



Adhesion – The Driving Force In Dentistry Towards Perfect Restorations

Prof. Jean-François Roulet, Switzerland

Once upon a time, direct dental restorations were anchored in teeth by macro mechanical retention (undercuts). Even with good adaptation between the restorative material and the tooth and even if some kind of tooth coloured materials were used, the restorations were always visible due to optical effects at the interface and differences in optical properties of restorative materials and tooth tissues. For indirect restorations this was basically true as well (retention by “friction” and opaque cements to seal the gap). However, there the task of the dentist was a little easier, because by inserting crowns, the transition tooth-restoration could be hidden by placing the margins subgingivally. Furthermore ceramic used as a restorative material for anterior crowns (“jacket crowns”) was already then aesthetically pleasing due to its similar optical characteristics as compared to teeth. However, these crowns were prone to fractures.

Adhesive technology has changed everything. Today we can bond to enamel and dentin with reliable products and techniques, yielding high bond strengths. In combination with composite materials having the same optical characteristics than enamel and dentin, it is possible to create the illusion of natural teeth. Furthermore, any macro mechanical retention now can be omitted, which not only saves considerable amounts of sound tooth tissues, but also gives the dentist more freedom and flexibility in creating even large restorations.

The same is true for indirect restorations. Today we have adhesive protocols to reliably bond to every known restorative material. The surfaces of these materials are conditioned in a way to allow resin based luting materials to bond perfectly to these restorative materials. Since resins can be matched regarding their optical parameters with the tooth and the restorative materials, the interfaces will not be visible anymore and therefore the dentist again gets more flexibility in the design of indirect restorations. On top of this, bonding ceramics can prevent crack initiation and therefore today ceramics can be used in thinner layers and extended indications. Furthermore also here sound tooth tissues can be saved from being removed just in order to insert a restoration.

Adhesive technology has made dentistry much more effective and less invasive as it has been in the past. However it became a little more complicated. By knowing some materials properties and the basics of adhesion the dentist can understand the application protocols, and can select the right one in the right situation. Clear guidelines will be presented.