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Original Article

Efficacy of Root Canal Sealant in Preventing Apical Leakage

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***ABSTRACT*:**

Aim: Apical leakage leads to endodontic failure. The present study was conducted to determine efficacy of Endorez and Realseal in apical leakage. **Materials & Methods:** The study consisted of forty mandibular permanent incisors. Group I teeth were sealed with Endorez and group II teeth with Realseal. After completing endodontic treatment in all teeth, glucose leakage value was assessed on 1th day, 7th day and 14th day. **Results:** At day 1st, (mean± S.D) leakage was 0.402± 0.012 in group I and 0.210± 0.08 in group II. On 8th day, it was 2.034± 0.100 in group I and 0.524± 0.114 in group II. On 14th day, it was 5.141± 0.122 in group I and 3.128± 0.147 in group II. The mean apical leakage in all groups in different days was comparatively statistically significant (P< 0.05). **Conclusion:** There was significantly increase in leakage in all groups with the progression of time. Endorez sealant showed highest apical leakage whereas realseal had minimum leakage.

Key words: Endorez, Realseal, Root canal

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INTRODUCTION

Endodontic sealers are commonly used with gutta percha to reach an optimal apical seal. Improper apical seal has been reported as the most common cause of root treatment failure. An effective endodontic seal blocks communication between apical foramen and surrounding pre-apical tissues. The ability of obturating materials determines the outcome of the treatment. Apical seal plays an important role in deciding the success of the root canal treated teeth. Properly sealed apex prevents bacterial growth and apical irritation. It should be capable of preventing direct communication between apical area and oral cavity thus ensuring sufficient lateral and apical seal.[1]

It is generally recommended to dry the root canal be-fore obturation, as this increases the sealers adherence to the dentin walls of the canal and the filling material. Moisture may prevent sealer setting by increasing or reducing its working or setting time, and may interface the entrance of the sealer into the dentinal tubules.[2] Different obturating materials have been used in the past. Recently, Endorez root canal sealer is getting publicity in the field of endodontics. This is widely used nowadays with enhanced root canal sealing ability. One of the biggest advantage of it is the less operative time. It is 2nd generation dual cure resin based sealer. Urethane dimethacrylate is its one of the component. When considering its properties, the thixotropic ability makes its capability to seal the canals effectively. This enhances its capacity of sealing lateral canals and dentinal tubules.[3]

Real seal is methacrylate resin based sealer. It is 3rd generation dentin resin composite sealer. It has better seal because of its ability of forming solid, continuous seal from one dentinal tubule to the other. Milestones have been placed in endodontics, with the advent of 4th generation root canal sealer.[4] The present study was conducted to comparative efficacy of Endorez and Realseal in apical leakage.

MATERIALS & METHODS

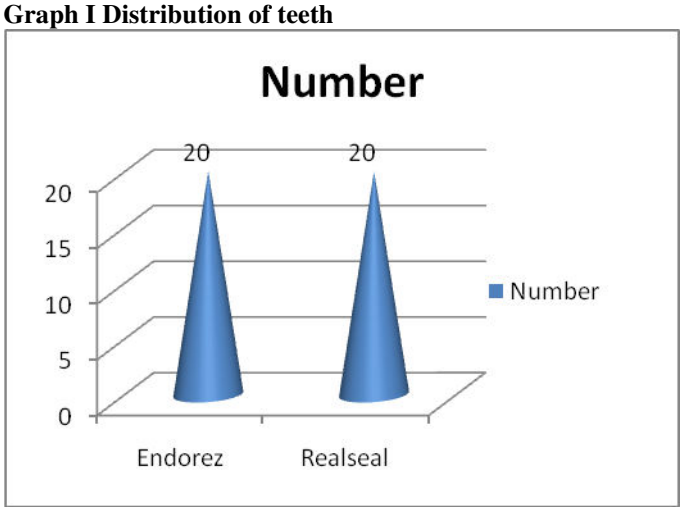
The in vitro study was conducted on 40 freshly extracted non carious permanent mandibular central incisors. All teeth were extracted due to periodontal breakdown. Teeth were divided into 2 groups of 20 teeth each. In group I, obturation was done with Endorez sealer (Ultradent) and endorez points and in group II, obturation was done with Realseal (Sybron).

Working length assessment was done using size 10 K file with the help of IOPAR. Biomechanical preparation was done following standardized procedure. NaOCl was used as irrigating solution. Following which obturation was done. After obturation, coronal sealing was done with light cure GIC for 30 seconds. All specimens were stored in humidity of 100% at temperature of 37° in incubator for 24 hours.

Glucose leakage (mmol/L) model was used to evaluate the apical leakage. At day 1, 7th and 14th, the concentration of leaked glucose was measured using glucose kit in spectrophotometer at 320 nm wavelength. Results thus obtained were subjected to statistical analysis. P value <0.05 was considered significant.

RESULTS

Graph I Distribution of teeth



Group I comprised of 20 teeth in which endorez sealer was used and in group II realseal sealer (20) was used.

Table I Comparison of apical leakage (mean± S.D) in all groups

Days	Group I	Group II	P value
1st	0.402± 0.012	0.210± 0.08	0.05
7th	2.034± 0.100	0.524± 0.114	0.01
14th	5.141± 0.122	3.128± 0.147	0.001

At day 1st, (mean± S.D) leakage was 0.402± 0.012 in group I and 0.210± 0.08 in group II. On 8th day, it was 2.034± 0.100 in group I and 0.524± 0.114 in group II. On 14th day, it was 5.141± 0.122 in group I and 3.128± 0.147 in group II. The mean apical leakage in all groups in different days was comparatively statistically significant (P< 0.05).

DISCUSSION

A fluid tight apical seal is mandatory for the success of any endodontic treated teeth. Poor apical seal promotes penetration of irritants from apical area into the root canals. Hence, for ensuring better treatment outcome, root canal sealers of good quality is required. The present study was conducted to comparative efficacy of Endorez and Realseal in apical leakage.

We observed that At day 1st, (mean± S.D) leakage was 0.402± 0.012 in group I and 0.210± 0.08 in group II. On 8th day, it was 2.034± 0.100 in group I and 0.524± 0.114 in group II. On 14th day, it was 5.141± 0.122 in group I and 3.128± 0.147 in group II. This is in agreement with Maryam et al.[5]

Ehsani et al[6] in their study found that mean apical micro-leakage was significantly lower in the dry groups. Minimum and maximum micro-leakage was seen in AH26 and ZOE, respectively. MTA Fillapex did not exhibit a significant difference in apical micro-leakage between dry and moist conditions (P > 0.05). Apical micro-leakage was significantly higher in the Excite DSC groups (P < 0.001). They suggested that AH26 provided the least apical micro-leakage under dry conditions while ZOE had the highest micro-leakage under moist conditions. MTA Fillapex provided acceptable apical seal regardless of moisture.

Obturation should be in all dimensions such as three-dimensional. Bacteria and their products may be viable in root canals as well as in apical region hence a properly sealed apex are necessary to prevent transfer of all irritants in both directions. Thus root canals need to be packed tightly with a good obturating material to ensure prevention of secondary caries and marginal discoloration.[7]

Roy et al[8] in their study evaluated the apical sealing ability of Resilon/ epiphany system and included forty two teeth in their study which were divided into 4 groups. Group I teeth were those which were obturated with resilon, group II teeth with gutta percha. Group III consisted of positive control and group IV had negative control teeth. Methylene blue dye was used to assess the binding ability of obturating material with the dentinal walls and resilon group showed better results as compared to gutta percha. Authors found that endodontic leakage is threat to the endodontic treatment success.

Ugur et al[9] also assessed the apical leakage using different endodontic sealers. In this study freshly extracted maxillary permanent incisors were selected which were divided into 4 groups in which different sealers (AH26, Excite DSC, MTA Fillapex, and ZOE) were used. Minimum leakage was observed in AH 26 and maximum in ZOE whereas significantly higher in excite DSC group.

Root canal sealers are to maintain the integrity of the canals and to inhibit leakage especially at apex. Different sealers have different properties. Not a single one is having all the desired qualities. Hence selection becomes important to avoid post operative complications.[10]

CONCLUSION:

Author found that there was significantly increase in leakage in all groups with the progression of time. Endorez sealant showed highest apical leakage whereas realseal had minimum leakage.

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