SprintRay Ceramic Crown

Cementation Workflow Guide

Overview:

Cementation workflows are highly dependent on material chemistry and can differ in choice of cement, surface treatment of the crown, and bonding protocol. The cement works by filling in any gaps between the tooth and the crown and securely bonding to both structures. Appropriate mechanical performance of this cemented interface helps to stabilize the restoration and reduce any risk of debonding or fracture. The bond strength between crown material and dental cement is therefore an important factor in long-term survival of a crown restoration.

In order to validate typical cementation workflows, a variety of common resin cements and adhesives were evaluated for their effects on shear bond strength. The ***Bonding Protocol*** below elaborates on the top recommended workflow for maximum bond strength which was provided by Panavia V5 Resin Cement with Clearfil Ceramic Primer Plus. Additional data on shear bond strength for alternative workflows is available in the *Ceramic Crown Scientific Studies* document.

Bonding Protocol:

Dental cement provides several important functions which include creating a strong and stable bond between the prep and the crown, filling in gaps and irregularities, protecting the underlying tooth structure, and providing additional strength and durability to the restoration. Because this bond helps to distribute the forces of chewing and prolong the life of a cemented crown, this recommended workflow was chosen to maximize bond strength between the resin cement and SprintRay Ceramic Crown.

1. Check the fit of the restoration on the prep. Make any necessary adjustments to the crown to ensure a proper fit.

2. Clean and prepare bonding surfaces of the tooth and crown. This involves removing any residue from the crown by washing thoroughly with IPA and preferably sandblasting the intaglio surface to create roughness for improved bond strength.

3. Apply Clearfil adhesive to the intaglio surface of the crown along the bonding interface. After application, dry the entire adherent surface by blowing with air.

4. Follow manufacturer's instructions for etching and/or priming of the prepped tooth.

5. Apply the cement to the inside surface of the crown, making sure to distribute it evenly. Place the crown onto the prepped tooth, using gentle pressure to ensure that it is fully seated.

6. Remove any excess cement from the margins of the crown and light cure for 5 seconds. Then remove any excess cement with a proper dental hand instrument. Ask patient to bite softly and hold in occlusion for 3 minutes for initial polymerization.

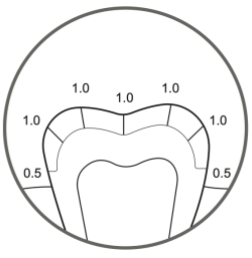
7. Perform a final check of the crown to ensure that it is fully seated, the margins are sealed, and the occlusion is correct.

(!) Note that it is important to follow the manufacturer's instructions for the specific cement being used and to utilize proper techniques to ensure a strong bond.

Frequently Asked Questions:

What are the recommended prep guidelines?

Evenly reduce the tooth while observing the minimum thickness, creating a circular shoulder with rounded inner edges or chamfer. Reduction should be a minimum of 0.5mm at the shoulders and 1mm for all other aspects. Note that occlusal reduction should be determined relative to the deepest groove in the occlusal anatomy.



Why are dual cure resin cements recommended?

Dual cure resin cements, as the name suggests, can be cured by both light activation and a chemical reaction, providing a more reliable and predictable setting of the cement. Benefits of dual cure cements include extended working time, better penetration, high bond strength, and reduced post-operative sensitivity.

Should I acid etch the intaglio surface of the printed restoration?

Acid etching is not recommended for SprintRay Ceramic Crown resin. Phosphoric and hydrofluoric acids are common in dentistry for etching and preparation of surfaces before bonding. Phosphoric acid is relatively weak and may cause surface roughening or changes in surface characteristics where it is applied. Hydrofluoric acid is highly corrosive and can cause discoloration, cracking, and loss of structural integrity.

Why does temporary cement result in a higher rate of fracture?

Temporary cements do not adhere as strongly as permanent resin cements, and therefore do not provide as much structural integrity to the cemented restoration. For this reason, restorations with temporary cement may not be able to withstand biting, chewing, or other trauma as well as those with permanent cement. Additionally, temporary cements are more susceptible to degradation, which can further weaken the bond over time.

Do I need to use an adhesive on the intaglio surface of the crown before cementation?

For many resin cements, adhesives are necessary to help improve the bond strength between the crown and the cement. The IFU provided by the cement manufacturer should be consulted for adhesive recommendations.

Should I use a primer on the prepped surface of the tooth?

This guide is focused specifically on bonding of dental cements to restorations printed from SprintRay Ceramic Crown resin. None of the presented data represents bond strength to natural enamel or dentin. Consult the cement manufacturer IFU for workflow recommendations related to etching and priming of tooth structures before cementation.