

EVALUATION OF BOND STRENGTH AND SCANNING ELECTRON MICROSCOPIC (SEM) EXAMINATION OF THE INTERFACE BETWEEN DENTIN ADHESIVE SYSTEMS, GLASS IONOMER CEMENT AND SCLEROTIC DENTIN

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Alexandria Dental Journal, Volume 20.Number 1.January 1995

Summary and Conclusion

The purpose of this study was to evaluate bond strength of two adhesive systems to sclerotic and normal dentin, as compared to glass ionomer cement restoration material. The microstructure of [he interface between glass ionomer cement, the adhesive systems / dentin was examined using scanning electron microscope Two dentin bonding systems were used in this study Scotchbond Multi-Purpose (fourth generation) and Syntac (third generation with their composite Wresin (Z10 and Helimolar). Glass ionomer cement restorative material (GIC) was also used. Twenty-one caries-free freshly extracted human premolars were collected and stored in distilled water. Another twenty-one caries-free human premolars showing severe occlusal attrition, were collected from patients over 60 years . The teeth were selected according to the criteria of dentin sclerosis scale described by Heyrnan and Bayne in 1993 (Table II)

The occlusal surfaces of the teeth were ground flat on a water-cooled abrasive wheel to expose dentin for preparation of The specimens for shear bond strength test The 42 teeth were divided into two main groups ; Group (I) normal dentin (21 teeth) and Group (II) sclerotic dentin (21 teeth). Each group was further subdivided into thee subgroups (a, b and c) Group 'a and Ha (Scotchbond Multi-Purpose with Z100) , Group 1b and tb (Syntac and Helimoler) , Group 1 and B (Glass ionomer cement- Fuji II) • The shear bond strength was determined in a Universal Testing Machine with cross head speed of 1 cm/minute The fractured specimens were Cut longitudinally and examined using scanning electron microscope (SEM)

From the obtained results, the following could be concluded:

- 1) It is increasingly important that clinicians should recognize differences in dentin composition before planning restorations that depend on the use of dentin bonding systems. By SEM examination, the clinical criteria of sclerosis (glassy appearance of dentin) was confirmed and the dentinal tubules were partly or completely obliterated by mineral crystals providing a uniform refractive index of the dentinal tubules
- 3) Dentin sclerosis significantly affected the bond strength of the two dentin bonding systems used in this study. However, dentin adhesive system that recommended a total etch pre-treatment of dentin, i.e. uses an etchant and a primer offers more reliable bonding to both normal and sclerotic dentin. This was clearly observed in SEM, where the Scotchbond MP shows more resin tags development with both normal and sclerotic dentin
- 4) Although glass ionomer cement showed higher bond strength to sclerotic dentin, these bond strength values were significantly lower than those of adhesive bonding systems.
- 5) Further researches are needed to develop adhesive systems that bond equally well to various kinds of dentin substrate. Also, extending the application time of the etchant of existing dentin adhesive systems or the use of more aggressive acids may be of benefit.