OralArts
DENTAL LABORATORIES HUNTSVILLE, ALABAMA

Zirconia Selection & Cementation Guide

Understanding Zirconia Types

TETRAGONAL ZIRCONIA (3Y)

- **Composition:** 100% tetragonal phase, 3 mol% yttria
- **Strength:** 1000-1500 MPa
- **Translucency:** Lowest translucency
- **Clinical Indications:** Posterior restorations, long-span bridges, short clinical crowns, and areas with minimal occlusal reduction
- **Key Advantage:** Transformational toughening - small cracks self-heal and stop propagating

CUBIC-CONTAINING ZIRCONIA (4Y)

- **Composition:** 75% tetragonal phase, 25% cubic phase, 4 mol% yttria
- **Strength:** 600-1050 MPa
- **Translucency:** Medium translucency
- **Clinical Indications:** Anterior and premolar crowns, as well as posterior restorations and bridges requiring better aesthetics
- **Key Advantage:** Versatility. Combines excellent strength with enhanced aesthetics.

HIGH-TRANSLUCENCY ZIRCONIA (5Y)

- **Composition:** 50% tetragonal phase, 50% cubic phase, 5 mol% yttria
- **Strength:** Lowest (approximately 500 - 750 MPa)
- **Translucency:** Highest translucency
- **Clinical Indications:** Anterior restorations where maximum aesthetics are required
- **Key Advantage:** Aesthetics. Closest to the appearance of natural dentition.

Clinical Considerations for Material Selection

WHEN TO USE 3Y ZIRCONIA

- Second molars and areas with minimal occlusal reduction
- Patients with heavy bruxism/grinding habits
- When maximum strength is needed
- Short clinical crowns
- When accessing for endo may be required in the future
- For restorations requiring minimal thickness

WHEN TO USE 4Y/5Y ZIRCONIA

- Restorations requiring better aesthetics
- Areas visible in the smile line
- Lower stress-bearing areas
- Cases with adequate occlusal reduction

Product	Strength	Recommended Clinical Preparation	Recommended Reduction	Minimum Reduction	Anterior Bridge	Posterior Bridge
3Y (Tetra-Z)	1,200 MPa	Chamfer Margins Recommended	1.5 mm	0.6 mm	Yes	Max 2 Consecutive Pontics
4Y (Element-Z)	1,050 MPa	Chamfer Margins Recommended	1.5 mm	0.6 mm	Yes	Max 2 Consecutive Pontics
5Y (Ultra-Z)	750 MPa	Chamfer Margins Recommended	1.5 mm	0.8 mm	1 Pontic	No Molars / 1 Pontic

Cementation Protocol for Zirconia Restorations

MATERIALS NEEDED

- Katana Cleaner (or equivalent zirconia cleaner like Ivoclean)
- Ceramic Primer containing MDP (e.g., Clearfil Ceramic Primer)
- Micro-prime/Gluma desensitizer
- Self-adhesive resin cement (NaviSA, RelyX Unicem, etc.) OR
- Resin-modified glass ionomer cement (for good retention preps)

STEP 1: PREPARATION

A. Try-in the restoration to verify fit

B. Check occlusion, margins, and contacts

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STEP 2: CLEANING

A. Crown Preparation:
- Clean with Katana Cleaner for 10 seconds (applied with microbrush)
- Note: Alcohol is insufficient for removing phosphate contamination
- Alternative: Sandblast the internal surface (for 3Y zirconia)

B. Tooth Preparation:
- Clean with Katana Cleaner for 10 seconds
- Rinse thoroughly
- Air dry Cleaning

STEP 3: DESENSITIZATION & PRIMING

A. Tooth:
- Apply Gluma/micro-prime desensitizer (two coats, one minute per coat)
- DO NOT RINSE - only air dry
- Benefits: Increases bond strength up to 30% and eliminates bacteria

B. Crown:
- Apply Ceramic Primer containing MDP to internal surface
- Air dry

STEP 4: CEMENTATION

A. For Questionable Retention:
- Use self-adhesive resin cement (NaviSA, RelyX)
- Optional: Apply universal bonding agent to tooth for maximum bond strength

B. For Good Retention Preps:
- Consider resin-modified glass ionomer cement (Gordon Christensen's recommendation)
- Fuji Plus or RelyX Luting provide fluoride release and reliable bond

C. Seating Technique:
- Apply cement to restoration
- Seat firmly
- Tack cure for 2-5 seconds per side
- Clean excess cement while in gel state
- Complete cure according to manufacturer's instructions

Troubleshooting Common Issues

ZIRCONIA CROWN DE-BONDING

- **Cause:** Insufficient cleaning of phosphate contaminants
- **Solution:** Proper cleaning with MDP-containing cleaner is critical

FRACTURES IN HIGH-TRANSLUCENCY ZIRCONIA

- **Cause:** Insufficient occlusal reduction, heavy occlusal forces
- **Solution:** Use 3Y zirconia in high-stress areas, ensure adequate occlusal reduction

EXCESSIVE OPPOSING WEAR

- **Cause:** Cubic-containing zirconia creates more opposing
- **Solution:** Consider night guard for patients with 4Y/5Y restorations, polish occlusal surfaces thoroughly

Clinical Pearl: Isolation is Critical for Success

FOR OPTIMAL OUTCOMES, ENSURE PROPER ISOLATION DURING CEMENTATION:

- Isolite (or equivalent) provides ideal isolation with minimal investment
- Dry field is paramount for long-term bonding success
- Consider investing in isolation systems that provide both retraction and evacuation

This guide is based on Dr. Mark McOmie's webinar "The Latest Crown and Bridge Materials for Higher Quality" and represents current best practices for zirconia selection and cementation as of May 2025.