



## S-PRG fillers in dental adhesives – what we know so far? –

Alessandra Bühler Borges  
São Paulo State University- UNESP,  
Institute of Science and Technology of São Jose dos Campos.

The development of dental materials able to release ions or substances that may effectively interact with the surrounding tissues and alter the local environment represents a great challenge in Dentistry. The Surface Pre-Reacted Glass-Ionomer (S-PRG) technology is based on the reaction between a multifunctional (fluoro-boro-aluminosilicate) glass and a polyacrylic acid solution. As the result of a complex multi-step process, the final particle presents a trilaminate structure: an outer thin inorganic silica glassy layer, an inner multifunctional glass core, and an intermediate glass ionomer phase. Six ions (aluminium, borate, fluoride, silicate, sodium and strontium) were proven to be released from the glass-ionomer phase in wet environments. Many functions may be attributed to the different ions; the most relevant in the context of preventive dentistry are related to antimicrobial activity, inhibition of enamel and dentin demineralization, as well as remineralization promotion. The generic term conceived for the materials that contain the S-PRG technology is Giomer, due to their Glass IONoMER phase. Among their applications, these fillers can be incorporated in materials used for prevention of primary caries, as well as added to products used in restorative dentistry, including adhesive systems, resinous cements, and resin composites. In adhesive systems, the S-PRG fillers are added to the bonding agent of self-etching products. Since dental adhesion still present shortcomings that may direct influence the restoration longevity, the differential action of ion-releasing systems would be desirable, mainly related to their antibacterial properties, acid neutralization and potential to increase the resistance of adjacent tissues to further demineralization. The interaction of the multiple ions with the surrounding tissues might eventually contribute to reduce secondary caries lesions and increase the durability of adhesive restorations. Additionally, aiming to preserve tooth hard tissue and reduce the risk of pulp exposure, as advocated by the concept of selective caries removal, the use of an adhesive agent able to optimize the remineralization of the affected dentin would also be favorable. Thus, corroborating with the minimally invasive dentistry, new and improved formulations of dental materials containing S-PRG fillers have been launched over the years, and the scientific evidence related to its benefits is noticeably increasing.

---

### <Curriculum Vitae>

- Master of Science and PhD in Restorative Dentistry in Sao Paulo State University – UNESP, Brazil
- Postdoctoral fellow at Oral Health Research Institute in Indiana University - USA
- Author of more than 150 research articles in peer-reviewed scientific journals