



## Evaluation the Sealing Ability of Different Types of Sealers and Obturation Techniques

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### Abstract

This study was conducted to assess the sealing ability of Gutta flow2 in comparison with Adseal & Endofill sealers by using different obturation techniques. Thirty extracted premolars were utilized as a part of this investigation, the roots were prepared by wave one (large file) as master file, samples randomization was categorized into three categories harmonious root filling materials, group(I) lateral compaction with Endofill sealer, group(II) single cone obturation with Adseal sealer, group(III) Gutta Flow2 with master cone. After incubation period for three days, all samples covered with two layers of nail coating aside from two mm at the zenith. Samples immersion was done in staining solution for 2 days, then the roots sectioned longitudinal and the depth of the color pathway from above was analyzed utilizing a stereomicroscope. The Gutta Flow2 group has lowest mean values (0.6660) mm of apical dye penetration in comparison with other groups, and the lateral compaction with Endofill sealer has highest mean values (0.7490) mm of apical dye penetration.

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## Introduction:

A perfect hermetic seal of the root canal system is the principle motivation behind endodontic treatment that must be accomplished. Inadequate root canal obturation may permit entrance of microorganisms and their toxins to periapical region <sup>(1)</sup>. Ingle accepts most incapable instances of root canal treatment are caused by permeation of liquid from excited periapical tissue into dishonorably obturated canal <sup>(2)</sup>. The gutta percha has all around been acknowledged as the highest quality level for root canal filling materials, yet primary hindrance of gutta percha not ideal seal of root canal systems, along these cones gutta-percha utilized using a sealer to the root canal to accomplish a liquid closely bind. The sealers plug the space between guttapercha points and dentin walls <sup>(3)</sup>. The outflow along the root canal obturation may happen amongst root filing material and sealer, through space inside the sealer, or between the root canal walls and sealer, in this way the achievement rate of root canal treatment lean significantly on the waterproofing of a sealer <sup>(4)</sup>. An collection t of sealers are accessible for utilize, another silicone based sealer Gutta Flow2 is a first sealer/guttapercha mix, flowable at room temperature that can be utilized as sealer and also obturating without guttapercha, it has a superior seal and great adaptability<sup>(5)</sup>. Adseal is one of the sealer based on epoxy resin, with best chemical and original material <sup>(6)</sup>. It is a double syringe which comprises of catalyst and base <sup>(7)</sup>.appeared in their examination the sealers of calcium phosphate compound and epoxy resin, afford very good physical properties and ensure a perfect biological performance <sup>(8)</sup>.

## Materials and methods:

Thirty extracted mandibular premolars with completely created root apices with no of cracks were utilized for this investigation, the radiographed was taken to reject any teeth with more than one channel. Teeth were put in 2.5% sodium hypochlorite (NaOCL) for 2 hours and put

away in normal saline to avoid development of fungal infection. The root of teeth was segmented opposite to the long hub of the root, by utilizing precious stone circle mounted on straight hand-piece, the length of the root was managed by cutting edge caliper and marker to (10) mm from the apex. The working length for each root was built up 1 mm from apex <sup>(9)</sup>. The root canals were set up with CrownDown procedure by wave one file system (large file 40\08) . (DentsplyMaillefer, Ballagigues, Switzerland) with 350 rpm and 5Ncm of torque. Five milliliter of 2.5% NaOCL with 27-G syringe was utilized for irrigation between each file measure with a last wash of 5 ml, 17% (Ethylene diaminetetraacetic acid) (EDTA) for 1min, trailed by 5 ml of 2.5% NaOCL then 10 ml of distilled water to expel any remnant of irrigation, at that point root canals were dried with paper points before obturation <sup>(10)</sup>. The roots randomly divided into three groups (n=10) according obturation materials were used:

**Group (I):** lateral compaction with Endofill sealer. Endofill sealer blended concurring producers direction, and connected in root canal by covering the guttapercha cone with sealer and addition to full working length with tag back accomplished. Compression and accessory cone #20 addition proceeded with resulting in less length of accessory cones insertion, until the point that the spreader came to no more remote than 2mm into the root canals. At that point abundance of guttapercha was expelled with a hot plugger

**Group (II):** Adseal sealer with single cone. The Adseal sealer utilized agreeing the producer direction, the brown cap of the applicator was removed, Press plunger to expel material in (2:1 proportion) of base and catalyst on mixing pad then mixing by utilizing spatula for 15-20 seconds until creamily homogeneous consistency, at that point sealer embedded into the root canals by covered guttapercha cone then insertion to the working length. Overabundance gutta-percha was evacuated with a hot plugger .

**Group (III):** Gutta Flow2 with guttapercha cone. The Gutta Flow2 mixed

by the producer's directions. After the root canals were dried with paper points, using the applicator of GuttaFlow2 sealer, the darker top of the tool was expelled and supplanted with an adaptable mixing tip. After slight weight on the plunger, the material flow homogeneously mixing at a proportion of 4:1 and free of air rises from the mixing tip. The sealer had a pink color tone when apportioned from the mixing tip. GuttaFlow2 was dispersed on union plate and embedded into the root canals with the guttapercha cone covered with sealer and insertion to the working length. Overabundance gutta-percha was expelled with a hot plunger. All obturation were surrounded by saline moisture gauze in close plastic container enabling the material to rigid for 3days with 100% moistness at 37C of every an incubator <sup>(10)</sup>.

#### **Sealing ability test :**

The apical 2mm of all root surface were fixed with two covering of coating nail. The sticky wax was then connected on the coating zone; teeth were submerged indian ink and afterward were put in incubator for 72 hours at 37°C. The samples were washed in flowing water and dried with paper towels. The coating and sticky wax covering was evacuated with a surgical tool sharp edge and a guide slit was set up with diamond shaped disc in a crown-upper direction in center of root till the profundity of the root canal. The samples were sectioning longitudinally utilizing a substantial spoon extractor <sup>(11)</sup>. The direct color infiltration was estimated from root summit to the most coronal degree under Stereo microscope (Labo Med CMZ4, India) at 40X amplification with adjustment scale visual to build up level of apical color entrance in millimeter. ANOVA test and LSD test was performed as statistical test to evaluate the significance of sealing ability.

#### **Results:**

Mean and standard deviation of sealing ability for all groups were shown in Table (1). The Gutta Flow2 group had the

lowest mean values in collation followed by Adseal group, while the lateral condensation with Endofill sealer group had highest mean value in dye penetration. Analysis of variance (ANOVA) tested was run and had shown that there were non-significant differences among tested materials showed in Table (2)  $P \geq 0.05$ .

#### **Discussion:**

The best obturation system is the one that gives us the best clinical result for our treatment, easy to use in a wide range of cases, speedier, with negligible confusions and with simpler expectation to learn and adapt for new users. The issue is that figuring out which obturation system yields the best clinical result with most noteworthy achievement rate turns out to be exceptionally troublesome, because of there are numbers of factors which can influence the result of treatment. There are a wide range of obturation strategies however no single technique has been distinguished which is prevalent in all perspectives <sup>(12)</sup>. Covering metal centers, for example, wire made from gold , silver focuses and endodontic file with warm mollified gutta-percha for three-dimensional obturation of the canals space has since a long time ago in use before the commercialization of various prefabricated gutta-percha core-carrier systems that are commercialized to enhance adaptation of the root filling material to the dentin, and passage of the gutta-percha into lateral canals, the original metal carriers were slowly replaced by plastic obturators and cross-linked gutta-percha <sup>(13)</sup>. Other of the newly introduced materials use the expansion sealer or obturation indicates as a method make up for self-seal holes interior the root canal space. One of these materials is a polydimethylsiloxane-based sealer that contains gutta-percha particles called GuttaFlow. This sealer has been accounted for to extend by under 1% (0.44– 0.76% at 37°C) in the wake of setting <sup>(14)</sup>. In this investigation the roots prepared with wave one file system to viably perfect and shape the root canal system without missing any un manipulated zone, while keep up the

first canal contour at the same time. The irrigation protocol during the chemo-mechanical preparation of the canals was 2.5% NaOCl, typical saline and 17% or 18% EDTA. The relationship of EDTA and NaOCl arrangements is the highest quality level in the chemo-mechanical readiness of the root canals <sup>(15)</sup>. EDTA follows up on the inorganic parts of the spread layer and remove calcification the peri-and intertubular dentine and Meanwhile, the utilization of NaOCl breaks down the collagen, cleaning the dentinal walls <sup>(16)</sup>. In this investigation the dye spill assessment, India ink was used instead of different dye since its molecules stay stable amid the procedure of removing calcification and scavenging of teeth. Its little molecule measure (3 microns) additionally guarantees that no microscopic organisms may enter where this dye can't, because that most microorganisms are mu in size and significantly bigger than it is size <sup>(17)</sup>. Estimation of color entrance were made in the wake of separating of roots, Pathomvanich and Edmunds suggested 2-3 days of dye introduction to permit most extreme color infiltration in root canals, which was appropriately joined in our philosophy<sup>(18)</sup>. In this investigation all groups had apical dye penetration and non-significant differences among materials, the mean dye infiltration was most for Endofill group this is identified with absence of homogenous mass of guttapercha, and increment the quantity of

the voids and sealer pools, and less adjustment of guttapercha to canal walls and anomaly. while Gutta Flow2 had minimum mean of dye infiltration than other groups this is identified with, the Gutta Flow2 better seal and great versatility due to great flowability and the way that this material extends somewhat (0.2%) on setting, upgrading its adjustment to root dentin walls<sup>(19,20)</sup>. Likewise the Guttaflow's biocompatibility, low water sorption and solubility <sup>(21)</sup>, low tissue toxicity <sup>(22)</sup>, antimicrobial protection because of quality of silver particles <sup>(23)</sup>, and sufficient radiopacity<sup>(24)</sup> additionally suggest it as a satisfactory elective obturation material. This outcome concurred with (Manu Rana et.al., 2014)<sup>(25)</sup>. In this examination the Adseal mass indicated minimum microleakage than Endofill group, this is identified with, the Adseal has amazing compound, original material properties and sealing ability. These qualities are in charge of the prevalence of this sealer over the other epoxy resin based sealers <sup>(7)</sup>.

### Conclusions

The apical sealing ability of Gutta Flow2 with master cone is similar to the gold standard of lateral compaction. Apical sealing ability of Gutta Flow2 at apex is useful, and in fact quite remarkable and a good alternative to lateral compaction with sealer.

Table (1): Descriptive Statistics of the sealingability (mm)of different materials

	N	Minimum	Maximum	Mean	Std. Deviation
Gutta Flow2	10	.35	.95	.6660	.20375
AdSeal	10	.50	.80	.7080	.10422
Endofill	10	.50	.95	.7490	.16743

Table (2): ANOVA test for apical of sealing ability for all groups.

	Squares sums	df	Mean Square	F	Sig.
Among Groups	.034	2	.017	.643	.534
In the same Groups	.724	27	.027		
Total	.758	29			

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