

## Original Research

### Evaluation of dentinal wall adaptation ability of three different sealers- An in-vitro stereomicroscopic study

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#### ABSTRACT:

**Background:** To evaluate the dentinal wall adaptation ability of different sealers. **Materials & methods:** A total of 30 recently extracted human maxillary anterior teeth were subjected for the study. The teeth were prepared and obturated with gutta-percha by a lateral condensation using AH Plus, Endorez and Epiphany sealers. 10 teeth from each group were used for the apical leakage test. Each group were used for examination under the scanning electron microscope. Data were analyzed using SPSS software. **Results:** The mean value of dye penetration for the AH Plus root canal sealer was 7.3 mm, Endorez sealer was 10.02 mm and Epiphany sealer was 3.55 mm. **Conclusion:** Epiphany sealer has a better apical sealing ability and adaptation to dentine than the AH Plus and Endorez sealers.

**Keywords:** Epiphany, AH plus, sealer, dentine.

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#### INTRODUCTION

Successful root canal treatment requires a complete obturation of the root canal system and the use of Gutta-percha with a sealer for root canal filling is generally accepted in endodontics. <sup>1</sup> However, it was emphasized that Gutta-percha does not adhere to the dentinal walls and could not prevent leakage by itself. <sup>2,3</sup> Thus, the role of the sealer is critical for the sealing ability of obturation material, and many root canal sealers have been developed to fill residual gaps between the Gutta-percha and the canal wall. <sup>2</sup> The primary functions of the root canal obturation are sealing the in-growth of the bacteria's from outside the canal, entombment of residual bacteria and, thorough obturation at a microscopic level to avoid stagnant fluid from collecting and aiding as nutrient for micro-organisms from any source. <sup>4</sup> The most common orthograde obturating method world-wide is gutta-percha. As, gutta-percha by itself cannot obturate the complete root canal system, owing to its poor sealing properties hence a sealer is used in conjunction with gutta-percha. <sup>5</sup> All the contemporary obturating techniques make use of the sealer to enhance the seal of the root canal filling. <sup>6</sup>

Endodontic sealers based on zinc oxide and eugenol have been used clinically for several decades because they have satisfactory physicochemical properties. <sup>7</sup> The glass ionomer sealers were introduced into root canal treatment because of their adhesion to dental hard tissues. <sup>8</sup> Recently, Endorez, a new resin-based sealer, has been introduced and its active ingredient is urethane dimethacrylate (UDMA). The UDMA is a monomer forming the organic matrix of composite resins. Materials including resin adhere adequately to the dentine. According to the manufacturer, Endorez is biocompatible and has satisfactory sealing properties, hydrophilic characteristics and early delivery system. <sup>9</sup> Hence, this study was conducted to evaluate the dentinal wall adaptation ability of different sealers.

#### MATERIALS & METHODS

A total of 30 recently extracted human maxillary anterior teeth were subjected for the study. The teeth were prepared and obturated with gutta-percha by a lateral condensation using AH Plus, Endorez and Epiphany sealers. 10 teeth from each group were used for the apical leakage test. Each group were used for

examination under the scanning electron microscope. Data were analyzed using SPSS software.

## RESULTS

A total of 30 teeth were enrolled. They were divided into groups as group I: Gutta-percha and AH Plus,

group II: Gutta-percha and Endorez and group III: Gutta-percha and epiphany. The mean value of dye penetration for the AH Plus root canal sealer was 7.3 mm, Endorez sealer was 10.02 mm and Epiphany sealer was 3.55 mm.

**Table: Mean microleakage in groups**

Groups	Mean	p- value
Group I: Gutta-percha and AH Plus	7.3	<0.001*
Group II: Gutta-percha and Endorez	10.02	
Group III: Gutta-percha and epiphany	3.55	

\*: significant

## DISCUSSION

Ideally, the root canal sealer should be capable of producing a bond between the cone material and the root dentine effectively preventing leakage.<sup>10</sup> Three-dimensional sealing of the root canal is one of the main goals of endodontic treatment and is essential for preventing reinfection of the canal and for preserving the health of the periapical tissues, thereby ensuring the success of root canal treatment. Thus, several types of endodontic sealers have been recommended to achieve this goal and, consequently, the evaluation of the apical sealing ability of the sealers is important. It is important to point out that not only is the apical seal of the root canal but the coronal seal is of equal importance for the success of endodontic treatment.<sup>11</sup> Hence, this study was conducted to evaluate the dentinal wall adaptation ability of different sealers.

In the present study, a total of 30 teeth were enrolled. They were divided into groups as group I: Gutta-percha and AH Plus, group II: Gutta-percha and Endorez and group III: Gutta-percha and epiphany. A study by Kumar SA et al studied a total of 66 recently extracted human maxillary anterior teeth were subjected for the study. The teeth were prepared and obturated with gutta-percha by a lateral condensation using AH Plus, Endorez and Epiphany sealers. Fifteen teeth from each group were used for the apical leakage test and the remaining five teeth from each group were used for examination under the scanning electron microscope. Data were analyzed using one-way ANOVA and the Student Newman-Keuls test. Epiphany sealer showed better sealing ability and adaptation to dentine.<sup>12</sup>

In the present study, the mean value of dye penetration for the AH Plus root canal sealer was 7.3 mm, Endorez sealer was 10.02 mm and Epiphany sealer was 3.55 mm. Another study by Baruah K et al studied a total of 80 freshly extracted human maxillary anterior teeth were decoronated, biomechanically prepared, and randomly divided into four groups; Group A and Group B served as positive and negative control with 10 teeth each. The teeth in Group C and Group D (with 30 teeth each) were obturated with gutta-percha using MTA Fillapex sealer and Endosequence BC sealer, respectively.

Teeth in Group C and Group D were further subdivided into three subgroups depending on the length of remaining apical gutta-percha, i.e., 3, 4, and 5 mm after postspace preparation. Apical leakage was assessed using dye penetration method under stereomicroscope. In both the Groups C and D, there was overall no statistically significant difference in leakage; however, Group C showed slightly more leakage than Group D. There was a statistically significant difference in leakage at 3 mm and 5 mm level in both groups.<sup>13</sup> The entire root canal system should be filled three dimensionally following thorough cleaning and shaping of the root canal space to ensure long term clinical success. The concept of a perfect apical seal has led to search for filling and sealing materials that are stable, non-irritating and provide a flawless seal at the apical foramen. The selection of sealers is dependent on its capacity to create a comprehensive seal but it must also be well accepted by peri-radicular tissues and be comparatively easy to manipulate so that its optimum physical and biological properties can be clinically achieved. In principle the core material should push the less viscous into unreachable areas such as canal anastomosis, apical delta and into irregularities produced through canal preparation.<sup>14</sup> The sealing ability of various root canal filling materials and root canal sealers have been studied and it has been found that dissimilar constituents seal the canal to different extents.<sup>15</sup> Principle aim of canal cleaning and shaping is to eliminate all pulp material remnants and bacteria along with their substrates and optimum shaping of the root canal space.<sup>16</sup>

## CONCLUSION

Epiphany sealer has a better apical sealing ability and adaptation to dentine than the AH Plus and Endorez sealers.

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