



## The evolution and harmony of analog and digital in direct composite restorative challenges 2022

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Over the past decades, the evolution of adhesive dentistry has expanded the range of applications of direct composite restorations and revolutionized modern restorative treatments. Direct composite restorations are frequently provided as esthetic and functional clinical treatments following the minimal intervention dentistry concept, even in extended cavities including endodontically treated teeth, replacing missing teeth, and full mouth reconstruction.

However, free-hand recreation of anatomical morphology using resin composites may be technique sensitive and challenging, especially for the aforementioned complicated cases. It is evident that a better outcome is possible if the appropriate morphology is planned and simulated before treatment and can be accurately transferred to the treated tooth. Therefore, several techniques utilizing a silicone index as a negative form prepared on a diagnostic wax-up model that simulates the morphology of the final restoration have been introduced to improve direct restorative procedures. Terry et al. introduced the inverse injection technique using a highly filled flowable resin composite and a highly clear silicone index, facilitating efficient and accurate direct flowable resin composite placement.

Digital technologies have become widespread in restorative dentistry, prosthodontics, orthodontics, oral surgery, and implant dentistry. This digital transformation of dental clinics and laboratories has been accomplished using intra-oral scanners, computer-aided design (CAD), and computer-aided manufacturing. There are many benefits of digital dentistry, even for the injection technique. Firstly, the dentition is scanned intraorally, and then a digital wax-up is accurately prepared using CAD software in collaboration with dental technicians. Secondly, the simulated wax-up is 3D-printed as a plastic model onto which a detailed index can be fabricated. Lastly, the laboratory work can become less time-consuming. As a result, the treatment time can be significantly reduced, and an accurate restoration can be provided according to the simulation. The presentation will introduce digitally-driven direct composite injection techniques with single-shade injectable resin composites and different designs of clear indices in several challenging situations and comprehensively describe related clinical procedures and adhesive bonding strategies.

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### <Biography>

Dr. Keiichi Hosaka, born in 1978, is a professor in the Department of Regenerative Dental Medicine, Tokushima University Graduate School of Biomedical Sciences. He received his D.D.S. and Ph.D. degrees from Tokyo Medical and Dental University in 2003/2007. In 2005-2006, he was a visiting scholar at the Department of Oral Biology, School of Dentistry, Medical College of Georgia, US. His research and clinical work focus on bonding between dental structures and tooth-colored dental materials. He has published and lectured both nationally and internationally in the field of adhesive dentistry and esthetic dentistry. In addition, he is a board-certified trainer of Japanese Society for Adhesive Dentistry and The Japanese Society of Conservative Dentistry, and a board-certified fellow of Japan Academy of Esthetic Dentistry.