The origin and development of dentin adhesives

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Systems for adhesion to dentin and enamel bonding are recognised to stem from the work of Buonocore in the 1950s. While bonding to enamel has become reliable, predictable, with typically excellent longevity, adhesion to dentin, despite many remarkable advances and innovations and its extensive application in clinical practice, has yet to achieve similar success. Much of the difficulty experienced in consistently producing an effective, durable and long lasting bond to dentine is related to the complex structure and variable nature and composition of dentin substrates encountered clinically, and the difficulty in applying adhesive systems in a precise manner in complex cavity forms. The work of Fusyama and co-workers in 1979, which heralded the now routine etching of operatively exposed dentin, followed by the description of the resin-infiltrated hybrid layer by Nakabyashi and co-workers in 1982, were transformational in the evolution of dentin adhesion technologies. Subsequently, a substantial and ever-expanding body of knowledge and understanding on aspects of adhesion to dentin has evolved and developed through sustained commercial investment and a vast, diverse body of basic, translational and clinical research, which has become, and is anticipated to remain a major element of dental biomaterials science. A great deal has been achieved, but, as acknowledged by the many champions, let alone pioneers and giants in the field, more remains to be done to realise the goal of adhesive systems and techniques being considered by clinicians at all levels to be convenient and reliably effective in producing predictable, durable adhesive bonds across the broad spectrum of the many existing and possible future applications for dentin adhesives. In the meantime, the many different clinical options and considerable patient benefits made possible by modern adhesive dentistry are considered to be cause for considerable celebration. Indeed, operative and esthetic dentistry, in particular, have been transformed in ways which were previously unimaginably, and taken to new levels of sophistication by recent and existing dentin adhesive technologies. Dentin adhesives are not only here to stay, but will play an ever-increasing role in the restoration, preservation, esthetic enhancement and replacement of teeth.

Learning objectives:
1. To understand the origins and development of dentin adhesives
2. To appreciate the impact developments in adhesive dentistry have had on the clinical practice of dentistry