

Clinical and Radiological Performance of Three Endodontic Sealers

HUSSAIN K., ANWAR F., TAREEN M.K., ZUBAIR S., TARIQ M.

Bolan Medical College, Quetta

Correspondence: Dr. Khalid Hussain, Assistant Professor, Bolan Medical College, Quetta :khalid321@yahoo.com

Calcium hydroxide is commonly used in endodontics as an interappointment root canal dressing. The object of this study was to compare the clinical/radiographic treatment of 3 sealers, 2 of which contain calcium hydroxide. The clinical/radiological performance of three endodontic sealers was assessed in a prospective study of endodontic treatment in 150 roots. The roots were treated by undergraduate students according to a standardized procedure, and were filled with laterally condensed gutta-percha and sealer. The patients were recalled yearly for 4 years for a clinical and radiographic control examination, and the radiographs were scored using the periapical index (PAI) scoring system. The difference was significant after 1 year and persisted through the 4-year observation period. The difference was also evident after stratification of the material with regard to preoperative pulpal and periapical diagnosis. The influence of the sealer on treatment outcome was small.

Key words: Gutta-percha, Sealer, Endodontic.

Over the last fifty years, endodontics has seen the advent of many new techniques and devices that have been aimed at making the procedure easier and increasing the success rate of the treatment.¹ Calcium hydroxide has been widely used in the treatment of various pathologic conditions in teeth.² It is believed to aid in the production of secondary dentin,³ the induction of apical closure of immature teeth, and the healing of periapical lesions.⁴ Calcium hydroxide is commonly used as an interappointment root canal dressing because of its effectiveness in disinfecting the root canal system before permanent filling.^{2,5} The inclusion of calcium hydroxide in salicylate resin or zinc oxide-eugenol (ZOE)-based sealers for filling root canals may lead to a better treatment outcome.⁶

Gutta-percha has been considered the most adaptable and compatible core material for root fillings.⁷ The number of different formulations of sealer cements are used in conjunction with gutta-percha. Clinical observations seem to indicate that some gutta-percha cones are softened by contact with sealers.⁸ This reflects the clinical interest in these materials and the belief that the type of sealer used will influence the outcome of endodontic treatment.⁹ The maxillofacial region is affected by a greater number of cysts than any other part of the body.¹⁰

Aims and Objectives

The aim of this study was to compare three different sealers used in endodontic therapy and evaluate the effect of incorporated calcium hydroxide on the outcome of therapy.

Materials and Methods

In the present study, 150 teeth underwent a standardized endodontic treatment regimen and divided into 3 groups at the time of root filling: group Procosol (PS), teeth filled with gutta-percha and Procosol sealer; group CRCS (CR), teeth followed with gutta-percha and CRCS sealer; and

group Sealapex (SA), teeth filled with gutta-percha and Sealapex sealer. Treatment was provided by undergraduate students at the Bolan Medical College, Quetta who used each of the 3 sealers in a minimum of 2 cases. The results were assessed yearly for 4 years at clinical and radiologic follow-up examination. All radiographs were examined by a single endodontist, and patients were clinically examined at recall by the endodontist who did the treatment.

Results

The attendance of the patients over the 4 years period is shown in Tables 1 and 2. During the first year after filling, the mean ridit value decreased in all test groups meaning the PAI index decreased. After 2 years, teeth in group SA had slightly better PA conditions than group CR and PS. The difference was statistically significant at the (P=0.01) level. By year 3 and 4, the difference was no longer detectable.

Table 1: Attendance of patients during the period of four years.

Year	Available for examination		Teeth extracted		No data available	
	No.	%	No.	%	No.	%
1.	101	67.3	1	0.7	48	32.0
2.	85	56.7	3	2.0	62	41.3
3.	53	35.4	4	2.6	93	62.0
4.	27	18.0	-	-	123	82.0

Discussion

The reasons for endodontic retreatment highlighted the pain, periapical radiolucency and inadequate filling of the canal space. Generally, retreatment is considered a better option as compared to endodontic surgery.¹¹ The PAI scoring system ensures unbiased assessment of the periapical condition,

Table 2: Attendance of patients in different groups.

Time (year)	Groups		
	SA	PS	CR
1.	41	58	28
2.	34	47	22
3.	27	39	17
4.	13	27	9

with reproducible data comparison of the variables that influence treatment outcome. The sealers are the important independent variable in our study. The PAI system has been shown to be a reliable endpoint dependent variable for such comparative studies.¹² At the 2-year examination, teeth in group SA had significantly better periapical conditions than did teeth in groups PA or CR. By years 3 and 4, the difference was no longer. When Sealapex was used, no inflammatory infiltrate was observed and there was no reabsorption of mineralized tissues. Leonardo et al¹³ also reported that vital teeth treated with Sealapex, CRCS, Sealer 26, and Apexit sealers and stated that half a year after the treatment, Sealapex was the sealer that best permitted the deposition of mineralized tissue at the apical level.

Clinical observations seem to indicate that some Gutta-percha cones are softened by contact with sealers. The interaction between sealer and cones is present in some combinations.¹⁴ Sealer was frequently absent between Gutta-percha cones and the canal wall and at times absent between cones, with a general moderate-partial coverage. None of the three sealers showed a continuous layer between the primary Gutta-percha obturant and the canal wall or in spaces between cones.¹⁵

Conclusion

After four years of study, there is a little difference between the root canals sealed with calcium hydroxide based sealers and zinc oxide based sealers. But initially the root canals filled with Sealapex sealer shows much better results than the other two. So that influence of the sealer on treatment outcome was small.

References

1. Deutsch AS. One-visit treatment using EZ-Fill root canal sealer. Endo Article, 2001.

2. Bystrom A, Claesson R, Sundqvist G. The antibacterial effect of camphorated paramonochlorophenol, camphorated phenol and calcium hydroxide in treatment of infected root canals. Endod Dent Traumatol 1985; 1: 170-5.

3. Tagger M, Tagger E. Periapical reactions to calcium hydroxide-containing sealers and AH 26® in monkeys. Dent Traumatol 1989; 5: 139-46.

4. Crabb HS. The basis of root canal therapy. Dent Pract 1965; 15: 397-401.

5. Bołtacz-Rzepkowska E, Pawlicka H. Radiographic features and outcome of root canal treatment carried out in the Łódź region of Poland. Inter Endod J 2003; 36: 27-32.

6. Holland R, DeSouza V. Ability of a new calcium hydroxide root canal filling material to induce hard tissue formation. J Endod 1985; 11: 535-43.

7. Sundqvist G, Figdor D. Endodontic treatment of apical periodontitis. In: Ørstavik D, Pitt Ford TR, editors. Essential endodontology. Oxford: Blackwell Science, 1998; 242-77.

8. Ørstavik D. Physical properties of root canal sealers: measurement of flow, working time, and compressive strength. Int Endod J 1983; 16: 99-107.

9. Tanomaru FM, Leonardo MR, da Silva LA, Utrilla LS. Effect of different root canal sealers on periapical repair of teeth with chronic periradicular periodontitis. Int Endod J 1998; 31: 85-9.

10. Khan M, Salam A. Clinical and radiological behaviour of Dentigerous cyst — study. Pak Oral Dental J 2006; 26: 63-6.

11. Rashid S, Allana K, Qureshi F, Rahman A. Endodontic re-treatment; An analysis based on clinical findings in a private dental practice. J Pak Dent Assoc 2003; 12: 218-23.

12. Ørstavik D. Reliability of the periapical index scoring system. Scand J Dent Res 1988; 96: 108-11.

13. Leonardo MR, da Silva LA, Utrilla LS, Assed S, Ether SS. Calcium hydroxide root canal sealers – histopathologic evaluation of apical and periapical repair after endodontic treatment. J Endod 1997; 23: 428-32.

14. Tagger M, Greenberg B, Sela G. Interaction between sealers and Gutta-percha cones. JOE 2003, 29: 15-7.

15. Facer SR, Walton RE. Intracanal distribution patterns of sealers after lateral condensation. JOE 2003, 29: 45-7.