

Step-by-step Smile Design records, preparation, and finishing

Success and predictability with your smile design is a direct result of good planning, excellent communication with your UVDL ceramist, and following set-by-step guidelines in preparation and cementation appointments. Utah Valley Dental Lab has been the lab chosen by Dr. David Hornbrook and Dr. Mark Montgomery for all their live-patient Functional Aesthetic and Hands-on Occlusion Courses and has had the unique opportunity to have been an active participant with both the doctor and their patients in the design, preparation, and cementation of dozens of successful cosmetic and functional cases. UVDL is committed to your success and your patient's satisfaction with all your cases and will always be available to discuss your specific case, use of materials, and optimizing long term prognosis.

Diagnostic Phase

The diagnostic phase of a Smile Design is one of the very most important steps necessary for predictability. Unfortunately, many doctors do not understand it's importance. UVDL would like the following information and items to design and fabricate an ideal wax-up for you that will be used for the preparation and provisionals, and ultimately a functional model to be used to design your definitive ceramic restorations.

- 1) Very accurate polyvinyl or digital full arch mandibular and maxillary impressions.
- 2) Facebow plate or jig if applicable and if you routinely use a facebow. Ceramists prefer mounting all cosmetic cases on an articulator.
- 3) Bite registration at CO or CR if a Freedom Appliance (deprogrammer) was used.
- 4) Stick-bite using a plastic stick and bite-registration material that is parallel to the interpupillary line.
- 5) Photos (see recommended photos on our website)
 - a. Full face
 - b. Profile
 - c. Full smile in frontal, left, and right views
 - d. Full smile retracted in frontal, left, and right views
 - e. Chin-to-eyebrow photos of stick bite in place
- 6) Smile design guidelines (think dentures; You can do a quick mock-up in mouth using a flowable resin)
 - a. Incisal edge position of centrals
 - b. Smile line
 - c. Midline
 - d. Profile of anterior teeth
 - e. Buccal corridor
 - f. Gingival contour changes

Preparation Visit

UVDL will send you a diagnostic esthetic wax-up based on the information you provided. They will also send you a preparation and provisionalization matrix kit. This will include a putty matrix of the wax-up, buccal, and lingual preparation matrices, and a clear suck down stint of wax-up.

- 1) If teeth are out of alignment or existing dentition needed to be modified prior to the ceramist beginning the wax-up (bulky pre-existing restoring, teeth out of arch form either too far buccal or lingual), enameloplasty will need to be done to seat matrix.
- 2) After enameloplasty, try-in full putty matrix for complete seating. If soft tissue contours were done, seat clear plastic matrix and verify that patient's soft tissue match the wax-up
- 3) Remove matrix and fill with a BIS: Acryl provisional resin and seat completely for 2 minutes and then gently remove putty matrix.
- 4) After removal, re-evaluate the smile design to verify the wax-up matched your and the patient's expectations.
- 5) If BIS: Acryl mock-up is acceptable, use a 0.3-0.5 mm depth cutting bur and put depth cuts into the BIS: Acryl mock-up and in enamel that is exposed. Ensure depth cuts are made in the incisal, middle, and genial thirds of each tooth.
- 6) Using a chamfer diamond, make a 1.5 mm depth cut in the incisal edge of each tooth.
- 7) After depth cuts are made, remove the remaining BIS: Acryl and evaluate extent of depth cuts.
- 8) Prepare teeth as below (if you have any questions about prep design, please call us at UVDL for suggestions)
 - a. Remove facial enamel or dentin down to all depth cuts
 - b. Remove all depth cuts in the incisal edges
 - c. Place "at-gingival chamfer margins" if possible, unless previous restoration or decay extends subgingival.
 - d. Follow gingival contours with chamfer margins into interproximal embrasure.
 - e. Wrap over canine cusp tip if necessary to achieve canine guidance with the definitive restorations
- 9) Take very accurate full arch polyvinyl impression or prepared arch
- 10) Take anterior bite registration between prepped teeth and opposing natural dentition.
- 11) If opposing model is intact and accurate, there is no need to take another opposing impression. If broken teeth, or changes were made by ceramist to improve esthetics or function, re-take opposing impression.
- 12) Take photos of the shade of the prepped teeth using a prep shade tab (Natural Die Shade Guide[Ivoclar])
- 13) Make provisionals using the "Shrink to Fit" technique and the putty matrix using BIS: Acryl
- 14) Take chin-to-eyebrow photo of provisionals and full smile photo

Cementation Visit

- 1) Remove provisional
- 2) Clean preparation with Chlorahexadine pumice
Recommended Product: • Consepsis Scrub (Ultradent)
- 3) Try-in restorations using water soluble try-in gels using different shades of the try-in gels to obtain desired final
Recommended Products: • Variolink Esthetic (Ivoclar) • Choice 2 (Bisco) • Relyx Veneer Cement (3M) • NX 3 (Kerr)
- 4) Clean out try-in gel using air/water syringe from inside restoration when shade is chosen
- 5) Prepare restoration for bonding
 - a. If restoration is IPS Empress, feldspathic, or lithium disilicate (e. Max)
 - i. Clean internal with phosphoric acid, rinse, and dry
 - ii. Apply Silane coupling agent for 1 minute
Recommended Products: • Porcelain Primer (Bisco) • Monobond + (Ivoclar)
 - b. If restoration is Zirconium-oxide
 - i. Clean internal with NaOH2
Recommended Product: • Ivoclean (Ivoclar)
 - ii. Place Zirconium-oxide/metal primer on internal surface for 1-minute
Recommended Product: • Z Prime + (Bisco)
- 6) Place a very thin layer of unfilled resin and air thin
Recommended Product: • Porcelain Bonding Resin (Bisco)
- 7) Place the light-cure only resin cement inside restoration and place in light protective container
Recommended Products: • “Light-Cure” only cements • Variolink Esthetic (Ivoclar) • Choice 2 (Bisco) • Relyx Veneer Cement (3M) • NX 3 (Kerr)
• Light protected container • Vivapad (Ivoclar)
- 8) Prepare teeth for adhesive bonding
 - a. After shade selection, rinse teeth thoroughly to remove try-in gel
- 9) Etch dentin and enamel for 15-20 seconds using a 35% phosphoric acid
- 10) Recommended Product: • HV Select Etch (Bisco)
- 11) Rinse and lightly dry
- 12) Apply glutaraldehyde/water/ HEMA desensitizer Recommended Products: • MicroPrime G (Danville) • Telio desensitizer (Ivoclar) • Gluma (Heraeus)
- 13) Place adhesive agent
Recommended Products: • All Bond 3 (Bisco) • All Bond Universal (Bisco) • Scotch bond Universal (3M) • Adhese Universal (Ivoclar)
- 14) Air dry and light polymerize for 10 seconds
Recommended Products: • BluePhase Style (Ivoclar) • Valo Cordless (Ultradent)
- 15) Place all restorations in at one time-inward upward pressure using instruments to ensure complete seating- do not clean up excess

- 16) "Tack"- using a 2.0 mm light guide, tack each restoration into place for 1 second in the middle of the restoration away from margins
- 17) "Wave"- using an 8.0 mm or 11.0 mm light guide, "Wave" all restorations for a total of 5 seconds
- 18) Remove excess resin gently using Bard Parker blades, scalers, and explorer
- 19) Floss through contacts using a metal strip
Recommended Product: • Serrated Saw (Brasseler)
- 20) Floss through contacts using waxed dental floss
- 21) Place glycerin around all margins to eliminate the oxygen inhibition layer
Recommended Products: • DeOx (Ultradent) • Liquid Strip (Ivoclar)
- 22) Light polymerize for at least 40 seconds per restoration
- 23) Rinse off glycerin
- 24) Remove excess cement using scalers, Bard Parker blades, etc.
- 25) Finish margins using 15 or 25 am finishing diamonds
Recommended Product: • Hornbrook Finishing kit (Brasseler)
- 26) Finish interproximal with finishing strips
Recommended Products: • 1954N strip (3M) • Epitex Strips (GC)
- 27) Polish all margins (that were adjusted) and adjust occlusion using ceramic polishing points and cups
Recommended Products: • Hornbrook lithium disilicate adjusting and polishing kit (DiaShine/VH Technologies) • OptraFine (Ivoclar)