Postoperative Pain after Using 1.3% and 5.25% Sodium Hypochlorite Irrigating Solutions: A Randomized Controlled trial- part VI

A thesis

Submitted to

Faculty of Oral and Dental Medicine

Cairo University In Partial Fulfillment of Requirements for Master Degree

In

Endodontics

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B.D.S. 2008 (6th October University)

Faculty of Oral and Dental Medicine

Cairo University

2012

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ACKNOWLEDGMENT

First of all, countless thanks to **ALLAH** who granted me the strength and patience to accomplish this work.

I would like to express my gratitude and deepest appreciation to ***Prof. Dr. Randa El-boghdady*** , *Professor of Endodontics, Faculty of Oral and Dental Medicine, Cairo University,* for her precious advice , great effort and continues guidance that enlightened my way throughout this work.

I am deeply thankful to ***Dr. Karim Galal,*** *lecturer of Endodontics, Faculty of Oral and Dental Medicine, Cairo University,* for inspiring me with the idea of this work, his honest advice and huge support.

I am also so grateful to ***Dr. Ahmad El-khadem*** , *lecturer of Pedodontics and Dental Public Health, Faculty of Oral and Dental Medicine, Cairo University,* for guiding me to the way of achieving accurate and valuable research along with his sincere encouragement all the time.

I wish to express my deep thanks to my uncle ***Prof. Dr. A. A. farra,*** *Professor of Theoretical Nuclear Physics and President of Alazhar University of Gaza* for his support , kindness and unlimited help.

Finally, I would like to extend my deepest thanks to ***all my dear friends*** for being with me through our career struggle.

DEDICATION

To **my leader and endless love my dear father**

Dr. Abdel Shakour Al-farra

Ph.D. in accounting and finance

Who is always encouraging and pushing me along the way of learning and the way of success.

To **my reason of life to my soul my mother**

With her sacrifice and all beautiful things in my life

To **my sister**

Dr. Nada Al-farra

Who offered me absolute love and help

To **my brothers**

Dr. Ayman Al-farra

Dr. Abdel Rahman Al-farra

Eng. Abdel Hameed Alfarra

Hytham Al-farra

Who loved me and supported me throughout life and the course of this thesis.

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Introduction

Introduction

Postoperative pain is defined as a pain of any degree that occurs after initiation of root canal treatment. Postoperative pain is an unwanted yet unfortunately common sensation after Endodontic treatment. The incidence of postoperative pain was reported to range from 3% to 58 %. It is common after few hours or days after endodontic treatment. The development of postoperative pain after root canal treatment is usually due to acute inflammatory response in the periradicular tissue.

Tooth pain causes suffering and reduces functioning. Pain is often the motivation for an individual seeking dental care. It was suggested that improved preoperative pain control can result in reduction of postoperative pain.

Development of inter-appointment pain during root canal treatment may undermine patient's confidence in their dentist. The etiologic factors in pain manifestation have not been determined precisely; however, several hypothetical mechanical, chemical and /or microbial injuries to the pulp or the periradical tissue might be involved. From the chemical causes is the irrigating solution.

The most widely used irrigant in root canal treatment is sodium hypochlorite which is used in endodontic field due to its board-spectrum antimicrobial activity against endodontic microorganisms and biofilms. Also it possesses a tissue dissolving action. The major disadvantages of sodium hypochlorite are its significant toxicity when injected into periradicular tissue, disagreeable smell and taste, corrosion of metal objects. In addition, sodium hypochlorite does not completely eradicate all bacterial species.

During endodontic therapy sodium hypochlorite solution is used at concentration ranging from 0.5% to 6, but the optimal clinical concentration of NaOCl is still controversial.

Evidence demonstrates that high concentrations of NaOCl have enhanced antimicrobial activity. However, NaOCl is tissue cytotoxic. When it comes in contact with the tissues, it causes hemolysis and ulceration, inhibits neutrophil migration, and damages endothelial and fibroblast cells, also increased cytotoxicity leads to increased postoperative pain.

Few data in literature is available about the effect of different sodium hypochlorite concentrations on incidence of postoperative pain which might need further investigations.

Review of Literature

REVIEW OF LITERATURE

I. Postoperative Pain (Post instrumentation)

The occurrence of postoperative pain of mild intensity is not a rare event even when endodontic treatment has followed acceptable standards. For the most part, mild pain after chemico mechanical preparation can develop in about 10–30% of the cases [(1–3)], in most instances the patient can bear the discomfort or can make use of common analgesics, which are usually effective in relieving the symptoms. On the other hand, the development of interappointment pain of moderate to severe intensity with accompanied swelling has been demonstrated to be an unusual occurrence.

Nekoofar *et al* (2003) [(4)] compared the pain reducing effect of oral preparations of meloxicam, piroxicam, and placebo in endodontic emergency patients. A total of fifty patients were asked to evaluate their pretreatment pain with a visual-analog scale. After root canal therapy they were randomly assigned to one of three groups: meloxicam, piroxicam, or placebo. Each patient was sent home with a visual-analog scale to fill out at 8 and 24 h after completion of therapy. The results of this study showed no significant difference between efficacy of meloxicam, piroxicam, and placebo, but a significant effect of the time factor in reducing postoperative pain in all treatment groups was observed.

Torabinejad *et al* (2005) [(5)] compared levels of postoperative discomfort after cleaning and shaping of root canals using two protocols for removal of smear layer. Seventy-three consecutive patients requiring root canal treatment were included. At random, canals were cleaned and shaped with one of the following protocols. In group 1, 5.25% sodium

hypochlorite was used as the root canal irrigant. The smear layer was removed by placing 17% EDTA in the canal for 1 min followed by a 5-ml rinse with 5.25% NaOCl. In group 2, canals were irrigated with 1.3% NaOCl; the smear layer was removed by placing MTAD in the canals for 5 min. They found that patients recorded degree of discomfort at various time intervals after cleaning and shaping on a visual analogue scale for 1 week. No significant statistical difference was found in the degree of discomfort between the two groups.

Attar *et al* (2008) [(6)] compared single-dose ibuprofen pretreatment for postoperative endodontic pain. Thirty-nine patients were randomly assigned to 3 groups: placebo, ibuprofen tablets, or ibuprofen liquigels. Patients recorded their pain levels before and at the end of treatment, then every 6 hours for 24 hours after administration of the medications and standard endodontic treatment. Pain evaluations were done by using 3 pain scales. No significant differences in postoperative pain levels were found between either single-dose ibuprofen formulation or the placebo control group. This study suggests that single-dose pretreatment analgesia alone in endodontic pain patients will not significantly reduce postoperative pain below the reduction in pain from endodontic treatment.

Arias *et al* (2009) [(7)] compared the incidence, degree, and length of postoperative pain in three hundred endodontically treated teeth, with and without apical patency, in relation to some diagnostic factors (vitality, presence of preoperative pain and mandible of treated tooth) of the questionnaires received back, apical patency was maintained during shaping procedures with#10 K-file in one group and not in the other. There was significantly less post endodontic pain when apical patency was maintained in non vital teeth. If pain appeared, its duration was

longer when apical patency was maintained in teeth with previous pain or located in the mandible. Maintenance of apical patency does not increase the incidence, degree, or duration of postoperative pain when considering all variables together.

ElMubarak *et al* (2010) [8] evaluated postoperative pain after root canal treatment. Two hundred and thirty-four patients were conventionally endodontically treated in a single visit or multiple visits. The chemico mechanical preparation of root canals was done by a modified double-flared technique with combination of hand instruments. Postoperative pain was recorded by each patient by using visual analogue scale in well-defined categories at 2 time intervals, twelve hours and twenty four hours. There was no significant difference in postoperative pain between single-visit and multiple-visit root canal treatment.

Gondim *et al* (2010) [9] compared the postoperative level of pain after root canal therapy, using either endodontic needle irrigation or a negative apical pressure device. One hundred and ten asymptomatic single-rooted anterior and premolar teeth were treated endodontically with two different irrigation techniques. The first group used an endodontic irrigating syringe and the second group used an irrigation device based on negative apical pressure. Postoperatively, the patients were prescribed ibuprofen 200 mg to take every 8 hours, if required. Pain levels were assessed by an analog scale questionnaire after 4, 24, and 48 hours, during the 0 to 4; 4 to 24 and 24 to 48 hour intervals after treatment, the pain experience with the negative apical pressure device was significantly lower than when using the needle irrigation. The outcome of this investigation indicated that the use of a negative apical pressure irrigation device can result in a significant reduction of postoperative pain levels in comparison to conventional needle irrigation.

Nixdorf *et al* (2010) [10] evaluated the frequency of nonodontogenic pain in patients who had undergone endodontic procedures; nonsurgical root canal treatment, retreatment, and surgical root canal treatment. Seven hundred and seventy articles retrieved and reviewed were searched in four databases electronically, complemented by hand searching. A summary estimate of nonodontogenic tooth pain frequency was derived using random-effects meta-analysis. Nonodontogenic pain is not an uncommon outcome after root canal therapy and may represent half of all cases of persistent tooth pain. These findings have implications for the diagnosis and treatment of painful teeth that were previously root canal treated because therapy directed at the tooth in question would not be expected to resolve nonodontogenic pain.

Nixdorf *et al* (2010) [11] evaluated the frequency of persistent pain, regardless of etiology, after endodontic treatment. Persistent tooth pain was defined as pain present 6 months after endodontic treatment. Included in the review were pulpectomy, nonsurgical root canal treatment, surgical root canal treatment and retreatment. Of seven hundred and seventy articles retrieved and reviewed, twenty six met inclusion criteria. A total of 5,777 teeth were enrolled, and 2,996 had follow-up information regarding pain status. They identified one hundred sixty eight teeth with pain and derived a frequency of 5.3% (95%confidence interval), 3.5%-7.2%, for persistent all-cause tooth pain. High and statistically significant heterogeneity among studies (80%) was present. In subgroup analysis, prospective studies had a higher pain frequency (7.6%) than retrospective studies did (0.9%). Quality of study reporting was identified as the most influential reason for study heterogeneity. The frequency of all-cause persistent tooth pain after endodontic procedures was estimated to be 5.3%, with higher report quality studies suggesting >7%.