Comparative Study Of The Shaping Ability Of Two Different Tapers Of Rotary Nickel Titanium Files Versus Hand Stainless Steel Instruments In The Preparation Of Oval Root Canals

(An in-vitro study)

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By

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THESIS APPROVAL FORM

This thesis tilted "comparative study of the shaping ability of two different tapers of rotary nickel titanium files versus hand stainless steel instruments in the preparation of oval root canal. (An in-vitro study)"
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بسم الله الرحمن الرحيم

وَاذْكُر رَّبَّكَ إِذَا نَسِيتَ وَقُلْ عَسَى

أَن يَهْدِيَنِ رَبِّي لِأَقْرَبَ مِنْ هَذَا رَشَدًا

صدق الله العظيم

الكهف ٢٤

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These simple and humble words will never express my thanks and gratitude to my everlasting support ***ALLAH***

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DEDICATION

To my Mom,

If anything is good about me,

It is because of you

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Introduction

1. INTRODUCTION

Root canal cleaning and shaping play a crucial role in the success of endodontic treatment. Shaping during instrumentation facilitates cleaning and provides space for placing obturating materials. Ideally shaping has to maintain the shape and cross section of the canal, while creating a continuously tapering funnel from canal orifice to the apex.

Oval root canals are the simplest deviation from a round outline and can be found in all types of teeth, especially in the mid root regions. Some manual and rotary instrumentation techniques tend to create a round root canal shape. Complete round preparation, to clean buccal and lingual extensions of oval canals, might require instrumentation to a size that may cause high risk of perforating or significantly weakening the root.

Thus, many preparation techniques and instruments have been advocated to facilitate preparation of this canal shape. The most common technique is circumferential filling with hand files or with rotary instruments by pressing the instruments against the root canal wall.

Rotary nickel-titanium instruments with variable designs and tapers have been developed recently. Rotary NiTi instruments have a two to three times the modulus of elasticity of the conventional stainless steel instruments, which make them useful for the preparation of curved root canals. Their use in oval canals is questionable, whether they would allow controlled preparation of buccal and lingual extensions of the oval shape. One of these rotary instruments, the K3 system, has three asymmetric flutes separated by land to prevent file from screwing itself into the canal. It also has positive cutting angles. Also, a safety tip is

incorporated into its design in order to avoid ledging, perforations and zipping. K3 system is available in different tapers 0.02, 0.04 and 0.06 up to 0.12 tapers.

The greater tapered NiTi instruments may be efficient in preparing canals with fewer instruments. A circular mesiodistal bulge might, however, be produced in the canal, while the buccal and lingual extensions remain unprepared, this round shape may induce risk of perforation. One perception is that, the use of rotary NiTi instruments having smaller taper might access the recesses or fins resulting in better preparation of the buccal and lingual extensions of oval canals. Thus, an attempt was done to find the effectiveness of using 0.06 or 0.02 tapered K3 rotary NiTi instruments in shaping oval canals.

Review of literature

2. REVIEW OF LITERATURE

One of the major procedural steps in endodontic treatment is to thoroughly remove debris, pulp tissue and microorganisms from the root canal system by means of chemicomechanical preparation. The use of both conventional hand files and current nickel-titanium (NiTi) rotary instruments do not result in fully cleaned and prepared root canal surface [1] due to anatomical complexities. One of the anatomical complexities is the root canal cross section. Cross sectional root canal configuration have been classified as round, oval, long oval, flattened or irregular. [2] Oval root canals are the simplest morphological canal shape deviation present in all types of teeth.

Wu *et al.* (2000)[3] investigated the canal diameters in the apical region of human roots of different teeth groups, and determined the prevalence and extent of long oval canals. One hundred eighty extracted adult human teeth, twenty for each tooth group, were horizontally sectioned with a low speed saw at 1, 2, 3, 4 and 5 mm from apex. Canal diameters were measured in the five cross sections from each tooth with a measuring microscope at 30× magnification. Their results showed that, in the 1181 cross section evaluated, a long oval canal was identified in 293 (25%) cross sections. At, 5 mm from the apex, the occurrence of the long oval canal was ≥50% in single canal of maxillary premolars, single MB and 2nd MB of maxillary molar, mandibular incisors and lingual canal of mandibular premolars. Generally, the long diameter decreased apically, meaning the canal tended toward a rounder shape. They concluded that, in approximately one fourth of the apical canals, the long canal diameter was equal to or larger than two times the short canal diameter; this discrepancy might complicate the root canal cleaning, shaping, and filling procedures.