

## Spectra Caries Detection Aid—Occlusal Caries Detection

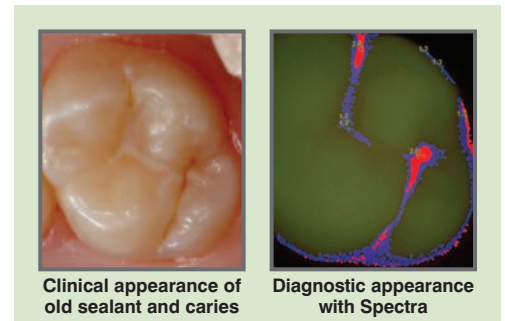
*This is the first report in a series on caries detection instruments*

**Gordon and Paul's Clinical Bottom Line:** It is well known that detection of *initial* caries is nearly impossible with analog or digital radiographs. In addition, when radiolucencies are present, they represent only about half of the actual carious lesion. Occlusal caries are especially challenging. The TRAC Research division of CR is investigating a number of caries detection instruments. The report below is on a device that has performed well clinically in controlled clinical trials conducted in six different practices.



**Dentists have never had a reliable way to detect early occlusal caries.**

Generally, radiographs are useful for detection of occlusal caries only after extensive lesions have developed. Electronic devices have been technique sensitive, and they can have varying levels of accuracy. However, they have been embraced widely in the absence of any other methods and for their patient education value. The TRAC Research team has been studying dental caries microbiology over the past four years and has been evaluating the clinical usefulness of several caries detection devices. The Spectra system (*Air Techniques*) has been the consistent top performer for the best combination of accuracy, ease of use, and cost effectiveness. Although the challenge of caries detection remains, **dentists need to look at this device.**



Clinical appearance of old sealant and caries

Diagnostic appearance with Spectra

*Continued on page 2*

## How to Survive a Bad Day at the Office—Avulsion

**Gordon and Paul's Clinical Bottom Line:** How many versions of the “recommended treatment” for avulsed teeth have you been taught or read? Undoubtedly you are confused, because the suggested treatments vary considerably. With the leadership of CR scientific staff, “real world” practicing dentists, and CR Project Directors and Evaluators, CR has assembled some logical, scientifically supported suggestions using the best available evidence and the observations of many clinicians. They are certain to be useful for your patients and give you confidence in what you are doing clinically with avulsed teeth.

**Clinical Scenario:** Just as you are ready to leave the office, the phone rings. One of your long-term patients is on the phone, and she is frantic. Her 12-year-old son slid into second base at his baseball game. He was safe, but his permanent central incisor came completely out of the mouth. You are about to experience one of dentistry's true emergencies.

**Diagnosis:** Avulsion—The complete displacement of the tooth out of the socket. It is one of the most serious of dental injuries and requires immediate attention. *The sooner the tooth can be replanted the better the prognosis. The chief concern is the viability of the periodontal ligament cells and fibers attached to the root surface.* Three factors that greatly influence the outcome include:

1. The length of time the tooth has been out of the socket.
2. Condition of the root surface and periodontal tissues (*with minimum manipulation*).
3. The manner in which the tooth is preserved prior to replantation.

**What is the optimum treatment?**

*Continued on page 3*

## CR Highly Rated Products

**BeeGentle:** Unique 20% benzocaine topical anesthetic provides continual delivery of anesthetic and stays where it is placed. (Page 4)

Film stays in place during procedures and increases patient comfort



**OraPlug:** Long-lasting, inexpensive resorbable collagen wound dressing is excellent for controlling bleeding and stabilizing blood clots in extraction and biopsy sites. (Page 4)

OraPlug being placed into a single rooted socket



**Ketac Nano:** New dispensing of this fluoride-releasing resin-modified glass ionomer (RMGI) restorative eliminates hand mixing. (Page 6)



Gingival margins immediately before and after repair

**Zircon-Brite and Ceramo-Dotz:** Gain the ability to polish full-contour Zirconium restorations to a very high luster. (Page 6)



Easily polish full-contour zirconia to a high luster

**Blue View Cervical Matrices:** Shape and eliminate the air-inhibited final layer of resin-based composite by curing through this transparent cervical matrix. (Page 6)



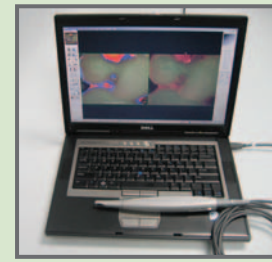
Placement instrument makes matrix use simple

## Spectra Caries Detection Aid—Occlusal Caries Detection (Continued from page 1)

### What is the Spectra Caries Detection Aid and how does it work?

The device consists of: 1) a special handpiece that emits blue light for detection and captures diagnostic images for software analysis and record keeping; 2) a 10-foot cord that connects the handpiece to a USB port in a computer; and 3) imaging software. The TWAIN interface (included) allows for direct acquisition into many different softwares. To operate the Spectra, a computer must have at least 256MB RAM, a USB 2.0 port, and Windows XP Pro or Windows 7. The 405 nm LED blue light within the handpiece causes healthy enamel to fluoresce green and the porphyrin by-product of caries associated microorganisms to fluoresce red. The intensity of red fluorescence is quantified and the software produces a color-coded map on the tooth's occlusal surface with numbers indicating the approximate intensity of the fluorescence.

### Spectra Caries Detection Aid



Computer not included

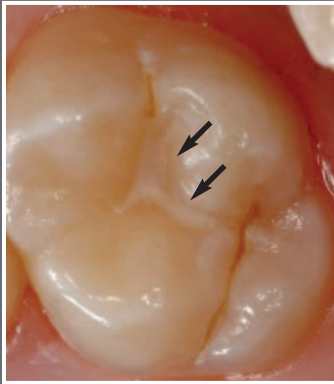
**Air Techniques Inc**  
www.airtechniques.com  
800-247-8324

**\$4995 / System**

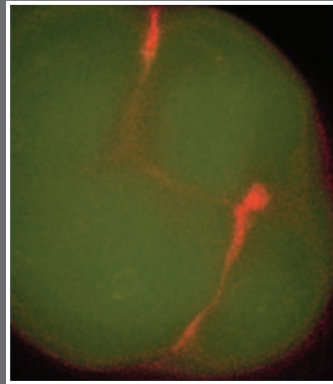
**\$125 / 25 Spacers**  
(sterilizable)

**\$290 / 500 Sheaths**  
(disposable)

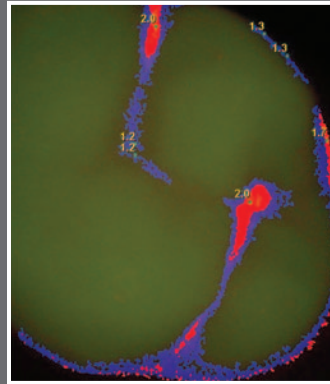
### Clinical Example Demonstrating the Steps in the Technique



**1.** Tooth with partially retained sealant (see arrows) where occlusal caries is suspected under sealant and in formerly sealed fissures.



**2.** Spectra Detection Mode showing healthy enamel fluorescing green and porphyrin by-product of caries associated microorganisms fluorescing red.



**3.** Analysis Mode shows lesion location. Numbers indicate fluorescence intensity. (Colors and numbers at periphery are artifact. This system is for **occlusal only**.)



**4.** Conservative initial excavation using Midwest #329 or #330 carbide bur (Dentsply).

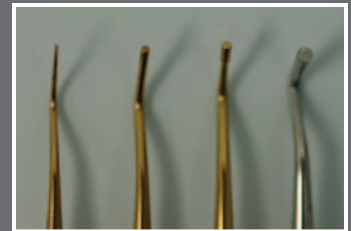


**5.** The final restoration is very conservative. This type of restoration is facilitated by accurate diagnosis, a small prep, and small instruments named Colonna Series Instruments shown at right (American Eagle, www.am-eagle.com).

### Colonna Series Instruments



Colonna Excavator series of three instruments (left with gold finish) compared to conventional excavators (right with silver finish)



Colonna Pluggers series of three instruments (left with gold finish) compared to a conventional condenser (right with silver finish)

### Clinical Technique for Diagnosing and Restoring Carious Lesions using Minimally Invasive Steps

1. Remove plaque in fissures using rotary ICB Brush (*Ultradent*) dipped in water.
2. Generate Spectra image and apply Analysis Mode. Store in patient file within Spectra software. (*Spectra does not produce the clinical images shown in steps 1, 4, and 5 above.*) Can be downloaded to business software patient files in systems such as Dextrix, EagleSoft, or PracticeWorks.
3. Enter tooth very conservatively using magnification while cutting with Midwest #329 or #330 (*Dentsply*), or other small carbide bur. Keep prep as narrow as possible while removing carious tooth structure. If indicated, use Colonna Series Excavators.
4. When excavation is completed, apply 5% glutaraldehyde—35% HEMA (*Gluma Desensitizer by Heraeus Kulzer, Glu/Sense by Centrix, G5 by Clinicians Choice, or MicroPrime G by Danville Materials*) for prep disinfection and desensitization. Apply for one minute, suction, re-apply 1 minute, suction. Then apply self-etching primer adhesive over damp tooth surface and light cure. (*Or use bonding technique of your choice.*)
5. Place resin restorative of choice in layers and light cure. Use Colonna Series Pluggers to obtain access within prep and to restore tooth anatomy.
6. Light cure restorative resin surface, place resin coating such as Biscover LV (*Bisco*) or G-Coat Plus (*GC America*) and light cure. (*Conventional resin finishing with rotary instruments is not necessary for this very narrow isthmus restoration.*)

**TRAC Conclusions:** Very conservative restorations are possible with accurate caries diagnosis. The Spectra Caries Detection Aid has demonstrated clinically its ability to identify presence of occlusal caries with excellent accuracy and no false positives. Its cost is competitive with other diagnostic instruments currently marketed. In a comparison with two other popular caries detection devices, it had the best combination of accuracy, ease of use, and cost effectiveness.

## How to Survive a Bad Day at the Office—Avulsion (Continued from page 1)

### Management of an Avulsed Tooth

The following information is based on guidelines from the International Association of Dental Traumatology (IADT) and other sources and was reviewed by authorities in the field.

#### Conditions influencing treatment of an avulsed tooth:

- Is the tooth apex open or closed?
- Has the tooth been kept in a storage medium?
- Is the extra-oral dry time more than or less than one hour?
- Was the tooth immediately replanted?
- Is the bony socket intact? If not, consider not replanting the tooth; use a slow resorbing graft such as a xenograft (e.g. *Bio-Oss* by Osteohealth; see *Clinicians Report* May 2010).

#### Follow up procedures for an avulsed permanent tooth include:

- Root canal therapy for teeth with closed apices may begin 7–10 days post replantation with a flexible splint in place for stabilization.
- In these cases, calcium hydroxide serves as the intracanal medication for up to one month followed by final obturation.
- For teeth that have been dry for more than 60 minutes, root canal therapy may be done outside the mouth prior to replantation.
- For teeth with open apices that have been immediately replanted or placed in a storage medium, revascularization is probable without the need for root canal therapy.
- Patient instructions should include a soft diet, no chewing on the affected teeth, good oral hygiene, and the use of a chlorhexidine gluconate rinse twice a day for 1–2 weeks.
- All replanted teeth need to be monitored frequently with clinical and radiographic interpretation: once a week during the first month; again at 3, 6, and 12 months; and yearly afterward. These examinations help to determine the outcome.

### Treatment of Avulsed Permanent Tooth with Closed Apex

#### A. Extra-oral dry time *less than* 60 minutes—Tooth *kept* in storage medium:

1. If necessary, gently clean the tooth with saline and place it in saline or Hanks Balanced Salt Solution (e.g. *EMT ToothSaver* by *SmartPractice*).
2. Administer local anesthesia.
3. Irrigate the socket site with saline (remove contaminated coagulum).
4. Radiographically and clinically examine the socket site. Remove loose bone fragments and reposition the alveolus if it is fractured.
5. Replant the tooth with minimal digital pressure (avoid touching the root).
6. Suture any gingival lacerations.
7. Check for alignment. Verify occlusion and assess radiographically.
8. Stabilize the tooth with a flexible splint for up to two weeks (see next page).
9. Administer antibiotics. For patients 12 years and older, Doxycycline 100 mg bid for 7 days (weight dependent). In younger patients, amoxicillin 40mg/kg/day in divided doses tid.
10. A tetanus booster may be recommended based on the patient's last immunization (more than 5 years).
11. Begin root canal treatment 7–10 days after replantation while the splint is in place.
12. Place calcium hydroxide as the intracanal medication for up to one month with a minimum of one to two weeks.
13. Follow with final obturation of the canal(s).



A serious dental injury with avulsion

#### B. Tooth Replanted Prior to Being Seen by a Dentist:

- Keep the tooth in position. Irrigate with chlorhexidine gluconate or saline.
- Follow steps 6 through 12 above.

### Instructions for the Frantic Parent/Patient

Since action must be taken prior to an office visit, the dentist is advised to offer the following instructions.

- Calm and reassure the parties involved.
- Verify if it is a permanent tooth. Primary (*baby*) teeth should not be replanted.
- Hold the tooth by the crown and avoid touching the root.
- If the root is dirty, gently rinse in cold water, saline, or milk for 10 seconds. Do not scrub.
- The best immediate treatment is to have the patient or parent reposition and replant the tooth into the socket. Hold the tooth in position.
- If this is not possible, place the tooth in an appropriate storage medium such as milk, saliva, or contact lens solution (*saline*). Cold milk is considered the best alternative because of its availability and physiologic properties. Milk can maintain the vitality of the PDL cells. Contact lens solution can be used as an alternative. In cases involving older patients, storing the tooth in the patient's oral vestibule in the absence of alternatives is advocated by some.
- Avoid storage in water. It is a hypotonic solution and causes the PDL cells to enlarge and rupture (*hypotonic lysis*).
- Advise patient to see a dentist immediately.

#### C. Extra-oral dry time *more than* 60 minutes—Tooth *not kept* in a suitable medium:

- Delayed replantation has a poor long-term prognosis (no viable PDL cells).
  - Replacement resorption (ankylosis) is the most likely sequela to replantation in this situation. In such cases, the tooth structure is resorbed and replaced by sclerotic bone.
  - The ultimate goal is to maintain the alveolar ridge height.
  - When ankylosis occurs and the tooth crown fails to erupt, decoronation may be accomplished to preserve the shape of the alveolar ridge (remove the clinical crown subgingivally and place a removable or provisional fixed prosthesis).
1. Remove debris and soft tissue from the root with dry gauze
  2. Soak the tooth in a 2% sodium fluoride solution for 20 minutes. The purpose is to introduce fluoride into the dentin and cementum that may slow the resorptive process.
  3. Administer local anesthesia.
  4. Irrigate the socket site with saline (remove contaminated coagulum).
  5. Radiographically and clinically examine the socket site. Remove loose bone fragments and reposition the alveolus if it is fractured.
  6. Root canal treatment can be performed on the tooth outside of the mouth held in fluoride soaked gauze or it can be accomplished 7–10 days later as with other replantations. If the root is immature, the root canal can be done from an apical direction.
  7. Replant the tooth with minimal digital pressure.
  8. Suture any gingival lacerations.
  9. Check for alignment. Verify occlusion and assess radiographically.
  10. Stabilize the tooth with a flexible splint for 4 weeks.
  11. Administer antibiotics. For patients 12 years and older, Doxycycline 100 mg bid for 7 days (weight dependent). In younger patients, amoxicillin 40mg/kg/day in divided doses tid.
  12. A tetanus booster may be recommended based on the patient's last immunization (more than 5 years).

Continued on next page

## How to Survive a Bad Day at the Office—Avulsion (Continued from page 3)

### Treatment of Avulsed Permanent Tooth with *Open Apex*

#### A. Extra-oral dry time *less than 60 minutes*—Tooth *kept* in storage medium:

Treatment the same as a closed apex except:

- Prior to replantation, cover the root surface with minocycline hydrochloride microspheres (*Arestin*, *OraPharma*) or powder from a minocycline capsule.
- Do not accomplish root canal therapy. The objective is to revascularize the tooth pulp. Subsequent follow up is necessary to monitor for pulpal necrosis. If that occurs, root canal therapy including possible apexification is required.
- A flexible splint for up to two weeks is recommended.
- The same treatment is recommended for teeth with wide open apices that were replanted prior to being seen by a dentist.

#### B. Extra-oral dry time *more than 60 minutes*—Tooth *not kept* in a suitable medium

The prognosis and treatment is the same as a tooth with a closed apex that has been out of the mouth and dry for more than 60 minutes except:

- Root canal therapy can be done through the open apex prior to replantation.
- Use flexible splint therapy for four weeks.

### What is a flexible splint?

A flexible splint allows for slight micro-movement of the teeth. Rigid splints and splinting for a longer time tend to promote resorption and ankylosis.

Some different methods to apply a flexible splint include:

- Wire splint: a light orthodontic arch wire (*0.014 nickel-titanium*) bonded only to the facial surfaces of the teeth with resin-based composite
- Other alternatives include the use of fiber reinforcement (*Ribbon-Splint It*) or monofilament fishing line (*30–60 pound test*) bonded to the facial surfaces of the teeth.

**CR Conclusions:** Much time, effort, and research has gone into the subject of avulsed teeth. Organizations such as the International Association of Dental Traumatology have helped establish guidelines for the treatment of such an occurrence. Treating an avulsed tooth depends on a variety of situations. A decision must be made based on how long the tooth has been kept out of the mouth, the storage medium, and whether the apex is open or closed. In all events, ***the earlier the tooth is replanted the better the prognosis.*** If this is not possible, keeping the tooth in a storage medium with an extra-oral dry time of less than sixty minutes greatly improves the prognosis. Milk continues to serve as the most available and easy-to-use storage medium. The goal is to keep the periodontal ligament cells and fibers intact.

## Unique Topical Anesthetic Stays where Placed and Provides Continual Delivery of Anesthetic

BeeGentle 20% benzocaine varnish is applied to the desired oral tissue and becomes a water-insoluble white film when the solvent evaporates (*allow 1 to 2 minutes*). It continually delivers topical anesthetic for several minutes or until removed. BeeGentle has an ethanol-based solvent and is honey flavored. Film will slowly dissolve over time.

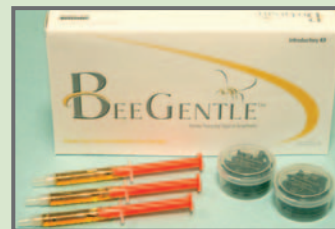
#### Advantages:

- Stays where placed and adheres well to moist oral tissues
- Effective topical anesthesia that is long lasting
- Easy to place and use
- Pleasant honey flavor
- Easy to control and does not flow where not desired

#### Limitations:

- If removal of film is desired, use of wet sponge with effort is required
- A few patients sensitive to ethanol may complain of initial burning sensation

### BeeGentle



#### CAO Group

877-236-4408  
www.caogroup.com

**\$24.95 / Kit of three 3cc syringes  
(\$2.22/ml)**

*Sold Exclusively through Henry Schein*

**CR Conclusions:** 63% of 24 CR Evaluators stated they would incorporate BeeGentle into their practice. 71% rated it excellent or good and worthy of trial by colleagues.

## Collagen Wound Dressing Excellent for Controlling Bleeding and Stabilizing Blood Clots

OraPLUGs are resorbable bovine collagen sponges that control bleeding, stabilize blood clots in extraction sites, protect the wound bed, and provide matrix for tissue ingrowth. Plugs are reported to absorb in 10 to 14 days.

#### Advantages:

- Plugs compress to fit socket, but maintain their shape and form
- Provided effective hemostasis
- Easy to use and place
- Well packaged
- Inexpensive compared to other collagen plugs
- Resorbable

#### Limitation:

- With extended placement time, OraPLUG may become gelatinous

**Clinical Tip:** For easiest placement, insert OraPLUG quickly into socket

### OraPLUG



#### Salvin Dental Specialties

800-535-6566  
www.salvin.com

**\$104 / Box of 10  
(\$10.40/collagen plug)**

**CR Conclusions:** 80% of 15 CR Evaluators stated they would incorporate OraPLUG into their practice. 93% rated it excellent or good and worthy of trial by colleagues.



## Fluoride Releasing RMGI Restorative with Improved Dispensing

Ketac Nano RMGI is delivered from a novel, quick-mix capsule eliminating hand mixing that was necessary with previous versions. This RMGI restorative is unique in its ability to be directly dispensed in up to 2 mm increments and cured. As with other RMGI restoratives, Ketac Nano remains somewhat sticky for direct applications. Allowing it to react chemically for a short time to gain firmness before placing or contouring allows it to gain some viscosity for improved handling and does not adversely change its strength. Ketac Nano is easy to use. A light-cured primer is applied first and cured, followed by placing Ketac Nano in up to 2 mm increments, curing, finishing, and polishing to an esthetic restoration that simulates resin-based composite. A1, A2, A3, A3.5, and B2 shades are available.

### Advantages:

- Excellent delivery system requires no mixing
- Good shades and opacity
- Requires less time to place than other RMGI restoratives
- Light cure
- Polishes to a smoothness similar to resin-based composite

### Limitation:

- To improve consistency, allow to sit for short period prior to placement

**Clinical Tip:** Have staff begin mixing while dentist finishes tooth prep.

Use primer as instrument lubricant to decrease stickiness.

### Ketac Nano



3M ESPE

800-634-2249

www.3mespe.com

**\$149/20 capsules (0.3 gm each)**

**(\$32.81/ml for refill capsules)**

**CR Conclusions:** 70% of 30 CR Evaluators stated they would incorporate Ketac Nano into their practice. 87% rated it excellent or good and worthy of trial by colleagues.

## Easily Polish Full-Contour Zirconium Restorations to a High Luster

Zircon-Brite and Ceramo-Dotz applied with soft bristle brushes easily produce a very high luster to full contour Zirconium restorations after conventional polishing. Also ideal for final polishing of layered porcelain; pressed and milled ceramics; and all composite and PMMA restorations.

### Advantages:

- Polish and brush easily produce a good shine
- Polish adheres to brush well for less splatter and mess
- Polishes both zirconia and porcelain quickly
- Ceramo-Dotz are available as individual patient pellets for intraoral use and improved infection control

### Limitation:

- No major limitations noted

**Clinical Tip:** Zircon-Brite and Ceramo-Dotz are to be used *after* initial polishing with coarse, medium, and fine diamond or silica impregnated finishing instruments.

### Zircon-Brite and Ceramo-Dotz



Dental Ventures of America

800-228-6696

www.dentalventures.com

**\$60/40 gm jar Zircon-Brite and  
20 DVA soft brushes**

**\$60/60 Ceramo-Dotz and  
3 contra-angle soft brushes**

**CR Conclusions:** 81% of 21 CR Evaluators stated they would incorporate Zircon-Brite into their practice. 90% rated it excellent or good and worthy of trial by colleagues.

## Transparent Cervical Matrix with Excellent Ease of Use

Blue View Transparent Cervical Matrices are held against the final layer of a Class V resin-based composite restoration with its placement instrument (*included*) to shape and prevent air inhibition of the final layer.

### Advantages:

- Unique placement instrument holds matrix for easily controlled application
- Less flash and minimized finishing and polishing time
- Numerous sizes and shapes available that fit most teeth
- Easy to place and use
- Eliminates air-inhibited surface

### Limitation:

- No major limitations noted

### Blue View Cervical Matrices



Garrison Dental Solutions

888-437-0032

www.garrisdental.com

**\$116/Box of 275 matrices (7 sizes)  
and placement instrument**

**CR Conclusions:** 72% of 25 CR Evaluators stated they would incorporate Blue View Cervical Matrices into their practice. 96% rated them excellent or good and worthy of trial by colleagues.