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	Steps of cementation (composite / ceramic material)	Additional information
1	Check the onlay on the articulator (In case it is not a cad/cam restoration)	Check the marginal seal, occlusion, contact points and the anatomical shape
2 2	Remove temporary filling with a probe	No drilling, the prepared cavity should not be damaged
3	Clean the cavity	With benzine or fluoride free-polishing paste (fluoride inhibits adhesive bonding)
4	Check the onlay in the prepared cavity first without a rubber dam. Make corrections if necessary.	The onlay can be placed on an instrument for insertion (with adhesive or wax). Check the marginal seal and integrity with a probe, contact points with floss. If the onlay does not fit due to tight contact points they can be adjusted with a polishing disk or diamond finishing bur. No occlusal control (fracture risk!)
5	Absolute isolation (rubber dam)	The neighbouring teeth should be included. (Avoid placing the clamp on the prepared tooth if possible).
6	Matrix+ wedge or teflon tape	Polyester strips + plastic wedges. If using teflon tape, no wedge is needed and in this case, the adhesive cement excess has to be cleaned with superfloss from the interproximal areas <b>before light curing!</b>
7	Re-inserting the onlay (with rubber dam)	Make sure that the rubberdam, polyester strips, wedges or teflon don't hinder the insertion
8	Pre-treatment of inner surface of the onlay	<b>Always follow the manufacturer's instructions for the material.</b> <ul style="list-style-type: none"> <li>• <i>Press-ceramic</i> e.g. Ivoclar e.max: 5% hydrofluoric acid for 20 seconds, and silanization. We rinse the acid over a cup, far from the patient. Always wear goggles, because the fluoric acid is highly corrosive.</li> <li>• <i>Composite</i>: sandblasting. The particle size is: 25-100 microns. Pressure: 1-2.5 bar. Blasting for 10 seconds, 1 cm away from the onlay. Silane is applied. Dry with air syringe or warm air (wait at least 1-2 mins till fully dry). The treated surface should not be touched after this point.</li> </ul>
9	Pre-treatment of the prepared cavity	<b>Again, always follow the manufacturer's instructions.</b> The pre-treatment of the cavity depends on the type of the adhesive cement. If the solvent is acetone, wet-bond technique is used (dentin should not be dried completely because it impairs the adhesive bond quality)

	Dual cure resin cement		Self-adhesive dual cure resin cement
	Etch and rinse	Self-etch	
	<ol style="list-style-type: none"> <li>35-37% <b>phosphoric acid</b> (dentin: 15-20 sec, enamel: 30-40 sec)</li> <li><b>Primer + bond</b> (1 or 2 steps, depending on the system used). Sometimes, an activator is added to the bond. In that case, we do not light cure (LC) it.</li> <li>Application of <b>dual cure resin cement</b>.  <i>E.g.: OptiBond Solo (LC)+ Nexus 3 adhesive cement (wet bonding)</i></li> </ol>	<ol style="list-style-type: none"> <li>Selective enamel <b>etching</b> (15 sec)</li> <li><b>Primer + bond</b> application (1 or 2 steps, depending on the system used). Bond activator or light curing (LC).</li> <li>Application of <b>dual-cure resin cement</b>  <b>This is what we use in the students' practices. (VOCO Bifix QM)</b></li> </ol>	<ol style="list-style-type: none"> <li><b>Selective enamel etching</b> for 15 sec.</li> <li>Application of self-adhesive dual cure cement. (No additional etching is needed!)</li> </ol> <p>For this technique, it is not recommended to use a separate bonding material because it would hinder the self-etching process!  <i>E.g.: MaxCem Elite, Speed Cem 2</i></p>
<b>10</b>	Insert the onlay into the prepared cavity	Make sure that it's firmly in place but without excessive pressure	
<b>11</b>	Remove excess cement	Once the cement has entered the gel phase (1-2 min), the probe is used to remove the excess. For self-etch or self-adhesive dual curing cement, wait until the self-etching process is finished. If teflon tape is used instead of polyester strips, you can use superfloss to remove the excess from the proximal spaces. The onlay must be held in place at all times, don't move it!	
<b>12</b>	Polymerisation	Only light cure after the excess cement has been removed! Should be light cured from each direction for at least 40 seconds. In case of vital teeth, make sure you don't overheat the pulp (take breaks, cool the tooth with air). Prior to light curing you can use glycerol gel along the marginal seals to prevent oxygen inhibition.	
<b>13</b>	Rubberdam removal, checking occlusion, correction if needed	And also check articulation movements! Corrections can be done with yellow or red diamond burs	
<b>14</b>	Finishing, polishing	Finishing: yellow / red diamond, Arkansas stone, Soflex discs. Polishing: rubber (specific rubber polisher for ceramic)	

## **Bonding of VOCO Grandio restoration with VOCO Bifix QM dual-bonded resin cement**

1. Pretreatment of the onlay cavity:
  - I. Selective enamel etching with orthophosphoric acid (15 sec.), washing, drying
  - II. Application of **VOCO Futurabond DC** (20 sec. rubbing, air blasting, 10 sec. polymerisation)
2. Preparation of the inner surface of the restoration:
  - I. Sandblasting
  - II. Cleaning with alcohol
  - III. Silanization: with **VOCO "Ceramic Bond"**. Attention, this is not the bond, this is the silane! Allow to dry for 60 sec. and then air dry completely.
3. Application of adhesive cement (**VOCO Bifix QM**):
  - I. Apply the cement to the inner surface of the restoration, possibly into the cavity.
  - II. Position and hold the restoration in place. 2 minutes are required.
  - III. Removal of the excess (microbrush, superfloss)
  - IV. Light curing with polymerisation lamp: min. 20 sec. per side

## **Bonding of Ivoclar e.max restoration with VOCO Bifix QM dual-bonded resin cement**

1. Pretreatment of the onlay cavity:
  - V. Selective enamel etching with orthophosphoric acid (15 sec.), washing, drying
  - VI. Application of **VOCO Futurabond DC** (20 sec. rubbing, air blasting, 10 sec. polymerisation)
2. Preparation of the inner surface of the restoration:
  - I. Etching with hydrofluoric acid (20 sec), washing, drying
  - II. Silanization: with **VOCO "Ceramic Bond"**. Attention, this is not the bond, this is the silane! Allow to dry for 60 sec. and then air dry completely.
3. Application of adhesive cement (**VOCO Bifix QM**):
  - I. Apply the cement to the inner surface of the restoration, possibly into the cavity.
  - II. Position and hold the restoration in place. 2 minutes are required.
  - III. Removal of the excess (microbrush, superfloss)
  - IV. Light curing with polymerisation lamp: min. 20 sec. per side