Efficacy of RaCe rotary Ni-Ti system versus manual H-Files in root canal retreatment (An in vitro study)

Thesis

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To my father with his endless love, support and knowledge

To my brother, his wife and their wonderful sons

To my beloved supporting husband and my beautiful lovely daughter

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INTRODUCTION

1. Introduction

The success rate of endodontic therapy is between 62% and 96% [(1)]. Cases in which root canal therapy had failed can often be successfully retreated. Although a surgical procedure may be performed to maintain the tooth, the option of retreating the tooth through the root canal system is invariably preferred.

The main causes of endodontic failure making retreatment necessary are the insufficient cleaning and inadequate obturation of the root canal space. Missed root canals, under extended root fillings or overextended root fillings may require also retreatment before coronal restoration, as failure may occur in the future.

The main goals of non-surgical retreatment are regaining access to the apical foramen by complete removal of the root canal filling material thus facilitating sufficient cleaning and shaping of the root canal system and the final three dimensional obturation. To ensure the success of retreatment, the filling material must be removed completely and the root canal negotiated to the apical foramen thus allowing thorough debridment to gain access for the removal of microorganisms and pulp tissue remnants. This will definitely raise the success rate of the retreatment.

Although numerous materials have been described for obturation of root canals, gutta-percha in combination with a sealer is the most frequently used solid core filling material.

Gutta percha removal is usually performed by the sole use of hand instruments (K-files and H-files), or the combined use with rotary instruments with or without solvents. Heat-carrying and ultrasonic instruments are thought to be helpful devices which facilitate retreatment. In many cases the combined use of different techniques may be the most efficient and time-saving aiming at complete and efficient removal of gutta percha. Unfortunately, no technique removes all gutta percha debris completely and efficiently. [(2)]

Recently nickel titanium rotary systems have been introduced. These instruments are widely used in endodontic treatment, because they have high flexibility in bending and torsion. It was shown that canals prepared by nickel titanium files produced more centered and tapered canals than those prepared by K- type files. Nickel titanium rotary instruments can also be used in removal of obturating materials during retreatment, but its effectiveness in gutta percha removal is still under research.

To ensure removal of the obturating materials absolutely, reinstrumentation of the root canal space is essential. Consequently further loss of the tooth structure may occur leaving insufficient remaining sound tooth structure. Few studies are made to assess the ability of different instruments to preserve the dentin of the root canal after the retreatment.

Usually a solvent such as chloroform or halothane is used in combination with the mechanical instruments but most of these are considered to be hazardous to health.

This motivated us to conduct this study to evaluate the effectiveness of one of the new Ni-Ti rotary system (RaCe) in retreatment and its ability to preserve the dentin of the root canal during retreatment. Also, the effectiveness of the use of either chlorhexidine or chloroform during retreatment was evaluated.