Post operative pain after root canal preparation using two instrumentation protocols (An In vivo clinical study)

Thesis submitted to the Faculty of Dentistry Ain Shams University for the partial fulfillment of requirements of the Master degree in Endodontics

By

Ahmed Mohamed Sayed Ghreeb

B.D.S Ain Shams University

2010

Supervisors

Prof. Dr. Shehab El-Din Mohamed Saber

Professor of Endodontics, Endodontic department, Faculty of Dentistry, Ain Shams University

Dr. Maram Farouk Obeid

Associate professor of Endodontics, Endodontic Department, Faculty of Dentistry, Ain Shams University

Department of Endodontics

Faculty of Dentistry

Ain Shams University

2017

بسم الله الرحمن الرحيم

(وَقُلْ رَبِّ زِدْنِي عِلْمًا)

صدق الله العظيم

سورة طه الايه (114)

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Acknowledgment

I wish to express my deepest gratitude and sincere appreciation to ***Prof. Dr. Shehab El-Din Mohamed Saber*** *Professor of Endodontics, Faculty of Dentistry, Ain Shams University. His guidance and collaboration helped me to overcome the obstacles and difficulties that arose along the way until my thesis got completed.*

I would also like to thank ***Dr. Maram Farouk Obeid*** *Associate Professor of Endodontics, Faculty of Dentistry, Ain Shams University for offering me much of her time, effort and support throughout the whole work.*

Finally, I would like to thank all the ***Staff of the Department of Endodontics*** *Faculty of Dentistry Ain Shams University for their unlimited support.*

Dedication

First of all, to Allah the merciful who helped me and guided me along my journey.

To my great father and my lovely mother, no words could describe how thankful I am to you.

To my wife, for your unlimited support.

To my son, I wish you all the best in your becoming life.

To all my family and friends, for their love and support.

During chemomechanical preparation of the root canals, all instrumentation techniques can produce apical extrusion of debris, even when preparations are short of the apical foramen [1][2][3][4]. Some debris, such as dentin and necrotic debris, microorganisms, pulp tissue remnants, and irrigating solutions cause irritation to periapical tissues, thereby causing different levels of postoperative pain [5]. Endodontic postoperative pain is defined as any degree of discomfort that occurs after endodontic procedures [2]. This is known in literature as flare-up, which is characterized by the development of pain, swelling or both, beginning within a few hours or days after the endodontic procedures [6].

Recent studies have shown that the treatment protocols of new reciprocating systems can also produce extrusion of debris in the apical region, which might be related to postoperative pain when compared with other traditional instrumentation techniques [3][7][8][9][10][11].

However, there are few clinical studies on postoperative pain using reciprocating instrumentation protocols. Thus, on the premise that an innovative reciprocating system can cause different levels of pain after endodontic treatment, the aim of this study was to assess postoperative pain in a prospective randomized clinical trial comparing two groups,using the wave one system in one group and the

one shape rotary system in the other. The primary outcome measure of the study was to assess if different instrumentation techniques influence the occurrence of postoperative pain.

Review :

Post operative pain :

It is defined as sensation of discomfort after endodontic intervention and is reported by 25%-40% of patients irrespective of pulp and periradicular status . [12]-[13]-[14] .

Most causes:

Several factors are involved in the sensation of post operative pain . This make clinical investigation that associate pain with possible cause even more challenging [15]. Although mild discomfort is generally expected after under going endodontic treatment [16]. The incidence of post operative pain and flare ups as reported in literature is estimated as ranging from 3%-58% [2] Mechanical ,chemical or microbial injuries to periapical tissues are the leading causes of acute periapical inflammation .Preoperative pain is one of the strongest predictors of postoperative pain[17].

Postoperative pain after mechanical preparation :

Harrison et al[18] determined whether any clinical factors are associated with an increased incidence or degree of pain occurring during or after endodontic treatment in patients who begin treatment with no

symptoms. Before treatment, patients were randomly placed into two groups, according to the chemical agents to be used for irrigation and intracanal medication. Teeth of patients in group 1 were irrigated during canal preparation with 3% hydrogen peroxide solution (H202) followed by 5.25% sodium hypochlorite solution (NaOCI), and had a cotton pledget moistened with formocresol sealed in the pulp chamber between appointments with a temporary filling material. Teeth of patients in group 2 were irrigated with normal saline solution (0.9% sodium chloride solution) during canal preparation. No intracanal medication was used between appointments. A dry sterile cotton pledget was sealed in the chamber with a temporary filling material. They found that 28.8% had slight interappointment pain and 15.7% had moderate to severe pain.They concluded that The incidence and degree of interappointment pain occurring in patients who began endodontic treatment with no symptoms were recorded.

Samuel and Irving [19] evaluated a number of hypothetical mechanisms which may be responsible for pain and swelling before and during endodontic therapy are presented. These mechanisms may be interrelated. The possible etiological factors was explored and some therapeutic suggestions was made.A number of

hypotheses, some of which may be interrelated, was offered and discussed. Among these were: (a) alteration of the local adaptation syndrome; (b) changes in periapical tissue pressure; (c) microbial factors; (d) effects of chemical mediators; (e) changes in cyclic nucleotides; (f) immunological phenomena; and (g) various psychological factors.

Genet et al[20] recorded the incidence of preoperative and postoperative pain of endodontic origin of 1204 teeth. They found that postoperative pain occurred in approximately 29 per cent (7 per cent severe, 22 per cent moderate) of all visits and that there existed a strong positive correlation between the presence of preoperative pain and the incidence of postoperative pain. Based on this observation it is concluded that in studying postoperative pain after endodontic treatment knowledge of the preoperative status is a prerequisite. The results also showed that out of all treatments that were classified as emergency treatment the therapy chosen relieved the patient's pain in 35 per cent, while in 39 per cent it was reduced to moderate pain and in 14 per cent severe pain

persisted. However, only 12 per cent of all these emergency treatments required further treatment.

Georgopoulou et al [21] determined the incidence of pain after chemomechanical preparation of root canals, and what clinical factors were associated with the incidence and degree of pain. Out of the 24.S patients in the study 140 (57 per cent) had no pain, *52* (21 per cent) had slight pain, 30 (15 per cent) had moderate pain and 17 (7 per cent) had severe pain. Statistical analysis showed a significantly higher incidence of pain after over-instrumentation of canals during preparation.

Torabinejad et al[22] assessed the causes of inter-appointement emergencies. To delineate information from the charts of 2,000 patients who had received root canal therapy for necrotic pulps was recorded and analyzed. One-half of the patients were those who had interappointment pain or swelling which required a nonscheduled emergency visit for urgent care. The other half were patients who reported no complications after cleaning and shaping of their root canals. They found that some factors, such as age, sex, tooth type, presence of preoperative pain, presence of allergies, absence of periapical lesions, sinus tract stomas, retreated cases as

well as those receiving prescribed analgesics, had significant effects on the incidence of endodontic interappointment emergencies. In contrast, presence of systemic diseases, use of intracanal medications, and penetration of the foramen with small instruments during length determination had no significant effect on the frequency of these emergencies.

Fava[23] analysed the incidence of postoperative pain after the completion of endodontic treatment performed in one or two visits in single-rooted teeth with non-vital pulps prepared by this technique. Sixty teeth with necrotic pulps from 48 patients whose ages ranged from 12 to 65 years were prepared and filled in either one or two appointments. They found no difference in pain incidence between the two groups. In the one a ppointment group only one patient reported moderate pain within the 48-hour period. All the others reported none to slight postoperative pain. He concluded that no difference in the incidence of postoperative pain between teeth treated in one or two visits.

Walton and Fouad [24] collected data at root canal treatment appointments on demographics, pulp/periapical diagnoses, presenting symptoms, treatment procedures,

and number of appointments. Patients that then experienced a flare-up (a severe problem requiring an unscheduled visit and treatment) had the correlating factors examined. Nine hundred forty-six visits resulted in an incidence of 3.17% flare-ups. Flare-ups were positively correlated with more severe presenting symptoms, pulp necrosis with painful apical pathosis, and patients on analgesics. Fewer flare-ups occurred in undergraduate patients and following obturation procedures. There was no correlation between patient demographics or systemic conditions, number of appointments, treatment procedures, or taking antibiotics.

Al-Jabreen [25] evaluated necrotic pulp of the maxillary central incisors in order to describe the incidence of post-operative pain following single-visit root canal treatment using three different instrumentation techniques. One hundred and five teeth from 91 patients whose ages ranged from 18 to 55 years were selected and divided into three groups. Each group (35 teeth) was prepared by one of the following instruments: stainless steel k-files utilizing a step-back technique, Profile 0.04-29% series files using crown-down pressureless technique and Profile GT files using crown-down pressureless technique. He found a significance difference in the incidence of postoperative