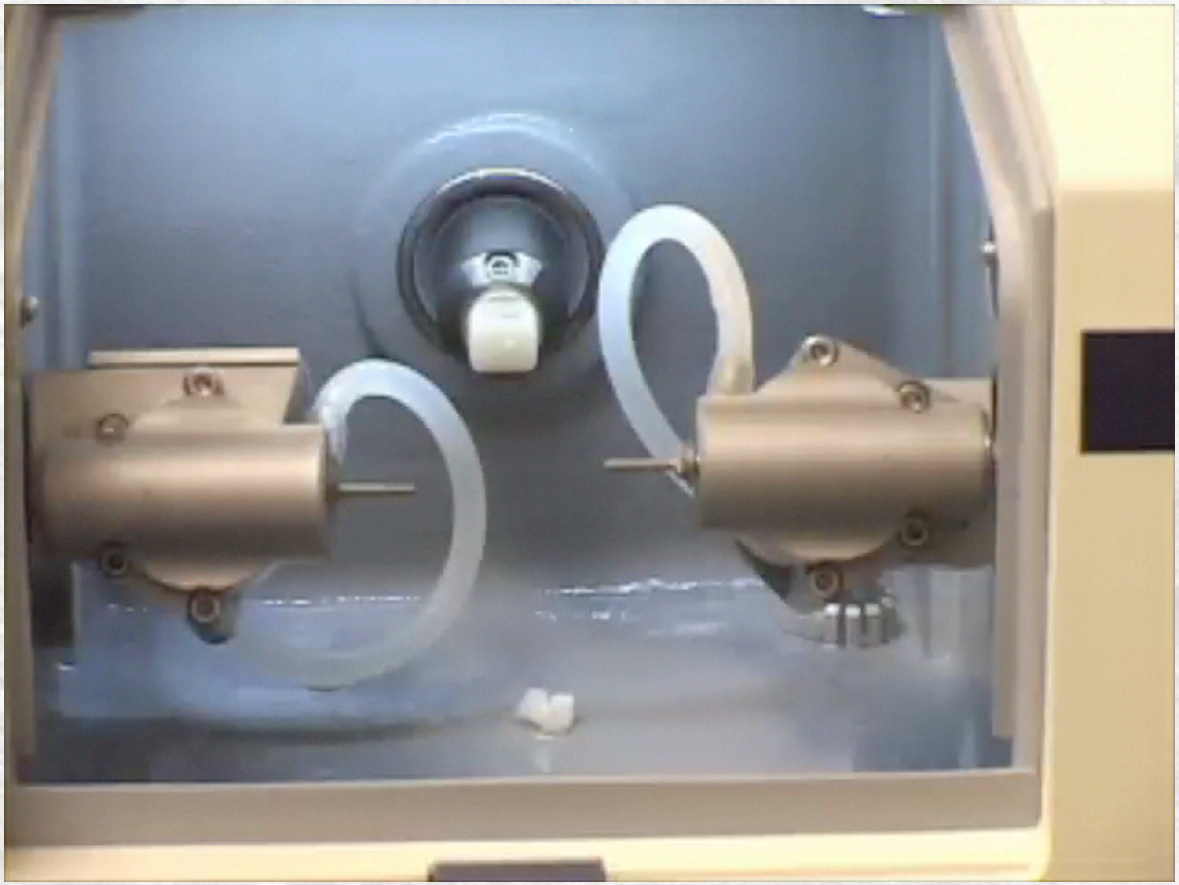
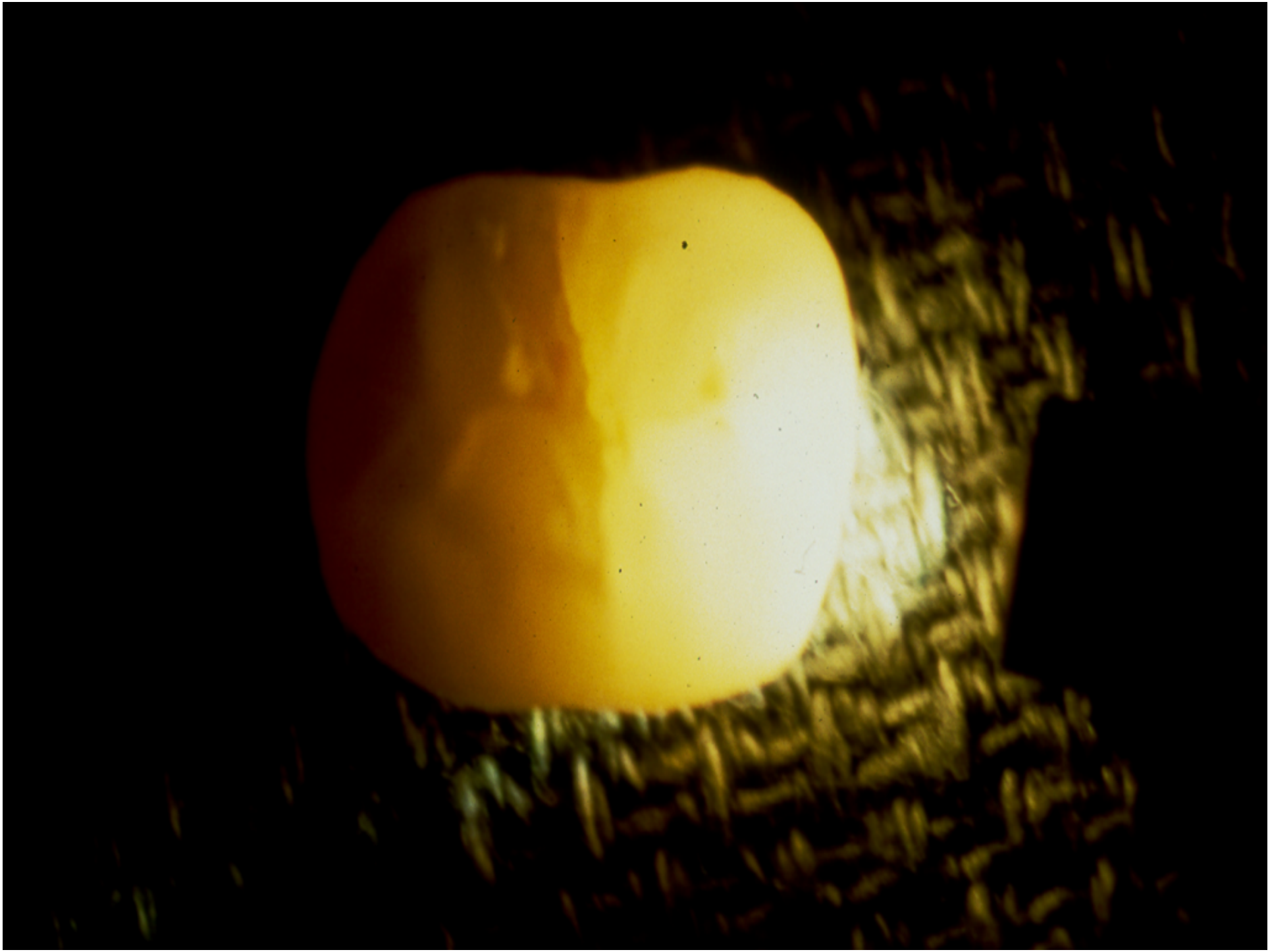
CADCAM: Restoration Seat & Adhesive Cementation

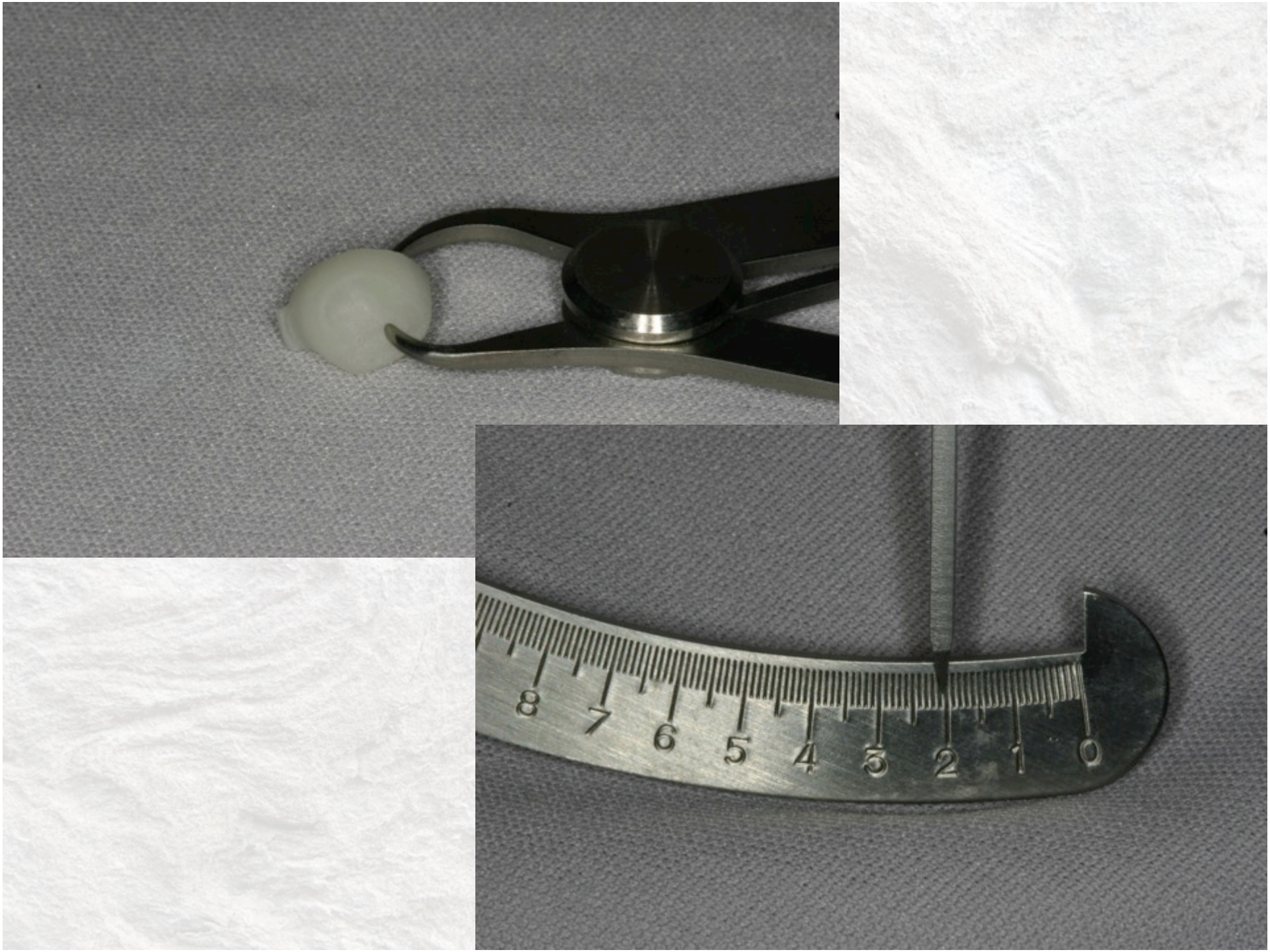


All Ceramic Restorations

Pre-cementation inspection

- Evaluate for fractures
- Verify shade
- Evaluate restoration thickness
- Evaluate contours
- Review cementation protocol




8 7 6 5 4 3 2 1 0

All Ceramic Restorations

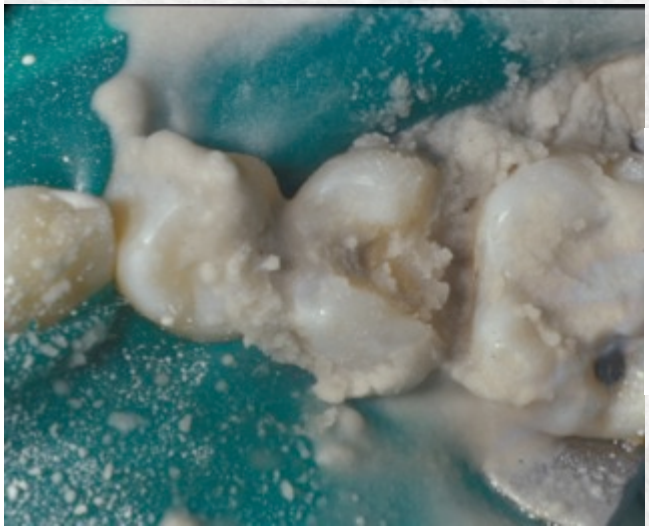
Try-In

- If shade match is critical, this needs to be evaluated without rubber dam
- Evaluate shade with water first; if OK -> translucent
- If shade off, try base shade of dual-cure cement or try-in paste Minimal change; often you need to refabricate

All Ceramic Restorations

Isolation

- Place rubber dam
  - Isolite
  - Suction, cotton rolls, dry angles
- Remove temporary restoration
- Complete removal of temporary cement
- Pumice prep as best as possible



ICB Brush/Ultradent

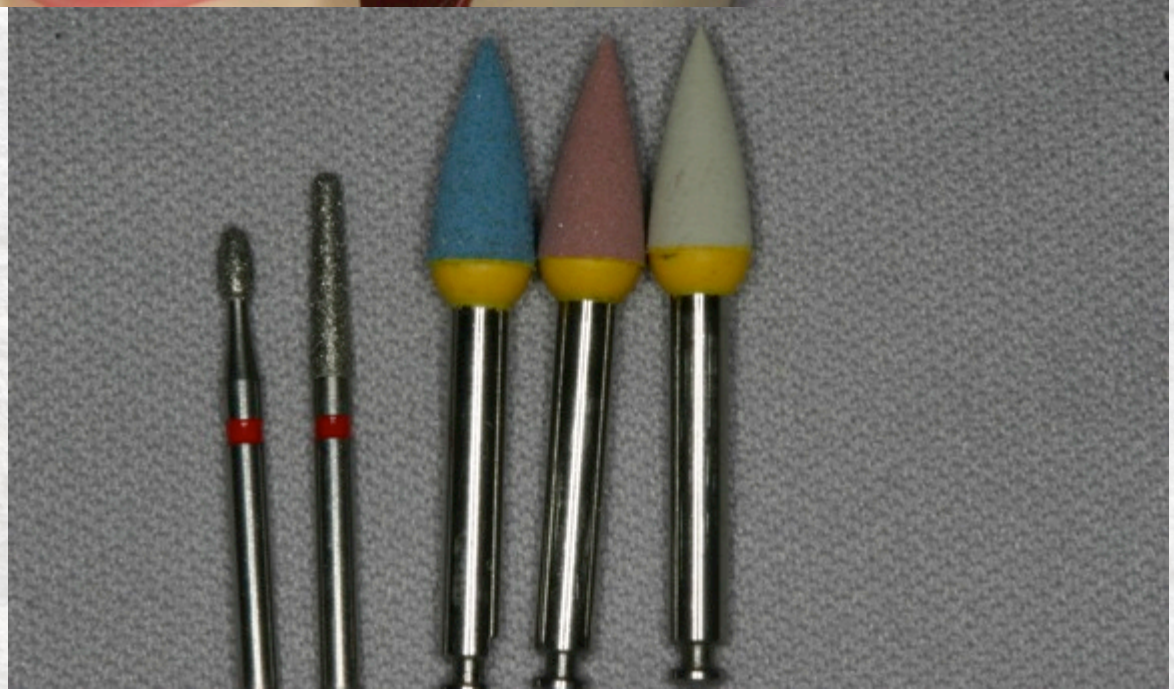
All Ceramic Restorations

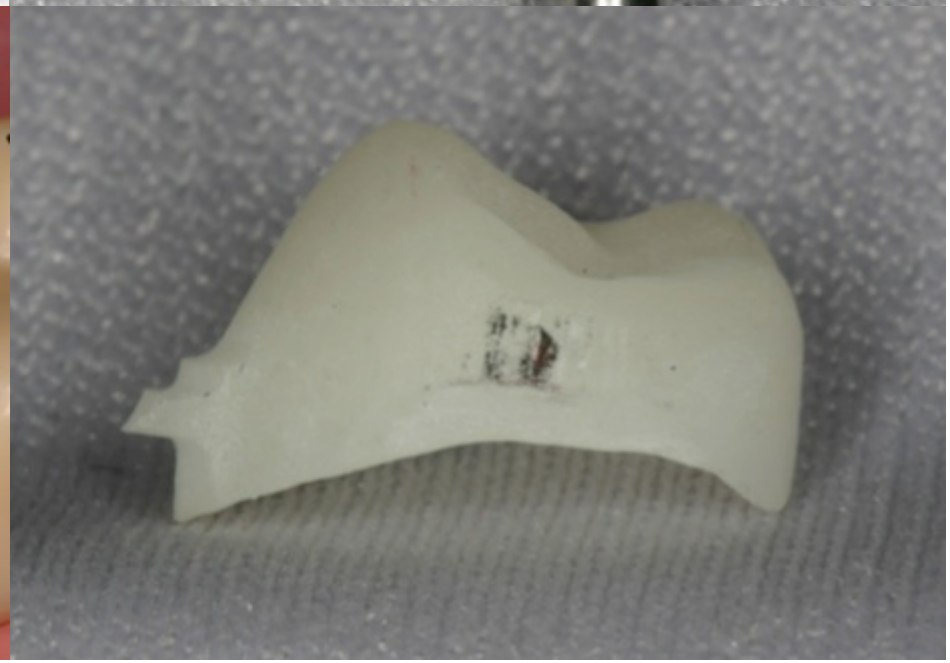
Try-In

- Evaluate marginal fit
- If restoration doesn't seat:
  - check proximal first with thin floss
    - Adjust with Sof-flex discs, fine diamonds, polishing points

Proximal contact too tight, can't seat all the way

Place articulating paper, seat restoration till it binds, tug on marking paper, leave mark behind, adjust the contact





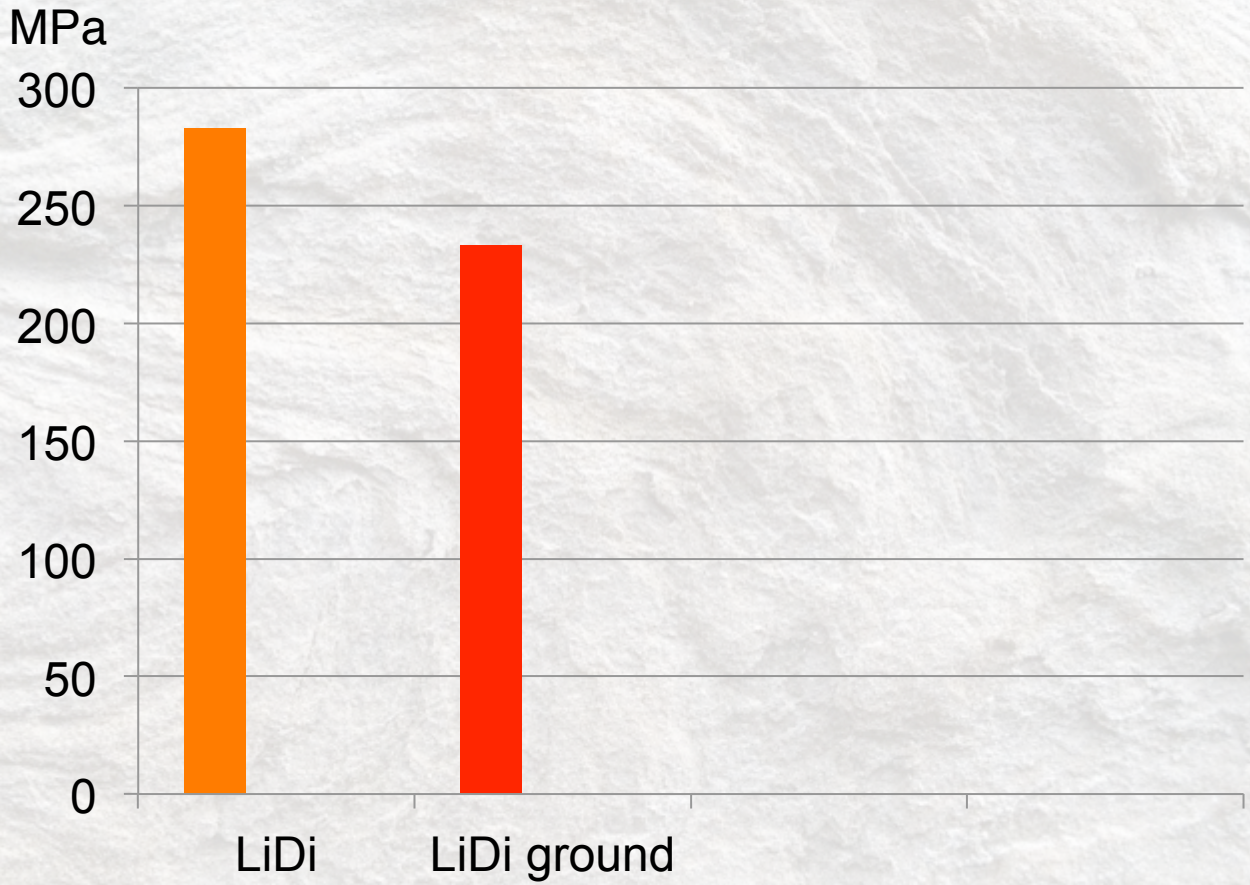
All Ceramic Restorations

Try-In

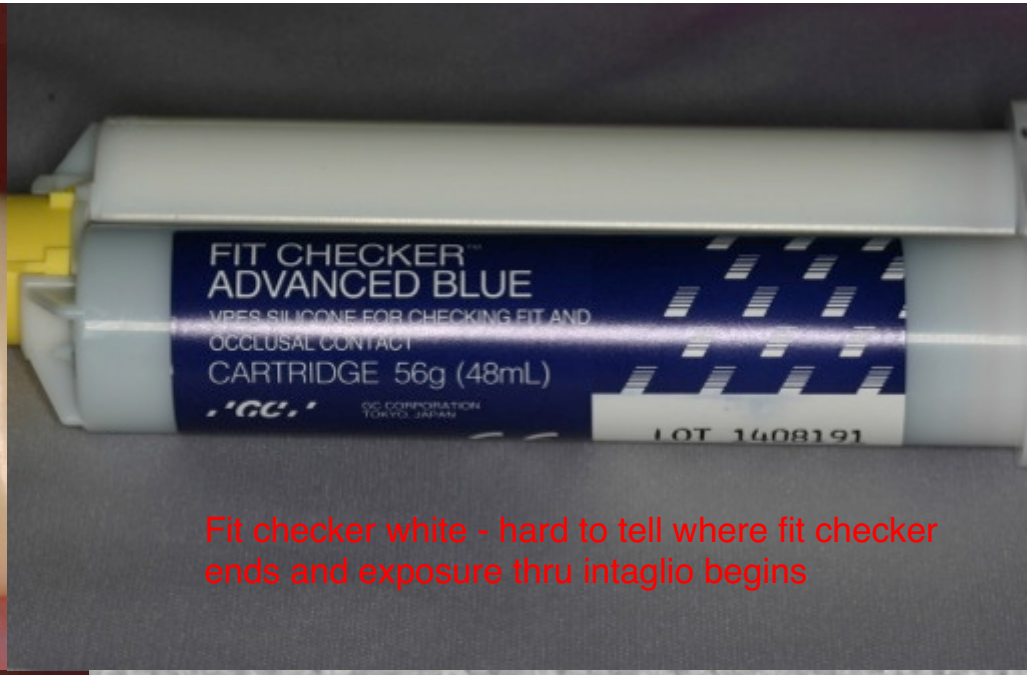
- Evaluate marginal fit
- If restoration doesn't seat:
  - check proximal first with thin floss
    - Adjust with Sof-flex discs or diamond finishing instruments, fine diamonds, polish
  - If proximal OK, use silicone disclosing material to check intaglio surface
    - Adjust intaglio surface vs. prep?

All Ceramic Restorations

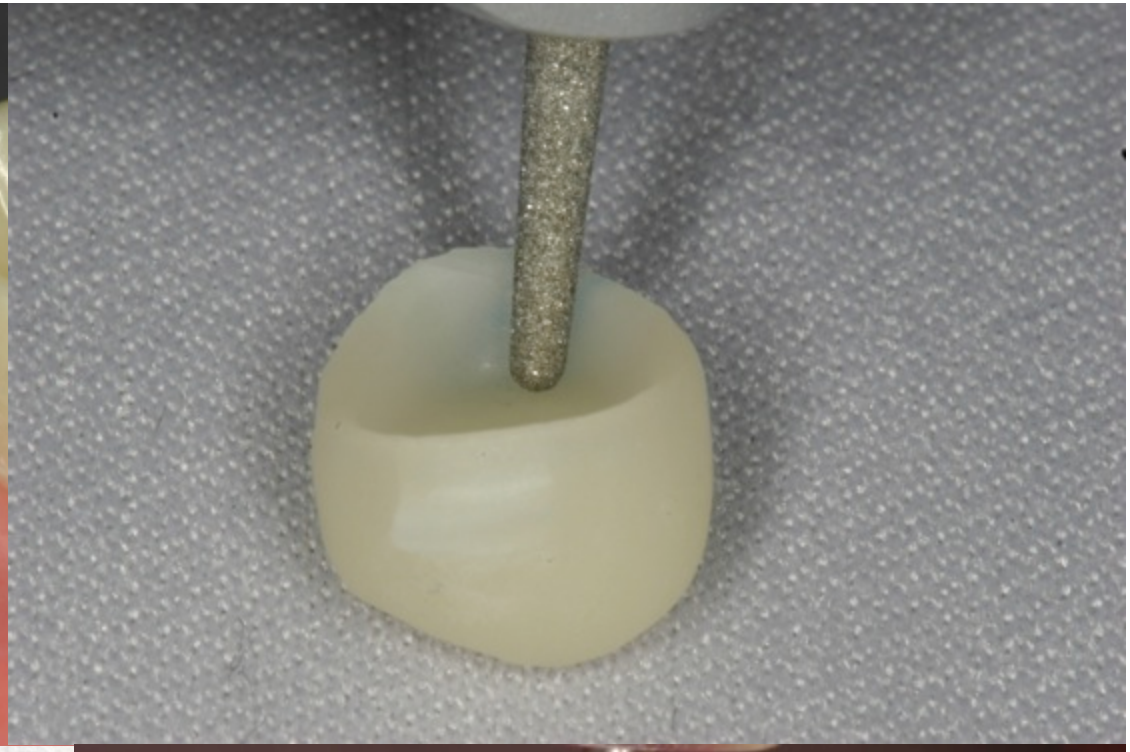
Effect of grinding Lithium Disilicate on flexural strength



Hung C-Y et al, Int J Prosthodont 21:496-498 (2008)_

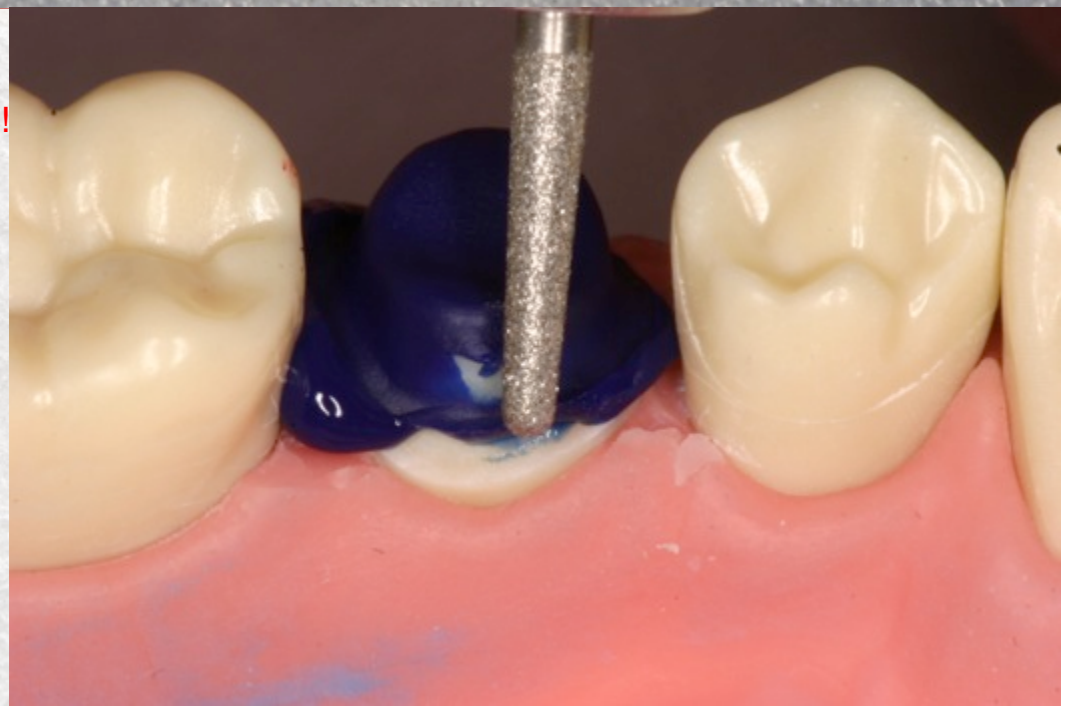


Fit checker white - hard to tell where fit checker ends and exposure thru intaglio begins



Adjust preparation: Instead of intaglio Don't adjust crown!

- Adjustment to crown may yield inadequate thickness
- Adjustment to crown may induce cracks, especially eMax if done post-crystalization



All Ceramic Restorations

Adjust Occlusion

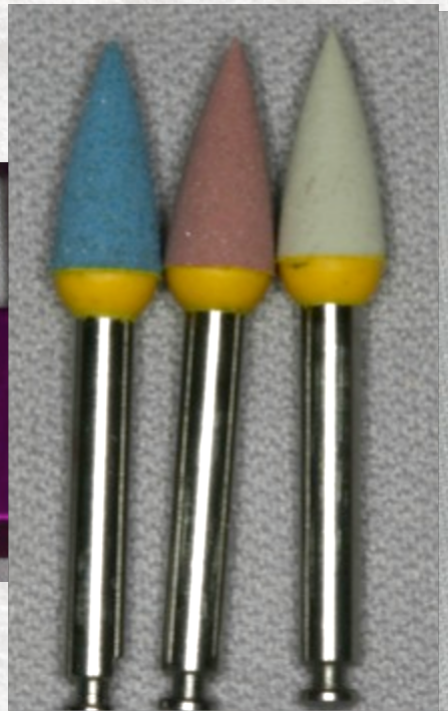
- Timing: before or after cementation?
- If a large discrepancy: fine diamond
- If smaller adjustment: ceramic finishing/polishing points

How stable is restoration on prep?
Before: single crown, sits stably
After: not much R+R form like crownlay and onlay prob wont stay in position; fracture risk if restoration moves

All Ceramic Restorations

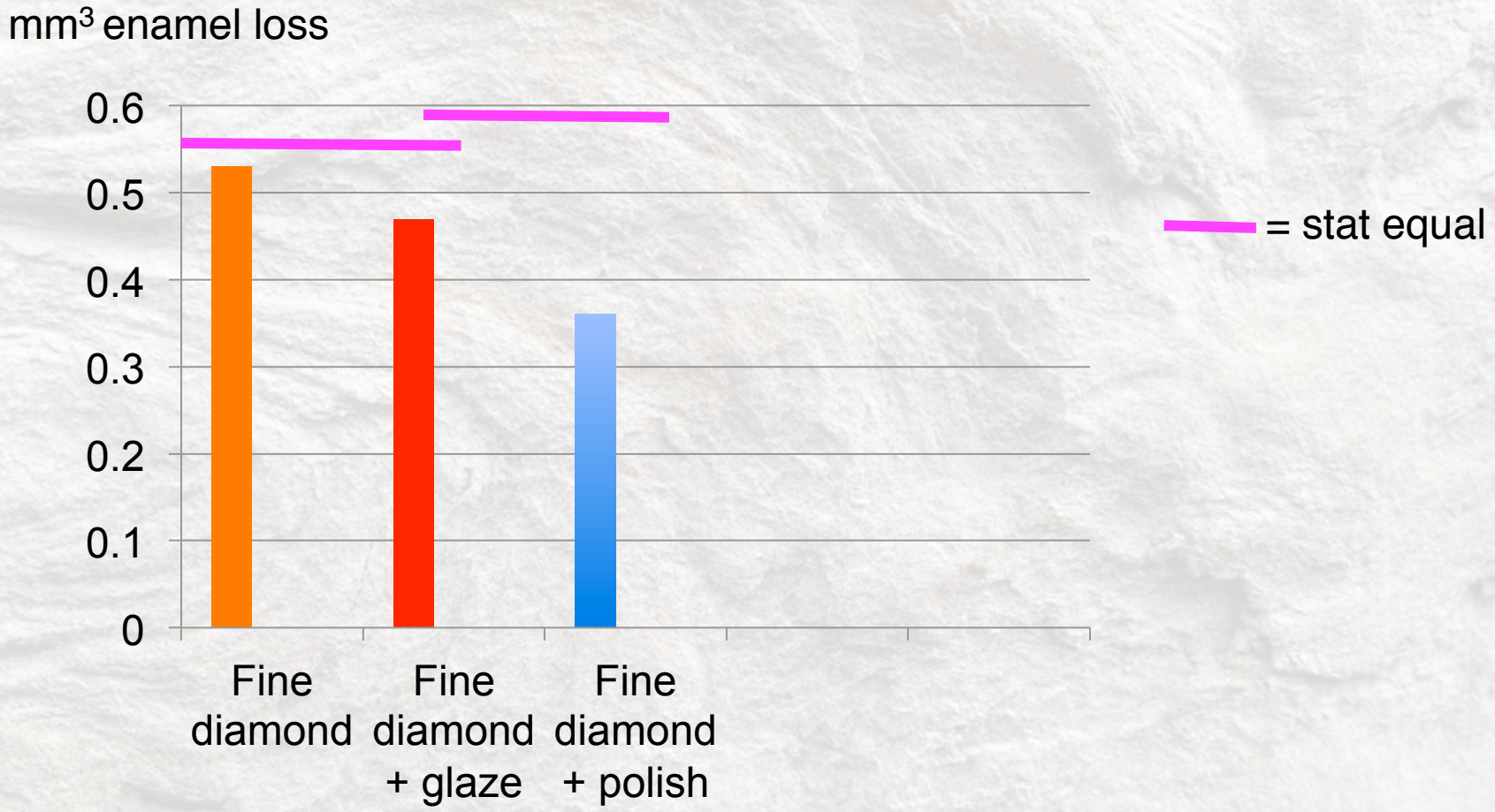
Final Polish

- Use appropriate polishing system for ceramic being used.



All Ceramic Restorations

Effect of surface finish on opposing enamel wear



All Ceramic Restorations
Cementation

- Luting Materials
  - Pumice/rubber cup/bristle brush (if provisional placed)
  - 9% Hydrofluoric acid (Ultradent)
  - Silane (Ultradent)
  - Dual cure adhesive (Multilink Primer, Ivoclar)
  - Dual cure resin cement (Multilink, Ivoclar)
    - Bond strength of bonded restoration is significantly higher when both a dual cure adhesive and dual cure resin cement are light cured Ooka S et al, JPD 92:239 (2004)

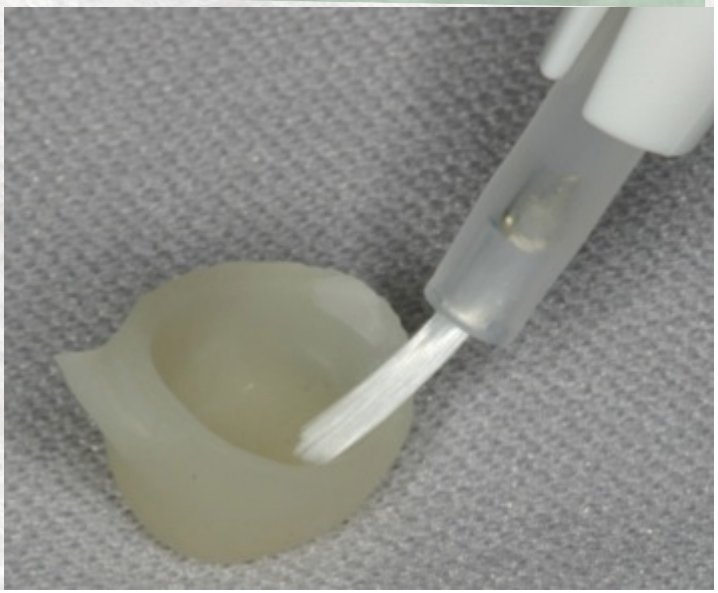
All Ceramic Restorations

Intaglio Surface

- Etch internal surface with 9% HF acid
  - eMax = 15 sec (20 sec with 5% HF)
  - Feldspathic = 90 sec

- Place silane on internal surface x 60 sec, air-dry, set aside

Excess cement may adhere if there is etch and silane on external surface




Multilink®
Primer
Adhesive
A
ivoclar vivadent
Multilink®
Primer
Adhesive
B
ivoclar vivadent


Multilink® Automix
Self-curing resin-based dental luting material
with light-curing option
ivoclar vivadent
Transparent

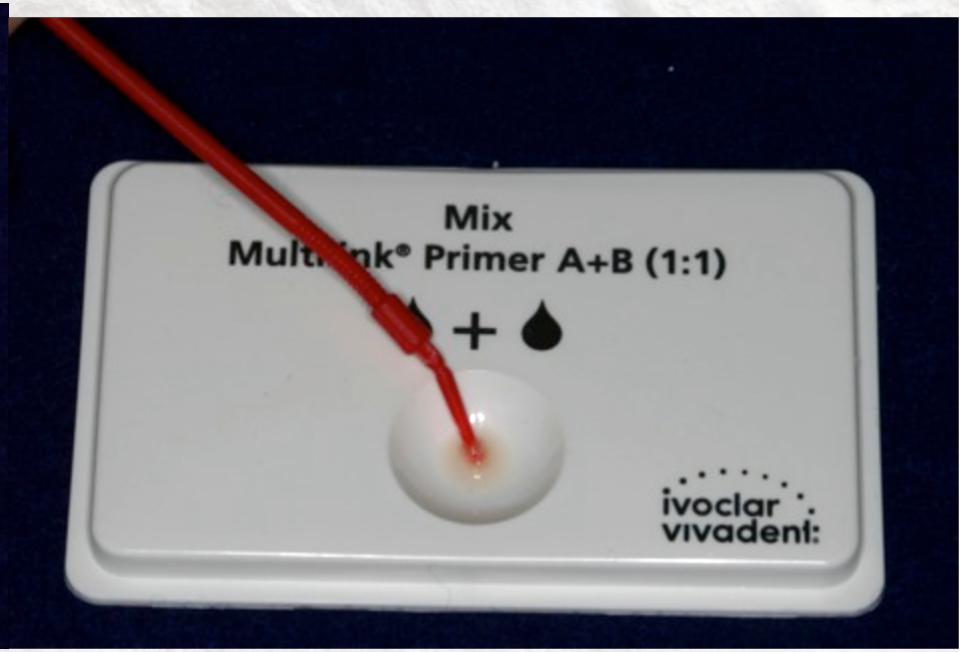

Multilink® Auto
Self-curing resin-based dental luting mat
with light-curing option


ivoclar vivadent

All Ceramic Restorations

Tooth Surface

- 1 drop Primer A + 1 drop Primer B, mix



All Ceramic Restorations

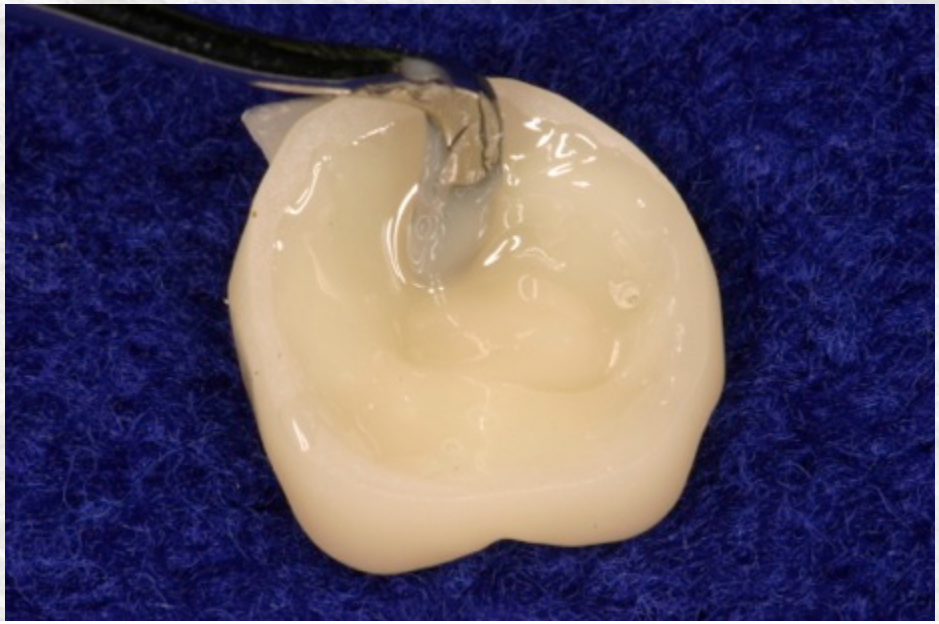
Tooth Surface

- Apply 1:1 mixture of primer A&B to prep x 30 sec, air dry

All Ceramic Restorations

Intaglio Surface

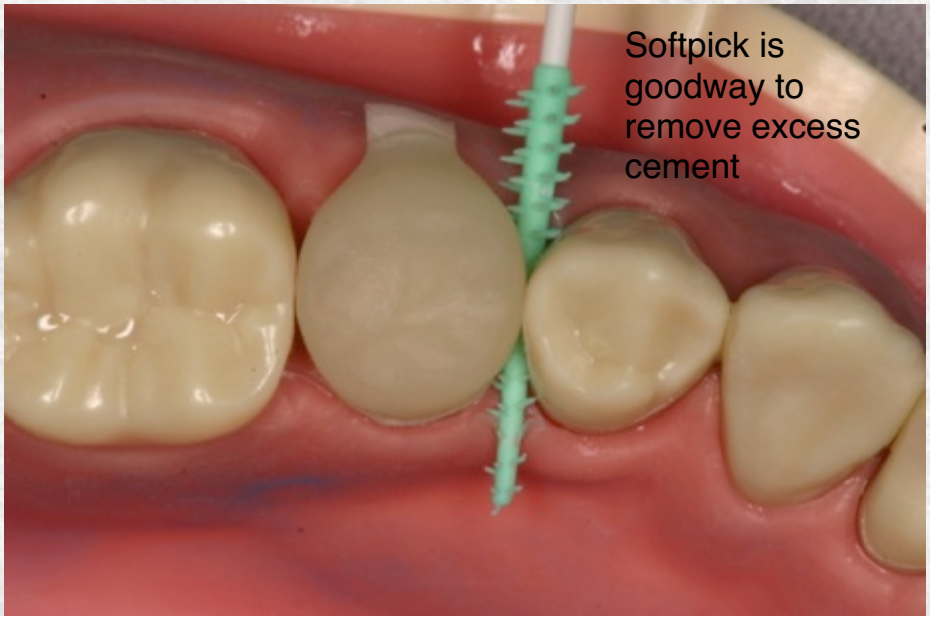
- Mix dual cure cement and place in crown
- QUICKLY apply cement to all surfaces
- Want to ensure there will be some cement that extrudes around entire periphery If not, then likely a void
- Do NOT over-fill the crown
  - This will result in excess cement that will require longer clean-up



All Ceramic Restorations

Cementation

- Place restoration onto prep and gently seat
- Remove excess cement with brush
- Completely seat, forming a bead around entire periphery
- Remove excess proximal gingival cement with floss or softpicks
- Light Cure 1-2 secs F, 1-2 sec L Gets initial set
- Confirm no interprox excess, remove F & L excess with 12/12B blade, cure x 60 sec from multiple directions, no longer than 10s/surface



Cement: Dual or Light Cure?

Ceramic Thickness (mm)	Light Intensity (mW/cm^2)
0	600
1	210
2	110
3	55
4	35
5	10
6	0

Hardness thru 2mm ceramic

Cement	Hardness (KHN)
Variolink II dual	35.6
Variolink II light	27.6
Linkmax dual	29.8
Linkmax light	18.4

Yoshida K, Atsuda, M AJD 19:303 (2006)

Significant reduction in cure of light cure resin cement through ceramic; cure retained with dual cure Hofmann N et al, J Orah Rehab 28:1022 (2001); Jung H et al, Oper Dent 31:68 (2006)

However, a clinical study of 783 ceramic inlays/onlays in place up to 9 years cemented with light-cure composite showed 90% survival Schulte A et al, J Dent 33:433 (2005)

All contacts are good, restoration seats

1. Prep treated with dual cure adhesive, intaglio surface of restoration etched of HF and silanated. Resin cement placed. Restoration seated

2. Gross excess removed with brush. Restoration is stabilized so it doesn't move.

4. Gross excess has been removed

3. Floss used to remove excess, tho you can also use soft pick.

6. Remove excess with blade now that its partially cured. Then complete cure

5. Initial light cure F and L 1-2 sec

8. Dialite porcelain polishing

7. Enhance to remove excess cement

- Following Dialite porcelain system polishing

Completed finishing and polishing