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Editorial

Restorative Aspects of Adhesive Dentistry

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Adhesion is the driving force of the progress in dentistry [1]. Many clinical applications in restorative dentistry are indeed adhesive procedures including the placement or repair of direct and indirect restorations.

In the direct restorative procedures, the main challenge is to achieve robust bonding to tooth structure. Based on the dental substrate, adhesive strategy is selected. Current adhesive strategies include; etch-and-rinse (ER), self-etching (SE) and selective enamel etching (SEE). ER strategy in which phosphoric acid etchant is applied to dental substrate prior to adhesive application is recommended for enamel, while it may be considered an aggressive step to dentin [2]. Acid-etching of dentin activates the matrix metalloproteinases enzymes which may result in degradation of collagen fibrils within hybrid layer which can affect bond strength [3,4]. In contrast to ER, SE strategy do not require the acid-etching step, as they contain acidic monomers that simultaneously 'condition' and 'prime' the dental substrate [5]. This strategy is more recommended for resin-dentin bonding more than enamel. In SEE, acid-etching is performed only to enamel followed by application of SE or multimode (MM) -universal- adhesive to both enamel and dentin [6]. MM adhesives are primarily SE adhesives that can be used in ER, SE or SEE approaches [7].

Clinician should consider clinical approaches to enhance the durability of adhesive bonding to tooth substrates such as vigorous rubbing application, prolonging the exposure time during light curing, application of multiple coats and effective solvent evaporation [8].

In contrast to direct resin-based restoratives which usually are applied in the preset form, and covalently bond to cured adhesives, the indirect restorations are mostly made of ceramics or indirect composite which is highly polymerized. The main challenge is the achievement of reliable bonding between the resin cement and indirect material. Two-step surface treatment is suggested based on the composition of indirect material [9]. Firstly, micromechanical surface treatment using hydrofluoric acid etching for glass-based [10] or hybrid ceramics [11], air-abrasion for polycrystalline ceramic [12] or indirect composite [13].

Following micromechanical surface treatment, the adhesion promoter or so-called [primers] can be applied to enhance chemical bonding between the indirect material and resin cement. Primers include γ-methacryloxypropyltrimethoxysilane (silane) which can be used for glass-based [14], hybrid ceramics [11] and indirect composites [13] or 10-methacryloyloxydecyl dihydrogen phosphate (MDP)-Containing primer for polycrystalline ceramics [15]. The recently introduced universal adhesives improved bond strength to zirconia ceramic [16]. However, regardless of its silane content universal adhesives cannot be considered as alternatives to the silane-based primers for glass-based ceramics [17].

The success of both direct and indirect restorations can be affected by the bonding quality achieved. Therefore, clinician should be aware of the nature of substrates to be bonded as well as the recommended adhesive strategy or surface treatment.

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