Corecem™ Studies and Articles

Coniglio, I, Magni, E., Cantoro, A, Goracci. C., Ferrari, M. **Push-out bond strength of circular and oval-shaped fiber posts.** *Clin Oral Investig. Oct, 2011, Vol. 15, Issue 5, pp 667-672*

This study aimed at evaluating the post-root dentin push-out bond strength of circular and oval posts luted in oval-shaped canals with two different resin cements. Twenty extracted premolars with oval-shaped canals were selected, endodontically instrumented and obturated. The teeth were divided into two groups according to the drill used for post-space preparation and to the post shape (Ellipson oval tip + post and MTwoPF + DT Light-Post). Each group was then subdivided into two subgroups according to the cement (Gradia Core and **Corecem** Automix). The post-dentin bond strength was evaluated with the thin-slice push-out test. The bonded surface area was calculated for each post shape with an appropriate geometric formula in order to express the retentive strength in megapascal. Push-out strength data were analyzed with the Kruskal-Wallis ANOVA. The results showed that neither the drill-post system nor the cement significantly affected the push-out strength. The means (SD) of the push-out bond strengths in the experimental subgroups were the following: 11.79 MPa (4.77) for Gradia Core/ Ellipson tip and post, 13.36 MPa (5.16) for Gradia Core/MtwoPF and DT Light-Post, 11.18 MPa (2.58) for Corecem Automix/Ellipson tip and post, and 10.91 MPa (3.89) for Corecem Automix/MtwoPF and DT Light-Post. In conclusion, circular and oval posts achieved similar retentive strengths in oval canals.

Di Renzo, S. Sauro, S., Grande, NM., Plotino, G., Somma, F. Watson, TF, F. Mannocci, F. **Confocal microscopy evaluation of post-resin-dentine interfaces.** *J Dent Res.Vol 87 (Spec Iss C) Abstract #0108, 2008 (www.dentalresearch.org)*

Objectives: The objectives of this study were to compare the number of voids and the cement thickness in post-resin-dentine interfaces of teeth restored with conventional and anatomically modified glass fibre posts. **Methods**: 48 single-rooted mandibular premolars were selected. After removing the crowns at the cemento-enamel junction the coronal portions of the root canals were prepared using Gates Glidden drills and instrumented to a size 40 master apical file. The apical portions of the roots were obturated with vertically condensed gutta-percha. The roots were divided into 2 groups. The teeth in group 1 were restored with standard fibre posts (Easypost Lux) and the teeth in group 2 were restored with anatomically modified glass-fibre posts (Periodent). The posts were cemented using a dentine bonding system (Sealbond Ultima) and composite cement (**Corecem**). The bonding agent was labelled with Rhodamine B, applied on the root dentine and on the surface of each post and light cured for 60s. Each tooth was sectioned along the long axis in a mesio-distal direction and sections were randomly selected for the study, 24 independent specimens were therefore included in each group. Confocal microscopy was used to assess the presence of voids between cement and fibre post (G1) between dentine and adhesive (G2) and between cement and adhesive (G3) at six sites for each specimen (two coronal, two middle, and two apical).The thickness of the cement was also evaluated at the same sites. All data were statistically analyzed using Pearson's X^2 **Results**: The presence of voids in Group 1 was significantly greater than in group 2. No significant differences were found between the cement thicknesses of the two groups. Conclusions: Anatomically modified glass fibre posts produced a post-resin-dentine interface of better quality than conventional posts.

	VOIDS				Cement Thickness (µm)
	G1	G2	G3	G/tot	(Mean±SD)
Modified Post	[a] 109	[a] 176	[a] 29	[a] **314**	[a] 30,1 ± 22,3
Standard Post	[b] 297	[b] 246	[a] 22	[b] **565**	[a] 30,5 ± 31,3

The values with the same superscript letter showed no statistically significant difference (p< 0.05).

Berthold, C, Binus, S.M, Koch, A.T., Powers, L.M., Petschelt, A. **Bonding Properties of FRC-posts - Influence of Post Pre-treatment.** *J Dent Res.Vol 92 (Spec Iss A) Abstract #1855, 2013 (www.dentalresearch.org)*

Objectives: To evaluate the influence of post pre-treatment by adhesive application on bond strength of adhesively luted quartz-fiber-reinforced-composite posts [QFRCP] to root canal dentin. **Methods:** 160 extracted single rooted bovine teeth were randomly assigned (n=20 per group), root canal treated, filled and post space (10mm) prepared. Size 6 custom-made smooth-surfaced QFRCPs [PSXRO] (Rz=5.5µm, Ra=0.8µm) (RTD, France) were cleaned with alcohol for pretreatment A and additionally pretreated with the respective dentin bonding system for pretreatment B. The posts were then luted with Multilink Primer_Multilink [ML], AdheSE_Multicore flow [MCF], SealBond Ultima (light-cured before post insertion)_**Corecem** [CC], and LuxaBond_LuxaCore Z [LCZ], respectively. After water storage (24h,

37°C), pull-out-test (N) was performed, bond strength (MPa) calculated and analyzed using Kolmogorov-Smirnov-test ($p>0.05$), ANOVA and t-test ($\alpha=0.05$). Failure mode was assessed under a stereomicroscope and data analyzed using Kolmogorov-Smirnov-test ($p<0.05$) and Mann-Whitney-U-test. **Results:** The influence of the post pretreatment on the bond strength ($p<0.05$) was statistically significant, while the luting system selection ($p=0.31$) was not. Within one luting system, statistically significant differences in bond strength, for the two post pretreatment techniques, were found for ML ($p<0.05$). Overall, the main failure occurred between the post and the luting system (86%). The failure between post and luting system was reduced when using pretreatment B (83%) compared to pretreatment A (89%), but not statistically significant ($p=0.069$).

Luting System	Bond strength (MPa)		p-value
	Pretreatment A (alcohol)	Pretreatment B (alcohol +adhesive)	
Multilink Primer_Multilink	13.1±3.0	15.0±2.9	<0.05
AdheSE_Multicore flow	13.6±2.4	14.4±3.1	0.39
SealBond Ultima_/ Corecem	**13.0±2.4**	**13.3±3.1**	0.34
LuxaBond_LuxaCore Z	13.9±2.3	14.6±2.5	0.68
p-value	0.64	0.31	

Conclusion: In this in vitro study, the post pretreatment technique using ML significantly influenced the bond strength of adhesively luted QFRCPs to bovine teeth. This effect might be explained due to improved bonding between the post and the ML luting system.

Note: Sealbond Ultima / Corecem performed as well as the more established brands.

Ebert, T., Koch, A.T.A., Binus, S.M., Powers, J.M., Petschelt. A., Berthold, C., **Bonding of frc-posts-influence of luting systems and post design.** *J Dent Res. Vol 89 (Spec. Iss. B) Abstract #4482, 2010 (www.dentalresearch.org)*

Objectives: The purpose was to evaluate the influence of conventional and adhesive luting systems on bond strength for two designs of glass-fiber-reinforced posts [FRCP] to bovine root canal dentin. **Methods:** 650 extracted bovine teeth were randomly assigned to 13 groups (n=50), root canal treated, filled and post space (8mm) prepared. The custom-made FRCPs (PXRO=smooth surface), the Macro-Lock Post [MLXRO] (RTD, France) (group 1-5) and the titanium-post [TIP] (control) were cleaned with alcohol; the posts of groups 4-6 additionally pretreated, using the corresponding adhesive system and than inserted into to the root canals using LS (table), following the manufacture's instruction. After water storage (24h, 37°C), pull-out-test was performed; bond strength (MPa) calculated and analyzed using ANOVA (Welch-test), Dunnett-T3 post-hoc-test ($p<0.05$) and t-test with Bonferroni-correction ($p<0.008$). The assessment of failure mode was made under a stereomicroscope. **Results**: Luting system and post design were statistically significant. Compared to the control, the bond strength of all luting systems, except for group 1_PXRO were statistically significant. Comparison of bond strength within the luting systems showed predominantly significant differences. When comparing the two post designs, significant differences were found for luting systems 1, 2 and 6.

Group	Luting System	Bond Strength (MPa)			t-test p-value
		TIP	PXRO	MLXRO	
control	Ketac Cem	4.3±1.5 $^{+}$	-	-	-
1	Ketac Cem	-	4.2±1.0 $^{+}$	7.2±2.2	<0.008
2	Fuji Plus	-	8.6±1.5 ^{a}	13.4±2.5 ^{A}	<0.008
3	RelyX Unicem	-	10.4±3.4 ^{a,b}	9.2±2.9	0.051
4	Multilink Primer_Multilink	-	12.7±3.0 ^{b}	12.5±4.5 ^{A}	0.813
5	**SealBond Ultima_CoreCem**	-	**12.7±3.0** ^{b}	**13.7±4.6** ^{A}	0.190
6	LuxaBond_LuxaCore Z	-	15.7±2.5	20.6±2.2	<0.008

Conclusion: Luting system and the post design influenced the bond strength of conventionally and adhesively luted FRCPs to bovine root canal dentin.

Note: Sealbond Ultima / Corecem performed as well as the more established brands

Santos, G.C.JR., Santos, MJMC, Johnson, N., Rizkalla, A.S. **Micotensile bond strength of different composite core foundation materials.** *J Dent Res.Vol 92 (Spec Iss A) Abstract #0498, 2013 (www.dentalresearch.org)*

Objective: The aim of this study was to evaluate the microtensile bond strength (μTBS) of four resin composite core foundation materials and their respective post systems with and without silane surface treatment. **Method**: Eight groups of posts (n=10) were divided into those with and without silane treatment. Four different core foundation materials were paired with their recommended posts and bonding agents as follows: Corecem + SealBond Ultima + Macro-Lock; Zircules + MPa+ Macro-Lock; RockCore + Prelude + IcePost; and ParaCore + ParaBond + ParaPost Fiber Lux. Following application of bonding agent, resin composite was injected around the post in a customized mold and light cured for 20s. For μTBS, specimens (1mm x 1mm cross-section and 8mm long) were produced. Testing was conducted using a universal Inston machine at a crosshead speed of 1mm/min. Statistical analysis was carried out using one-way ANOVA and Tukey-HSD test, p=0.05. **Result:** The μTBS values ranged from 18.59 MPa for Paracore without silane to 43.09 MPa for Corecem with silane. Silane treated Macro-Lock post paired with Zircules and Corecem exhibited the highest μTBS amongst groups, $p<0.05$, while ParaPost Fiber Lux without silane exhibited the lowest μTBS, $p<0.05$. SEM analysis demonstrated mixed adhesive/cohesive failures. FRC posts tend to lose surface fibers or break during stress failure, most notably in IcePost. **Conclusion**: Macro-Lock post associated with Corecem or Zircules, give the best results with and without silane. Silane coupling improved significantly the μTBS for three core foundation materials ($p<0.05$) with the exception of RockCore + IcePost.

Note: Sealbond Ultima / Corecem performed as well as or better than the more established brands

Mackert, T. Binus,SM, Koch, ATA., Powers, JM, Petschelt, A.Berthold, C. **Bonding of FRC-posts to luting systems-Influence of application technique** *J Dent Res. Vol 89 (Spec. Iss. B) Abstract #3928, 2010 (www.dentalresearch.org)*

Objectives: The purpose of this study was to evaluate the influence of two application techniques [AT] on bond strength between adhesively bonded glass-fiber-reinforced posts [FRCP] and the luting system.

Methods: 200 (n=20/group) samples (length 10 mm), consisting of custom-made FRCP (RTD, France) and luting system (table), were prepared using a mould. All posts were cleaned with alcohol; the posts applied with AT2 were additionally pretreated, using the corresponding adhesive system, following the manufacturers' instructions for conditioning root canal dentin. After water storage (24h, 37°C), pull-out-test was performed; bond strength (MPa) calculated and analyzed using Kolmogorov-Smirnov-test ($p=0,038$), followed by Kruskal-Wallis-test ($p<0.05$) and Mann-Whitney-U-test with Bonferroni-correction ($p<0.01$). The assessment of failure mode was made under a stereomicroscope. **Results**: When comparing the two ATs, significant differences in bond strength were found for all tested luting systems. In all five luting systems, the AT2 revealed higher bond strength than the AT1. Comparing the bond strength within the five luting systems, minor significant differences were found when using AT1 ($p=0.032$) while the choice of luting system significantly influences the bond strength when using AT2 ($p<0.001$). The predominant failure mode for all groups was adhesive failure between FRCP and luting system.

Group	Luting System	Bond Strength (MPa)	
		AT1	AT2
1	Multilink Primer_Multilink	8.1±0.6	9.4±0.6
2	AdheSE_Multicore flow	8.7±0.7	11.5±1.0
3	**SealBond Ultima(light-cured after post insertion)_CoreCem**	**8.5±0.6**	**9.4±1.0**
4	**SealBond Ultima(light-cured before post insertion)_CoreCem**	**8.5±0.6**	**10.5±0.7**
5	LuxaBond_LuxaCore Z	8.3±0.5	10.4±0.7

Conclusion: Application technique influenced the bond strength of adhesively bonded FRCPs for all tested luting systems.

Note: Sealbond Ultima / Corecem performed as well as the more established brands