



State-of-the-art structural adhesive dentistry: diagnosis and management

Alireza Sadr, DDS, PhD
Department of Restorative Dentistry,
School of Dentistry, University of Washington

Dental bonding revolutionized the shape and content of clinical dentistry, presenting a durable minimally invasive alternative to the traditional approach. Thanks to the strong bonding achieved by functional monomers and multi-step adhesives such as the two-step self-etching adhesive, retention of an intracoronal adhesive restoration is not a challenge anymore; however, sealing is still considered a critical issue. Polymerization shrinkage stress still affects all kinds of adhesive restorations. Our research methodology based on optical coherence tomography (OCT) presented a systematic approach to evaluate the bonded interface of resin composites. We showed that in addition to debonding, the shrinkage stress can induce and propagate tooth cracks; OCT is a unique tool for assessment of these cracks both in vitro and clinically. Today, tooth crack is a major concern in restoration of structurally compromised teeth, particularly those previously treated with the traditional (also known as amputational) dentistry. Adhesive reconstruction of a cracked tooth requires a structural approach, which relies on adhesion, mimics the properties of the natural tissues and presents a mechanism to mitigate the internal and external functional stresses, such as the fiber-reinforced composites.

<Curriculum Vitae>

Ali Sadr received his DDS degree from the National University of Iran (SBMU) and went on to complete his PhD and advanced training in operative dentistry in Tokyo Medical and Dental University, mentored by Prof. Junji Tagami in 2008. In Japan, he focused on advanced technology research, mainly dental adhesives and optical coherence tomography (OCT) for non-invasive diagnosis into the clinical practice of dentistry and a clinical imaging tool. Dr. Sadr published over 200 scientific articles on the research projects funded by the governments, industry and non-profit organizations in Japan and the United States. He is currently the director of operative dentistry at UW, while running the B4T research lab and practicing dentistry. Dr. Sadr received the UW SOD Faculty Award for his operative courses for 3 years in a row. He has been attending the IAD since 2004, and won IAD scientific presentation awards in 2011 (Seoul, Korea) and 2013 (Philadelphia, PA). He organized the IAD 2019 in Seattle, WA. In 2022, Dr. Sadr received the IADR Dental Materials Research Award (The Bayne Award) for his significant contribution to the science and application of dental materials research by his mid-career.