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The Effect of Etching procedures on Biofilm-Coated Dentin Adhesion

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Pe ec i e

In d c i n

Acid etching on an adherent substrate is a critical process to achieve successful adhesion between dental hard tissues (i.e., enamel or dentin) and restorative materials. Although the importance of phosphoric acid etching for dentin has been deemphasized due to the development Inrtfr0haa 0 1 Tw 0-1.2 TD(were unable to completely remove alive and dead bacteria attached to)Tj0 3 Tw 0-1.2 TD(the dentin su exposes the collagen bers in the dentin and opens the dentinal tubules, leading to the preparation for micromechanical interlocking with adhesive agents. In the region where the bio lm remains, the dentin surface could not be properly demineralized by phosphoric acid, preventing the appropriate hybridization with collagen bers and adhesives as well as a resin tag formation within the dentinal tubules [3]. In the present study, even the mechanical pressure and friction with a rubber cup and pumice did not completely remove the bio lm, and could not restore the bond strength to the level of the bio lm-free group.

Adhesion between the dentin wall of tooth preparations and resin composites is a critical factor determining the success of direct or indirect restorations using resin composite. Based on the results of this study, e orts to remove the bio lm are essential because the remnant bio lm on the dentin surface hinders the adhesion with the resin its antibacterial e ect, and it can induce durable resin–dentin adhesion by protecting against collagen degradation. e chlorhexidine molecule with a positive charge interacts with the negatively charged substance of the bacterial cell wall when low concentrations are used. e binding of chlorhexidine to the bacterial cell wall changes the osmotic equilibrium of the cell, causing the low-molecular weight substances to leak out. In high concentrations, chlorhexidine penetrates the bacterial cell wall, leading to bacterial cytoplasm precipitation [5]. In fact, the bactericidal e ect of chlorhexidine was evidenced by a prominent increase in the population of bacterial dead cells in the chlorhexidine-treated groups compared with the group that did not receive chlorhexidine treatment in this study. However, other than the antibacterial e ect, chlorhexidine treatment appears to have little ability to remove contaminants, including smear debris and remnants of provisional cement, from the dentin surface.

C ncl i n

In this study, a single species of *S. m an* was used, and saliva was initially coated but not continuously supplied. erefore, the appearance of the bio lm may be di erent from the actual bio lm in the oral cavity, and the binding force between the bacteria and dentin may also be di erent. In situ experimental setups in the oral cavity might be needed to simulate the actual bio lm coating on tooth surfaces in future studies.

References

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