

INTRODUCTION

Background:

One of the main goals of a non-surgical root canal treatment (NSRCT) is to obtain a proper seal along the walls of the canal and along the cemento-dentinal junction during obturation of a tooth.¹ In endodontics, microleakage, or the movement of fluid or microorganisms between the root canal sealing material and the wall of the canals, is unfavorable in the long-term success of root canal treatments.² Leakage in either coronal or apical direction is the primary cause in failure of a root canal filling.³






Objective:

The objective of this study is to utilize dye penetration to compare coronal and apical microleakage among five different endodontic sealers, AH Plus Sealer, Pulp Canal Sealer, NeoSEALER Flo, EndoSequence BC, and Super-Bond RC Sealer, in endodontically treated single canal, teeth *in vitro*.

MATERIALS AND METHODS

One hundred extracted human pre-molars roots with one canal were cleaned and shaped using the ProTaper Next rotary file system and then divided into 5 groups before obturation with a matched gutta-percha point (X5) along with one of the five following sealers: AH Plus (Group 1), Pulp Canal Sealer (Group 2), NeoSEALER Flo (Group 3), EndoSequence BC (Group 4), or Super-Bond RC Sealer (Group 5). The obturated teeth were left in a PBS solution for up to 30 hours until all sealers set.

After sealer setting, obturated roots were air dried and coated with nail polish, except for the coronal and apical accesses, and then placed in a 0.6% rhodamine B solution at 37°C for 7 days. After 7 days, the roots were ground longitudinally (mesiodistally) until the gutta percha and dye were visible. Pictures of each root were taken and Image-J software was used to measure the maximum dye penetration along the dentin in coronal and apical directions. Mean values of dye penetration and the standard deviation were calculated and recorded for each group.

Group	Type	Product Name (Manufacturer, Country)	
1	Epoxy Resin	AH Plus (Dentsply Sirona, Germany)	
2	Zinc oxide-eugenol	Pulp Canal Sealer (Kerr, USA)	
3	Tricalcium silicate	NeoSEALER Flo (Avalon Biomed Division of NuSmile Ltd., USA)	
4	Tricalcium silicate	EndoSequence BC (Brasseler, USA)	
5	Methacrylate resin	Super-Bond RC Sealer (Accel) (Sun Medical, Japan)	

RESULTS

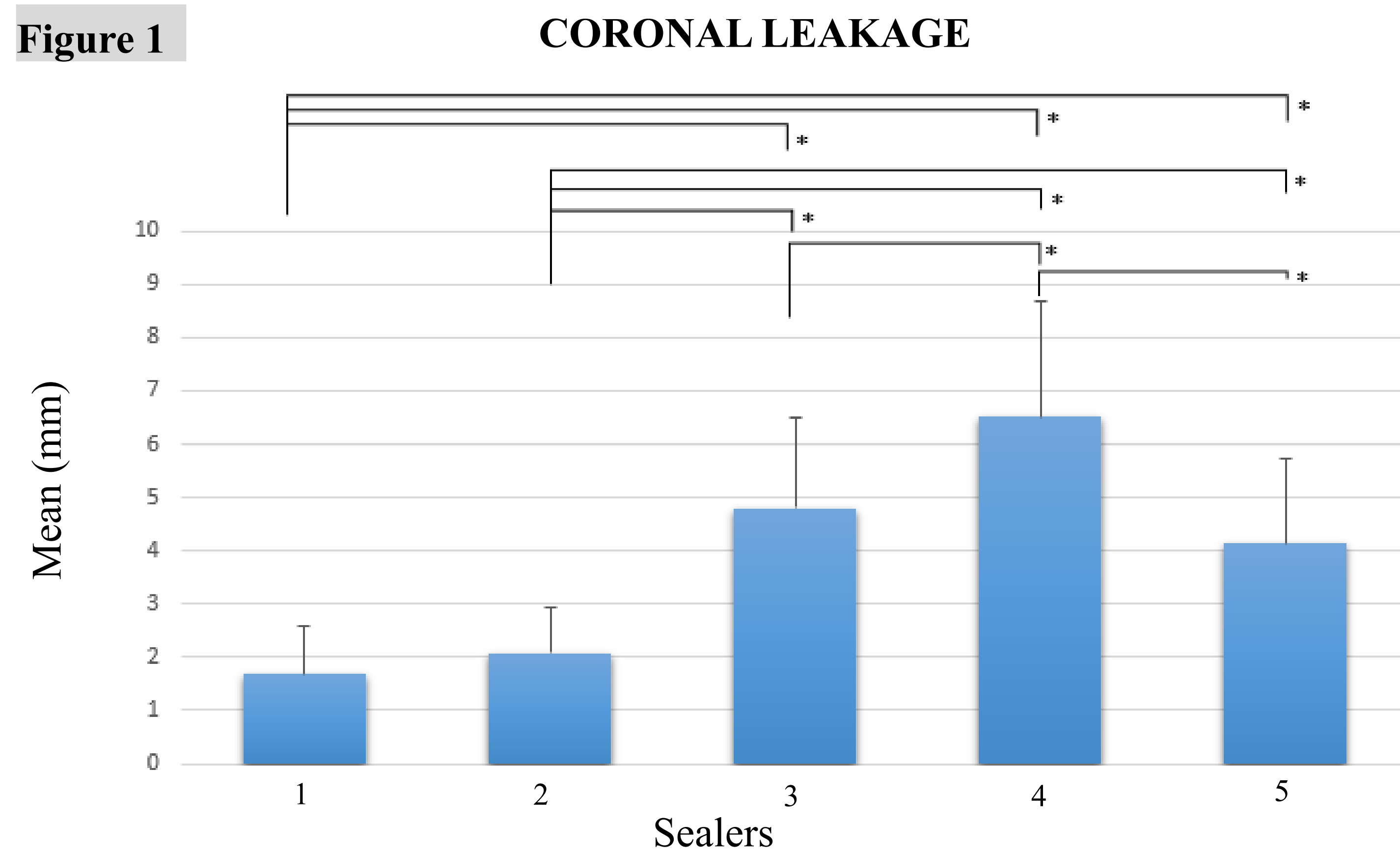
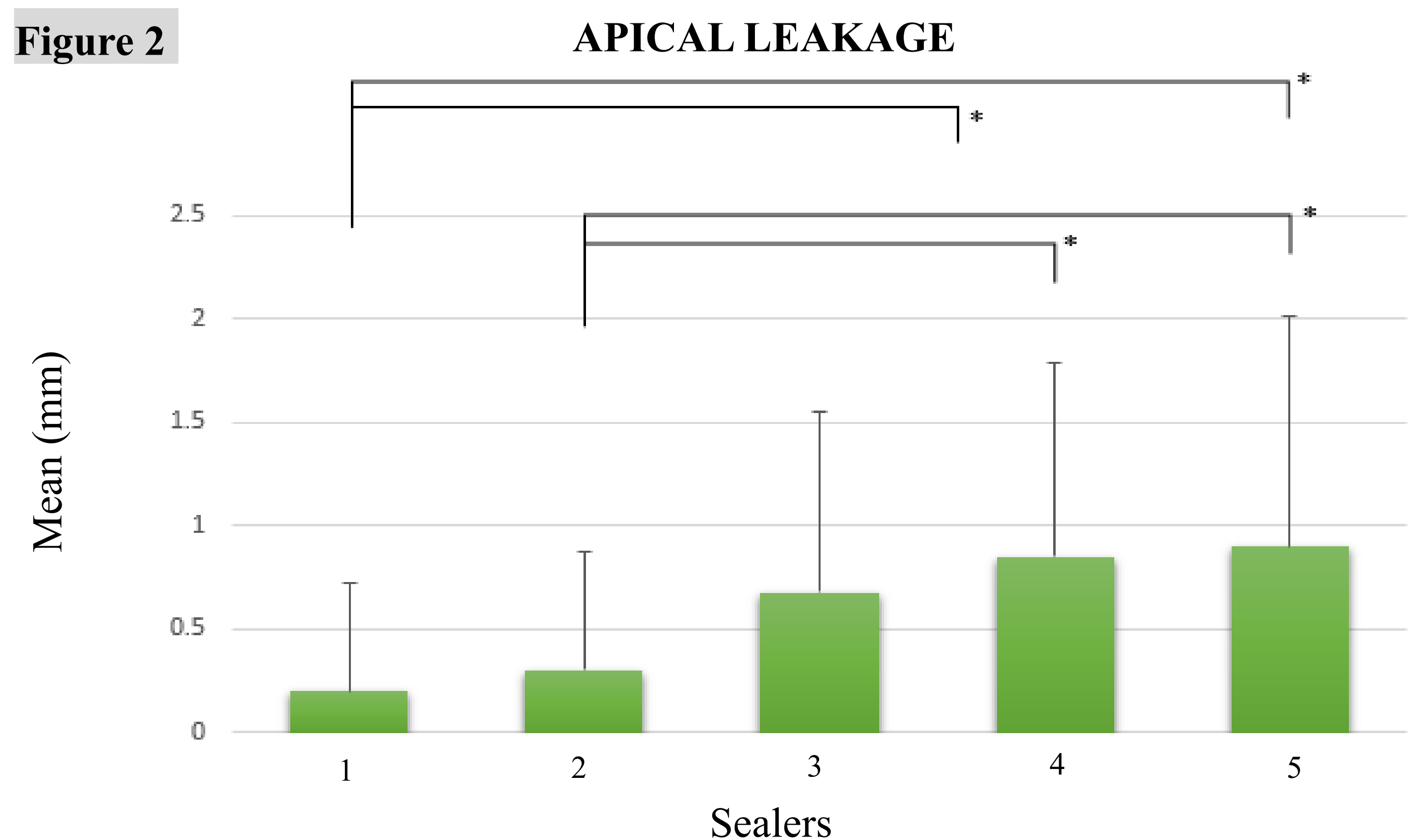


Figure 3
Dye penetration visible coronally and apically here in Sample 87 from Group 5 (Super-Bond RC Sealer)

The height of each column indicates the mean value.
The vertical bars indicates SD for each group of sealers.
The horizontal bars with asterisk indicates that there is a statistical significance difference between two groups ($p < 0.05$)



CONCLUSION

1. All five sealers showed some degree of coronal and apical microleakage. No endodontic sealers achieved complete coronal and apical seals.
2. AH Plus showed the lowest leakage in both coronal and apical directions.
3. Coronal leakage is highest in EndoSequence BC, followed by NeoSEALER Flo, Sealer Accel, and Pulp Canal Sealer.
4. Apical leakage is highest in Accel, followed by EndoSequence BC, NeoSEALER Flo, and Pulp Canal Sealer.

REFERENCES

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