Sealing Ability And Solubility Of Different Adhesive Obturation Systems

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بسم الله الرحمن الرحيم

قالوا سبحانك لا علم لنا إلا ما علمتنا
انك أنت العليم الحكيم

صدق الله العظيم

Dedicated to

To my great father, my lovely mother, precious husband, my beautiful daughters and my dear son.

Thank you for supporting me all the time.

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Introduction

Three dimensional stability of the filling materials is considered a critical factor for the success of the endodontic treatment.

Sealing ability of the root canal filling material is important for the prevention of the regrowth of micro-organisms and failure of root canal treatment.

Many factors can influence the sealing ability of the root canal filling material such as; the technique of filling, the type of the filling material, the type of sealer, technique of instrumentation, type of irrigant and the presence or absence of the smear layer in addition to the use of intracanal medicaments.

Proper adhesion of the filling material is considered a key factor for its proper sealing ability, this adhesion can be carried out mechanically using resin materials or chemically using glass ionomer material.

The root canal filling materials are subjected to different media which are; the serum through the apical and lateral communication with the peridontium and saliva in case of the presence of defects in the coronal restoration. Any solubility of the root canal filling materials can create enough space (leakage) which

allows bacterial growth and failure of the endodontic treatment.

So that the main goal for many endodontic researches is the creation of an obturating material that can face the challenges of different media without any solubility to prevent any dimensional instability and so having a proper sealing ability so that preventing the existence of any microorganisms that can cause failure of the whole root canal treatment.

Review Of Literature

The monoblock concept is the keyword for the hermetic seal of the root canal filling material. This concept depends on the adhesion of the filling material to the root canal dentine wall and its dimensional stability.

Part I: Solubility of different root canal filling materials.

Schafer and Zandbiglari (1) compared the weight loss of eight different root canal sealers in water and artificial saliva with different pH values. They used ring mould that was filled with epoxy resin (AH26, AH plus), silicon (RSA Roekoseal), calcium hydroxide (Apexit, sealapex, zinc oxide-eugenol (Aptal Harz), glass ionomer (Ketac-endo) and polyketone (Diaket) based sealer. These samples were immersed in double distilled water or artificial saliva with different pH values (7.0, 5.7 and 4.5) for 30 seconds, 1minute, 2minutes, 5minutes, 10minutes, 20minutes, 1hour, 2hours, 10hours, 24hours, 48hours, 72hours, 14 days & 28 days, then weight loss was determined. They found

that AH plus showed the least weight loss of all sealers tested, independent of the solubility medium used while seal apex, Aptal-hare and ketac-Endo had a marked weight loss in all liquids.

Tay etal (2) examined the susceptibility of Resilon, a polycaprolactone-based root filling material to enzymatic hydrolysis. Resilon, gutta-percha, and polycaprolactone disks, prepared by compression molding, were incubated in phosphate buffered saline, lipase PS or cholesterol esterase at 37°C for 96 h. They were retrieved at different time intervals for gravimetric analysis and scanning electron microscopy. The materials exhibited slight weight gains when incubated in phosphate-buffered saline that can be attributed to water sorption. Gutta-percha showed similar weight gains in the two enzymes. Conversely, Resilon and polycaprolactone exhibited extensive surface thinning and weight losses after incubation in lipase PS and cholesterol esterase. Glass filler particles in Resilon were exposed following surface dissolution of the polymer matrix, creating rough surface topography. Biodegradation of Resilon by bacterial and salivary enzymes warrants further investigation of their activities