

CLINICAL CHEAT SHEET

Dental Ceramic Materials

Material selection, preparation, and chairside troubleshooting

ONLAYS — LITHIUM DISILICATE (E.MAX)

For teeth with fractured cusps and existing large restorations.

Preparation	Cap cusps taller than 3 mm; bevel the margin; leave the marginal ridge un-prepared (preserve the ridge); block out undercuts with flowable.
Burs	1.5 mm depth-cutting bur; occlusal reduction bur (Komet 370-035 is nice, other barrel-shaped burs work); flame-shaped diamond to connect the interproximal and buccal/lingual margins.
Temporization	Telio Onlay (Ivoclar). If there are no neighboring teeth, spot bond.
Checking contacts	Interproximal: Sharpie. Intaglio: Pasta Rosa (Anexdent) or Tanaka Bite-X red.

OCCLUSAL REDUCTION

RESTORATION	OCCLUSAL REDUCTION	WITH DIE SPACER
Cemented lithium disilicate (e.max)	1.5 mm	+0.2 mm
Bonded lithium disilicate or cemented 4/5Y zirconia	1.0 mm	+0.2 mm
Cemented 3Y zirconia	0.8 mm	+0.2 mm

GENERATIONS OF ZIRCONIA

GRADE	YTTRIA	CUBIC	OPTICAL / MECHANICAL PROFILE	EXAMPLES
3Y	5.2 wt%	~0%	High strength, opaque	BruxZir, Lava Plus, ZirCAD LT, Katana HT
4Y	7.1 wt%	25%	Intermediate strength and translucency	ZirCAD MT, Katana STML
5Y	8.8 wt%	50%	High translucency, low strength	Lava Esthetic, BruxZir Anterior, Katana UTML

RESTORATION DESIGN BY INDICATION

RESTORATION	MATERIAL	DESIGN NOTES
Resin-bonded bridge	Porcelain fused to zirconia	One wing — wing on the central for a missing lateral. Connector 2 mm (facial–palatal) × 3 mm (incisal–gingival).
Posterior bridge	3Y zirconia	Connectors 3 mm tall. Do not disc the gingival embrasure.
Anterior crown	Monolithic e.max or 5Y, or porcelain fused to zirconia	Use layered 3Y zirconia for a discolored tooth or when occlusal reduction is limited.
Anterior bridge	Porcelain fused to zirconia, or monolithic 4/5Y	3Y with coping extended to the incisal, or monolithic 4Y zirconia.

CHAIRSIDE TROUBLESHOOTING

SITUATION	WHAT TO DO
Removing zirconia / e.max	4ZR (Komet); NeoDiamond 1116Z (Microcopy).
Build-ups under universal adhesives	Activa (Pulpdent); Evanesce Bulk Cure (Clinician's Choice); Bulk EZ (Danville).
Preventing anterior staining	Use aluminum chloride (ViscoStat Clear, Hemodent) instead of ferric sulfate (ViscoStat). If ferric sulfate is used, clean the tooth afterward with 10% EDTA or 2% chlorhexidine.
Removing anterior staining	Bleach and hydrogen peroxide will remove the stain, but it can return with further microleakage. Sandblasting removes it permanently.
Cleaning cement off a debonded e.max restoration	Sandblast with glass beads (Rolloblast, Renfert); if unavailable, sandblast with alumina.

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Guide to Ceramic Bonding

Cementation vs. bonding, surface treatment, and chairside protocol

CONVENTIONAL CEMENTATION [RMGI CEMENTS (FUJICEM, RELYX LUTING)]

Easier, faster, moisture tolerant, and releases fluoride.
No cleaner (Ivoclean) or primer (Monobond) is needed.

BONDING

Increases retention and reinforces the strength of the ceramic.

Laboratory surface treatment

CERAMIC	LABORATORY SURFACE TREATMENT
Lithium disilicate (e.max)	Etch with 5–10% hydrofluoric acid for 20 seconds.
Zirconia	Sandblast with 50 µm alumina (Cobra, Renfert) at 1–2 bar for 10 seconds.

Chairside protocol — when the lab has already roughened the surface

STEP	GLASS-CONTAINING CERAMICS (FELDSPATHIC, LITHIUM DISILICATE)	ZIRCONIA
1. Clean the crown	After try-in, clean with phosphoric acid (or a ceramic cleaner).	After try-in, clean with a ceramic cleaner.
2. Treat the crown	Apply silane primer.	Apply 10-MDP primer.
3. Prime the tooth	If the IFU recommends it, apply tooth primer — and light cure it if the IFU recommends.	
4. Apply cement	Apply resin cement to the internal surface of the crown.	
5. Light cure	Clean off excess, then light cure the cement through the restoration.	

PRODUCT QUICK REFERENCE

CATEGORY	PRODUCTS	NOTE
Silane	Pure silane (Bisco, 3M, Ultradent, Kerr, Dentsply); Monobond Plus (Ivoclar); Clearfil Ceramic Primer (Kuraray)	<i>Pure silane performs best</i>
MDP primer	Scotchbond Universal (3M); Monobond Plus (Ivoclar); Clearfil Ceramic Primer (Kuraray); Z-Prime (Bisco)	<i>All MDP primers perform similarly</i>
Ceramic cleaner	Ivoclean (Ivoclar); Katana Cleaner (Kuraray); bleach (applied for 1 minuted and rinsed)	
Self-adhesive resin cement	Panavia SA Universal (Kuraray); RelyX Universal (3M)	<i>Panavia SA contains MDP + silane; RelyX Universal contains MDP</i>
Resin cement + adhesive	RelyX Universal / Scotchbond Universal (3M); Variolink Esthetic / Adhese Universal (Ivoclar)	