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### **In-Vitro Efficacy of Cleaning Splints Assisting Approximal Plaque Removal**

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**Objectives** Cleaning splints (CS) can facilitate interdental brush (IDB) insertion and guide IDB during cleaning movement. This can be in particular beneficial for patients with impaired manual skills and cleaning deficits on tooth surfaces next to wide gaps or on terminal teeth. In this in-vitro study, cleaning efficacy with and without CS was assessed for a fully dentate (FD) and a partially edentulous (PE) situation.

**Methods** A typodont model was used either as FD (all teeth inserted) or as PE (every second tooth missing). For both situations, suitable IDBs were selected and cleaning splints were designed and fabricated (n=10/group) by 3D printing (Freeprint Splint 2.0, Detax). Before and after the standardized cleaning with/without CS model teeth were removed and photographed (Smartzoom 5, Zeiss) at three timepoints: T1) clean surface, T2) plaque simulation (Artificial Plaque, Nissin Dental Products), and T3) after cleaning. For each of the four test groups differing in dental status and use of CS, n=10 tests were performed. After alignment of corresponding photos, the quotient (T2-T3)/(T2-T1) of color differences (Matlab R2022a, Mathworks) was calculated. Cleaning efficacy was set as the mean value over predefined regions of interest. Effects of CS use and dental status were analyzed with two-way ANOVA ( $\alpha=0.05$ ).

**Results** With FD models, no significant differences were found irrespective of the use of cleaning splints. In contrast, the cleaning efficacy of approximal tooth surfaces in PE models was significantly improved by the use of cleaning splints.

**Conclusions** Cleaning splints can be recommended for clinical application. The results showed no negative effects on approximal plaque removal. For patients with manual impairment or tooth situations that are difficult to clean, cleaning splints might have the potential to improve interproximal hygiene. Clinical studies have to clarify if such an improvement can also be seen for patients with restricted manual skills.