well recognized CE instructors. (*Go to Google for information.*)
- **Clinical microscope.** Many endodontists now consider use of a clinical microscope to be the current level of care. Global and Zeiss are used most.
- **SAF System from ReDent Nova** (*available from Henry Schein*). This recently introduced, evolving system uses an elastically compressible file that has been shown to closely adapt to canal anatomy removing significantly more debris than conventional techniques.
- **File bender.** Often, when it appears the canal is blocked, bending the file will allow it to find the canal. Endo-Bender (*SybronEndo*) or a simple metal plicer.
- **Hand files.** These are desirable when rotary files will not negotiate a sharp curvature. If hand file cannot negotiate canal, don't use rotary.
- **Endoguide burs.** Conical carbide endoguide burs assist the dentist to enter the canal at the correct angle. EndoGuide burs (*SS White*).
- **Removal instruments.** Obtura III Max (*Obtura Spartan*) for gutta percha removal and P5 Newtron (*Aesculap*) assist in troughing or post removal.
- **Torque control handpiece.** Example: X-Smart Easy (*Dentsply Tulsa*) or Endo DTC (*Aseptica*) torque control motors.
- **Reciprocal instrumentation systems.** Proven simple alternative to rotary instrumentation with less file breakage. Desirable for those experiencing file breakage with rotary instruments. SafeSealer (*Essential Dental Systems*) or Endo-Eze TLOS (*Ultradent*).

#### Elective

- **Carrier-based obturation systems.** Plastic or metal carrier coated with gutta percha, heated, and placed to length. Thermafil (*Dentsply Tulsa*) is most popular; without metal or plastic carrier: gutta core.
- **Non-gutta percha obturation systems.** Research supported alternatives for gutta percha. RealSeal (*SybronEndo*).
- **Glide path rotary files.** Fragile, ultra small rotary files that allow a transition from a #10 file to the smallest conventional rotary file. PathFile (*Dentsply Tulsa*).

### Questions and Answers

In order of instrumentation, irrigants, obturation, and sealers as based on available research literature and observations of CR staff and Evaluators

1. **Should antibiotics be used routinely during endodontic treatment for asymptomatic teeth?** *Controversial.* Not warranted based on best evidence currently available. However, antibiotics may be useful for infected teeth.
2. **Are all canal instrumentation techniques comparable** (*hand, reciprocal, or rotary files*)? Yes, controversial, depends on personal preference, all types used properly are successful.
3. **Which instrumentation type is most popular?** Rotary.
4. **Which instrumentation technique has the most reported file breakage?** Rotary has the most, but done properly, canal debridement and shaping is more consistent. Reciprocal has least breakage making it an alternative for those experiencing significant file breakage.
5. **Are lasers effective to remove smear layer and vaporize tissues in canal(s)?** Results are inconsistent and controversial.
6. **Is use of clinical microscope mandatory?** Most endodontic treatment is done with loupes, but microscope can be desirable and is used by many endodontists.
7. **Is conc-beam radiography useful in endodontics?** Infrequently used, but can show reasons for some painful or failing treatments that would otherwise be missed.
8. **Which irrigant is best?** Sodium hypochlorite, chlorhexidine gluconate, EDTA (*Ethylenediaminetetraacetic acid*), and MTAD (*tetracycline isomer, citric acid, and detergent*) are used. Sodium hypochlorite is used most but with well know significant problems if injected beyond apex. Use of BioPure MTAD (*Dentsply Tulsa*) or Q Mix (*Dentsply Tulsa*) to remove smear layer and necrotic tissue caused by instrumentation is promising. *Comparative studies are inconclusive.*
9. **Should hydrogen peroxide be used?** Use is based on antimicrobial and cleansing properties. Research questions value. Some prefer effervescent property when mixed with sodium hypochlorite. *Use declining.*
10. **Should intracanal medicaments be used?** Many potent antimicrobial medications have been used historically. *Current research shows that intracanal medications do not prevent pain.* Ca(OH)<sub>2</sub> occasionally used for bacteriostatic activity.
11. **Which obturation concept is best?** Gutta percha, resin, glass ionomer, or others? Success is reported with each. Comparative research is inconclusive. Gutta percha is most used.
12. **Are ZOE-based, calcium hydroxide, or resin sealers best?** Both research and observations are mixed. *Most use ZOE-based sealers.*
13. **Is the Sargenti technique effective?** The Sargenti technique can be effective, but has been controversial in the U.S., and FDA approval is still pending.



## Endodontic Treatment 2011: Proven or Still Evolving? (Continued from page 2)

### Endodontic Survey Results (n = 1171 respondents)

- **Specialty:** 95% GP, 2% Prosthodontist, 2% Pediatric, 1% Endodontist
- **Root Canal Therapy:** 76% accomplish endo, average 7.5 teeth/month
  - **Referral to Endodontist:** Posterior teeth 53% and anterior teeth 31%
  - **Magnification Use:** 42% loupes 2.0–2.9x, 27% loupes 3.0–3.9x, 15% loupes >4.0x, 12% no magnification, and 2% microscope
- **Apex Locator Use:** 63% all the time, 22% never, and 15% sometimes; Root ZX (*Morita*) most popular
- **Type of Files Used (more than one choice):** 79% rotary, 70% hand files, and 10% reciprocal; Dentsply Tulsa and Brasseler most popular manufacturers
- **Irrigant Use (more than one choice):** 94% sodium hypochlorite, 22% chlorhexidine gluconate, 9% hydrogen peroxide, and 20% other (*use with EDTA, local anesthetic, laser, etc.*); 18% use active irrigation such as ultrasonic, AutoActivator (*Dentsply Tulsa*), etc.
- **Obturation Type:** 68% master cone and 27% carrier based

- **Gutta Percha Placement:** 41% lateral condensation, 27% warm vertical condensation, and 23% carrier based
- **Sealer Type:** 35% zinc oxide eugenol based, 25% resin based, 22% calcium hydroxide based, and 5% glass ionomer
- **Post and Core Build-up at Same Appointment:** 66% sometimes, 25% never, and 9% always
- **Opinions on Reasons for Failure:** 51% inadequate canal debridement, 30% inadequate seal, 11% inadequate obturation, and 8% other (*bacterial/infection, lateral canals, cracks/fractures, missed canals, etc.*)
- **Appointments:** 69% 1 appointment and 30% 2 appointments
- **Partial or Complete Failure at 5 years:** 93% report up to 10% failure; indicated by occasional unsolicited pain, sensitivity to pain, or outright failure
- **Extraction of Teeth Due to Availability of Implants:** 52% extracting more teeth that previously would have been treated endodontically

**CR Conclusions:** The reported success rate of a typical general practitioner endodontic treatment could be better, but can be very effective if accomplished adequately. Norms in the U.S. are rotary canal instrumentation, sodium hypochlorite irrigant, and gutta percha obturation. Successful endo requires excellent diagnosis, canal debridement, disinfection, filling, and restoration. Practitioners are advised to update their endodontic knowledge and concentrate on producing excellent successful results. There exists a wide divergence of opinion and many controversies on techniques with most claiming clinical success. New endodontic concepts are under investigation, and CR will report on them at a later time.

## Provisional Cements: The Optimal One for Your Clinical Needs (Continued from page 1)

### CR Clinical Techniques and Tips for Using Provisional Cements

- **Retentive strength:** Medium to high strength is desired to avoid dislodgment of provisional and return of patient to practice for re-cementation. This problem plagues practices worldwide, irritates patients, and adds to overhead expenses.
  - **Tooth preparation:** For teeth with parallel walls (6–18 degrees) and adequate proximal wall height (~4 mm), a low to medium strength provisional cement is sufficient. However, most teeth lack adequate retentive features; therefore, add grooves and boxes to increase retention.
- **Eugenol, non-eugenol, or resin?** Eugenol is a known obtundent and can help reduce sensitivity of a tooth during the provisionalization stage. Its continued use, although contrary to the current trend, is encouraged by CR. (*see graph on page 4*).
- **Clean preparation:** Use a flour pumice (*such as Preppies by WhipMix*) on a flexible rubber cup to remove all provisional cement and debris before final cementation. Use of a 5% glutaraldehyde/35% HFMA disinfectant (*Gluma by Heraeus, MicroPrime G by Danville, etc.*) can help disinfect and decrease sensitivity during provisionalization. Other additives like triclosan, potassium nitrate, and chlorhexidine may also provide relief.
- **Moisten preparation:** Use a water soluble lubricant (*such as glycerin by Ultradent, KY Jelly by J&J, etc.*) on adequately prepared teeth for easy removal of the provisional crown. Some clinicians add Vaseline to final cements (*such as Durelon by 3M ESPE*) for long-term provisionalization or when added strength is required.
- **Potential endodontic therapy:** A tooth preparation with an indirect pulp-cap (*core build-up or crown prep*) or a tooth that may require future endodontic therapy is best treated by long-term provisionalization (>1 month) to avoid endodontic access through the new crown. Use ZOE based provisional cement for its obtundent effect.
- **Single implant restorations:** Most implant restorations are single units with a highly retentive abutment and are cemented with a provisional cement. For single units, a medium strength cement is desired to allow for future removal if necessary.
- **Multiple-unit fixed implant restorations:** A provisional cement with a long working and setting time and low to medium strength that allows for future removal if necessary is desired.

### Provisional Cement Survey Results (n = 965)

Note: All of the following questions pertain to cements used as provisional cement with resin based provisional.

- **Eugenol-based provisional cement:** Decreased use over past 20 years primarily due to the false belief that eugenol interferes with setting of final resin cement (*see graph on page 4*).
- **Non-eugenol-based provisional cement:** 75% use when final restoration is all-ceramic, zirconia-based, or lithium disilicate. Overall, non-eugenol-based provisional cement is used more frequently than ZOE-based provisional cement regardless of final restoration.
- **Top five most common provisional cements:**

1. TempBond ZOE ( <i>Kerr</i> ).....28%	3. TempBond Clear ( <i>Kerr</i> ).....13%	5. RelyX NE ( <i>3M ESPE</i> ).....6%
2. TempBond NE ( <i>Kerr</i> ).....26%	4. Zonc NE ( <i>Dux</i> ).....9%	
- **Final cement used as a provisional cement:** 53% use final cement as a provisional cement with the most common technique using polycarboxylate cement (*Durelon*) with or without addition of Vaseline.
- **Added strength desired:** Polycarboxylate, zinc phosphate, glass ionomer, or resin-based non-eugenol cements are most common for increased strength.
- **Dislodgment of final crown:** 85% have not experienced dislodgment of a final crown when final cement used is resin-based after using a eugenol-based provisional cement.
- **Setting time:** 66% state setting time does not make a difference in choice of provisional cement.
- **Long-term provisionalization (>6 weeks, e.g., full arch or full-mouth rehabilitation):** Non-eugenol-based provisional cement is most preferred cement (29%) followed by eugenol based (21%), polycarboxylate (12%), resin-based (12%), and IRM (11%).
- **Veneer provisionalization:** Flowable composite (30%) and bonding agent (27%) are most common.



## Provisional Cements: The Optimal One for Your Clinical Needs (Continued from page 3)

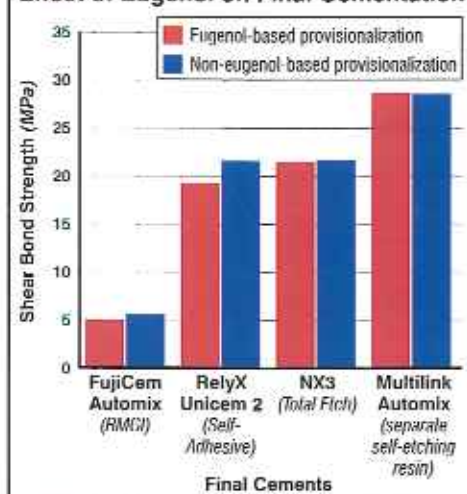
### CR Laboratory Tests and Results

The following chart is a comparison of the characteristics of 28 provisional cements. Grading is based on the most common restoration: **single crown** (*provisional fabricated with resin-based material*). Please refer to Clinical Tips (*on page 3*) for implant or fixed prostheses with three or more units.

Type	Brand (Company)	Cost/ml (\$)	Cost of Material Wasted (\$) *	Working Time (minutes) †	Intraoral Set Time (Self Cure) (minutes) ‡	Dual Cure	Retentive Strength Rating	Available Mix Types (tested in bold)	Overall Grade
Zinc Oxide with Eugenol	TempBond (Kerr)	\$0.70	*	3.0	3.0	No	Low	auto, manual, uni-dose	Excellent
	RelyX Temp E (3M ESPE)	\$1.20	*	3.7	5.7	No	Low	manual	Excellent-Good
	Temporary Cement (Patterson)	\$3.50	*	>5	4.0	No	Low	manual	Excellent-Good
	Fynal** (Dentsply Caulk)	\$5.80	*	2.6	8.1	No	Moderate-High	manual	Excellent-Good
	Temporary Cement (Henry Schein)	\$5.60	*	3.2	5.0	No	Low	auto, manual	Excellent-Good
	CR Plus (Tennex)	\$6.20	\$2.20	2.9	8.2	No	Low	auto	Excellent-Good
	TempoCem (DMG America)	\$9.00	\$4.10	>5	7.1	No	Low	auto	Excellent-Good
Zinc Oxide without Eugenol	TEMP Advantage (GC America)	\$7.50	\$2.80	>5	8.1	No	Moderate	auto	Excellent-Good
	RelyX Temp NE (3M ESPE)	\$2.00	*	3.7	4.9	No	Low	manual	Excellent-Good
	TempBond NE (Kerr)	\$1.70	*	4.5	>15	No	Low	auto, manual, uni-dose	Good
	Integrity TempGrip (Dentsply Caulk)	\$10.90	\$4.40	>5	8.4	No	Moderate	auto	Good
	TempoCem NE (DMG America)	\$8.70	\$3.80	4.8	7.1	No	Low	auto	Good
	NoMIX (Centrix)	\$9.10	*	>5	>15	No	Low	pre-mixed, uni-dose	Good
	Zone (Dux Dental)	\$13.90	*	3.3	10.2	No	Low	auto, manual, uni-dose	Good
Resin Based	F.T.C. (Parkell)	\$5.90	\$1.40	2.8	2.2	Yes	Moderate-High	auto	Excellent
	NexTemp Temporary Cement (Premier)	\$6.80	\$1.60	4.4	2.6	No	High	auto	Excellent
	TempBond Clear (Kerr)	\$13.90	\$4.10	2.4	2.9	Yes	Moderate-High	auto	Excellent-Good
	Retrieve (Parkell)	\$6.70	\$1.90	3.2	3.4	No	High	auto	Excellent-Good
	SensiTemp Resin (Sultan Healthcare)	\$7.60	\$1.70	3.6	2.9	No	Moderate	auto	Excellent-Good
	Premier Implant Cement (Premier)	\$11.80	\$2.60	3.6	2.6	No	High	auto	Excellent-Good
	Telio CS Link (Ivoclar Vivadent)	\$12.70	\$3.50	4.9	3.0	Yes	Moderate	auto	Excellent Cor. <sup>4</sup>
	Cling <sup>2</sup> (Clinicians Choice)	\$9.00	\$3.80	>5	4.9	No	Moderate-High	auto	Good
	IMProv (Alveology)	\$8.60	\$2.20	1.2	1.7	No	Moderate	auto	Good
Other	IRM†† (Dentsply Caulk)	\$4.10	*	>5	12.5	No	Moderate-High	manual, triturated	Excellent-Good
	Durelon**—normal, universal (3M ESPE)	\$7.10	*	>5	6.7	No	Moderate	manual, triturated	Excellent-Good
	Flecks** (Mizzy/Keystone)	\$2.50	*	3.6	7.7	No	Moderate	manual	Excellent-Good
	Fuji TEMP LT (GC America)	\$10.70	*	2.5	10.8	No	Moderate	manual	Good
	UltraTemp Regular (Ultradent)	\$9.10	\$3.60	1.3	3.6	No	Low	auto	Good

\*Varies; Depends on amount of material dispensed or type of mix used. †at 23°C ‡at 37°C with water \*\*Final cement being used as provisional ††Not indicated as a provisional cement

### Effect of Eugenol on Final Cementation



### Summary

- **Cost/ml:** Range: \$0.70 (TempBond) to \$13.90 (TempBond Clear and Zone). Broad differences in cost were observed.
- **Cost of waste in delivery/automix:** Up to \$4.40. Manual/self-mixing limits wastage compared to automix tips. However, if excess material is dispensed, wasted material can equal that of an automix.
- **Working time:** All are sufficient for single crown restorations. Longer working times (>5 minutes) are desirable for multiple units.
- **Intraoral setting time:** Range: 1.7 minutes (IMProv) to >15 minutes (NoMix and TempBond NE). Dual-cure materials are desirable. Faster setting time is desirable for single crown. Longer setting time is desirable for multiple units to facilitate clean up before complete set.
- **Crown pull-off (retention) strength:** ProTemp Plus (3M ESPE) provisionals bonded under constant weight to standardized machined stainless steel dies, kept in water storage for 24 hours at 37°C, then debonded using Instron machine.
  - Results:** Eugenol based: Relyx Temp E (lowest) to Fynal (highest); Non-eugenol based: NoMix (lowest) to Temp Advantage (highest); Resin based: Telio CS Link (lowest) to Implant Cement, NexTemp NE, and Retrieve (highest)
- **Effect of eugenol on final cementation:** Mean shear bond strength of ceramic (Vita Mark II) cylinders milled using Cerec MCXI and bonded to human teeth (cleaned, rinsed, after provisionalization using eugenol-based (TempBond) and a non-eugenol-based (TempBond NE) provisional cement, and 2 week water storage) was determined with four representative final cements. (See chart at left.)
  - Results:** No statistical difference observed in mean shear bond strength after provisionalization using eugenol-based provisional cement and non-eugenol-based provisional cement. Mean shear bond strength for final cementation after either eugenol- or non-eugenol-based provisionalization: Multilink Automix (highest), FujiCEM Automix (lowest). Additional CR research is currently underway to determine the long-term effects of using eugenol-based provisional cements.

**CR Conclusions:** Clinicians should select provisional cements based on reducing sensitivity, the degree of retention desired, the duration of provisionalization, and cost. TempBond, F.T.C., and NexTemp Temporary Cement were the best performing provisional cements tested in the study. The study also found that the use of a eugenol-based provisional cement had no statistically significant influence on the shear bond strength of four representative final cements. Better tooth preparations should reduce the reliance on retentive strength of provisional cements for clinical success.



## Anterior and Posterior Dual-Arch Impression Trays with Additional Features

This unique anterior dual-arch tray with *facial midline positioner* and posterior dual-arch tray have additional desirable features including: *rigid and solid design; fully attached thin inter-occlusal mesh; and low sidewalls*. Anterior trays allow accurate impression of prepared teeth, opposing arch, bite registration, and facial midline record all in one impression. Posterior trays have wide arch and metal distal bar to prevent distortion of impression. Both are constructed with biodegradable corn starch and posterior trays have a metal portion for added rigidity.

### Advantages:

- Rigid and solid metal/biodegradable corn starch design
- Provides accurate impressions and inter-occlusal record
- Easy to use
- Low sides for no soft tissue or occlusal interferences
- Thin, non-sorbing, inter-occlusal mesh
- Cost

### Limitation:

- CR Evaluators recommend use of dual-arch trays for one or two units and full-arch tray for three or more units (see *Clinicians Report June 2008*).

## Harmony Dual-Arch Tray



### HO Dental Company

866-430-3718

www.hodentalcompany.com

**\$39.60/Bag of 40 (99¢/tray)**

**CR Conclusions:** 64% of 22 CR Evaluators stated they would incorporate Harmony Dual-Arch Tray into their practice. 73% rated it excellent or good and worthy of trial by colleagues.

## Implant Scaler and Easily-Identifiable Probe Do Not Alter Implant Surfaces

Many clinicians have sought metal-free scalers and probes for safe maintenance of implants, but have discovered many break during use. While titanium scalers have provided more durability and best access for implant maintenance, most can alter implant surfaces. Total Solutions Kit contains three *durable* unfilled resin scaler tip designs and choice of 4 vivid yellow and black perio probes, all of which are compatible with the popular Satin Steel handles. All instrument tips will not significantly alter implant surfaces and are safe to use around all dental implants.

### Advantages:

- Durable metal-free scaler tips do not alter implant surfaces
- Easily identified depth gauges on perio probes
- Light weight and ergonomic handles
- Tips are removable and interchangeable

### Limitation:

- Scaler tips are bulkier than metal tipped instruments

## Total Solutions Implant Maintenance Starter Kit



### Hu-Friedy

800-729-3743

www.hu-friedy.com

**\$82/Kit (2 handles and multiple tips)**

**CR Conclusions:** 67% of 21 CR Evaluators stated they would incorporate Total Solutions Implant Maintenance Starter Kit into their practice. 90% rated it excellent or good and worthy of trial by colleagues.

## Long-Term Use Validates Popular Overdenture Attachments for all Major Implant Systems

Many CR Evaluators use the Locator Implant Attachment System because of its ease of use and availability for and success with many implant brands. This system provides a way to predictably engage endosseous implants in the mandible or maxilla and retain overdentures. Not indicated for multiple implants with a divergence of greater than 40 degrees between implants.

### Advantages:

- Easy to use and place
- Provides multiple levels of retentive strength
- Easily changed
- Unique pivoting technology provides for some correction of non-parallel implants (*no more than 20 degrees of divergence per implant*)
- Less expensive than other systems
- Various tissue heights available including short

### Limitation:

- Non-sterile packaging

## Locator Implant Attachment System



### Zest Anchors

800-262-2310 • www.zestanchors.com

**\$115/Abutment**

**\$30.50/Denture Cap Locator**

**Male Processing Packages**  
(*denture cap with black processing male, three final males of different retention values, and block-out spacer*)

**CR Conclusions:** 95% of 19 CR Evaluators rated Locator Implant Attachments as excellent and use them in their practice. 100% rated it excellent or good and worthy of trial by colleagues.