

The Effect of **Bioceramic** Root Filling Material on Fracture Resistance of Tooth with Thin Root Canal Wall



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Introduction & Background

Thickness of root canal wall is one of the crucial factors that contribute to fracture resistance.

Several studies showed that bioceramic sealers exhibit chemical bonding to root dentin and may strengthen the root.

Objectives

1. To study the effect of bioceramic sealer on fracture resistance of root with thin root canal wall.
2. To compare the fracture resistance of thin root wall that fill with CeraSeal® , AH Plus® and RetroMTA®.

Material and Methods

One hundred single root canal mandibular premolars were decoronated and prepared with RECIPROC® R40 and peeso reamers no.1-6 to simulated thin root canal wall. All teeth were divided into 5 groups (N=20/group). Group 1 - filled with gutta percha and CeraSeal®, Groups 2 - filled with gutta percha and AH Plus®, Group 3 - filled with RetroMTA®, Group 4 - no treatment (positive control), and group 5 – mechanical instrumented but no obturation (negative control).



The fracture load data were statistically analyzed by Kruskal-Wallis and Mann-Whitney U test.

Results

Groups	n	Median(N)	Minimum(N)	Maximum(M)
BC ^{b,e}	20	547.19	331.32	950.04
AH plus ^{a,d}	20	536.93	274.44	900.02
MTA ^f	20	518.38	265.52	807.71
Positive ^{a,b,c}	20	324.55	192.98	741.32
Negative ^{c,d,e,f}	20	817.40	497.33	1389.34

(p < .05)

The same superscript letters indicate significant differences (P < .05)

The median force required to fracture the root filled with CeraSeal®, AH Plus®, RetroMTA®, negative control and positive control group were 547.19, 536.93, 518.38, 817.40 and 324.55 Newton respectively. The fracture resistance in the experimental group were statistically significant higher than positive control but lower than negative control (P<0.05). However, there were no statistically different among the three experimental groups.



Conclusion

It may conclude that filling the root with CeraSeal®, AH Plus®, and RetroMTA® were able to enhances the fracture resistance of thin root canal wall and there were no differences among these materials.

Key words : fracture resistance, bioceramic sealer, resin sealer, MTA, vertical root fracture

References

(Ghoneim *et al.*, 2011, Hegde & Arora, 2015, Hemalatha *et al.*, 2009, Johnson *et al.*, 2000, Kivanc *et al.*, 2009), (Cobankara *et al.*, 2002), (Dibaji *et al.*, 2017)