Assessment of postoperative pain after using two different kinematics (Randomized clinical trial)

" In vivo study"

By

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2019**

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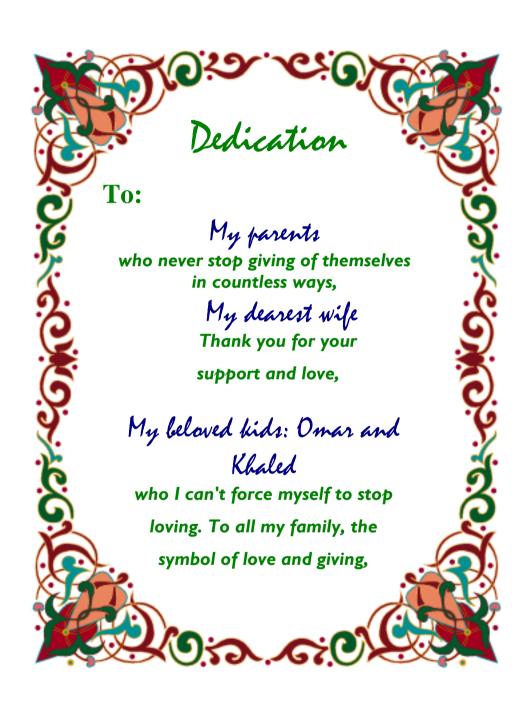
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بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

(رَبِّ أَوْزِعْنِي أَنْ أَشْكُرَ نِعْمَتَكَ الَّتِي أَنْعَمْتَ عَلَيَّ وَعَلَى وَالِدَيَّ وَأَنْ أَعْمَلَ صَالِحاً تَرْضَاهُ وَأَدْخِلْنِي بِرَحْمَتِكَ فِي عِبَادِكَ الصَّالِحِينَ)

صــــدق الله العظيم

سورة النمل.. الآية رقم ١٩

Dedication

To:

My parents

**who never stop giving of themselves
in countless ways,**

My dearest wife

Thank you for your

support and love,

*My beloved kids: Omar and
Khaled*

who I can't force myself to stop

loving. To all my family, the

symbol of love and giving,

Acknowledgement

First of all, all gratitude is due to Allah almighty for blessing this work, until it has reached its end, as a part of his generous help, throughout my life.

I express my profound sense of reverence to my supervisor Prof Ahmed Abdel Rahman Hashem, Professor of Endodontics, Faculty of Dentistry, Ain Shams University, for the time and guidance he devoted to me. Words can't express my deep gratitude and respect to you. You are a wonderful and great professor.

I express my deepest gratitude to Dr Mohamed Mokhtar, Associate professor of Endodontics, Faculty of Dentistry, Ain Shams University for his constant guidance, support, motivation and untiring help during this work. His depth knowledge has been extremely beneficial for me.

I would like to thank also Ain shams endodontics staff for offering me much support, effort throughout the whole work.

Mohamed Nabil Elghandour

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Abstract

Aim: Evaluation of post-operative pain after using two different kinematics "continuous rotation motion and adaptive motion" of different nickel titanium files

Materials and Methods: A total of 125 patients with irreversible pulpitis without apical periodontitis in lower first mandibular molar tooth.

18 patients were excluded as they not fulfilled inclusion criteria, 2 patients refused to perform the procedure.

So 105 patient done this procedure N=54 for I Race and N=51 for TF Adaptive file. The patients were randomly selected for each group either I Race file group or TF adaptive group.

Postoperative pain was evaluated using VAS Visual analogue scale at 0hr, 6hrs, 24hrs, 72hrs and 7 days. All data obtained from patient were statistically analyzed.

Results: Results showed that there was no significant difference between two groups at follow up intervals (0hr, 6hrs, 24hrs, 72hrs and 7 days).

There was significant difference between follow up intervals at same group. Pair wise (6hr, 24hrs.) showed higher postoperative pain than (72hrs and 7 days).

Conclusions: The incidence and intensity of post-operative pain was highest at 24 hr. after instrumentation and decrease gradually with time. Different kinematics have no significant effect on postoperative pain

KEYWORDS: postoperative pain, kinematics, Twisted file adaptive, RACE file

Introduction

Pain has been described as unpleasant sensation ranging from mild discomfort to severe distress which may be associated with real or potential damage to tissue. It is a complex multi-dimensional and bio-psychogenic event. Making the perception of pain very different between individual[1]

Dental pain management is very difficult to control during and after endodontic treatment. Prevention and management of post endodontic pain is an integral part of endodontic treatment. During chemo-mechanical preparation of the root canals, all instrumentation techniques can produce apical extrusion of debris, even when short of the apical foramen Some debris, such as dentin and necrotic debris, microorganisms, pulp tissue remnants, and irrigating solutions cause irritation to the periradicular tissue, thereby provoking different levels of postoperative pain.

There are different factors that affect post treatment endodontic pain like gender, anxiety, environment, age, psychogenic state, type of the tooth, pulp condition, Instrumentation, obturation technique, sealer extrusion.

Postoperative pain due to Instrumentation could be affected by several items like irrigant type, irrigant amount,

number of file, preparation size, preparation technique, type of file, instrument design and file kinematics.

Different file kinematics during the chemo - mechanical preparation of the root canals cause apical extrusion of root canal debris including dentin chips, pulp tissue, micro-organisms and irrigants that can exacerbate an inflammatory response leading to pain.

Does the use of different nickel titanium files with different kinematics can affect the post-operative endodontic pain?

Review of Literature

Postoperative pain is a frequent complication associated with root canal treatment, and can be influenced by insufficient root canal preparation, extrusion of irrigant, debris or intra-canal inter-appointment medicament, presence of preoperative pain, presence of periapical pathosis, and apical patency during root canal instrumentation. The apical extrusion of irrigant and debris, including bacteria and necrotic tissue, may lead to postoperative pain, periapical inflammation and postoperative flare-ups. Even though all instrumentation techniques and instruments are associated with debris extrusion, the instrumentation techniques and the design of the files may affect the amount of debris extrusion

In this study, the difference in motion (continuous rotation) were compared to adaptive motion (rotation and reciprocation)

I.   Apical debris extrusion during the use of different rotary Nickel Titanium systems:

Burklin et al.[2] (2012) compared the amount of apically extruded debris using rotary and reciprocating nickel-titanium instrumentation systems. 80 mandibular central incisors divided into 4 groups n 20 using the 2 reciprocating single-file systems Reciproc (VDW, Munich, Germany) and WaveOne (Dentsply Maillefer, Ballaigues, Switzerland) and the 2 full-sequence rotary Mtwo (VDW,

Munich, Germany) and ProTaper (Dentsply Maillefer, Ballaigues, Switzerland) instruments. Data were collected and analyzed. Results showed that the reciprocating files has more debris extrusion compared to rotary files.

Surakanti et al. (2013)[3] evaluated the number of bacteria extruded apically during root canal preparation using Four Rotary instrumentation techniques(K3, Mtwo, Race and Protaper rotary systems)A total of 50 extracted mandibular premolars were selected, access cavities prepared and inserted in to rubber stoppers of 10 mL glass vial. Root canals were contaminated with a suspension of Enterococcus faecalis (American Type Culture Collection (ATCC) 29212 and incubated for 24 h at 37°C. Debris extruded from the apical foramen during instrumentation was collected into vials. The numbers of Colony-forming units were determined for each sample extrusion of bacteria was found in all the experimental groups. There was less bacterial extrusion in K3 Group while more bacterial extrusion was seen in Mtwo Group.

Nagaveni et al. (2013)[4] evaluated of apical extrusion of debris and irrigants using four rotary instrumentation systems. Four groups of each 20 extracted mandibular premolars were instrumented using one of the four systems ProTaper Universal, Hero-shaper, Race and k3. Debris and irrigant extruded from the apical foramen during instrumentation were collected in pre weighed test tubes. Volume of irrigant extruded was noted. The containers

were stored in incubator at 70° for two days to evaporate the moisture. Weight of dry debris was noted. All instrumentation techniques apically extruded debris and irrigant. However, Hero-shaper, K3 and Race systems produced less extruded debris and irrigant than the Protaper system

Capar et al.(2014)[5]compared the amount of apically extruded debris using different nickel-titanium instrument (Protaper Universal- Protaper Next- Twisted File adaptive and Hyflex file). Sixty mandibular premolars were instrumented up to size 25 using Protaper Universal- Protaper Next- Twisted File adaptive and Hyflex file The amount of extruded debris was assessed with an electronic balance. The total time required to complete root canal shaping with the different instruments was also recorded. The ProTaper Universal and HyFlex system shows higher debris extrusion than The Twisted File Adaptive and ProTaper Next systems.

Nayak et al. (2014) [6] compared the amount of debris and irrigants extruded apically in single rooted canals using two reciprocating and one rotary single file nickel-titanium instrumentation systems.60 mandibular premolars divided into 3 groups 20 in each group were instrumented by Reciproc group one WaveOne group 2 and One Shape group 3. Bidistilled water was used as irrigant with traditional needle irrigation delivery system. Eppendorf tubes were used as test apparatus for collection of debris

and irrigant. The extruded irrrigant volume was collected and quantified via 0.1-mL increment measure supplied on the disposable plastic insulin syringe. The mean weight of debris was assessed using an electronic microbalance the data were analysed using Kruskal-Wallis nonparametric test and Mann Whitney U test. no statistically significant difference was obtained between the two reciprocating instruments. While one shape file produce less debris than The Reciproc. Continuous rotary instrumentation was associated with less extrusion as compared with the use of reciprocating file systems

Karataş et al. (2015)[7]evaluated the quantity of apically extruded debris with Twisted File Adaptive instruments in straight root canals: reciprocation with different angles, adaptive motion and continuous rotation. This done to evaluate the influence of movement kinematics when using Twisted File Adaptive instruments) (TF Adaptive) on the amount of apically extruded debris. Forty-eight extracted mandibular incisor teeth were selected divided into four groups (n 12), and the root canals were instrumented using the following movement kinematics: TF Adaptive motion, reciprocating motion or continuous rotation. TF Adaptive instruments were used for all groups. Debris extruded apically during instrumentation was collected in pre-weighed Eppendorf tubes, and after drying, the mean weight of the debris was assessed with an electronic balance. The data were analyzed statistically