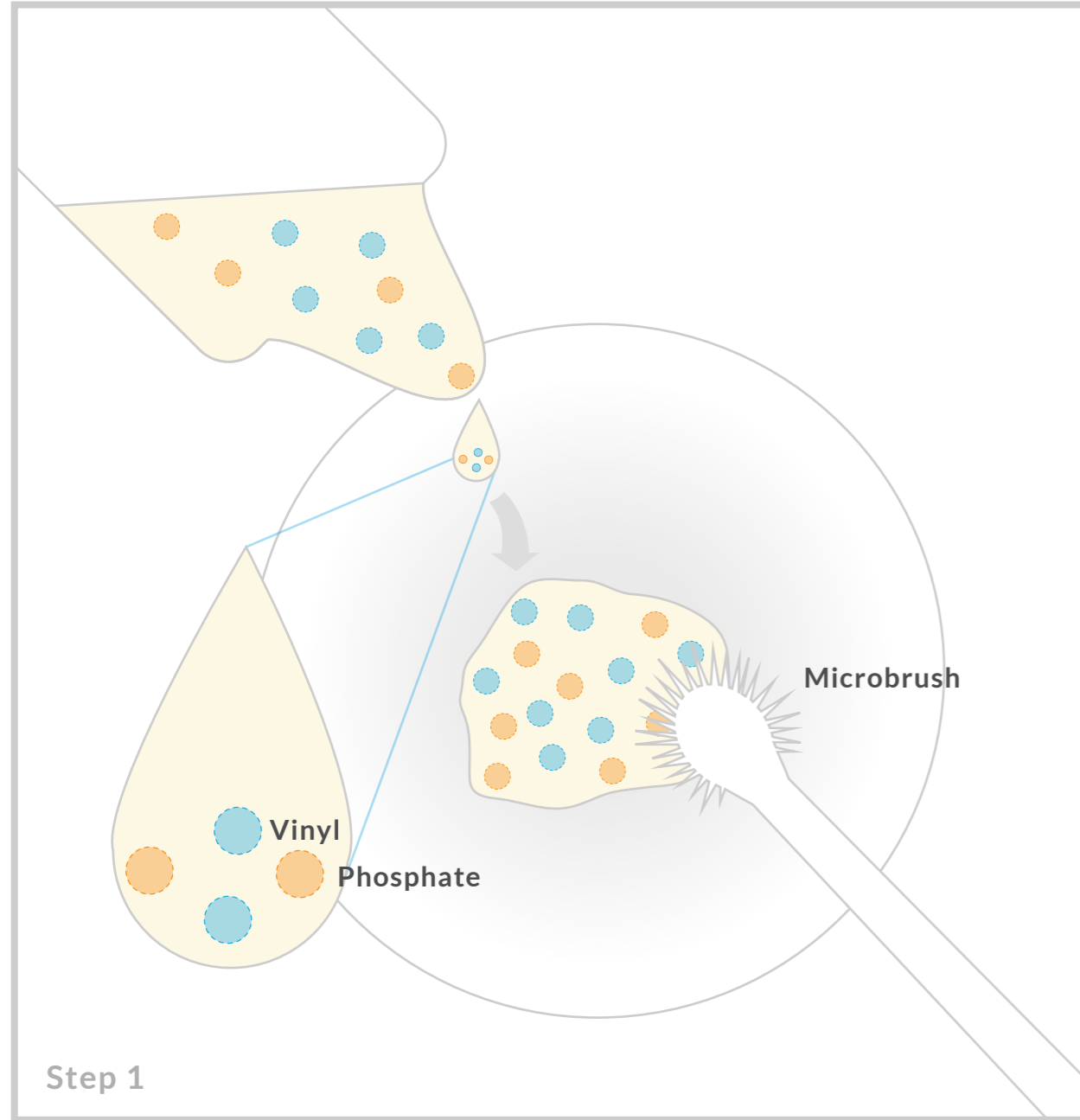
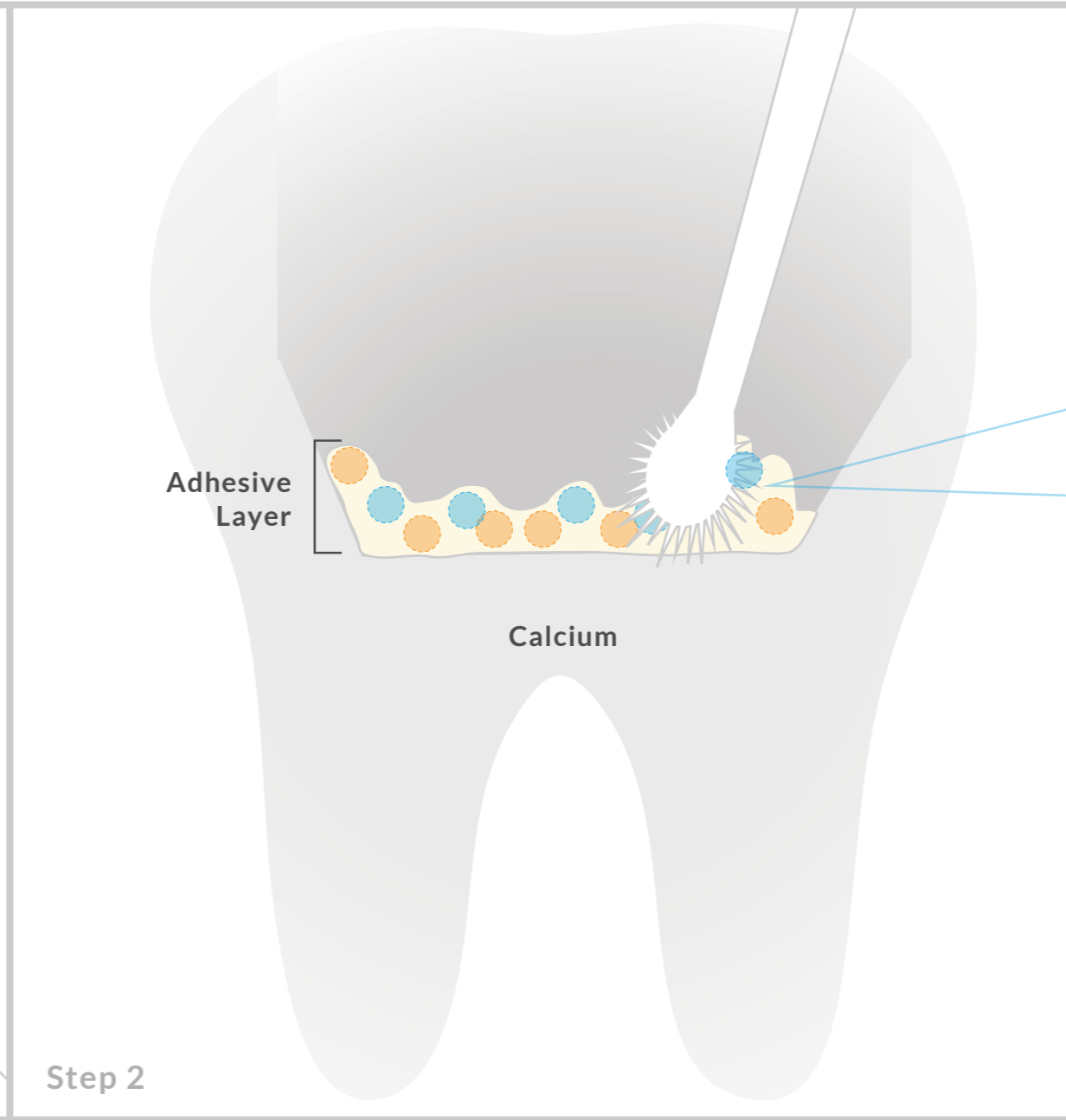


# DENTSPLY Caulk's PENTA Adhesive Monomer: A molecular structure advantage



Dental adhesive chemistry utilizes adhesive monomers comprised of vinyl groups and phosphate groups, each performing a specific function in the adhesion step.



For an effective bond, the Vinyl group (circled in blue above) must be locked into the resin, and the Phosphate group (circled in orange above) must be locked into the calcium in the tooth structure. The two groups must also be connected.

## Detailed view of bond

**Characteristics of PENTA**  
PENTA - Dipentaerythritol-Pentaacrylate Phosphate

**Characteristics of MDP**  
MDP - Methacryloyloxydecyl Dihydrogen Phosphate

**Legend**

<span style="color: green;">○</span> OXYGEN	<span style="color: blue;">●</span> VINYL - GROUP Function: The part of the molecule that locks into the resin
<span style="color: orange;">●</span> PHOSPHATE	<span style="color: orange;">●</span> PHOSPHATE - GROUP Function: The part of the molecule that chemically bonds to the tooth structure
<span style="color: purple;">OH</span> HYDROXYL	
<span style="color: blue;">H<sub>2</sub>O</span> WATER	
<span style="color: red;">//</span> BREAK IN THE BOND	

DENTSPLY Caulk adhesives utilize a proprietary adhesive monomer called PENTA that provides a unique micromechanical AND chemical bond for long-term success. Unlike the MDP adhesive monomer which contains just 1 vinyl group, PENTA contains 5 vinyl groups (for locking into resin). This way, when hydrolysis occurs and breaks a vinyl group off from the phosphate group (which is locked into calcium in tooth structure), 4 vinyl groups still remain available to maintain the connection to the phosphate group, and thus to the tooth structure. As a result of this molecular structure advantage, adhesives with PENTA are better able to resist degradation of the bond.