

In vitro micro-shear bond strength of five composite resins to dentin with five different dentin adhesives

Jin-Ho Chung, Byoung-Duck Roh

Department of Conservative Dentistry, College of Dentistry, Yonsei University

I. Objectives

Objectives of this study were to (1)compare and evaluate the combination use of 5 types of dentin adhesive system and 5 type of composite resin using micro-shear bond test, and to (2)compare micro-shear bond strength of contemporary 5th generation dentin adhesive system.

II. Material & Methods

Five bonding systems(Prime & Bond NT, Excite, Syntac, Onecoat bond, Clearfil SE bond) and Five composite resins(Spectrum, Tetric Ceram, Synergy Compact, Clearfil AP-X, Z100) were used(5x5=25group, n=14/group). The slices of horizontally sectioned human tooth were bonded with each bonding system & each composite resin, and tested by a micro-shear bond test. In addition, observation of the sheared site after debonding were performed with scanning electron microscopy(SEM). This results were analyzed by ANOVA(P<0.0001), LSD and Tukey(confidence interval : 95%)

III. Results

This results was as follow

(n:14/group×25=350)

	Spectrum	Tetric Ceram	Synergy Compact	Clearfil AP-X	Z100	Mean
	Mean±S.D.	Mean±S.D	Mean±S.D	Mean±S.D	Mean±S.D	
Prime&Bond NT	16.008±6.598	11.544±2.656	11.671±2.967	15.976±6.308	9.444±4.143	12.762
Excite	15.976±3.763	13.425±4.711	14.048±7.303	17.877±5.232	11.671±5.263	14.599
Syntac	20.762±7.065	17.004±8.167	17.603±6.223	19.036±8.505	17.437±3.557	18.368**
Onecoat bond	18.353±5.361	11.222±3.020	13.663±6.629	13.191±5.614	12.079±5.425	13.702
Clearfil SE bond	23.940±8.628	22.147±6.984	21.952±6.501	22.412±8.832	22.758±9.588	22.642***
Mean	19.008***	15.068	15.787	17.532	14.678	

(unit : MPa)

After dentin bond strength test, predominant mode of failure was mixed failure.

IV. Conclusion

1. The mean micro-shear bond strength of 5th dentin adhesive systems were in order of Clearfil SE bond(22.642 MPa), Syntac(18.368 MPa), Excite(14.599 MPa), Onecoat bond(13.702 MPa), Prime & Bond NT(12.762 MPa). The mean bond strength of self-etching primer system group(Clearfil SE bond, Syntac) in dentin was higher than that of Self-priming adhesive system group(Prime and Bond NT, Excite, Onecoat bond) significantly.
2. The mean micro-shear bond strength of composite resins were Spectrum(19.008 MPa), Clearfil AP-X(17.532 MPa), Synergy Compact(15.787 MPa), Tetric Ceram(15.068 MPa), Z100(14.678 MPa). Spectrum was bonded stronger than other composite resins significantly.
3. The combination of composite resin and dentin adhesive system recommended by manufacturer was not better than the combination of composite resin and dentin adhesive system different from those recommended by the manufacturers. It was not a significant factor.
4. No difference was found in micro-shear bond strength of composite resin in self-etching primer system group(Clearfil SE bond, Syntac) statistically. However, there was significant difference of bonding strength of composite resin group in self priming adhesive group(Prime & Bond NT, Excite, Onecoat bond).
5. In conclusion, the physical properties of composite resin and dentin adhesive system seem to be more important factor in dentin bonding strength than same manufacturer.