



ZIRCONIA: most durable tooth-colored crown material in practice-based clinical study

Gordon's Clinical Observations: Some tooth-colored monolithic crown materials are serving remarkably well, while others have had numerous challenges. The TRAC Research component of Clinicians Report has been conducting the only large, long-term, **comparative** clinical study of tooth-colored materials available to the profession. *Results from this practice-based study reported below will enhance the service you provide for your patients.*



CAD-CAM methods and materials have revolutionized the dental laboratory industry and dental practice, but—
DO THE VARIOUS PRODUCTS SERVE PATIENTS EQUALLY WELL?

For over 40 years TRAC Research has been seeking the following material:

- Tooth colored
- Reasonable cost
- Requires minimal tooth removal
- Cementation is durable and easy
- Tolerates abuse by clinician and patient
- Serves trouble-free at least 10+ years
- Does not wear opposing dentition excessively

Over 200 tooth-colored materials have been studied clinically by this lab over the last 40+ years. The current study includes 20 materials at various stages of clinical service (*see listing on page 2*). The materials differ in many aspects, but all are tooth-colored, monolithic, CAD-CAM fabricated either by commercial labs or in-office; all were recommended for single units anywhere in the oral cavity when entered into this study; and all study restorations are full-contour crowns on molars.



BruxZir 3Y 2009
Initial Placement



BruxZir 3Y
At 8 Years
(Note loss of glaze)

Continued on Page 2

First Look: Probiotics & Dentistry: Can They Benefit Patients?

Gordon's Clinical Observations: One of the major topics of articles in health magazines and scientific journals is the “gut” organisms and how they influence your patients’ overall health. This is a controversial topic in the USA. However, the international literature is supportive of the concept. The CR survey on this topic shows that most dentists are NOT using pre and probiotics for themselves or for their patients. Should dentists be prescribing them? If so, for what dental conditions? How can this concept influence *your* patients? One of the PCC (*Practical Clinical Courses*) mentors is a general dentist who is also a naturopathic physician. *Together with other CR scientists and clinician input, they have put together an informative article on this topic that may help you educate and treat your patients.*

Probiotics have been used for over a century to effectively alter the human intestinal microflora with ideal bacterial species. Their basic purpose is to introduce good bacteria into an environment where detrimental bacteria have become overpopulated, with the intent of modulating the microbiome so that good bacteria overwhelm the bad, thus improving nutrient metabolism, immune function and overall health. Worldwide, probiotics are a \$40 billion industry, most of which addresses digestive health. But there is also a growing trend towards using probiotics to help improve oral health as well.

Until recently, limited consideration has been given to how probiotics can be of direct benefit to the oral cavity. What products are currently available and how will they benefit our patients? **In this article, we discuss how probiotics may help dental patients improve their oral health in an “easy-to-comply-with” way.**

Continued on Page 4

Products Rated Highly by Evaluators in CR Clinical Trials

The following products were rated excellent or good by CR Evaluator use and science evaluations.

MiTi: New material for those who prefer two step VPS impression technique

IPRGS – Gauge Set: Convenient interproximal reduction gauge set for confirming space created for orthodontics

Bite Dx: Unique instrument designed for diagnosing many causes of chewing pain

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ZIRCONIA: most durable tooth-colored crown material in clinical study (Continued from page 1)

1. Products under study currently (ordered by similar material description and alphabetical within groupings)

A	B	C	D	E	F	G	H
Product Name	Company	Where Milled	Material Description (Received from Companies)	Survival † to Date	Cement Type Used	Cementation Failure to Date	Time in Study
ZIRCONIA 3Y–5Y *							
BruxZir 2009	Glidewell Dental	Lab	3Y* zirconia	100%	RMGI	6%	8 years
BruxZir NOW 2016	Glidewell Dental	In-office	3Y zirconia (fully sintered before mill)	100%	RMGI	2%	2 years
BruxZir NOW 2018	Glidewell Dental	In-office	3Y zirconia (fully sintered before mill)	<i>new in study</i>	<i>new in study</i>	<i>new in study</i>	<i>new in study</i>
BruxZir Shaded 2018	Glidewell Dental	Lab	3Y zirconia	<i>new in study</i>	<i>new in study</i>	<i>new in study</i>	<i>new in study</i>
Pavati Z40.1	CCRI (same Zr as inCoris TZI)	Lab	3Y zirconia	100%	Resin	0%	1 year
IPS ZirCAD LT	Ivoclar Vivadent	Lab	3Y zirconia	100%	Resin	10%	2 years
Zirlux 16+	Zahn Dental	Lab	3Y zirconia	100%	Resin	0%	1 year
ArgenZ HT+	Argen Corporation	Lab	4Y translucent zirconia	<i>new in study</i>	<i>new in study</i>	<i>new in study</i>	<i>new in study</i>
IPS ZirCAD MT	Ivoclar Vivadent	Lab	4Y translucent zirconia	<i>new in study</i>	<i>new in study</i>	<i>new in study</i>	<i>new in study</i>
BruxZir Esthetic	Glidewell Dental	Lab	4.9Y translucent zirconia	<i>new in study</i>	<i>new in study</i>	<i>new in study</i>	<i>new in study</i>
CubeX ²	Dental Direkt	Lab	5Y translucent zirconia	100%	RMGI	0%	1 year
Katana STML	Kuraray Noritake	Lab	5Y translucent zirconia color blended	100%	Resin	0%	2 years
Lava Esthetic	3M Dental	Lab	5Y translucent zirconia color blended	100%	Resin	9%	1 year
BruxZir Anterior	Glidewell Dental	Lab	5.5Y translucent zirconia	100%	RMGI	0%	2 years
GLASS CERAMIC							
Celtra DUO Non-Fired	Dentsply	In-office	lithium silicate + 10% zirconia	76%	Resin	0%	1 year
IPS e.maxCAD	Ivoclar Vivadent	In-office	lithium disilicate	95%	Resin	5%	8 years
CERAMIC – POLYMER							
CAMouflage NOW	Glidewell Dental	In-office	79% ceramic 21% polymer	98%	Resin	2%	1 year
CeraSmart	GC America	In-office	71% ceramic 29% polymer	97%	Resin	29%	2 years
Enamic	Vita USA	In-office	86% ceramic 14% polymer	89%	Resin	26%	4 years
Lava Ultimate	3M Dental	In-office	80% ceramic 20% polymer	95%	Resin	25%	5 years

* Y = Mole Percent of yttria added to zirconia. Higher amount of yttria increases translucence, but lowers strength.

† Survival means crown did not require replacement due to material inadequacy.

2. Summary of 2018 results

Of 17 characteristics graded clinically and in the laboratory, so far the 3 below have shown clinically concerning results:

- (1) Terminal fracture (missing material that compromises contact(s) or occlusion; or crack(s) ≥6mm in length)
- (2) Cementation failure
- (3) Greater than expected opposing dentition wear.

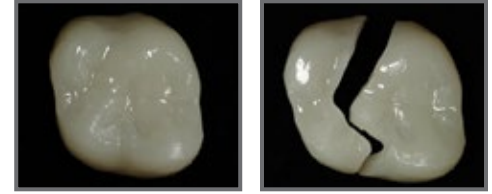
BELOW, 3 MATERIAL GROUPS IN ABOVE CHART ARE COMPARED BY 3 CLINICALLY CONCERNING RESULTS:

Clinically Concerning Result	Zirconia	Glass Ceramic	Ceramic-Polymer	Summary
Terminal Fracture	Zirconia had NO Terminal Fractures in 1–8 yrs	Glass Ceramic Celtra DUO Non-Fired had 26% Terminal Fractures in 1 yr	Ceramic-Polymer had 2–4% Terminal Fractures in 1–5 yrs	26% terminal fractures of Celtra DUO Non-Fired resulted in its statistically lower 1-year survival in this study.
Cementation Failure	Zirconias IPS ZirCAD LT 10% in 2 yrs * Lava Esthetic 9% in 1 yr * IPS ZirCAD LT problem addressed with new cement SpeedCEM Plus	Glass Ceramic Celtra DUO Non-Fired and IPS e.max CAD had cementation failure at 0–5% respectively in 1–8 yrs	CeraSmart 29% 1 yr * Enamic 16% 1 yr 26% 4 yrs Lava Ultimate 14% 1 yr 25% 5 yrs CAMouflage NOW 2% 1 yr * CeraSmart problem addressed with new cement G-CEM LinkForce	All the ceramic-polymer products in this study <i>(except CAMouflage NOW)</i> had high cementation failure at 1 year of clinical service, and the numbers increased over time.
Greater-Than-Expected Opposing Dentition Wear	Some zirconia brands had greater than expected wear of opposing dentition <i>(5 of the 9 brands)</i> at 1 yr Pavati Z40.1 57% of crowns Katana STML 50% of crowns IPS ZirCAD LT 45% of crowns BruxZir NOW 2016 39% of crowns CubeX ² 33% of crowns	Glass Ceramic had NO greater-than-expected wear on opposing dentition	Ceramic-Polymer had NO greater-than-expected wear on opposing dentition	5 zirconia brands caused <u>concave facets</u> on opposing dentition. More time in service is needed to determine the clinical significance of this finding.

ZIRCONIA: most durable tooth colored crown material in clinical study *(Continued from page 2)*

3. Observations

- A. Zirconia is a robust material.** Zirconia was the only material category in this study where all products tested so far show 100% survival. This is an important finding considering the differences represented in the brands tested (*e.g., powders from Japan and China, formulation differences, disk/block processing differences*).
- B. 3Y zirconia gives best chance of long-term durability.** 3Y maximum fracture toughness zirconia restorations have demonstrated ability to tolerate minimal tooth reduction preparations, clinical abuse such as occlusal adjustments made both in hand and after cementation, and subsequent endodontic access preparation through the crown.
- C. 5Y zirconia needs more gentle handling by dentists before cementation and during endodontic access procedures.** Crown fracture during seating occurred in 2% of the 5Y zirconia crowns when there was: Inadequate tooth reduction causing thin finished crowns, or crowns were hand held during occlusal adjustment before cementation. Fracturing can also occur in 5Y zirconia when endo entry preparation is aggressive.
- D. Glaze is not long lasting.** No glaze used in this study has been long lasting, regardless of material category. By year 7 over 90% of original BruxZir 3Y and IPS e.maxCAD crowns had lost occlusal glaze. Glaze lasts longer on smooth surfaces, but characterizing techniques that require glaze to seal in colors will not be as durable as patients desire. *(See photos page 1.)*
- E. Ceramic-polymer crowns have higher than expected cementation failure.** For reasons not fully apparent, ceramic-polymer crowns have experienced high cementation failure, both in this study and in clinical practices. Yet ceramic-polymer crowns have highly desirable characteristics (*e.g., mill rapidly and smoothly with minimal bur wear, do not require post-mill procedures, wear opposing dentition minimally, have good to excellent esthetics, have high survival rates with minimal fracturing*). This material category is worthy of further investigation to solve the problem with cementation failure. The new CAMouflage NOW is showing promise with only 2% cementation failure in its first year of service.
- F. Celtra DUO Non-Fired developed long (≥ 6 mm) craze line fractures within 1 year after seating.** Celtra DUO was not post-mill fired in this study because we hoped to verify the claim that it was a ceramic-based product that could be milled & seated without need for post-mill firing. After noting study crowns with long craze line fractures, we conducted a survey which identified randomized Celtra DUO users and confirmed frequent fracture of Celtra DUO when crowns were fired or non-fired. This indicates the need for improvement of this material to gain the robust performance necessary clinically.



5Y zirconia crown broken during hand-held occlusal adjustment



Celtra DUO Non-Fired crack appearance

TRAC Research CONCLUSIONS: It is too early in the service life to reach final conclusions on many of the products in this large diverse study. However, after just one to two years, several materials are no longer sold (*BruxZir Anterior, BruxZir NOW 2016, Pavati Z40.1*) and several others are no longer recommended for full-contour **molar** crowns (*cubeX², Lava Ultimate*).

The following **important trends** are indicated by the data **so far**, and these trends could be helpful now to clinicians and patients attempting to select products for treatment:

- A. Zirconia demonstrated best durability** with 0% terminal fractures in all 9 brands in this study, in spite of differences in material sources, formulations, and manufacturing methods.
- B. BruxZir 2009 3Y zirconia best meets the 7 ideal characteristics.** Importantly, throughout its 8-year clinical history it has not worn opposing dentition excessively and it has demonstrated excellent tolerance of clinical abuse.
- C. A skilled laboratory technician and possible added cost still necessary for optimum esthetics.** Increased translucence has helped—but not solved—the difficulty of blending zirconia with surrounding dentition.
- D. If glass ceramic or ceramic-polymer products are used for full-contour molar crowns, expect higher numbers of fractures, cementation failures, and need for more tooth removal** to gain the material thickness needed for strength. In this study, IPS e.maxCAD lithium disilicate has performed very well as a molar crown material, with 95% survival at 8 years, when tooth preparations provided adequate material thickness.
- E. Cementation failure with zirconia crowns was relatively infrequent in this study.** This was attributed to careful following of cementation instructions by the dentists. IPS ZirCAD LT cementation material problems have been corrected by the manufacturer.
- F. When unknown company and brand names are chosen to save costs, watch for inconsistencies** in purity, density, and distribution of formulation components, all of which may ultimately affect long-term durability.
- G. Clinically at this time, 3Y zirconia indications are molar full-contour crowns, posterior multi-unit restorations, patients with bruxing/clenching habits, where minimal tooth preparation is desired, and anytime maximum durability is desired. 3Y, 4Y, and 5Y zirconia and IPS e.maxCAD or Press can all fulfill expectations where optimum esthetics is desired, if fabricated by a skilled laboratory technician.**

First Look: Probiotics & Dentistry: Can They Benefit Patients? (Continued from page 1)

Terminology 101

- **Probiotics:** Bacteria are crucial for maintaining good health. Probiotics are a supplement containing good bacterial species designed to maintain the bacterial balance throughout certain organs in the digestive tract. These good bacteria play a key role in maintaining general health and help fight disease.
- **Prebiotics:** Non-digestible fibers (*inulin, oligofructose, polydextrose, etc.*) that fuel the growth and bioactivity of good bacterial strains. They pass through the digestive tract where they benefit bacteria, but have no nutritional value to humans as we simply lack the ability to break them down.
- **Synbiotics:** A combination product containing both prebiotic fibers and probiotic bacteria.

Oral Probiotics

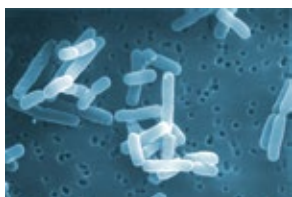
Oral probiotics contain bacterial strains—*L. reuteri*, *S. salivarius*, *S. uberis*, *S. oralis*, *L. rhamnosus*, etc.—that are specifically designed to improve health in the upper GI tract. Several companies make supplements in the form of lozenges, rinses, toothpastes, chewing gums, and chewable tablets that release and coat the oral cavity with good bacteria. Several foods (*yogurt, kefir, buttermilk, sauerkraut, cheeses, etc.*) also have a natural probiotic component that can be beneficial in the mouth.

Common Bacteria Used In Oral Probiotic Supplements

- *Lactobacillus rhamnosus*
- *Lactobacillus reuteri*
- *Lactobacillus salivarius*
- *Lactobacillus paracasei*
- *Lactobacillus bulgaricus*
- *Lactobacillus brevis*
- *Bifidobacteria lactis*
- *Bifidobacteria longum*



L. paracasei



L. reuteri



L. rhamnosus



S. mutans



S. salivariusK12

Dietary Considerations

The goal with probiotic use is to create an environment where good/helpful bacteria strains outnumber harmful ones. Once established, probiotic colonies must be maintained and proper dietary choices are key. Good bacteria require prebiotic foods such as fresh vegetables, whole grains, and fermented foods in order to maintain healthy colony sizes, whereas bad bacteria thrive on animal fats, refined sugars and processed flours, all of which are widespread throughout the diet of today's average American, regardless of age. To stay healthy, we must maintain a status quo where the good bacteria outnumber the bad, so making good food choices is essential to maintaining good bacterial populations, both systemically and orally.

Limited Use Despite Worldwide Data

Studies investigating probiotic use in the oral cavity are lacking in the United States, but international studies have shown that oral probiotics may be beneficial and help control various oral diseases, including the treatment of periodontal disease, cessation of early carious lesions, prevention of candida development, reduction in gingivitis, the prevention of halitosis, etc. (See citations on page 6.)

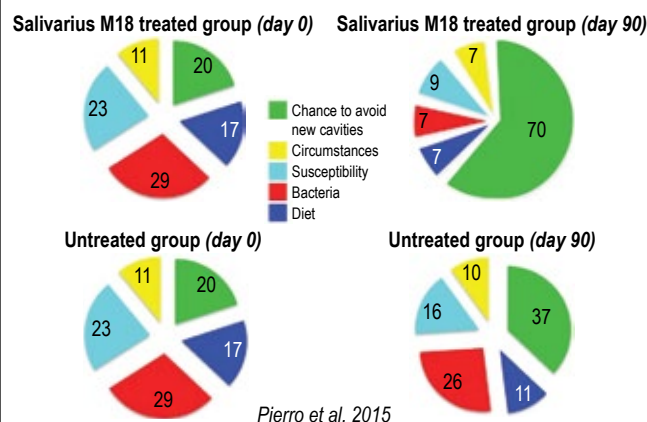
Research Examples

- Researchers at Tohoku School of Dentistry in Japan gave *L. salivarius* WB21 lozenges to patients with active periodontal disease for eight weeks. At the conclusion of testing, subjects had significant improvements in plaque index scores and pocket depth reduction vs. the placebo group (*Shimauchi et al. 2008*).
- Researchers at the Institute of Dentistry in Helsinki, Finland, gave milk with or without *L. rhamnosus* added to 594 children, ages 1–6. The probiotic group had significantly less decay and lower *S. mutans* counts by the end of the study, especially among 3–4 year olds (*Näse et al. 2001*).
- Scientists at Malmö University in Sweden gave *L. reuteri* lozenges or placebo to 59 patients with moderate to severe gingivitis. After two weeks of treatment, the average gingival index and plaque scores were significantly lower in the group taking the probiotic supplement (*Krasse et al. 2006*).
- Coordinated research by scientists in Italy suggests that supplementation with *S. salivarius* M18 probiotics reduces the chance of new caries development in high risk children (*Pierro et al. 2015*).

Thirteen Great Probiotic Foods



Cariogram Data following 90 Day Probiotic Supplementation with *S. Salivarius* M18 Probiotics



First Look: Probiotics & Dentistry: Can They Benefit Patients? *(Continued from page 4)*

Oral Pre- and Probiotic Products					
Name	Manufacturer	Use	Ingredients	Website	Unit cost
Revitin	Revitin	Toothpaste with prebiotic compounds to help aid healthy oral flora	xanthan, fatty acids, seaweed fibers, triglyceride fatty acids	www.revitin.com	\$15/4 oz. tube
ProBiora Pro	ProBiora	Tablets that contain 3 strains of strep bacteria that benefit oral health	Patented ProBiora 3 blend of <i>S. oralis</i> KJ3, <i>S. Uberis</i> KJ2, and <i>S. Rattus</i> JH145	www.probiora.com	\$17.95/30 lozenges
Probiotic Gum	Cultured Care	Designed to reduce levels of pathogens that cause periodontal disease	<i>S. salivarius</i> BLIS K12	www.culturedcare.com	\$14.50/8 pieces
Prodentis Lozenges	BioGaia	Lozenge designed to reduce periodontal disease and inflammation	<i>L. reuteri</i> DSM 13978 and PTA 5289	www.biogaia.com	\$14/30 lozenges

Revitin



Prebiotic toothpaste designed to promote growth of healthy oral microbes

ProBiora Pro



Mint with 3 patented probiotics designed to aid in reduction of periodontal disease

Probiotic Gum



Probiotic gum with *S. salivarius* K12 added to help reduce perio inflammation

Prodentis



Probiotic lozenge with *L. reuteri* to help reduce periodontal inflammation

Recommendations for Use

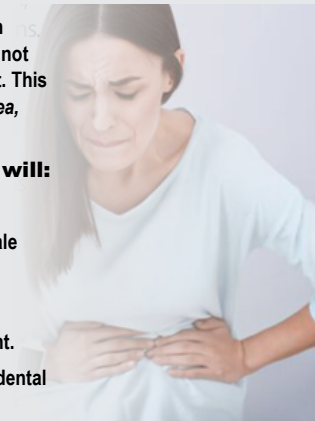
- **Dosage:** 100 million to 1 billion CFU/day is adequate to allow good colonization.
- **Consumption:** Best done either at bedtime after brushing or during the day after a meal and after brush. Toothpaste may inhibit colonization, so rinsing with water prior to taking probiotic is advised.
- **What to avoid:** Sugary foods during or after oral probiotic consumption will encourage growth of undesirable bacterial strains and counter the desired effect of the oral probiotic supplement.
- **Requires continual use.** Oral tissues take more physical punishment than lower GI organs, and therefore bacterial counts can diminish easily if supplementation is not done on a daily basis.

Using Probiotics to Counter the Side Effects of Dental Antibiotics

Dentists routinely prescribe antibiotics to patients with dental infections. Unfortunately, these medications do not discriminate between good and bad bacteria in our gut. This can lead to painful side effects (*stomach upset, diarrhea, cramping, etc.*) while on these medications.

Use of probiotics during antibiotic use will:

- Help maintain gut health and immune function.
- Minimize or eliminate side effects, especially for female patients.
- Improve immune response to dental infections.
- Reduce potential for secondary infection development.
- Increase speed of healing following treatment of the dental infection.



Contraindications for Use

Probiotics are classified by the FDA as “generally regarded as safe,” but there are still some situations that warrant discussion with a physician prior to use. Fortunately, oral probiotics have few side effects. They should be used with caution for premature babies, individuals with autoimmune deficiencies, people with HIV, and recent transplant patients. Patients with extreme sensitivity or allergy to dairy products should also use caution.

Thank you to Douglas Green, DDS, NMD, for his assistance with this important topic.

CR CONCLUSIONS: Despite the limited support for oral probiotic use in the U.S., international research continues to show that oral probiotics have been beneficial for test subjects. Further research is certainly needed to determine if probiotics can truly provide a natural solution to oral imbalance and disease.

Easy Reads on Probiotics

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First Look: Probiotics & Dentistry: Can They Benefit Patients? *(Continued from page 5)*

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Earn 1 credit hour for successfully completing each test. Tests are also available at www.CliniciansReport.org. This is a self-instruction program.

At the completion of this test, participants should be able to:

- Discuss tooth-colored monolithic crown materials
- Evaluate the potential benefits of probiotics in dentistry
- Evaluate new products and their potential clinical usefulness

Self-Instruction Test, November 2018, 1 CE Check the box next to the most correct answer.

1. The tooth-colored material category that demonstrated best durability was:

- ☐ A. Glass ceramic
☐ B. Zirconia
☐ C. Both of the above
☐ D. Neither of the above

2. Translucent zirconias have solved the problem of zirconia's lack of blend with surrounding dentition.

- ☐ A. True
☐ B. False

3. If clinicians and patients choose to use glass ceramics or ceramic-polymer materials for molar full-contour crowns, they should expect:

- ☐ A. Deeper tooth preparations to allow more material thickness for strength
☐ B. More fractures if tooth preparations are under-reduced
☐ C. Both of the above
☐ D. Neither of the above

4. 3Y maximum fracture toughness zirconia is the preferable material for:

- ☐ A. Molars, multi-units, people with occlusal habits
☐ B. Minimal tooth preparations and whenever maximum durability is desired
☐ C. Both of the above
☐ D. Neither of the above

5. Oral probiotics are available in which of the following ways?

- ☐ A. Lozenges
☐ B. Foods
☐ C. Gums
☐ D. All the above

6. Probiotics are classified by the FDA as "generally regarded as safe."

- ☐ A. True
☐ B. False

7. Which of the following is **not** considered to be a probiotic food?

- ☐ A. Yogurt
☐ B. Oatmeal
☐ C. Pickles
☐ D. Some Cheeses

8. MiTi is a system designed to:

- ☐ A. Make accurate one-step impressions without need of cord.
☐ B. Make two-cord-technique impressions with less effort.
☐ C. Provide materials and a technique for making accurate impressions without cord in some cases.
☐ D. Make all impressions with more accuracy than using the double cord technique.

9. IPRGS – Gauge Set is a set of:

- ☐ A. Six interproximal reduction disks.
☐ B. Plastic, disposable tabs to measure interproximal spaces created for orthodontics.
☐ C. Six durable metal tabs that confirm the interproximal space created for orthodontics.
☐ D. Six interproximal reduction burs.

10. Bite Dx is an instrument:

- ☐ A. Designed to help diagnose occlusal bite pain.
☐ B. With one end that allows vertical and lateral forces on all cusps.
☐ C. With one end with pyramid shape to isolate single cups and diagnose vertical root fractures.
☐ D. All of the above

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Products Rated Highly by Evaluators in CR Clinical Trials *(Continued from page 6)*

New Material for Those Who Prefer Two Step VPS Impression Technique

MiT

DentalRee



\$10/Impression
\$40/Intro Kit

MiT is a VPS impression system that promotes a “two step” impression technique:

1. Load MiTi tray with tray material and place in oral cavity. Cures in 95 seconds. Remove initial impression and trim.
2. Trace sulcus around prep with periodontal probe twice. Rinse prep and leave moist.
3. Inject wash material intraorally on prepared tooth and into sulcus. Re-seat initial impression and allow wash to cure for 95 seconds.

Wash material produces a fluid displacement that can eliminate the need of cord for some cases. As with other materials, final impressions may also be scanned for digital dental imaging.

Advantages:

- Materials and technique can produce accurate margin detail
- Alternative for patients who do not tolerate epinephrine
- Two viscosities of VPS material; good consistency
- Easy and preferred over placement of cord by some clinicians

CR Notes:

- 77% of Evaluators rated fit of crown using this technique equal to two-cord impressions
- Increased time to make impression. However, technique can eliminate cord placement which is often not calculated into overall impression making time.
- Many CR Evaluators still preferred the predictable results of the two-cord impression technique.

CR CONCLUSIONS: MiTi provides a system to make accurate impressions potentially without cord placement, which is desirable for some clinicians. 72% of 25 CR Evaluators rated it excellent or good and worthy of trial by colleagues.

Convenient Interproximal Reduction Gauge Set for Confirming Space Created for Orthodontics

IPRGS – Gauge Set

Strauss Diamond
Instruments



\$35/Set of six gauges

Orthodontic gauge set measures interproximal reduction and confirms desired space is accomplished. Set includes gauges with the following measurements: 0.1 mm, 0.2 mm, 0.25 mm, 0.3 mm, 0.4 mm, and 0.5 mm. Gauges are sturdy, polished, well-marked, and conveniently sized. Especially useful for clear aligner orthodontic treatments and helpful in demonstrating minimal reduction to patients.

Advantages:

- Convenient and easy to use
- Accurate reduction can be confirmed
- Appropriate size of gauge and stainless steel is sturdy
- Reasonable cost

Limitation:

- No major limitations noted

CR CONCLUSIONS: 100% of 18 CR Evaluators stated they would incorporate IPRGS – Gauge Set into their practice. 100% rated it excellent or good and worthy of trial by colleagues.

Unique Instrument Designed for Diagnosing Cracks and Other Causes of Chewing Pain

Bite Dx

Practicon



\$20.00/Instrument

This unique diagnostic instrument helps identify the cause of occlusal bite pain. One side of the polypropylene handle has a nonslip elastomer pad which engages all cups of a single tooth to detect chewing pain caused by PDL inflammation or the spread of pulpitis, in addition to cracks. Elastomer pad allows for both vertical and lateral forces. The other end of this instrument features a traditional pyramid-shaped end for single cusp engagement and fracture detection. Instrument is fully autoclavable.

Advantages:

- Bite pad size is able to engage all types of teeth
- Pyramid end is helpful in diagnosing vertical root fractures
- Instrument is easy to use

Limitation:

- A few Evaluators desired a longer handle design for some patients

CR CONCLUSIONS: 82% of 17 CR Evaluators stated they would incorporate Bite Dx into their practice. 88% rated it excellent or good and worthy of trial by colleagues.

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CR Dentistry Update with Gordon J. Christensen



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