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Clinical Handling Guidelines for Dentists and Labs —
For Clinical Experts from Clinical Experts

Lava™
Precision Solutions



Achieving Clinical Success with Lava™ Plus High Translucency Zirconia Restorations

3M ESPE

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Lava™ Plus Zirconia — Inspired by True Colors



The Lava brand integrates digital technology and material science in an intuitive way to help dentists and labs improve productivity while offering excellent oral care. Since its introduction in 2001, Lava™ Zirconia has become a huge success story. Lava Zirconia is well-known for its outstanding reliability, precision and beauty. More than eleven years of clinical history with millions of produced restorations as well as extensive scientific data prove this to be true.

With the Lava™ Plus High Translucency Zirconia system — the next generation of Lava Zirconia — translucency, color match and individualization are improved to reach a higher esthetic level. Now you have the ability to create highly characterized, color-infused all-zirconia restorations to meet your increased monolithic esthetic demands.

Lava™ Design 7 now fully integrates Lava™ Plus Zirconia for a full digital workflow. At the dental office, the 3M™ True Definition Scanner allows capture of the clinical situation in a digital scan. These digital extensions improve productivity, adding consistency and control to the workflow to further enhance the quality of Lava Plus zirconia restorations.

These added enhancements further enable dentists to serve their patient's clinical needs with Lava Plus high translucency zirconia. This preparation and handling guide has been designed for dentists and their dental labs — for clinical experts from clinical experts.

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Lava™ Plus High Translucency Zirconia Monolithic Crowns.
Complete shade range compared to VITAPAN® Classical Shade Guide.

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The highest esthetics for all-zirconia.

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Copings and Frameworks

Due to its excellent mechanical and optical characteristics, 3M™ ESPE™ Lava™ Plus Zirconia restorations can be used for a wide range of indications.



Fig. 1: Single Crowns



Fig. 2: Splinted Crowns[1]



Fig. 3: 3-unit Bridges



Fig. 4: 4-unit Bridges



Fig. 5: 5-unit Bridges[2]



Fig. 6: 6-unit Bridges[2]



Fig. 7: Curved and Long-span Bridges[2]



Fig. 8: Cantilever Bridges[3]
(excluded for patients with bruxism)



Fig. 9: Inlay Bridges and Onlay Bridges[4]
(excluded for patients with bruxism)



Fig. 10: Anterior Adhesive Bridges[4]
(excluded for patients with bruxism)



Fig. 11: 3-unit bridge with 2 implants

1) Splinted crowns up to 4 units

2) 5+ unit bridges (up to 48 mm) with a maximum of two pontics next to one another in the posterior area and a maximum of four pontics next to one another in the anterior area. (Only feasible with Lava™ Multi XL; in some regions Lava™ Multi XL is not available)

3) With a maximum of 1 pontics at the position of a premolar or incisor.

4) Tests have proven: Lava™ Plus Zirconia shows a sufficient strength for this indication. However, this type of indication overall can have a higher failure risk due to de-cementation and secondary caries regardless of manufacturer. Please refer to national and regional dental associations for more information

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Preparation for Monolithic Lava™ Plus All-Zirconia Restorations

With the introduction of Lava™ Plus High Translucency All-Zirconia Monolithic Restorations, clinicians can meet all their strength and esthetic needs. Lava Plus zirconia offers full flexibility in crown and bridge restorations.

In the past, Lava Plus zirconia has only been available as a fully veneered restoration. In addition, Lava Plus zirconia can be utilized as a full contour all-zirconia restoration, as partially veneered restorations or as restorations with zirconia occlusal stops. Lava Plus zirconia's finest qualities remain: Excellent marginal fit, outstanding strength, biocompatibility and natural color!

- Due to its high strength, Lava Plus all-zirconia monolithic restorations are suited for cases with only **limited inter-occlusal space**. Clinicians can provide a tooth-preserving restoration with as little as 0.5 mm occlusal reduction.
- With Lava Plus all-zirconia monolithic restorations, you can offer **patients with bruxism** a tooth-colored and strong restoration without porcelain overlay.
- With Lava Plus all-zirconia Monolithic restorations, a **highly esthetic tooth-colored replacement of metal-occlusal PFM or full-cast metal restorations** can be achieved.

Note: Wear behavior of monolithic Lava™ Plus All-Zirconia was thoroughly tested. Test results show that when compared to traditional veneering materials, polished and glazed zirconia surfaces exhibit less or comparable occlusal wear. As similar to full cast, non-precious metal restorations, the correct static and dynamic occlusion should be checked at each dental appointment.

Preparation Guidelines

Tooth preparations for monolithic restorations based on the dimensions indicated below are sufficient (Fig. 12 and 13). We recommend a matrix of the initial clinical situation to check the progress of the tooth preparation. Ideally, the preparation includes a circumferential continuous and clearly visible chamfer. Give the horizontal and vertical peraration an angle of at least 5°, but avoid bevelling. All occlusal and incisal edges should be rounded.

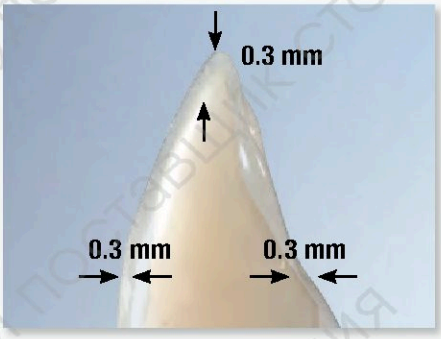


Fig. 12: Anterior crown: Minimum wall thickness of 0.3 mm.

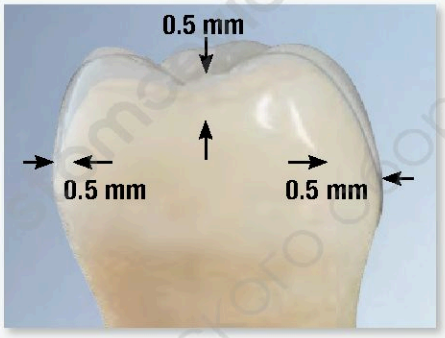


Fig. 13: Posterior crown: Minimum wall thickness of 0.5 mm.

Note: Wear tests have shown that polished Lava™ All-Zirconia surfaces were less abrasive to antagonist materials than veneering materials or glazed zirconia surfaces.

Photography created by **Dr. Carlos Eduardo Sabrosa, Rio de Janeiro, Brazil.** Modified for monolithic indications.

The wall thickness and connector cross-section requirements, as well as special and unacceptable preparation guidelines apply also for monolithic restorations.

Note: Similar to full cast, non-precious metal restorations Zirconia occlusal surfaces are not subject to any noteworthy abrasive wear. This must be considered when planning the therapy. Special attention must be paid to the design of the occlusal surface so that dynamic and static occlusion is correct. This should be checked regularly by a dentist, e.g., during preventive check-ups.

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Preparation for Veneered Lava™ Plus Zirconia Restorations

Many Procedures Remain the Same

With Lava™ Plus all-zirconia restorations, clinicians can provide high-quality restorations to patients. In addition to natural esthetics and durability, Lava Plus all-zirconia restorations also stand out for their excellent fit. Due to the high strength of Lava Plus zirconia, the usage is very similar to PFM and easier than glass ceramic materials. In this brochure, we provide you with important clinical tips and tricks to facilitate the utmost quality, esthetics and durability for you and your patients.



Upper left canine: Courtesy Dr. Seto, Japan

Flexibility in Preparation

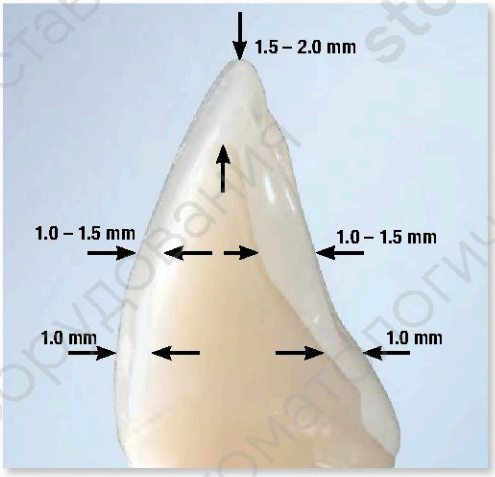
Lava Plus restorations have a substructure made of zirconia. This strong material does not require an aggressive shoulder to support the framework or to enhance the esthetics. The margins may be thinly tapered as the Lava framework is strong enough to allow for thin walls. Space for an opaque layer is not required because discolored teeth can also be sufficiently covered by Lava Plus zirconia.

Due to the tooth-colored framework, supra-gingivial margins provide more flexibility with preparation requirements. Easier control of the preparation, easier impressioning and easier cementation are all benefactors of this flexibility. Because the restorations are metal-free, darkening at the margin is not an issue — even after extended clinical service or periodontal therapy. This makes it easy to maintain optimal gingival esthetics.

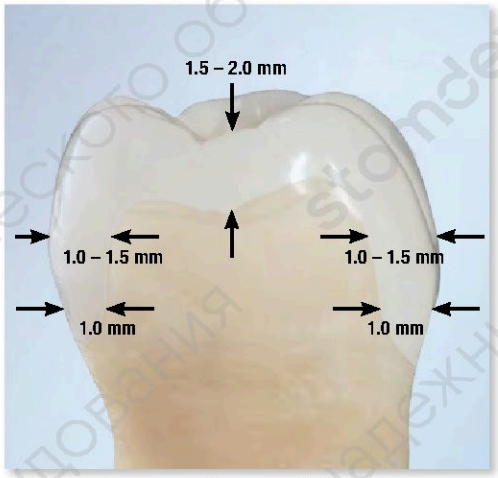
Ideal Preparation: Shoulder or Chamfer?

A reduction of the tooth structure based on the dimensions indicated below is sufficient. We recommend a preparation matrix of the initial clinical situation in order to check the progress of the tooth preparation. Ideally, the preparation includes a circumferential shoulder or chamfer with a horizontal angle of at least 5°. The vertical preparation angle should be at least 4°. The inside angle of the shoulder preparation must be given a rounded contour. All occlusal and incisal edges should also be rounded.

The marginal edge of the preparation needs to be continuous and clearly visible. A bevel should be avoided.



Recommended preparation for anterior teeth.



Recommended preparation for posterior teeth.

Photography created by
Dr. Carlos Eduardo Sabrosa,
Rio de Janeiro, Brazil.

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Special Preparations



Feathered Margin Preparation: Steep feathered margin preparations may result in extremely thin tapered margins. In principle, this type of preparation is possible, but caution is advised.

Preparation samples and photography shown on pages 6–9 created by **Dr. Carlos Eduardo Sabrosa, Rio de Janeiro, Brazil.**

Remember: Due to the outstanding strength of Lava™ Plus Zirconia, in clinical cases with very limited space, occlusal reduction can be as low as 0.5 mm for monolithic Lava Plus All-zirconia.

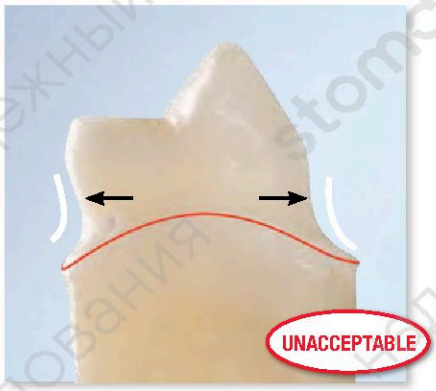
Unacceptable Preparations



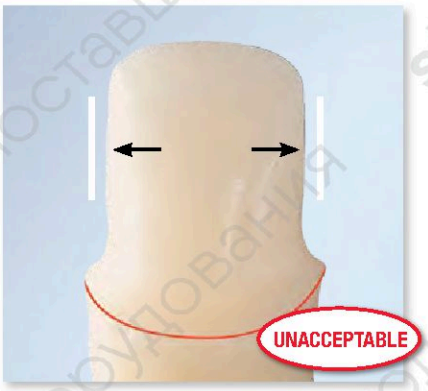
Gutter Preparation: Margin cannot be detected clearly.



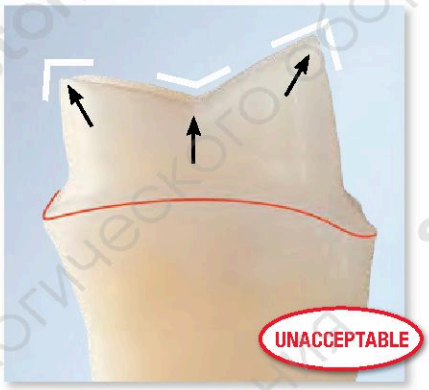
90° Shoulder: Margin cannot be detected clearly.



Undercuts must be avoided.



Parallel wall preparations result in a cement gap that cannot be milled. This may significantly affect the fit. A 5° taper should be used.



Sharp incisal-occlusal edges must be avoided. The rounding radius should be > 0.4 mm.



Bridges with inclined teeth cannot be achieved due to the restricted path of insertion.

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Preparation for Lava™ Plus Zirconia Adhesive Bridges

Adhesive and inlay bridges have the advantage of being minimally invasive. This makes these restorations an attractive option for young people with healthy dentition. In addition, anterior adhesive bridges show a lower occurrence of post-operative sensitivity. However, these restorations are associated with a higher risk of failure in comparison to conventional FPDs (Priest, 1996). These indications have to be carefully considered for each clinical situation. Recommendations of the national or regional dental associations should be followed.

Anterior Adhesive Bridges

Tooth preparation has an influence on the survival of the restoration. In the case of adhesive bridges ("Maryland" bridges) retentive elements should be prepared (e.g. seating groove and pinhole (M. Behr and A. Leibrock, 1998, El Mowafy 2003, Kern (2005), see dental textbooks). A total lingual surface bond will most certainly result in adhesive failure. Some attempt to create a proximal bond will contribute to adhesion success.

The teeth to be restored with a Lava™ Plus Zirconia adhesive bridge should be prepared according to the following instructions. In general, rounded edges (minimum radius ≥ 0.4 mm) and clear margins are required for full ceramic restorations.

Preparation depth: Minimum 0.5 mm to ensure optimal strength. The preparation margin needs to be in enamel. The enamel thickness of a tooth can vary from 0.4 to 1.0 mm (W. Kullmann 1990). All prepared radius have to be ≥ 0.4 mm, all prepared angles have to be ≥ 2°.

Wall thickness of zirconia framework: 0.5 mm minimum to ensure sufficient strength.

If the preparation depth can not be obtained with the minimum wing thickness of 0.5 mm due to insufficient enamel thickness, the dentist should re-evaluate this indication. We recommend the use of a preparation matrix to check preparation depth.

For the preparation of retentive elements see Figures 1 to 3 (e.g. pinholes, seating groove).

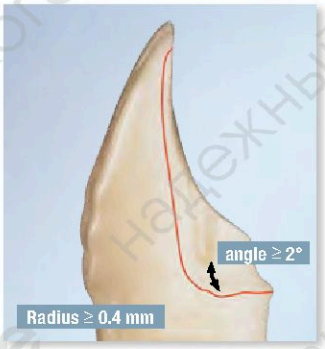


Figure 1: Rounded angles (Radius ≥ 0.4 mm, no sharp edges), clear margin and horizontal angle ≥ 2°.



Figure 2: Retentive element: rounded ridge (Radius ≥ 0.4 mm).

In comparison to a 3-unit adhesive bridge (fixed-pontic-fixed), a cantilever 2-unit adhesive bridge (fixed-pontic) design is even more conservative, since only one abutment tooth needs to be prepared. The risk of unnoticed debonding and consecutive secondary caries is low. However, debonding of a single retainer adhesive bridge could directly lead to loss or swallowing/aspiration of the restoration. In general, clinical studies show a better survival rate of 2-unit cantilever bridges. When considering adhesive bridges, the recommendations of national or regional dental association need to be followed.

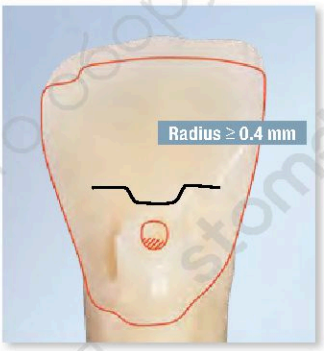


Figure 3: Retentive element: rounded pinhole (no sharp edges, radius ≥ 0.4 mm).

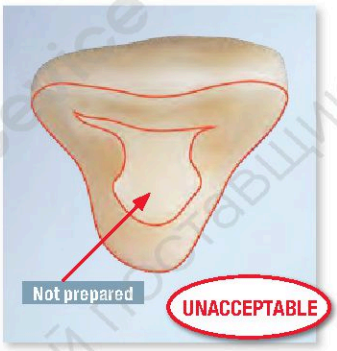


Figure 4: Unprepared enamel in the tooth middle creates two separate preparation margins on one tooth. These cannot be detected by the system.

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Preparation for Lava™ Plus Zirconia Inlay Bridges

Full ceramic preparation in general requires rounded angles (no sharp edges, minimum radius ≥ 0.4 mm). The margins must be clearly indicated. The maximum length of the pontic to replace a missing tooth is 10 mm.

Preparation depth: 2–4 mm; It is important to have sufficient space for a connector of 9 mm². The preparation should have a taper of ≥ 2° to 3° without any friction.

Wall thickness of zirconia framework: ≥ 0.5 mm

Remember: Adhesive and inlay bridges are more complex to manufacture. The path of insertion is extremely critical in the design phase. With these restorations, it is very important to follow preparation guidelines to avoid inferior marginal adaptation and lengthy manual fitting efforts after milling.

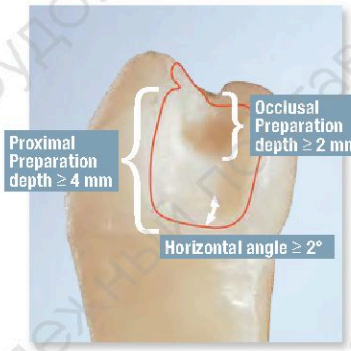


Figure 5: Proximal view of inlay preparation.



Figure 6: Occlusal view of inlay preparation.



Figure 7a: Additional lingual or vestibular wings: extension on the level of the tooth equator or above.

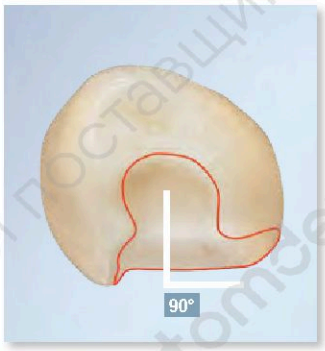


Figure 7b: In the case of vestibular and oral wings in addition to the inlay cavity, the wings can be processed by the Lava system maximally to a 90° angle at the inlay preparation (see figure 7a + 7b).

References:

Behr M, Leibrock A et al Clin Oral Invest 1998

El-Mowafy, Omar (2003) Resin-Bonded fixed partial denture as alternative to conventional fixed treatment, The Inter J Prosthodontics, 16, 60–70

Goodacre CJ et al. (2003) The journal of Prosthetic Dentistry 90, 1, 31–40

Kern (2005) Einfügelige Adhesivbrücken und Adhäsivattachments- Innovation mit Bewährung, ZM 95, 21, 54–60

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Zalkind M., Ever-Hadani P., Hochman N. (2003) Resin-bonded FPD retention: a retrospective 13 years follow-up, J Oral Rehabil 30, 10, 971–977

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Initial: Missing tooth 26, insufficient occlusal amalgam filling at tooth 27, single implant therary neglected.



Therapy: Minimal invasive preparation for a 3-unit Lava™ Zirconia Inlay Bridge at teeth 25 and 27 to replace tooth 26.



Final: 3-unit Lava Zirconia™ Bridge, occlusally veneered at teeth 25 and 27, fully veneered at pontic 26.

Courtesy of Prof. Dr. Karl-Heinz Friedl and Dr. Katrin Friedl, Regensburg, Germany

Note: These indications have to be carefully considered for each clinical situation. Recommendations of the national or regional dental associations should be followed.



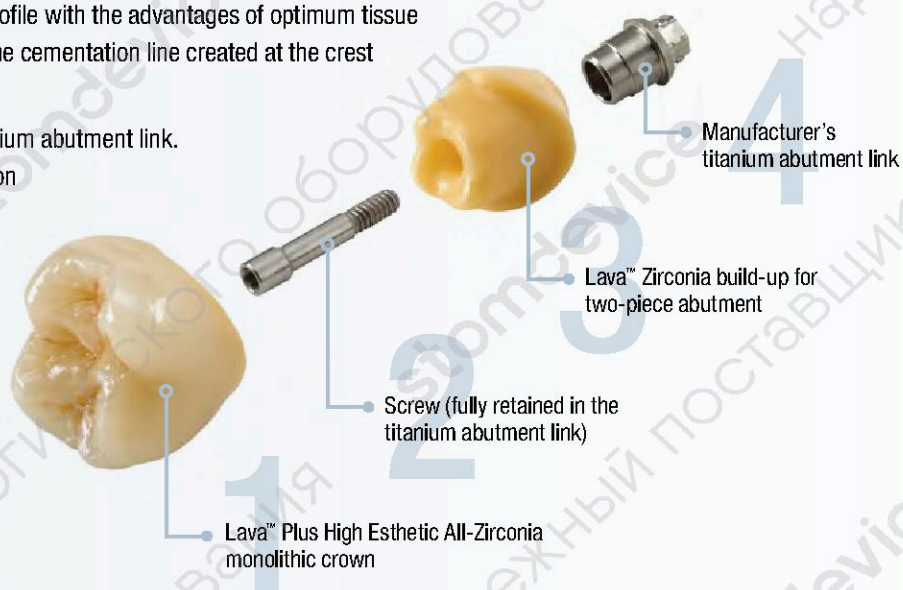
Lava™ Plus Zirconia Build-up for Two-piece Abutments

Lava Plus zirconia build-up for two-piece abutments is compatible with most implant systems available. By sending an implant level impression to your lab, you will receive a custom implant abutment which is perfectly shade-matched to your Lava Plus restoration.

Compared with a traditional titanium stock abutment, Lava Plus zirconia for two-piece abutments, allow a customized CAD designed emergence profile with the advantages of optimum tissue management and natural appearance down to the cementation line created at the crest of the gingiva.

The Lava Plus zirconia top is cemented to a titanium abutment link. This provides a reliable metal-to-metal connection between the screw and abutment. Because the screw does not torque directly into the zirconia material, dentists can follow standard recommendations for torque forces on the screw and abutment.

With the custom design of this abutment, a Lava Plus restoration combined with the new Lava Plus Effect Shades kit can provide a highly esthetic restoration with many options, including white and pink tissue esthetics as well as fluorescence shades for implant restorations. Fluorescence is important to mimic the optical properties of natural dentin by brightening surrounding tissue.



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Impressioning...

...the Traditional

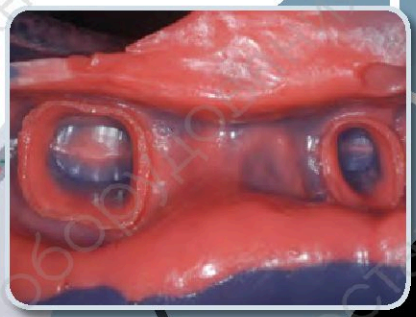


Accurate impressioning is one of the key success factors to a superior restoration. 3M ESPE offers a wide range of impression materials and techniques to ensure this important clinical step is precise, easy and productive.

Traditional Impression

From Impregum™ Soft Polyether Impression Material to Imprint™ VPS Impression Material — delivered by the Pentamix™ Automatic Mixing System or Garant™ Dispenser





Impression of the clinical situation with Impregum™ Impression Material

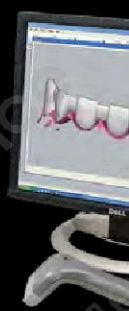


Sectioned gypsum model made by laboratory

Preciso™ S200 Scanner

To digitize the clinical situation, the dies of a gypsum model are scanned with a non-contact white light fringe pattern. Manually created wax-ups can also be scanned.





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3M™ ESPE Retraction Paste

The innovative retraction paste sets another milestone: it is a simple and effective means of gingival retraction. Because of the capsule's fine tip, the astringent retraction paste can easily be inserted right where it belongs — directly into the sulcus.



or Digital Way





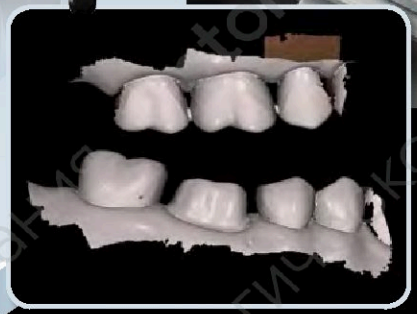
Digital Impression

Capturing the digital impression with the 3M™ True Definition Scanner and transmission of the data to an authorized laboratory.

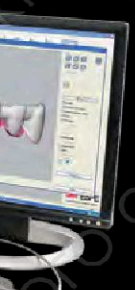




Digital impression of the clinical situation with 3M™ True Definition Scanner



Virtual model from the 3M™ True Definition Scanner



Lava™ Design 7 / Preciso™ CAD Software

Digitally design the optimal restoration. The software is able to automatically define the overall preparation margin and block out any undercuts.

Framework Requirements of Lava™ Plus Zirconia Restorations

Wall Thickness and Connector Design

You can determine the thickness of the framework wall to fit your needs. The minimum wall thickness is 0.5 mm for bridges and posterior crowns and 0.3 mm for stand-alone anterior crowns. The minimum connector cross section depends on the bridge position and the number of pontics. These thicknesses have been tested and verified as sufficiently strong by 3M ESPE.

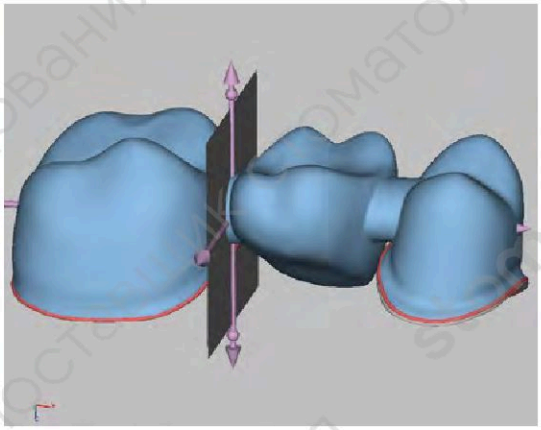
Wall Thickness and Minimum Connector Cross Section

Indication	Anterior Restoration		Posterior Restoration	
	Wall Thickness	Connector Cross Section	Wall Thickness	Connector Cross Section
Single Unit	0.3 mm	n/a	0.5 mm	n/a
3-unit Bridge	0.5 mm	7 mm²	0.5 mm	9 mm²
4-unit Bridge	0.5 mm	7 mm²	0.5 mm	9/12/9 mm²
6-unit Bridge with 4 pontics	0.7 mm	10 mm²	—	—

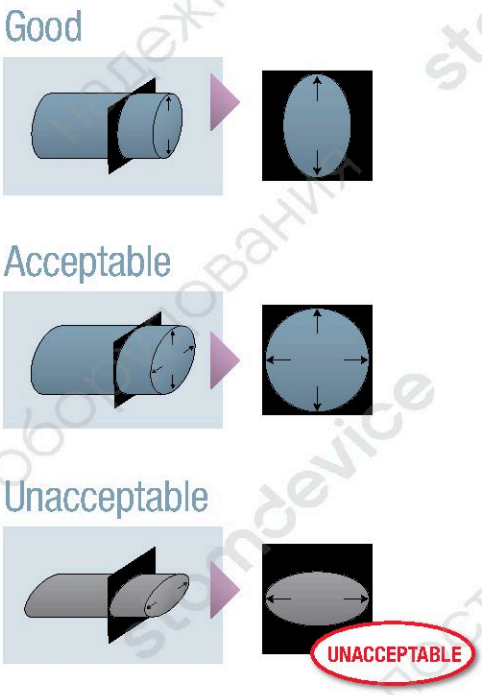
Remember: For special indications, please contact your laboratory or milling center or check the Instructions for Use.

Connector Cross Section Design

As with any framework material, along with the size of the minimum connector cross section, the connector shape is also a crucial parameter for the longevity of the bridge frameworks.



Cross section tool in Lava™ Design Software is used to check proper parameters.



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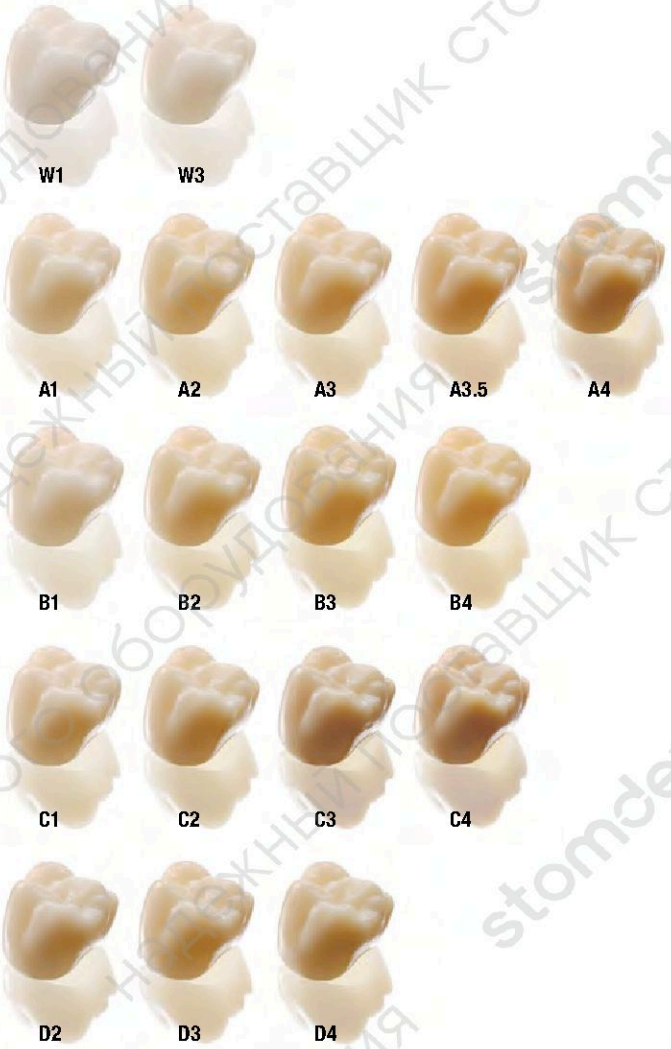
Lava™ Plus Zirconia Finishing and Shading — The Widest Range of Dyeing Liquids

Excellent match to VITA® Classical Shade Guide.

Lava™ Plus High Translucency Zirconia is the only zirconia system on the market that matches the VITA classical shade guide A1 – D4 including the bleached shades.

Unique conversion to VITA® SYSTEM 3D-MASTER® Shade Guide.

Lava Plus High Translucency Zirconia is the only system on the market that features direct conversion to the most common VITA SYSTEM 3D-MASTER Shades.



True Colors — You Get What You Order

Lava™ Plus system helps you hit the mark.

With many shading systems, a lot of trial and error is required to successfully match colors.

The Lava Plus system, by contrast, gives you accurate and reliable results without any additional tools. The precise color match of the eighteen pre-mixed Dyeing Liquids ensures predictable and precise results.



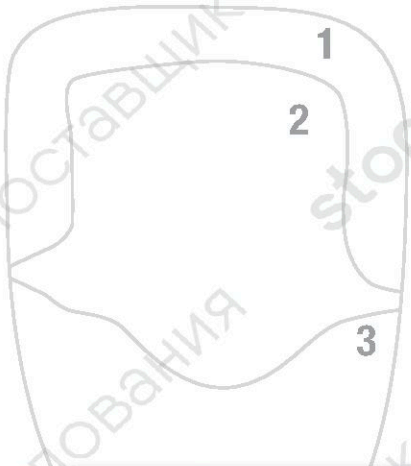
Sliced pontic of monolithic zirconia 3-unit bridges, A4 shaded according to instructions for use of manufacturer. From Left to Right: Crystal™ HS, VITA® In-Ceram® YZ, Lava™ Plus High Translucency Zirconia.

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Easy Shading Procedure — Predictable and Precise Results

The unique Lava™ Plus Color Markers — full control over custom shading.

Lava™ Plus Dyeing Liquids enable you to achieve any shade and any shade gradient, especially in the custom shading technique. For utmost precision and ease, Lava™ Plus Color Markers can be added to the Dyeing Liquid to visualize application on the pre-sintered restoration. Color Markers burn out by sintering and become invisible.



1



Coloring of the Dyeing Liquid with the red Lava Plus Color Marker.

2



Perfect visual control of the colored Dyeing Liquid application.

3



Full precision with the unique Color Marker.

Lava Plus Effect Shades — tools to help bring individual artistry into every restoration.

CHROME AND COBALT FREE!



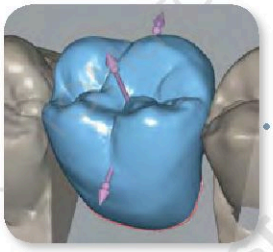


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Veneering of Lava™ Plus Zirconia Restorations

3M ESPE offers a wide range of veneering techniques in order to fulfill the special requirements that every individual clinical situation brings. If utmost esthetics are demanded (e.g. in the anterior), the traditional hand-layered technique is applied to allow a restoration that perfectly mimics nature (see Path 1). If the clinical situation requires outstanding strength (e.g. bruxism) or when there is very limited inter-occlusal space, Lava Plus All-Zirconia monolithic restorations with occlusal stops in zirconia, partially veneered or monolithic restorations are utilized (see Path 3). In case of monolithic Lava Plus all-zirconia restorations, zirconia surfaces must be polished or glazed.

Various Veneering Options for Lava™ Plus Zirconia Framework



Design Full Contour



Anatomical Lava™ Plus Zirconia Coping Ready for Porcelain Work

1



Hand-layered:
Traditional Porcelain

2



Pressed:
Milled Wax Pattern, Pressable Ceramics

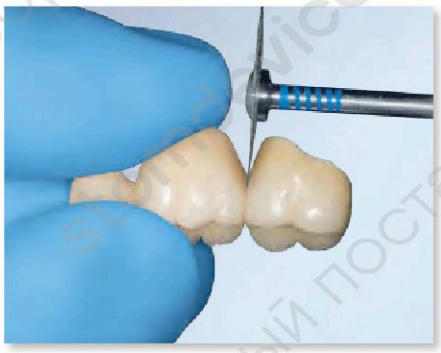
3



Lava™ Plus All-Zirconia Monolithic Options:
Partially veneered, glazed or simply polished, or fully veneered with zirconia stops only

Interdental Separation of a Veneered Bridge

In order to achieve a natural look and a healthy proximal design, diamond separation cutters are utilized. It is strongly recommended not to cut into the framework in the interdental area as this may affect the durability of the final restoration. If the framework is inadvertently damaged during separation, this area must be polished. Diamond-impregnated rubber polishers, discs or cones, are utilized for this purpose.



Interdental separation with a separation disk. Beware of cutting into the framework. Created by Dr. Carlos Eduardo Sabrosa, Rio de Janeiro, Brazil.

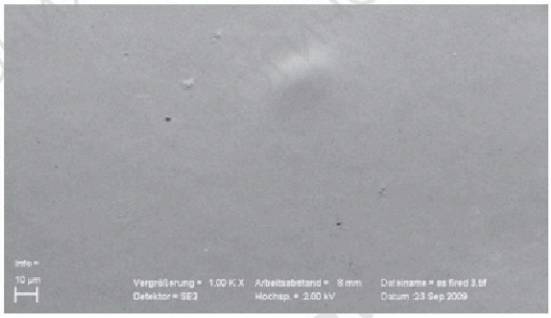
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Intraoral Handling of Lava™ Plus Zirconia Restorations

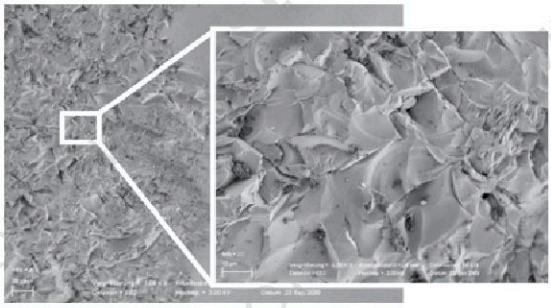
If minor intraoral adjustments are necessary, a fine diamond bur and copious amount of water should be used to remove contact points. Use a rubber polishing set to smooth the ceramic surface afterwards. For the mandatory high-shine polishing step, a diamond polishing paste and a suitable polishing brush finalize the area of adjustments.

In the following SEM pictures, you can see the surface damage that will be introduced by the use of a diamond bur. The smooth surface can be restored by re-polishing the damaged surface as described above.

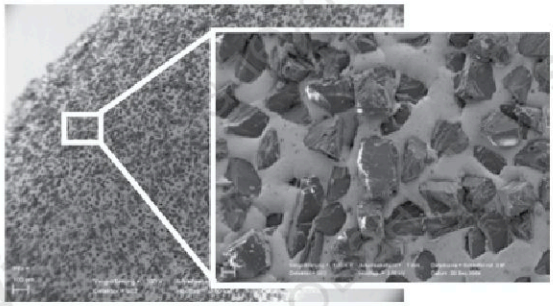
If larger corrections of a veneered restoration are necessary, try-in and corrective measures are recommended.



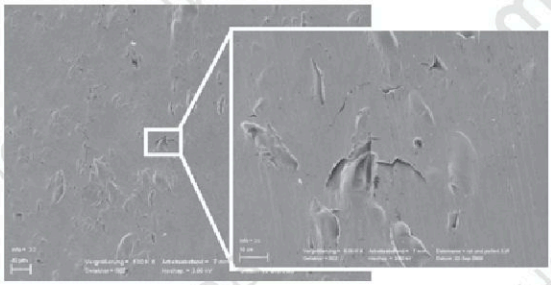
SEM Image of as-fired Porcelain Surface



Surface Damage after using Red Ring Diamond Bur



SEM Image Red Ring Diamond Bur



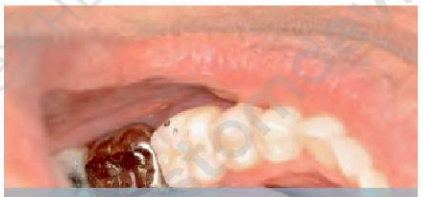
3-step Polishing after using Red Ring Diamond Bur

Sometimes, endodontic access of a Lava Plus zirconia restoration is necessary. In this case, a coarse new diamond bur should be used to create access to the pulp. During the opening process of the zirconia restoration, intense water cooling is crucial to avoid heating. Please ensure adequate amounts of water always coat the rotating instrument.

If the removal of a Lava Plus zirconia restoration is necessary, use a new conventional rotating diamond tool and adequate water cooling to introduce a slit and lift the restoration with a common dental office chisel as an aid to pull off the restoration.

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Step by Step — Adjustment and Polishing of Lava™ Plus All-Zirconia Crown

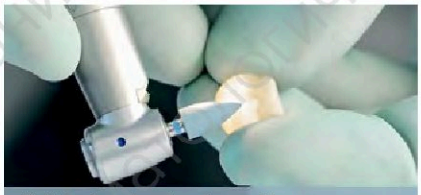
1

Supracontact on Lava™ Plus All-Zirconia Crown.

2

Intra-oral occlusal adjustment with finishing diamond and copious water.

3

Pre-polish of occlusal surface with coarse ceramic polisher.

4

Polish of occlusal surface with medium-fine ceramic polisher.

5

Polish of occlusal surface with super-fine ceramic polisher.

6

High surface gloss indicates perfect polish.

Endodontic Access and Zirconia Restoration Removal.

If endodontic access through a Lava restoration is necessary use a new coarse diamond bur to open the crown. During the opening process, intense water cooling is crucial to avoid heating. Ensure adequate amounts of water always coat the rotating instrument.

Zirconia-indicated crown cutter



Komet 4ZR.314.018

Example of zirconia-indicated crown cutter.

For Lava restoration removal, use a new crown cutter and adequate water cooling to introduce a cutting slot in the axial direction. Use moderate pressure to extend the slot over the occlusal surface to the oral side. Sparks may be observed while cutting through zirconia. Lift the restoration with a common dental office chisel to pull off restoration. Sometimes additional slots and changing diamond burs are necessary for complete removal.

Discolored teeth.

The esthetic result of a restoration, especially in the anterior region, will be compromised if darker underlying structures shine through. To prevent a grayish appearance of the restoration from the inside, various measures can be applied.

- Bleaching of endodontically treated discolored teeth
- Core build-up with tooth-colored restorative materials
- Masking cements
- Lava Plus zirconia with thicker walls and/or veneered with veneering porcelain
- Tooth-colored Lava Plus zirconia build-up for two-piece abutments
- Opaque layer on titanium abutments.

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Indications Overview for Lava™ Plus High Translucency Zirconia

Indications	Lava Plus High Translucency Layered Zirconia		Lava Plus All-Zirconia	Recommended Cement
	Hand-layered Veneering	Pressed-over Veneering	Full-contour	
Crowns (anterior and posterior)	●	●	●[1]	RelyX™ Unicem 2 Self-Adhesive Resin Cement
Splinted crowns[2] 	●	●	●[1]	RelyX™ Unicem 2 Self-Adhesive Resin Cement
3-4 unit bridges 	●	●	●[1]	RelyX™ Unicem 2 Self-Adhesive Resin Cement
Long-span and curved bridges (up to 48 mm)[3] 	●	●	●[1]	RelyX™ Unicem 2 Self-Adhesive Resin Cement
Cantilever bridges[4] 	●	●	●	RelyX™ Unicem 2 Self-Adhesive Resin Cement
3-unit Inlay and onlay bridges[5] 	●	●	●	RelyX™ Ultimate Adhesive Resin Cement
Anterior adhesive bridges (Maryland bridges)[5] 	●	●	●	RelyX™ Ultimate Adhesive Resin Cement
Primary Crowns 	N/A	N/A	●	RelyX™ Unicem 2 Self-Adhesive Resin Cement
Crowns on implants 	●	●	●	RelyX™ Unicem 2 Self-Adhesive Resin Cement
3-unit bridges on 2 implants 	●	●	●	RelyX™ Unicem 2 Self-Adhesive Resin Cement
Zirconia build-up for two-piece abutments 	N/A	N/A	●	RelyX™ Unicem 2 Self-Adhesive Resin Cement

1. Indicated for patients with bruxism
2. Splinted crowns up to 4 units
3. 5+ unit bridges (up to 48 mm) with a maximum of two pontics next to one another in the posterior area and a maximum of four pontics next to one another in the anterior area. (Registration pending in Canada.)
4. With a maximum of 1 pontic at the position of a premolar or incisor
5. Tests have proven: Lava™ Plus Zirconia shows a sufficient strength for this indication. However, this type of indication overall can have a higher failure risk due to adhesion failure and secondary caries regardless of manufacturer. Please refer to national and regional dental associations for more information

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Cementation of Lava™ Plus Zirconia Restorations

Lava™ Plus Zirconia restorations can be cemented in various ways: By using conventional cements or by using adhesive or self-adhesive cements. For detailed information please see the appropriate Instructions for Use of the respective cements.

Conventional Cementation

Due to the outstanding strength of Lava Plus zirconia frameworks, adhesive cementation is not mandatory. Lava Plus restorations can be conventionally cemented. Before cementation, blast the interior surfaces of the crowns with aluminum oxide ≤ 50µm and thoroughly clean the restoration with alcohol. For detailed cementation information, please see the dedicated Instructions for Use of the respective cement.

Adhesive Cementation

If Lava Plus zirconia frameworks are to be adhesively bonded, please be aware that zirconia cannot be etched with HF acid or silanized only with a silane coupling agent. Pretreat the Lava Plus zirconia restoration using a zirconia primer or silicatize/silanize (Rocatec™/CoJet™) the surface prior to adhesive cementation. Scotchbond™ Universal Adhesive contains both silane and MDP (methacryloyloxydecyl dihydrogen phosphate) monomers which acts as a primer for bonding to glass and zirconia.

Remember: Before working with Lava™ Plus Zirconia, RelyX™ Unicem 2 Self-Adhesive Resin Cement, RelyX™ Ultimate Adhesive Resin Cement, Cojet™ Silicate Ceramic Surface Treatment System and Sof-Lex™ Finishing and Polishing Discs, please refer to the respective Instructions for Use.

Pre-treatment of Lava™ Plus Zirconia with Scotchbond™ Universal Adhesive

1



Sandblast with aluminum oxide grain size ≤ 50µm.

2



Clean with alcohol and dry with air.

3



Apply Scotchbond™ Universal Adhesive to the bonding surface of the restoration and rub it in for 20 seconds.

4



Air thin with oil and moisture-free air for 5 seconds until the solvent is evaporated and the resin no longer flows over the surface.

For Dentists: 3M ESPE also recommends CoJet™ Silicate Ceramic Surface Treatment System for pre-treatment of restoration surface.



For Labs: 3M ESPE recommends using Rocatec™ Soft 30µm blasting media used with the Rocatec™ Junior Bonding System for pre-treatment of restoration surface.



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Resin-Bonded Cementation of Adhesive ("Maryland") and Inlay/Onlay Bridges with RelyX™ Ultimate Adhesive Resin Cement:

Indications such as Adhesive ("Maryland") and Inlay/Onlay bridges (resin bonded bridges) demand especially high adhesive bond strength. Regardless of the manufacturer of the cement and restoration, these indications may be exposed to a higher risk of adhesion failure. To achieve an optimal result, abutment teeth must have an adequate enamel surface for bonding. They should be healthy or only slightly restored and the periodontal conditions should be good. It is the sole responsibility of the dentist to ensure proper selection of indication and technique. The guidelines of the relevant national professional associations must be observed for such indications.

Pretreatment of Lava™ Plus Maryland and Inlay/Onlay Bridges:

- If the restoration is to be tried in, this must be done before the Cojet™ silicatization/silanization steps described below.
- Coat (silicate) the zirconia restoration surface to be luted with a micro-blasting device and the blast-coating agent CoJet™ Sand from a distance of 2–10 mm and vertically to the surface for 15 seconds.
- Blow away any residues of the blasting agent with water-free and oil-free air.
- Apply Scotchbond™ Universal Adhesive over the entire surface to be luted. Rub in for 20 seconds before blowing a gentle stream of air over the liquid for about 5 seconds.
- As an alternative, a suitable silane can be used in accordance with the Instructions for Use.
- Apply RelyX™ Ultimate Adhesive Resin Cement in accordance with the Instructions for Use.

Etching of the Tooth Structure:

- Use a rubber dam and keep the cavity free of any contamination during cementation.
- Apply Scotchbond™ Universal Etchant gel to enamel and/or dentin and allow to react for 15 seconds.
- Rinse thoroughly with water.
- Dry with water-free and oil-free air or with cotton pellets; do not over dry.
- Avoid any contamination of etched surfaces. **IF** contamination occurs, repeat the etching, rinsing and drying.
- Continue immediately with the application of Scotchbond Universal Adhesive.

For additional information please see Instructions for Use for RelyX Ultimate cement and CoJet Sand.

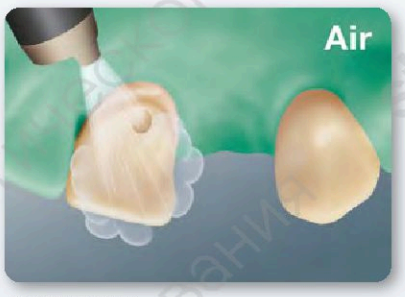
Maryland and Inlay/Onlay Bridge

1



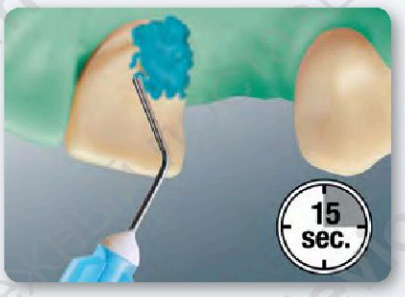
Rinse with water to remove loose preparation debris.

2



Lightly air dry.

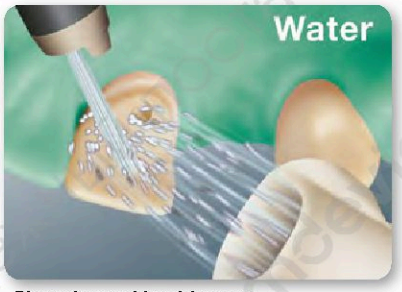
3



Apply etching gel and allow to react for 15 seconds.

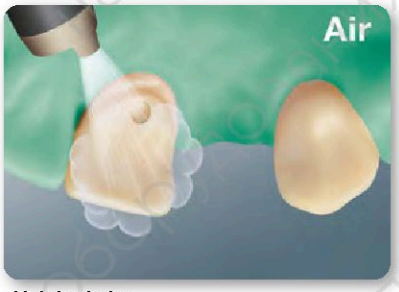
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4



Rinse thoroughly with water.

5



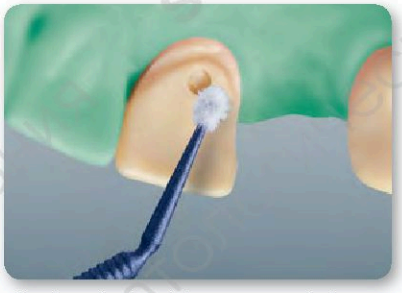
Lightly air dry.

6



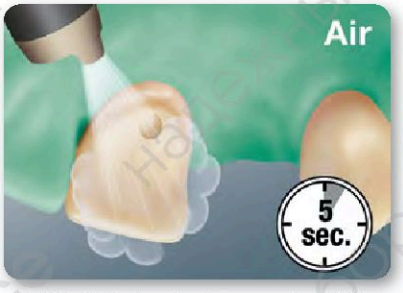
Apply Scotchbond™ Universal Adhesive and rub it in for 20 seconds.

7



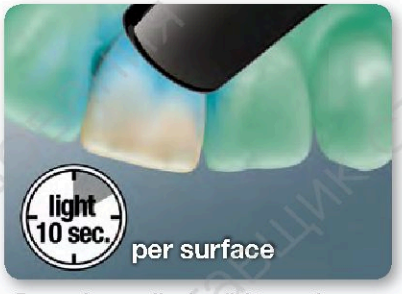
Use dry microbrush to remove pooled adhesive.

8



Lightly air dry for about 5 seconds until the adhesive no longer moves.

9



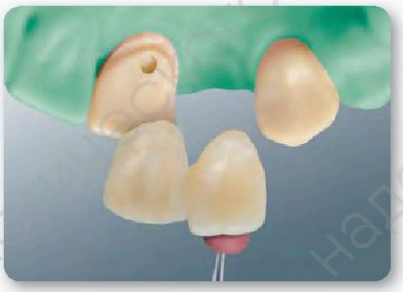
For maximum adhesion, light cure the adhesive for 10 seconds.

10



Apply cement evenly to the entire surface of the restoration.

11



Seat the restoration and stabilize long enough for the cement to fully set.

12



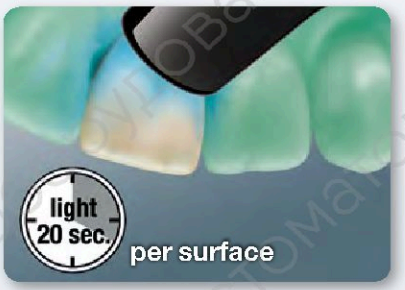
Removal of Excess: Option 1 — While holding the restoration in place, remove excess using a sponge pellet or floss. Cover margins with glycerine gel.

or



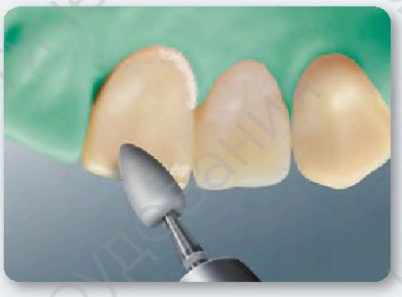
Removal of Excess: Option 2 —While holding the restoration in place, remove excess cement after brief tack light cure for 1 second (hand waving technique).

13



Light cure 20 seconds per surface or if self-curing wait 6 minutes after start of mixing.

14



Finish and polish.

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Cementation of Crowns and Bridges with RelyX™ Unicem 2 Self-Adhesive Resin Cement

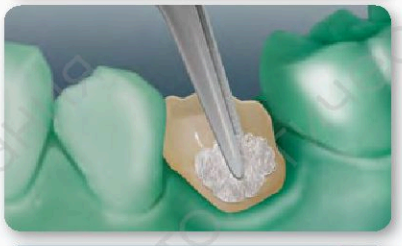
1



Try-in of Lava™ Plus Restoration

- Try-in Lava Plus restoration to check fit and color match.
- Carefully mark contacts.
- Remove undesired contacts with red ring diamond if necessary. (30µm grain, water cooling and turbine; perfectly smooth and polish afterwards)

2



Cleaning Step Intraoral

- Clean the prepared abutment/cavity thoroughly with pumice slurry, rinse with a water spray and lightly air dry or use cotton pellets to dry it off. Do not over dry.
- Do not use H_2O_2 (hydrogen peroxide) or substances such as desensitizers, disinfectants, astringents, dentin sealants, rinsing solutions containing EDTA, etc., after the final cleaning with pumice slurry and water.
- Take care for adequate blood and saliva control. Do not use ferrous liquids for blood control.

3



Cleaning Step Extraoral

- Sandblast inner Lava restoration with aluminum oxide AL_2O_3 <=50µm, 2bar.
- Clean inner Lava restoration surface with alcohol and dry with water-free and oil-free air.

4



Application of RelyX™ Unicem 2 Self-Adhesive Resin Cement

- Apply according to Instructions for Use.

5



Excess Removal

- Remove excess cement after brief light exposure ("tack cure", ~ 2 sec with a conventional polymerization device) or during self-hardening (starting 2 min [2:30 min for RelyX™ Unicem 2 Automix Self-Adhesive Resin Cement] after beginning of mixing in the "gel phase").
- During excess removal use a suitable instrument to hold restoration in place.

6



Curing Step

- Light cure 20 seconds per surface or if self-curing, wait 6 minutes after start of mixing.

7



Polishing Step

- Remove any remaining uneven areas on the edges of restorations and polish the marginal area with diamond polishing devices, aluminum oxide coated discs (e.g. 3M™ ESPE™ Sof-Lex™ Discs), and polishing paste.
- If occlusion was adjusted, polish these areas with ceramic rubber burs, ceramic polishing paste and adequate brush to a smooth and shiny surface.

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3M ESPE Customer Care Center: 1-800-634-2249 **Visit www.3MESPE.com/lava for more information**

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