Clinical & Scientific Documentation

BruxZir®

Solid Zirconia Crowns & Bridges

OVER 2.6 MILLION RESTORATIONS PLACED

BruxZir Shaded provides improved translucency and esthetics. Complete color penetration all the way through your restorations ensures greater shade consistency and prevents any shade change after occlusal adjustment.

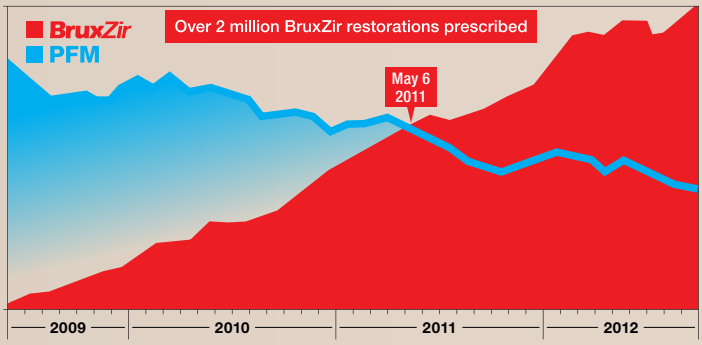
The #1 prescribed brand of solid zirconia is available nationwide at a laboratory near you. See inside for a complete listing and special offer.

Authentic BruxZir® SOLID ZIRCONIA

The *BruxZir* Phenomenon – A Clinician's Perspective by Dr. Michael DiTolla

May 6th, 2011 is an important day in dental history. That's the first day that doctors prescribed more BruxZir restorations than PFM restorations. At the time, BruxZir was two years old and PFMs were fifty years old. Here at the lab, it confirmed a trend that we had been observing during those two years: the days of the PFM being the dentist's everyday restoration were coming to a close. The sales of BruxZir never dipped below those of the PFM again, in fact, the gap between the two continues to grow wider as BruxZir grows and PFMs continue to shrink (see graph on facing page).

BruxZir vs PFM – Units Produced per Month



The rapid growth of BruxZir took us somewhat by surprise, as our original intention for the material was as a cast gold replacement. Almost every dentist I know agrees that cast gold is the finest indirect restorative material we have in dentistry. Unfortunately, almost every patient I know agrees that cast gold is the least esthetic indirect restorative material we have in dentistry. Ten years ago, our R&D department asked me what they should work on, what kind of restorative material would most benefit dentists and patients. My answer was simple: cast gold that is shade A2. They reminded me that they were engineers, not alchemists, but I remained undeterred in my push for a cast gold in shade A2.

Five years later, they presented me with BruxZir, an impressive effort at creating a cast gold in shade A2. Fast-forward five more years to today, and it is clear that they were truly on to something big. As the translucency and esthetics of BruxZir continue to improve, it transitioned from a posterior material to an anterior material as well, that could be used in almost any clinical situation.

The biggest reasons for the rapid growth of BruxZir are high strength and fit. As a monolithic restoration with no porcelain on it, BruxZir has the lowest fracture rate of any restoration (besides cast gold) in our lab. It's clear that dentists place strength very close to the top, if not at the top, of their list of desirable characteristics for an everyday crown and bridge material.

By far the most common comment that we get is about how well they fit compared to most of the crowns they have used in the past. It took us a few months to figure out what these dentists really meant. It wasn't that they used to cement crowns with open margins; it was that the emergence profile of BruxZir crowns blended with the tooth structure and soft tissue better than any material they had previously used (again, with the exception being cast gold.) The microscopic images that follow demonstrate how a high-strength monolithic material (BruxZir) has a much better emergence profile than a bi-layered crown (PFM) on an identical prep.

This combination of fit, strength and improved esthetics has made BruxZir the most prescribed restoration in the lab, and it shows no signs of slowing down. The final frontier for BruxZir is to be used for veneers, and with the translucency and esthetics improving monthly, that day is not too far off.

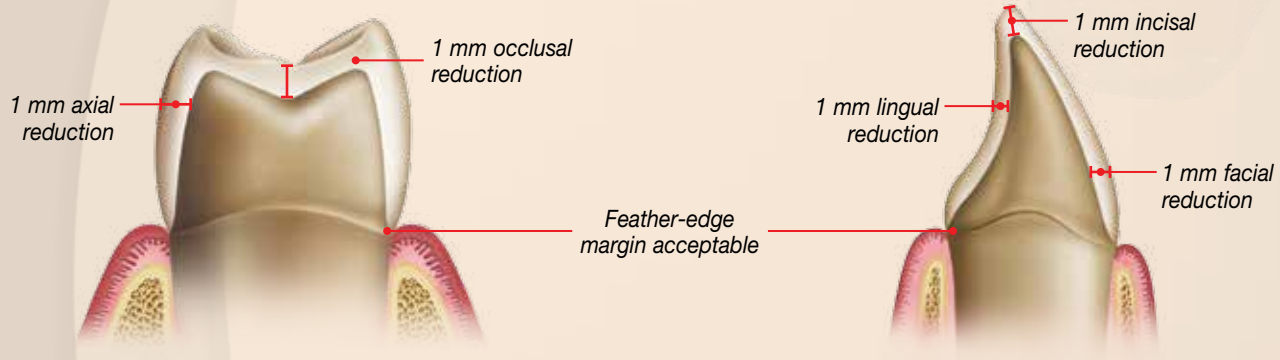
Dr. Michael C. DiTolla
mditolla@glidewelldental.com

Indications

BruxZir Solid Zirconia is indicated for crowns, bridges, veneers, inlays and onlays. It is an esthetic alternative to PFM metal occlusal/lingual or full-cast restorations and ideal for restorations requiring extra durability such as crowns under partials or screw-retained implant crowns. The chip-proof durability of BruxZir restorations also makes them ideal for bruxers who have broken natural teeth or previous PFM restorations. BruxZir restorations are also ideal for patients lacking the preparation space for a PFM.

Preparation Requirements

- Shoulder preparation not needed, feather edge is OK. It is a conservative preparation similar to full-cast gold, so any preparation with at least 0.5 mm of occlusal space is accepted.
- Minimum occlusal reduction of 0.5 mm; 1 mm is ideal.



These illustrations show an ideal 1 mm reduction for an anterior or posterior BruxZir crown, and also have feather-edge margins. BruxZir does fine at 1.5 or 2.0 mm as well, but this amount of reduction is not always possible. By maintaining 1 mm of BruxZir thickness, this allows you to safely adjust the crown if necessary when checking the occlusion. While BruxZir can be milled as thin as 0.5 mm, it cannot be adjusted at this thickness without breaking at some point. With a BruxZir crown at 0.5 mm thickness with high occlusion, consider adjusting the opposing tooth.

Typical Prep with PFM Crown

This image represents the typical PFM prep we receive with a conservative feather-edge margin. When a PFM is fabricated for this prep, there is a bulky 1 mm margin on the PFM that catches on the explorer. Even if the margin is sealed, the emergence profile is unacceptable.

Typical Prep with BruxZir Crown

This image represents the typical PFM prep we receive with a BruxZir crown in place. Because it is a monolithic crown and can be milled to a feather edge, there is no bulk of material, or "speed bump," at the margin. Dentists tell us their explorer cannot detect where the tooth ends and the BruxZir crown begins.

Cementation Recommendations

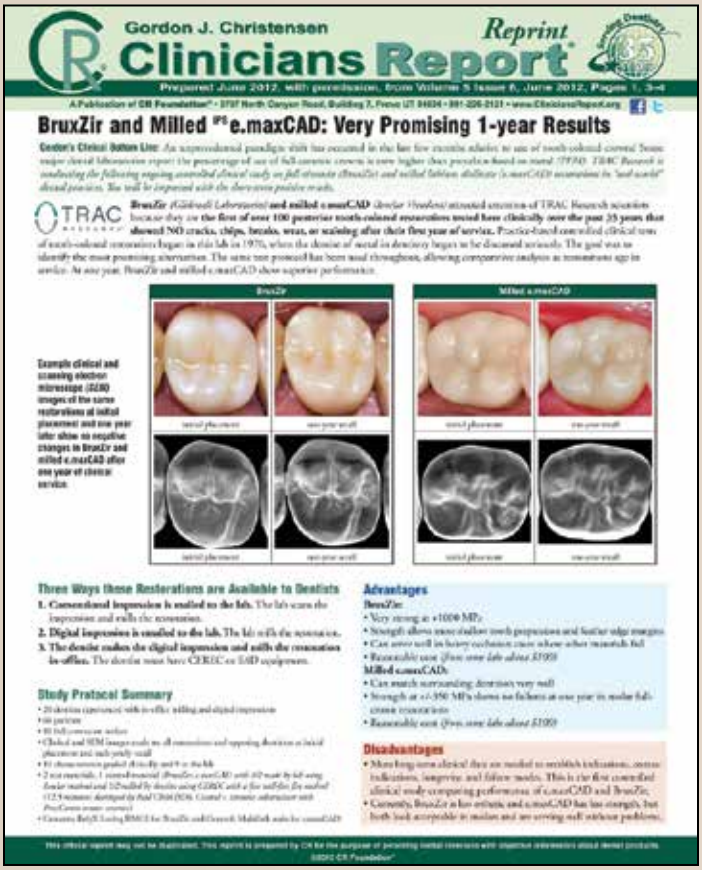
- Ceramir® Crown & Bridge (Doxa Dental; Newport Beach, Calif.) or a resin-reinforced glass ionomer cement such as RelyX™ Luting Cement (3M ESPE; St. Paul, Minn.) or GC Fuji Plus™ (GC America; Alsip; Ill.) with Z-Prime Plus or Monobond Plus
- For short or over-tapered preparations, use a resin cement such as RelyX™ Unicem (3M ESPE) or Panavia™ F2.0 (Kuraray; New York, N.Y.) with Z-Prime Plus or Monobond Plus

BruxZir Clinical Study 1

BruxZir and Milled IPS e.maxCAD: Very Promising 1-Year Results

Gordon's Clinical Bottom Line: An unprecedented paradigm shift has occurred in the last few months relative to use of tooth-colored crowns! Some major dental laboratories report the percentage of use of full-ceramic crowns is now higher than porcelain-fused-to-metal (PFM). *TRAC Research is conducting the following ongoing controlled clinical study on full-zirconia (BruxZir) and milled lithium disilicate (e.maxCAD) restorations in "real-world" dental practices. You will be impressed with the short-term positive results.*

BruxZir *(Glidewell Laboratories)* **and milled e.maxCAD** *(Ivoclar Vivadent)* attracted attention of TRAC Research scientists because they are **the first of over 100 posterior tooth-colored restoratives tested here clinically over the past 35 years that showed NO cracks, chips, break, wear, or staining after their first year of service.** Practice-based controlled clinical tests of tooth-colored restoratives began in this lab in 1976, when the demise of metal in denistry began to be discussed seriously. The goal was to indentify the most promising alternatives. The same test protocol has been used throughout, allowing comparative analyses as restorations age in service. At one year, BruxZir and milled e.maxCAD show superior performance.


Gordon J. Christensen

Reprint

Clinicians Report

BruxZir and Milled IPS e.maxCAD: Very Promising 1-year Results

TRAC

Three Ways these Restorations are Available to Dentists

Advantages

Disadvantages

Study Protocol Summary

To view the full report, visit www.bruxzir.com.

BruxZir initial placement

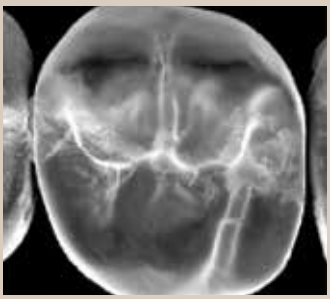
BruxZir one-year recall

Milled e.max CAD initial placement

Milled e.max CAD one-year recall

Initial placement SEM image

One-year recall SEM image



Initial placement SEM image

One-year recall SEM image

Example clinical and scanning electron microscope (SEM) images of the same restorations at initial placement and one year later show no negative changes in BruxZir and milled e.maxCAD after one year of clinical service.

SOURCE: An independent, non-profit, dental education and product testing foundation, Clinicians Report®, June, 2012.

ADVANTAGES

BruxZir:

- Very strong at +1000 MPa
- Strength allows more shallow tooth preparation and feather edge margins
- Can serve well in heavy occlusion cases where other materials fail
- Reasonable cost *(from some labs about $100)*

Milled e.maxCAD:

- Can match surrounding dentition very well
- Strength at +/-350 MPa shows no failures at one year in molar full-crown restorations
- Reasonable cost *(from some labs $100)*

DISADVANTAGES

- More long-term clinical data are needed to establish indications, contra-indications, longevity and failure modes. This is the first controlled clinical study comparing performance of e.maxCAD and BruxZir.
- Currently, BruxZir is less esthetic and e.maxCAD has less strength, but both look acceptable in molars and are serving well without problems.

Three Ways These Restorations Are Available to Dentists

1. **Conventional impression is mailed to the lab.** The lab scans the impression and mills the restoration.
2. **Digital impression is emailed to the lab.** The lab mills the restoration.
3. **The dentist makes the digital impression and mills the restoration in-office.** The dentist must have CEREC or E4D equipment.

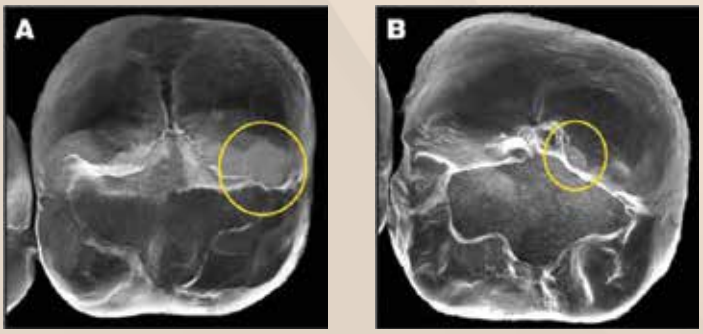
Study Protocol Summary

- 20 dentists experienced with in-office milling and digital impressions
- 66 patients
- 81 full crowns on molars
- Clinical and SEM images made on all restorations and opposing dentitions at initial placement and each yearly recall
- 11 characteristics graded clinically and 9 in the lab
- 2 test materials, 1 control material *(BruxZir; e.maxCAD with 1/2 made by lab using Ivoclar method and 1/2 milled by dentists using CEREC with a fast mill-fast fire method (12.5 minutes) developed by Paul Child DDS; Control = zirconia substructure with PressCeram veneer ceramic)*
- Cements: RelyX Luting RMGI for BruxZir and Control; Multilink resin for e.maxCAD

Results and Observations

1. **Overall esthetics:** e.maxCAD best with 69% rated excellent for matching color and translucency and 47% excellent for BruxZir.

2. **Wear of opposing dentition by crowns:** All 3 crown materials wore small facets (see image below) in over half the opposing dentitions. Facets by BruxZir were more numerous and larger. More time is needed to see if the facets progress beyond first year “wearing in.”



Images A and B show wear facets on dentition opposing BruxZir and milled e.maxCAD full crowns. All the materials in this study, including the Control, produced similar facets in enamel, gold castings, composite resin and some ceramics.

3. **Wear of crowns by opposing dentition:** Suprisingly, opposing dentition of all types produced wear facets on all the crown materials. Most aggressive was opposing ceramics, followed by enamel. Cast gold alloy and composite resin also produced wear facets.

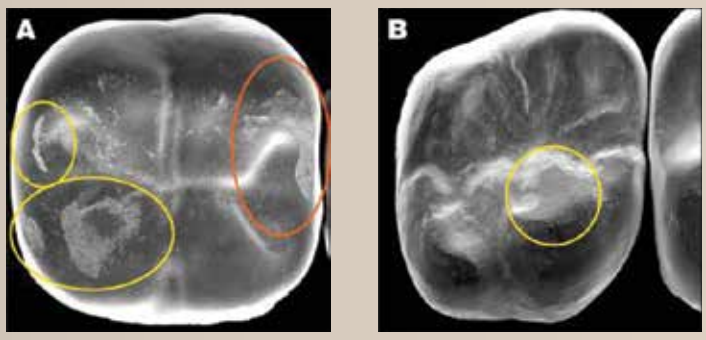


Image A shows a BruxZir crown with wear facets produced by composite resin and enamel (yellow circles) and ceramic (orange circle) opposing dentition. Image B shows a milled e.maxCAD crown with a wear facet made by cast gold opposing dentition. Small wear facets on both the crowns and their opposing dentition is a positive finding indicating near equal wear potential of the materials clinically.

4. **Surface smoothness:** BruxZir and e.maxCAD ceramics retained smoothness, but surface glazes in some patients roughened and/or wore away at occlusal contacts or were removed by occlusal adjustment. The question arises — is it necessary to glaze these materials?

It is apparent that glazes used on all the crowns in this study will not be long lasting. Image A shows glaze disruption to e.maxCAD by a ceramic onlay; Image B shows glaze worn off a BruxZir cusp tip by opposing cast gold; Image C shows where occlusal adjustment stripped away the glaze and left the zirconia underneath untouched.

5. **Cracks, chips, breaks, wear, staining:** None of these problems were present on BruxZir and milled e.maxCAD, but the Control *(zirconia substructure plus veneer ceramic)* had cracks, chips and breaks typical of veneering ceramics designed for use on zirconia.

6. **Occlusal adjustment:** The homogeneously dense BruxZir and milled e.maxCAD both tolerate occlusal adjustment well, but the rotary instruments roughen and remove the surface glazes. Fine diamonds followed by diamond-impregnated rubber cups are indicated for smoothing of occlusal adjustments. Example products: Axis and Komet have special kits *(product numbers LS7579 and LD0707, repectively)*.

7. **e.maxCAD recommended protocol vs. faster fabrication protocol:** A fast mill-fast fine protocol to reduce fabrication time to 12.5 minutes was used by dentists chairside in this research. Although Ivoclar states this protocol is "not recommended by the manufacturer," so far, no differences have been seen in any of the 20 graded characteristics between the slower and faster processing protocols.

8. **No differences:** So far, there have been no problems with endo, caries, changes in perio health, unusual plaque retention on the crowns, need for re-cementation, margin fit or interproximal contact. Patient ratings for both crown materials have been very high. Overall ratings of crown "feel" and esthetics are 89% excellent and 11% good.

CR Conclusions: Milled e.maxCAD processed two ways and BruxZir full crowns on molars have served well after one year in this practice-based controlled clinical trial, showing no cracks, chips, breaks, wear or staining. Wear of opposing dentition, glaze degradation, effects of occlusal adjustment and long-term durability of e.maxCAD crowns fabricated with the fast mill-fast fire method remain as questions to be answered as more time passes in this ongoing study. Readers can expect a yearly status report on the progress of the pertinent new materials as they age in service.

BruxZir Seating Instructions

Instructions for Seating BruxZir and Other Zirconia-Based Crowns & Bridges

BruxZir restorations are fabricated from solid zirconia oxide material, much like the zirconia oxide coping found in restorations such as Prismatik Clinical Zirconia™, Lava™ Zirconia (3M ESPE; St. Paul, Minn.) and NobelProcera™ (Nobel Biocare; Yorba Linda, Calif.). Interestingly, zirconia oxide exhibits a strong affinity for phosphate groups. We can take advantage of this fact with phosphate-containing primers, such as Monobond Plus (Ivoclar Vivadent; Amherst, N.Y.) and Z-Prime™ Plus (Bisco; Schaumburg, Ill.), or cements such as Ceramir® Crown & Bridge (Doxa Dental) to increase our bond strengths to zirconia oxide. Unfortunately, saliva also contains phosphates in the form of phospholipids, so when a BruxZir crown or bridge is tried in the patient's mouth and comes in contact with saliva, the phosphate groups in the saliva bind to the zirconia oxide and cannot be rinsed out with water. Attempting to use phosphoric acid (which is full of phosphate groups) to "clean out" the saliva only makes the problem worse.

The only way we have found to successfully remove these phosphate groups from the interior of a BruxZir restoration is with the use of Ivoclean (Ivoclar Vivadent). This zirconia oxide solution is placed inside the restoration for 20 seconds and then rinsed out. Due to the large concentration of free zirconia oxide in the Ivoclean, it acts as a sponge and binds to the phosphate groups that were previously bonded to the BruxZir restoration. Once the Ivoclean is rinsed out, you will have a fresh bonding surface for the Monobond Plus, Z-Prime Plus or Ceramir to bond to.

The clinical steps would look like this:

1. This patient has a PFM crown on tooth #9 that he would like to replace, and tooth #8 has a failing composite with some fairly significant recurrent decay underneath it, so that it also required a full-coverage crown. Every month or two I do an anterior BruxZir case like this to give the R&D department some feedback on the translucency of the material, which they continue to improve. Teeth #8 and 9 will be prepped for BruxZir crowns.

2. The BruxZir crowns fit well, and the patient has approved them, so it is time to start the cementation procedure. Since zirconia crowns are susceptible to salivary contamination from phospholipids when they are tried in the mouth, if you simply rinse them out with water, as I am doing here, you remove the visible saliva, but the phosphate groups remain bonded to the zirconia surface. The good news is that once we remove these salivary phosphate groups, we are going to take advantage of this fact when we cement or bond these crowns.

3. Fortunately, Ivoclean (Ivoclar Vivadent) was released earlier this year, specifically for the purpose of cleaning out restorations prior to bonding or cementation. I place a couple drops in both of the crowns that will stay in place for 20 seconds. Ivoclean is a concentrated zirconia oxide solution. When placed in crowns, it sets up a concentration gradient so that the salivary phosphate groups bonded to the inside of the crowns are drawn across the gradient to the zirconia particles in the Ivoclean, which can then be rinsed away.

4. I use a microbrush to ensure that the Ivoclean is evenly distributed and has come in contact with all of the internal surfaces of the crowns, although it is not necessary to agitate it against the surface of the zirconia crowns. We just want to ensure that the purple Ivoclean material is coating the entire internal surface of the crown; then, after 20 seconds, it can be rinsed out. Make sure you brush it all the way on to the margins with the microbrush, don't be afraid to get it on the outside surface of the crown.

BruxZir Seating Instructions

5. After 20 seconds, the Ivoclean is rinsed from the crown with an air/water syringe. Ironically, perhaps the worst thing you can do to clean out zirconia-based crowns after try-in is to use phosphoric acid to clean them. As you might imagine, phosphoric acid is full of phosphate groups, so they will occupy every receptor site on the zirconia. It is only by flooding the crowns with Ivoclean that we can decontaminate the internal surfaces in preparation for cementation or bonding. Since Ceramir cement contains phosphates, it will bond directly to the BruxZir crowns without the use of a zirconia primer.

6. Fill the BruxZir crowns with the Ceramir and seat them simultaneously on the preps. Because Ceramir cement is so moisture tolerant, I no longer have to vigorously air-dry the preps prior to cementation, I simply use cotton balls to remove pooling moisture. Not having to blast the preps with air anymore, I find that I have to anesthetize far fewer patients for crown seats than before. We use pinewood sticks to ensure that the crowns stay in place while the cement sets, in case there is any soft tissue rebound. Ceramir is the one cement I use where the excess always peels off in one piece, simplifying cleanup.

Instructions for Adjusting and Polishing BruxZir Crowns & Bridges

Adjust BruxZir Solid Zirconia restorations using a fine-grit diamond with light pressure to avoid potential microfractures. The specially designed BruxZir Adjustment & Polishing Kit may be purchased through Glidewell Direct at www.glidewelldirect.com or by calling 888-303-3975.

A football-shaped bur is most effective for adjusting occlusion on the occlusal surfaces of posterior teeth and lingual surfaces of anterior teeth.

A tapered bur is most effective for adjusting cusps or proximal contacts.

A round bur is used to adjust a cusp or fossa and for creating endodontic access.

Using light pressure and no water, begin pre-polishing with the brown cup to remove abrasions left by the diamonds.

Continue pre-polishing with the green cup until a more glossy look starts to appear on the adjustment areas.

Finally, use the white cup with light to medium pressure to achieve a "wet" high shine.

BruxZir Before & After Cases

Case 1

As you can see in this non-retracted “before” photo, the patient had two pre-existing, high-value PFMs over what appeared to be base metal copings on tooth #8 and #9. The condition of the gingiva suggested a possible base metal allergy, which contributed to my decision to go with BruxZir all-ceramic (solid zirconia) crowns.

In the retracted view, you can see the full extent of the gingival tissues. As I placed the topical on tooth #9 with a cotton swab, it started to bleed. You can see that the midline on the existing crown is off, as are the axial inclinations of the two crowns. The unhealthy gingival tissue was removed with a diode laser and BioTemps were placed. I’ve found that the smooth glazed surface of BioTemps helps gingiva heal faster in these types of cases.

As you view the crowns in the lateral smile view, you will notice the flat facial profiles of these crowns.

Authorized BruxZir™ Laboratories

Call for case pickup at your preferred laboratory

LABORATORY	CITY	STATE	PHONE
Barksdale Dental Lab	Athens	AL	256-232-1772
Burdette Dental Lab Inc.	Birmingham	AL	800-624-5301
Capitol Dental Designs	Montgomery	AL	334-269-2700
Mobile Dental Design, Inc.**	Mobile	AL	251-634-2445
Oral Arts Dental Laboratories, Inc.	Huntsville	AL	800-354-2075
Parkway Dental Lab	Opelika	AL	800-239-3512
Scrimpshire Dental Studio	Huntsville	AL	800-633-2912
Walker Dental Laboratory, Inc	Decatur	AL	800-727-0705
Green Dental Laboratories, Inc.	Heber Springs	AR	800-247-1365
Continental Dental Laboratory	Phoenix	AZ	800-695-0155
Dentek Dental Laboratory, Inc.	Scottsdale	AZ	877-433-6835
DW Dental Laboratory	Phoenix	AZ	602-973-2166
Lafayette Dental Lab	Phoenix	AZ	800-996-9482
Lakeview Dental Ceramics	Lake Havasu City	AZ	928-855-3388
New West Dental Ceramics**	Lake Havasu City	AZ	800-321-1614
A & M Dental Laboratories	Santa Ana	CA	800-487-8051
Advanced Dental Technology	Chula Vista	CA	619-656-9422
Atlas Dental	Gardena	CA	866-517-2233
BDL Prosthetics**	Irvine	CA	800-411-9723
Beverly Hills Dental Studio	Beverly Hills	CA	800-215-5544
Bigler Dental Ceramics	Tustin	CA	714-832-9251
Continental Dental Laboratories	Torrance	CA	800-443-8048
Creative Porcelain	Oakland	CA	800-470-4085
Crowns R Us	Brea	CA	562-694-8670
DentalLab.com	North Hollywood	CA	877-437-4647
Dental Masters Laboratory	Santa Rosa	CA	800-368-8482
G & H Dental Arts, Inc	Torrance	CA	800-548-3384
Glidewell Laboratories**	Newport Beach	CA	800-854-7256
Great Smile Dental Lab	Northridge	CA	877-773-8815
Ikon Dental Design	San Leandro	CA	510-430-9659
Iverson Dental Laboratories	Riverside	CA	800-334-2057
Mr. Crown Dental Studio	Santa Ana	CA	800-515-6926
Nash Dental Lab, Inc.	Temecula	CA	877-528-2522
NEO Milling Center	Cerritos	CA	562-404-4048
Nichols Dental Lab	Glendale	CA	800-936-8552
Noel Laboratories, Inc.	San Luis Obispo	CA	800-575-4442
PCS Dental Lab	Foster City	CA	650-349-1085
Perfect Smile Dental Ceramics, Inc	San Diego	CA	877-729-5282
Polaris Dental Laboratory	Anaheim	CA	866-937-1563
Precision Ceramics Dental Laboratory**	Montclair	CA	800-223-6322
Riverside Dental Ceramics**	Riverside	CA	800-321-9943
Robertson Dental Lab	Lompoc	CA	800-585-3111
San Ramon Dental Lab	San Ramon	CA	800-834-4522
So Cal Dental Lab	Colton	CA	909-633-6462
World Lab U.S.A.	Irvine	CA	800-975-3522
Gnathodontics, Ltd.	Lakewood	CO	800-234-9515
Zinser Dental Lab, Inc.	Westminster	CO	303-650-1994
Dodd Dental Laboratories	New Castle	DE	800-441-9005
Carlos Ceramics Dental Lab	Miami	FL	305-661-0260
DigiTech Dental Restorations	Doral	FL	888-336-1301
Fox Dental Laboratory	Tampa	FL	800-282-9054
Knight Dental Group	Oldsmar	FL	800-359-2043
TLC Dental Laboratory	Orlando	FL	800-262-2547
New Image Dental Laboratory**	Morrow	GA	800-233-6785
Oral Arts Dental Lab Georgia	Chamblee	GA	800-229-7645
Ridge Craft Dental Laboratory	Lagrange	GA	800-516-0281
The Lab 2000, Inc.	Columbus	GA	800-239-3947
Eclipse Dental	Waterloo	IA	319-232-6020
Oral Arts Dental Lab Iowa	Dubuque	IA	800-747-3522
AOC Dental	Hayden	ID	800-729-1593
Accudent Dental Laboratory	Lansing	IL	800-895-3565
Artistic Dental Studio, Inc.	Bolingbrook	IL	800-755-0412
Dental Arts Laboratories, Inc.	Peoria	IL	800-322-2213
Dental Arts Lincolnshire	Lincolnshire	IL	800-779-5089
Distinctive Dental Studio, Ltd.	Naperville	IL	800-552-7890
Prosthotech	Sugar Grove	IL	630-466-8333
Quad City Dental Laboratory Inc.	Moline	IL	888-797-5707
Rockert Dental Studio	Wheaton	IL	800-665-1401
Vitality Dental Arts**	Arlington Heights	IL	800-399-0705
Ito & Koby Dental Studio	Indianapolis	IN	800-288-6684
Lumident, Inc.	Indianapolis	IN	866-586-4336
Myron's Dental Laboratory	Kansas City	KS	800-359-7111
Keller Dental Laboratory	Louisville	KY	800-292-1894
CDS Dental Studio**	Bossier City	LA	800-259-7775
Crown Dental Studio	Shreveport	LA	800-551-8157
Pfisterer-Auderer Dental Lab	Metairie	LA	800-288-8910
Arcari Dental Lab	Wakefield	MA	781-213-3434
Dental Studios of Western Massachusetts, Inc.	West Springfield	MA	413-787-9920
Aronovitch Dental Laboratory	Owings Mills	MD	800-441-6647
Eliason Dental Lab	Portland	ME	800-498-7881
Apex Dental Milling	Ann Arbor	MI	866-755-4236
Artistic Dental Lab	Allen Park	MI	800-437-3261
D.H. Baker Dental Laboratory	Traverse City	MI	800-946-8880
Davison Dental Lab	Flint	MI	800-340-6971
Dental Art Laboratories	Lansing	MI	800-444-3744
Olson Dental Laboratory	Clinton Township	MI	800-482-3166
Spartan Dental Lab	Lansing	MI	800-678-2227
U.S. Dental Laboratories	Southfield	MI	248-557-8029
Xcel Dental Studio	Flint	MI	810-733-0909
Excel Dental Studios Inc.	Minneapolis	MN	800-328-2568
Harrison Dental Studio	West St. Paul	MN	800-899-3264
Saber Dental Studio	Brooklyn Center	MN	800-264-3903
Thoele Dental Laboratory	Waite Park	MN	800-899-1115
Trachsel Dental Studio**	Rochester	MN	800-831-2362

LABORATORY	CITY	STATE	PHONE
Webster Dental Laboratory	Saint Paul	MN	800-621-3350
Wornson-Polzin Dental Lab	North Mankato	MN	800-950-5079
Becker Dental Lab, Inc.	Herculanem	MO	800-963-6691
Keller Laboratories, Inc.**	Fenton	MO	800-325-3056
Mallow-Tru Dental Studio	Lee's Summit	MO	800-444-3685
Midwest Dental Laboratory	St. Louis	MO	800-325-8011
Stewart Dental Laboratories	Columbia	MO	866-724-5509
Oral Tech Dental Laboratory	Pearl	MS	800-321-6201
Western Dental Arts	Billings	MT	406-652-1652
Carolina Outsource Inc.	Charlotte	NC	704-814-0644
Drake Precision Dental Laboratory	Charlotte	NC	800-476-2771
Sirona InfiniDent	Charlotte	NC	800-659-5977
Natural Ceramics Inc.	Fayetteville	NC	910-425-8296
The Freeman Center	Stallings	NC	800-659-7636
Kiess Kraft Dental Laboratory	Omaha	NE	800-553-9522
H & O Dental Laboratory	Manchester	NH	800-543-4312
Excel Berger Dental Laboratory	North Brunswick	NJ	800-438-3384
Ideal Dental Laboratory	Albuquerque	NM	800-998-6684
Core 3D Centres, LLP	Las Vegas	NV	888-750-9204
Digital Dental Studio	Henderson	NV	702-992-4055
Las Vegas Dental Studio	Las Vegas	NV	800-455-1598
Las Vegas Digital Dental Solutions**	Las Vegas	NV	800-936-1848
Creo Dental	New York	NY	212-302-3860
Elegant Dental Laboratories	Brooklyn	NY	877-335-5221
Smile Design Dental Laboratory	Port Washington	NY	516-472-0890
AccuTech Dental Lab	Reynoldsburg	OH	614-751-9888
John Hagler, CDT	New Albany	OH	614-560-5667
New Era Dental Arts, LLC	Sylvania	OH	800-971-8201
Northwest Ceramics Inc.	Columbus	OH	614-451-9597
ROE Dental Laboratory	Garfield Heights	OH	216-663-2233
Salem Dental Laboratory	Cleveland	OH	800-747-5577
Tooth Fairy Dental Lab	Findlay	OH	419-429-8181
Flud Dental Laboratory	Tulsa	OK	800-331-4650
Great Southwest Dental Laboratory	Oklahoma City	OK	800-777-1522
Imperial Crowns Dental Laboratory	Broken Arrow	OK	866-207-0858
Applegate Dental Ceramics	Medford	OR	541-772-7729
Ceramicraft Dental Lab	Bend	OR	541-318-7808
Albensi Laboratories	Irwin	PA	800-734-3064
DeLux Dental Laboratory	Reading	PA	800-541-5642
Dynamic Dental Group: Toothsmiths	Lititz	PA	717-626-8806
Innovative Dental Arts	North Huntingdon	PA	866-305-5434
Maverick Dental Laboratories	Export	PA	866-294-7444
Newtech Dental Laboratories	Lansdale	PA	866-635-5227
Thayer Dental Laboratory	Mechanicsburg	PA	800-382-1240
Sherer Dental Laboratory	Rock Hill	SC	800-845-1116
Bauer Dental Studio	Mitchell	SD	800-952-3334
Dental Prosthetics Lab	Clarksville	TN	931-647-2917
Peterman Dental Laboratory	Nashville	TN	800-476-1670
R-Dent Dental Laboratory	Bartlett	TN	877-733-6848
Rogers' Dental Laboratories	Athens	TN	800-278-6046
Wade Dental Ceramics	Maryville	TN	865-982-4324
Affordable Cosmetic Laboratories	Arlington	TX	860-258-0678
Crystal Dental Ceramics	Richardson	TX	972-680-1660
Dental Dynamics Laboratory Inc.	Arlington	TX	800-640-8112
MDA Studio, Inc.	Corpus Christi	TX	888-544-3307
Natural Arts Dental Laboratory	San Antonio	TX	800-322-6235
Oral Designs Dental Laboratory, Inc.	San Antonio	TX	800-292-5516
PCB Dental Lab	Richardson	TX	972-671-3894
Rose Dental Laboratory	Stafford	TX	281-565-3600
Stern Empire Dental Laboratory	Houston	TX	800-229-0214
Stern Reed Associates Dental Laboratory	Addison	TX	800-888-8341
Stern Tyler Dental Laboratory	Tyler	TX	800-926-1318
Accudent Dental Lab	West Jordan	UT	801-231-6161
Arrowhead Dental Laboratory	Sandy	UT	800-800-7200
Crown Laboratories Inc.	Sandy	UT	800-574-1911
Crystarr Dental Design	Salt Lake City	UT	800-343-2488
Epic Dental Studios**	American Fork	UT	801-756-1117
Evolution Dental Studio	Draper	UT	801-432-7446
Precision Milling Center	West Valley City	UT	877-810-6210
Treasure Dental Studio	Salt Lake City	UT	800-358-6444
Via Digital Solutions	Sandy	UT	888-484-6842
Art Dental Lab	Chantilly	VA	888-645-7541
NexTek Dental Studios	Manassas	VA	800-678-7354
The Point Dental Studio, LLC	West Point	VA	804-337-5477
McElvain Dental Laboratory	Colville	WA	509-684-8620
Pacific Dental Arts Inc.	Olympia	WA	877-438-1882
Ziemek Aesthetic Dental Lab	Olympia	WA	866-943-6357
Haag Dental Laboratory	Kenosha	WI	262-694-4732
Lord's Dental Studio	DePere	WI	800-821-0859
Saber Dental Studio	Waukesha	WI	800-365-3210
Midtown Dental Laboratory	Charleston	WV	800-992-3368

CANADA

Core 3D Centres, LLP	Calgary	AB, Canada	877-308-7717
Highland Dental Laboratory	Calgary	AB, Canada	800-504-3199
Protec Dental Laboratories Ltd.**	Vancouver	BC, Canada	800-663-5488
Impact Dental Laboratory	Ottawa	ON, Canada	800-668-4691
Smile Designs	Guelph	ON, Canada	519-836-1100
Carlton Dental Labs	Prince Albert	SK, Canada	800-667-5525

INTERNATIONAL SERVICING THE U.S.

Smith-Sterling Dental Laboratories**	Cartago	Costa Rica	800-479-5203
EPS Dental Studio	Cuernavaca	MO, Mexico	347-246-5203
Pacific Edge Dental Laboratories**	Baja California	Mexico	800-889-9323

INTERNATIONAL

Glidewell Europe GmbH	Frankfurt am Main	Germany	+49 6195 5077

OUTSOURCE SERVICE FOR OTHER LABORATORIES ONLY

Stoneglass Industries	Homebrush, NSW	Australia/New Zealand	+ 61 2 9764 1036
Royal Dental Lab	Shenzhen	China	+86 755 8950 1870
Global Eagle Medical Corporation	Johannesburg	South Africa	+27 (0)11 996 6000
Illusion Dental Laboratory Pvt. Ltd.	Mumbai	India	+91 8879 522 544
Laxmi Dental Laboratory Pvt. Ltd	Mumbai	India	+91 9820268438

****Also a Prismatik Clinical Zirconia™ Milling Center.**
*****BruxZir Milling Center for Labs only**

Case 1 Continued

This is much more difficult to achieve with bilayered restorations such as porcelain-fused-to-metal or porcelain-fused-to-zirconia. Since a BruxZir zirconia restoration is monolithic (one layer), it is much easier to achieve desirable contours.

Case 2

This patient had a number of existing PFM restorations in the anterior, but tooth #8 and #9 had a previous rooth canal and a lingual fracture next to the access openings. It was decided that the best option was a full-coverage anterior BruxZir crown.

Case 3

The patient presented with a fractured Maryland bridge. He ruled out implants because it would require a large bone graft. Instead, a digital impression was taken to fabricate a conventional BruxZir bridge.

Case 4

As you can see in the “after” photos, the BruxZir bridge has acceptable esthetics, although it won’t be mistaken for IPS Empress® anytime soon. Because BruxZir restorations are vitually unbreakable and the patient had already broken two PFM bridges in the past, this was the most appealing solution.

IPS Empress is a registered trademark of Ivoclar Vivadent.

Case 5

This female patient presented with a predominately cast metal bridge, which her dentist prescribed after she fractured the porcelain on each of the abutment teeth on the previous restoration. The patient always disliked how it looked and desired a more esthetic, long-term option. Because her PFM restorations had fractured previously, a high-strength BruxZir bridge was prescribed, providing the patient with the best combination of strength and esthetics.

Case 6

When this patient required an onlay to replace a broken cusp, cast gold was suggested, but the patient declined. A BruxZir crown was used instead due to its impressive strength.

BruxZir Before & After Cases

Case 7


This patient factured a porcelain all-ceramic crown on the second molar and chipped the first molar. Both crowns were replaced with BruxZir crowns.

Case 8


The patient had always disliked the metal occlusal on this PFM. When it became necessary to replace it, a tooth-colored BruxZir crown was chosen.

Case 9


This endodontically treated molar had a large amalgam and several fractures, necessitating a full-coverage BruxZir crown.

Case 10

This PFM crown had undergone chipping on multiple cusps and the mesial marginal ridge, resulting in an open contact. To prevent this from happening again, high-strength BruxZir Solid Zirconia was prescribed as a replacement restoration.

Case 11

When a patient generates enough occlusal force to break a PFM, a BruxZir crown is a great choice as a replacement.

Case 12

Delivery of the BruxZir screw-retained crown involved removing the custom healing abutment and then seating the one-piece crown. The abutment screw was tightened to 35 Ncm, and a periapical radiograph taken to verify final seating.

Case 12 Continued

Once the interproximal and occlusal contacts had been checked, the occlusal screw access opening was sealed with a piece of Teflon tape and composite, bringing the BruxZir implant case to a successful conclusion.

Case 13

Mandibular occlusal view demonstrating healthy dentition, with edentulous sites #29 and #30 planned for implant restoration. BruxZir screw-retained crowns, consisting of titanium base and monolithic zirconia body, were prescribed.

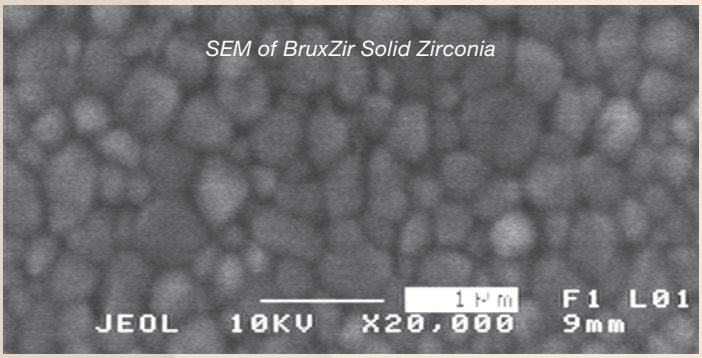
BruxZir screw-retained implant crowns with access openings to the titanium retention screws shown were tightened into place. Buccal view with the occlusal screw access opening sealed with a piece of Teflon tape and composite demonstrates the excellent tissue adaption.

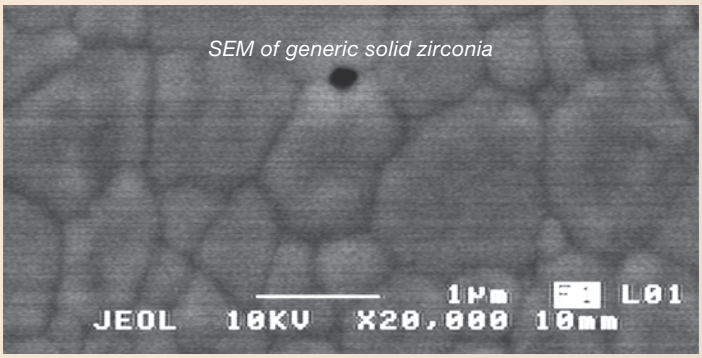
BruxZir Scientific Validation

BruxZir Restorations Deliver More Lifelike Results

Note the differences in these photomicrographs of solid zirconia brands. The high-resolution photomicrographs capture cross-sectioned samples of BruxZir Solid Zirconia and two generic competitors. The visible white spots in the competitor samples reveal agglomerates that remain after the sintering process, which decrease translucency and flexural strength. BruxZir Solid Zirconia has a smaller grain size and is nearly free of agglomerates. Unique, patented colloidal zirconia processing gives BruxZir Solid Zirconia higher flexural strength and provides more natural-looking restorations.

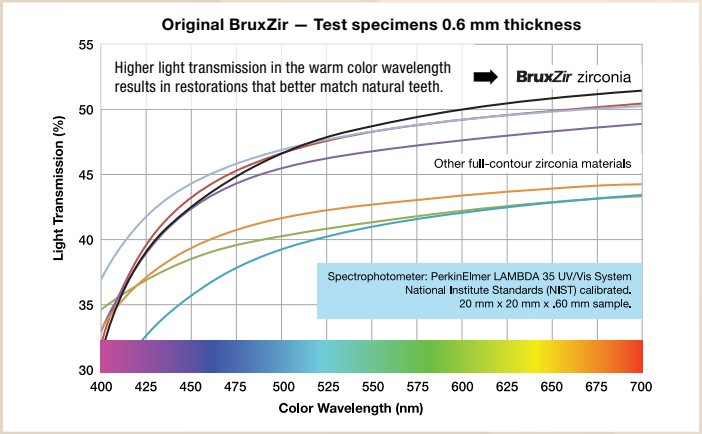
Scanning Electron Microscope Images

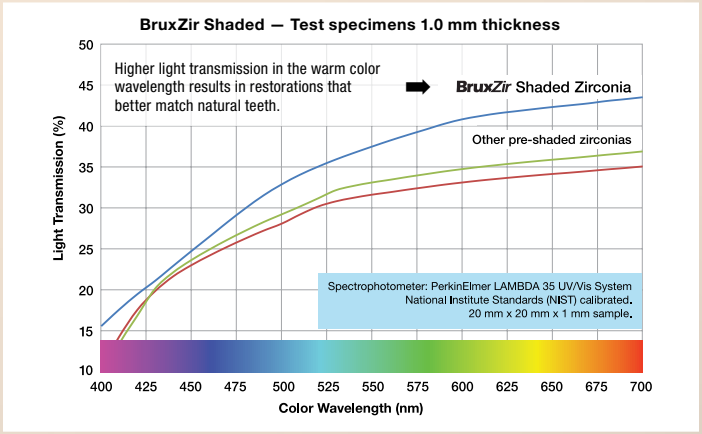




SEM of sintered, colloidally processed BruxZir vs. sintered, isostatically pressed zirconia

BruxZir's translucency is unsurpassed in the warm color spectrum for more natural esthetics.





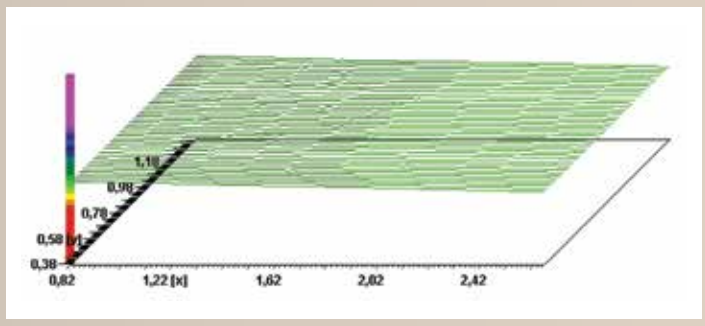
BruxZir zirconia exhibits higher translucency in the warm color spectral wavelength (>550 nanometers), allowing for more natural-looking restorations.

BruxZir Shaded zirconia, which allows for improved shade consistency, also exhibits a higher translucency when compared to other pre-shaded zirconias.

BruxZir Scientific Validation

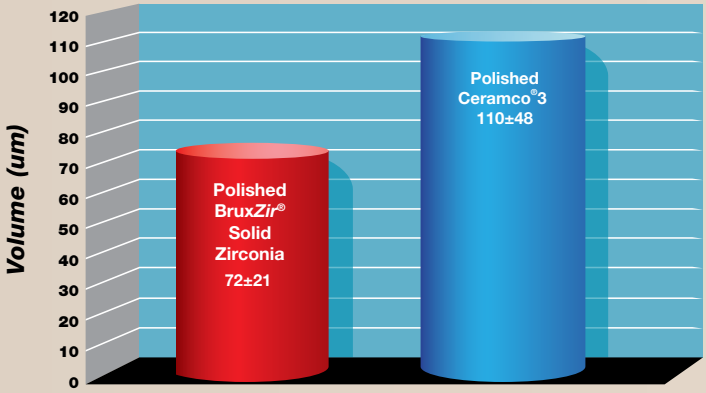
BruxZir vs. Ceramco®3 — Comparative Wear Study

BruxZir® Solid Zirconia and Ceramco®3 were tested in a comparative wear study led by Dr. Jürgen Geis-Gerstorfer, a professor at the University Hospital Tübingen in Germany.

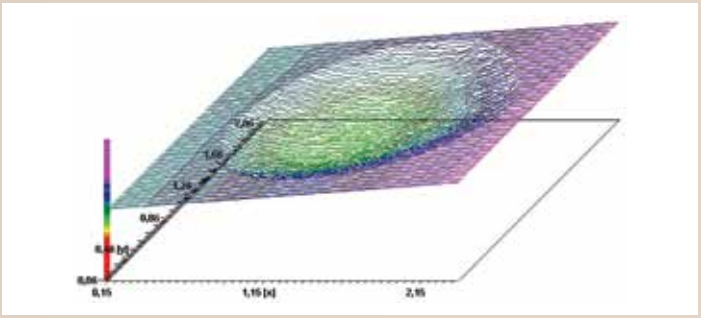


Each material was tested using an eight-chamber Willytech Chewing Simulator, which simulated the clinical performance of the material over a period of five years. Example of the topography of BruxZir after wear test is shown above.

Antagonist Wear Study



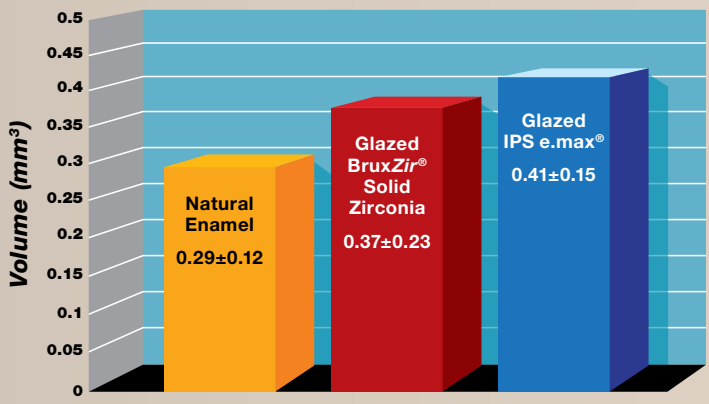
The antagonistic (Steatite balls) wear shows BruxZir zirconia only with 72±21 micron, which is significantly lower than Ceramco3, with 110±48 micron.



After 1.2 million wear cycles under a load of 5 kg, BruxZir compared favorably to Ceramco3, with barely detectable wear. Example of the topography of Ceramco3 after wear test is shown above. ***To view the full report, visit www.bruxzir.com.***

Ceramco is a registered trademark of DENTSPLY Ceramco.

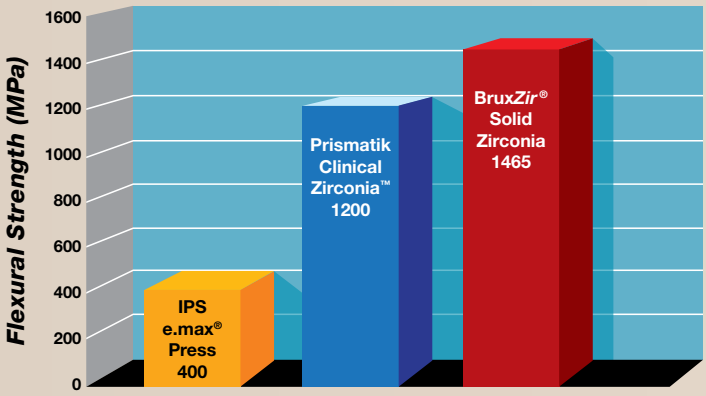
BruxZir vs. IPS e.max® Enamel Wear Test



In a recent study, to measure the volumetric loss of enamel, glazed BruxZir zirconia was found to wear compatible with enamel and virtually identical to glazed IPS e.max. ***To view the full study, visit www.bruxzir.com.***

IPS e.max is a registered trademark of Ivoclar Vivadent.

High Flexural Strength



Lithium disilicate ceramics have 400 MPa and typical zirconia materials have a flexural strength of more than 1200 MPa. BruxZir Solid Zirconia restorations are able to exceed that strength threshold, with flexural strengths up to 1465 MPa.

BruxZir Clinical Study 2

The Dental Advisor: BruxZir Solid Zirconia and Bridges 18-month Clinical Performance Report

Purpose

The purpose of this clinical study was to determine the clinical performance of ***BruxZir Solid Zirconia Crowns and Bridges*** *(Glidewell Dental Laboratories)* over an 18-month period.

Clinical Evaluation Protocol

At recall time, over 390 full-contour, monolithic ***BruxZir*** restorations (crowns and bridges) were placed. All restorations were fabricated at *Glidewell Dental Laboratories*. Most of the restorations were cemented with self-adhesive resin cement or adhesive resin cement.

Placement

Th e following parameters were evaluated at placement: esthetics, marginal accuracy, fit, interproximal contacts, and occlusion. Restorations were evaluated on a 1-5 rating scale: 1 = poor, 2 = fair, 3 = good, 4 = very good, 5 = excellent.

Esthetics, marginal accuracy, fit, and interproximal contacts of more than 96% of the restorations were rated excellent at placement. Very few restorations (less than 2%) had to be remade because of improper fit. A few restorations had light interproximal contacts and had to be remade. For the category of occlusion, 84% of the restorations received an excellent rating. In many cases, the occlusion was light and in some cases the restoration was out of occlusion. Based on customer feedback, *Glidewell Dental Laboratories* designs most of their crowns light in occlusion.


THE DENTAL ADVISOR

BruxZir Solid Zirconia Crowns and Bridges
18-month Clinical Performance Report

Glidewell Dental Laboratories

Purpose

Clinical Evaluation Protocol

Placement

Results at 18 Months

Consultants' Comments

Patient's Comment

FIGURE 1
Types of restorations placed.
78%
20%
2%

FIGURE 2
Age of restorations at recall.
67%
33%

To view the full report, visit www.bruxzir.com.

Results at 18 Months

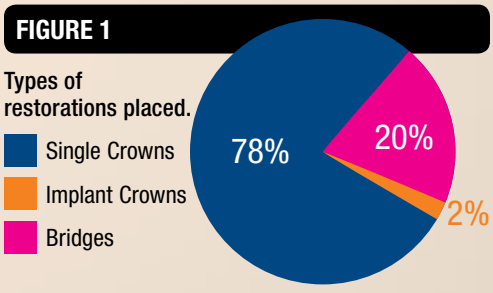
In December, 2012, 367 ***BruxZir*** restorations were recalled and evaluated.

Of the 367 ***BruxZir*** restorations observed at recall (Figure 1), there were:

- 287 posterior single crowns
- 36 units - 12 three-unit bridges
- 24 units - six four-unit bridges
- 10 units - two fi ve-unit bridges
- One 3-unit inlay bridge
- 7 implant crowns

FIGURE 1

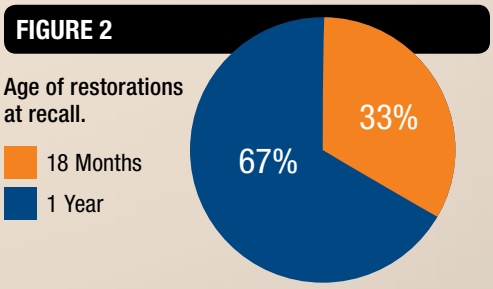
Types of restorations placed.



Of the 367 restorations, 121 (33%) had been in function for 18 months while 246 (67%) had been in function for one year (Figure 2).

FIGURE 2

Age of restorations at recall.



The recalled ***BruxZir*** restorations were evaluated in the following categories:

- Resistance to fracture or chipping
- Esthetics
- Resistance to marginal discoloration
- Wear on zirconia and opposing dentition
- Retention

Restorations were evaluated on a 1-5 rating scale: 1 = poor, 2 = fair, 3 = good, 4 = very good, 5 = excellent.

BruxZir®
Solid Zirconia Crowns & Bridges

Another BruxZir Award
THE DENTAL ADVISOR 2013
Top Long Term Performer - Zirconia

PRIDE INSTITUTE
"Best of Class"
TECHNOLOGY AWARD
2012

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See inside for the expanding list of Authorized BruxZir Laboratories

The Dental Advisor Results (cont.)

Esthetics

BruxZir restorations were rated excellent for esthetics when compared to other monolithic zirconia crowns (Figure 3).

Resistance to Fracture/Chipping

Nearly all ***BruxZir*** restorations exhibited no fracture or chipping (Figure 3). One five-unit bridge with very little clearance fractured one week after cementation. The bridge was redone, and is in function without any issues.

Resistance to Marginal Discoloration

No restorations exhibited marginal staining (Figure 3).

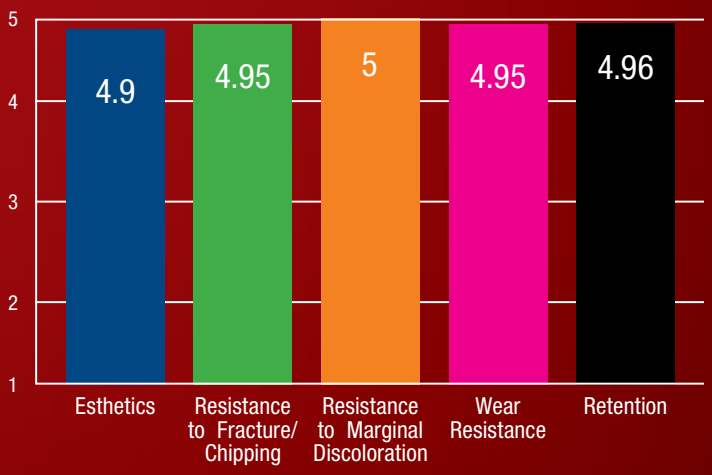
Wear Resistance

Minimal wear was observed on ***BruxZir*** restorations or on opposing tooth structure (Figure 3).

Retention

Three posterior crowns debonded (Figure 3). One was cemented with self-adhesive resin cement and two were cemented with an adhesive resin cement. Two of the teeth had short clinical crowns.

FIGURE 3 Ratings of ***BruxZir*** restorations at recall.



Four-unit bridge for teeth 18-21 at 15 months.

Conclusion

Ninety-eight percent of ***BruxZir Solid Zirconia Crowns and Bridges*** restorations manufactured by *Glidewell Dental Laboratories* received a 5 or excellent rating at 18-month recall. All of the single crowns and all of the three- and four-unit bridges had no evidence of fracture or chipping. One of two five-unit bridges failed shortly after cementation and was replaced. Over the 18-month period, ***BruxZir*** has proven to be an excellent restoration with respect to esthetics, resistance to fracture/chipping, resistance to marginal discoloration, wear resistance, and retention. ***BruxZir*** received a clinical rating of 98%.