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Review Article

A 'Gutta Percha Based Endodontic Sealer' with an Excellent Flow: Gutta Flow

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Abstract

The success of endodontic therapy relies on multiple contributing factors, with each one having a substantial role to play. While focusing intricately on each step involved in the procedure of root canal treatment, the aim is targeted at obtaining three dimensional obturation of the root canal system. Of the two main materials used in obturation, the gutta percha component is standard across the globe, owing to its exceptionally magnificent properties while the endodontic sealer, the second component, is variable. This is for the fact that there is a plethora of sealers available and their usage is operator dependent, more so as per personal inclination. While the dental professionals are still looking for an 'ideal endodontic sealer', it seems quite appropriate that a sealer which contains gutta percha as one of its major components, can be crowned with this title. Guttaflow 2, a gutta percha based sealer fits perfectly in this category and may put an end to the seamless search of an ideal endodontic sealer.

Keywords: *Endodontic Sealer; Endodontic Therapy; Guttaflow 2; Gutta Percha*

Introduction

The basis of success in Endodontic therapy is multi-factorial, each factor having its own strategic significance. All the steps involved in this technique sensitive procedure must be carefully performed in order to provide the highest level of care to the patients [1]. The Endodontic triad comprising of access opening, cleaning and shaping and three dimensional obturation, clearly lays out the sequential procedures to be followed so as to achieve highest success rate in endodontic therapy [2]. As far as the three-dimensional obturation is concerned, the endodontic sealer has a very crucial role to play. There are several ideal properties which an ideal sealer should possess [3]. However, its chemical property in terms of its composition (which largely determines its biocompatibility component) and the physical property in terms of flow are large determinants of its success in clinical endodontic practice [3,4]. The search of an endodontic sealer having a specific chemical composition which makes it highly biocompatible has been going on since years together by various researchers across the globe [5]. Also, the flow of the sealer is a highly critical physical feature of a sealer for it should neither be too low nor too high [6].

While the clinicians and the academicians all over the world had been searching and working over to formulate an ideal endodontic sealer, the concept of using Gutta Percha as a main component of its sealer was an innovative idea put into reality in the form of 'Gutta Flow Sealer' (Coltene) which is currently available widely in the name of Gutta Flow 2 [7,8] (Figure 1). While the original Gutta flow was available in the form of cartridges and were triturated and inserted in a gun before application in root canal, the Gutta Flow 2 is more user friendly as it is available in the form of a simple automix syringe. Let us discuss the properties of Gutta Flow 2 sealer in detail.

Figure 1: *Guttaflow 2 syringe.*

Properties of Gutta Flow 2

Chemical composition

GuttaFlow 2 (Coltène) is a silicone-based root canal sealer. The particle size of its powder form is less than 30 µm, and it contains gutta-percha powder, poly dimethyl siloxane, platinum catalyst, zirconium dioxide and micro-silver [9]. The presence of Gutta Percha powder in this sealer makes it a unique endodontic sealer and is one of the major reasons responsible for its high biocompatibility as Gutta percha in itself is being used in endodontic practice since several years.

Working characteristics

The working time of Gutta flow sealer is 10 - 15 minutes and its setting time is 25 - 30 minutes as per the manufacturer (Coltene) [10]. These characteristics help the clinician in excellent chair side management of their endodontic cases.

Biocompatibility

Gutta flow is a highly biocompatible sealer and this has been tested in several studies conducted all over the globe [11-14] indicating that it is highly safe for use in endodontic practice.

Flow: One of the unique characteristics of Guttaflow sealer is its excellent flow which makes it an ideal sealer of choice in endodontics. Figure 2 represents a confocal laser scan exhibiting the excellent flow of gutta flow 2 sealer (GFL) in between dentin (DE) and gutta percha (GP). This unique flow property allows it to fill the lateral canals and apical ramifications, thus helping in achieving the target of obtaining three-dimensional seal. GuttaFlow is highly thixotropic, with its fine grain size (< 9 µm) and so the material flows well under slight pressure [15,16]. Figure 3 depicts the post-operative radiograph of an endodontically treated mandibular first premolar using Guttaflow2 sealer. The excellent flow of the sealer can be seen in the apical split area.

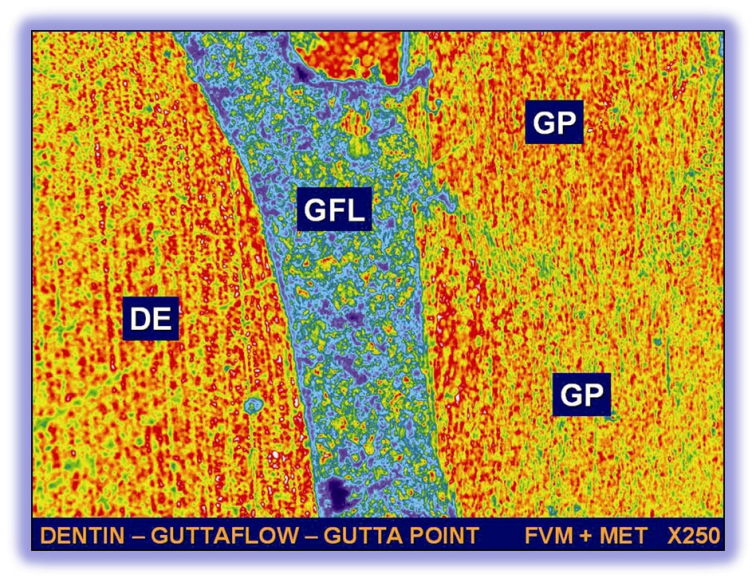

Figure 2: *Confocal laser scan exhibiting excellent flow of Guttaflow2.*

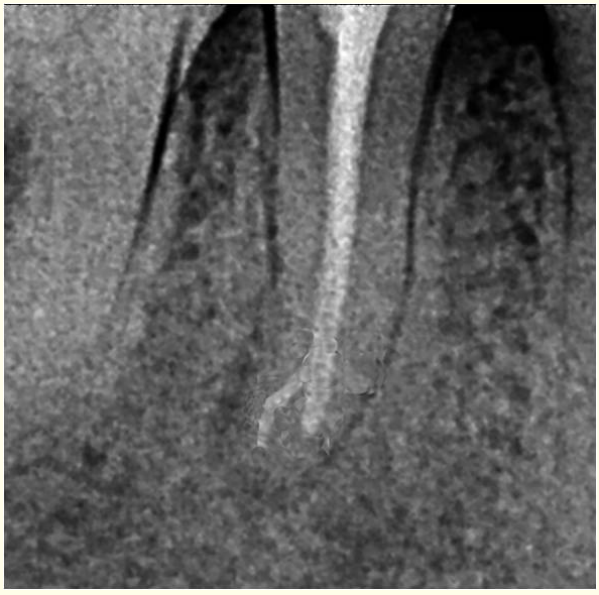

Figure 3: *Post obturation radiograph of mandibular premolar exhibiting excellent flow of Guttaflow 2.*

Slight expansion on setting: The GuttaFlow also has another property that is quite useful in its sealing ability. In contrast to other obturation materials, GuttaFlow expands very slightly (0.2%) when it sets, and this expansion is beneficial in the material's ability to create

an impenetrable seal of the apical and coronal aspects of the root [7,15,17]. Figure 4 shows a case of Radix entomolaris along with the presence of middle mesial canal, treated using Hyflex EDM files (Coltene) and obturated using Guttaflow2 sealer.

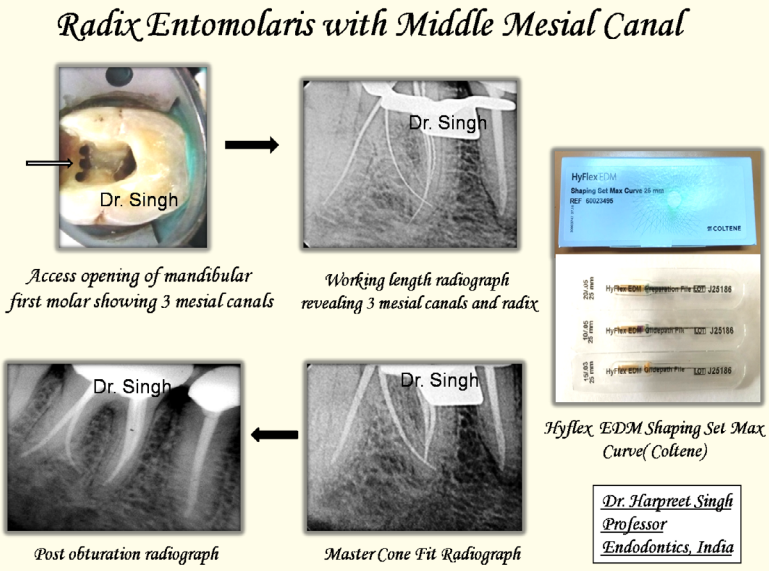

Figure 4: *A treated case of radix entomolaris.*

Solubility: Usually, in contact with body fluids, materials may dissolve over a period of time, creating space for bacterial colonisation. Conventional root canal sealer materials are soluble to a varying degree. The solubility tests, according to ISO 6876:2001 show zero solubility of GuttaFlow 2 [18]. This excellent physical property results in a dimensionally stable root canal filling.

Radiopacity: The Guttaflow2 sealer exhibits good radiographic density and thus its presence can be visualized emphatically on a radiograph. This helps the clinician to verify the flow of the material which in turn provides a sense of satisfaction, related to the successful completion of the case. The radiographic density of this material is related to the presence of radiopacifiers such zirconium dioxide and nano silver particles in its formulation [19].

Conclusion

The quest for the search of an ideal endodontic sealer seems to have come to an end with the advent of Guttaflow sealer. The unique property of having gutta-percha as its main component makes this material as highly biocompatible. The unique flow enables the sealing of lateral canals and apical ramifications, while the slight expansion on setting ensures three-dimensional seal.

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