

Evaluation of Post-Pulpectomy Pain After Using Different Irrigation Needles in Primary Molars - A Clinical Study

AUTHORS (WITH AFFILIATION):

1. V. Ranjith Akshay Seshadri

Postgraduate Student
Saveetha Dental College and Hospitals,
Saveetha Institute Of Medical and Technical Sciences,
Saveetha University,
Chennai, India
Mail Id: 152011006.sdc@saveetha.com

2. Mahesh Ramakrishnan

Reader,
Department of Pediatric and Preventive Dentistry,
Saveetha Dental College and Hospitals,
Saveetha Institute Of Medical and Technical Sciences,
Saveetha University,
Chennai, India
Mail Id: mahesh@saveetha.com

ABSTRACT

Aim: The study aimed to assess the discomfort that follows a pulpectomy procedure using two different irrigation needles (side vented and open ended needles) in deciduous molars.

Materials and methods: The study involved 50 patients in the age group of 4-9 years old, divided equally in both the groups.(side vented and open ended needles). The post operative pain in various time interval were assessed using Wong-Baker faces pain scale and Visual Analog Scale. The results were then statistically analyzed.

Results: At the end of 72 hours time interval, patients irrigated with side vented needles had a less post operative pain (6.4%) compared to open ended needles and this was statistically significant $P < 0.05$.

Conclusion: It can be concluded that side vented needles induced less postoperative pain than the open ended needles, When evaluated at 24hrs interval.

Keywords: Postoperative pain, pulpectomy, side vented needles, open ended needles

INTRODUCTION

Pulpectomy is the procedure performed in deciduous teeth which involves completely removing tissue that is permanently inflammatory or necrotic. The indications for pulpectomy are non-vital teeth, furcation involvement, dental abscess in deciduous teeth, pulpless primary teeth with need for arch maintenance (Winters, Cameron, and Widmer

2013). Pulpectomy involves the debridement and shaping of root canals followed by obturation with a resorbable material (Martin-Gonzalez et al. 2012). Usually it is done to remove irreversibly damaged pulp or tooth that has undergone any trauma. As a result of pulpectomy, the tooth can maintain normal function and thereby guide the eruption of permanent teeth. This endodontic treatment is contraindicated in teeth with a wide pulpal floor that approximates the bifurcation level (Genet, Wesselink, and Thoden Velzen 1986).

The most common complications after pulpectomy include anesthesia adverse effects, tooth discoloration, pain, swelling, local infection, local bleeding and tooth fracture followed by tooth loss. The adverse effects of pulpectomy creates unpleasant experiences for the patients and the clinicians (Ramamoorthi, Nivedhitha, and Divyanand 2015). The apical extrusion of intracanal debris and irrigants during pulpectomy is a common occurrence during the biomechanical preparation. This causes irritation to periradicular tissues leading to periapical inflammation and postoperative flareup leading to postoperative pain (PP) (Sathorn, Parashos, and Messer 2008). Many studies have shown that apical extrusion of debris (AED) is caused due to hand files and all (NiTi) rotary files during the root canal shaping in deciduous teeth (Pawar et al. 2021).

It has been well documented that the type of irrigation methods plays a major role in the AED. Also, it has been said that open ended needles cause more of AED than the side vented needle and also the irrigation solution extruded more in the open ended needle than the side vented needle (Madan et al. 2011). Considering there is correlation between AED and PP, it should also be examined about the effect of irrigation needles and also the type of the intensity of postoperative pain on primary teeth. Consequently, the purpose of this study is to assess the post operative pain after pulpectomy using side vented and open ended needles in primary molars.

MATERIALS AND METHODS

Study design

This study was conducted in Saveetha Dental College and Hospitals, Chennai. The Saveetha Institute of Medical and Technical Sciences' ethics committee granted their clearance. Children between the age group of 4-9 years were included for this study. To calculate the sample bias, a straightforward random procedure for data gathering and separation was used.

Data collection

The inclusion criteria were Frankl positive children who require endodontic treatment for primary molars (pulpectomy) and the exclusion criteria were patients with special needs and those with systemic diseases. The children were allocated in both the groups based on a random sampling method. After the procedure, the children were evaluated by a dentist. The postoperative pain was evaluated using Wong-Baker scale and Visual analogue scale. The Wong-Baker scale has a pain score from 0 to 8, in which 0 indicates no hurt, 2 indicates hurts a little bit, score of 4 indicates hurts a little more, score of 6 which indicates hurts even more and score of 8 which hurts the worst. The Visual Analog Scale (VAS) is a 10-cm line with anchor statements at 0 (no pain) and 10 (extreme pain) on either side (worst, unbearable and excruciating pain). The patient is asked to indicate where on the line their current level of pain is. They may be asked to indicate their highest, minimal, and average levels of discomfort. The recordings were noted down at a period interval of 6 hours, 24 hours, 48 hours and 72 hours respectively for open ended and side vented needles.

Statistical analysis

Data was transferred to an MS Excel sheet and coded based on the information gathered. Following collection, these data were loaded into SPSS IBM version 20.0. Age and gender were the independent variables. The Wong Baker scale

and Visual Analog Scale served as the dependent variables. We used both descriptive and inferential statistics. The computer was fed with data, and graphical representation was created.

RESULTS

Table 1, it can be seen that at 6 hour, patients irrigated with open ended needles had a higher percentage (9.2%) of patients. In a 24 hours time interval, patients irrigated with side vented needles had a drastically lesser percentage (6.4%) of postoperative pain when compared to open ended needles. Whereas in both 48 and 72 hour time intervals, open ended needles had more number of patients with post operative pain. Irrigation with side vented needles produces less postoperative pain compared to open ended needles.

Figure 1 represents the Wong- Baker faces pain scale with values from 0 to 8 in which 0 indicates no hurt and score of 8 which hurts the worst and Figure 2 represents the Visual Analog scale with values from 0 to 10 with 0 being no pain and 10 being the worst, unbearable and excruciating pain. From Figure 3, it can be seen that there was a significant correlation for side vented needles at the interval of 24 hours with $P < 0.05$ suggesting a significant correlation with respect to the post operative pain. There was no significant relation with respect to the side vented needles and open ended needles at the 48 and 72 hours interval, as the patients reported with mild pain at these intervals.

DISCUSSION

The pulpectomy procedure performed in pediatric patients is an endodontic treatment involving the removal of necrotic pulp tissues and this was mainly carried out using hand files. The invention of rotary files had made this chairside process easier for the dentists and for the patients (Katge, Patil, and Rusawat 2016). The clinical relevance of this study focuses on the need to encourage the use of side vented needles as it shows less PP. It is also reported that apical extrusion of debris in a side vented needle and open ended needles is because of irrigating the solutions from a greater distance from the apex.

The etiology of this pain depends on the host response, infection, and periapical extrusion (Shokraneh et al. 2017). During mechanical preparation, various amounts of dentinal chips, debris, solution etc are being pushed into periapical tissues, which can bring about undesired consequences such as inflammation, postoperative pain (Panchal, Jeevanandan, and Subramanian 2019). NSAIDs have no or less effect on young children in order to treat postoperative pain.

There are a variety of irrigating solutions used in dentistry for root canal and pulpectomy procedures during mechanical preparation such as sodium hypochlorite (NaOCl), chlorhexidine (CHX), or ethylenediaminetetraacetic acid (EDTA). Studies have shown that, in addition to irrigants, different types of needle tips have been used earlier to deliver the irrigant inside the canal system (Topçuoğlu, Topçuoğlu, and Akpek 2016). It has been seen that the postoperative pain is also dependent on the type of files used and is reported that when primary teeth are treated with rotary instrumentation rather than manual instrumentation, postoperative discomfort is reduced. (Ali, Magdy, and Husien 2020). This can be an added feather to the world of rotary endodontics. In future, more clinical and practical studies are to be conducted to determine the postoperative pain in other teeth such as the primary anterior tooth, as this study concentrated only the primary molars.

CONCLUSION

Therefore, within the constraints of this research, it may be said that the side vented needles caused less similar postoperative pain in patients with irreversible pulpitis in primary molars, whereas open ended needles had high chances of inducing pain.

ACKNOWLEDGEMENT

The authors would like to acknowledge the support rendered by The Department of Pediatric and Preventive Dentistry of Saveetha Dental College and Hospitals and the management for their constant assistance with the research.

CONFLICTS OF INTEREST

There are no conflicts of interest.

REFERENCES

1. Ali, Mohamed Elsaed Mohamed, A. Magdy, and W. Hussien. 2020. "Evaluation of Post-Operative Pain after Irrigation Using End-Vented NaviTip Tips versus Vibringe Sonic Irrigating System in Teeth with Acute Pulpitis with Apical Periodontitis: A Randomized Clinical Trial." *Open Access Macedonian Journal of Medical Sciences*. <https://doi.org/10.3889/oamjms.2020.4353>.
2. Genet, J. M., P. R. Wesselink, and S. K. Thoden Velzen. 1986. "The Incidence of Preoperative and Postoperative Pain in Endodontic Therapy." *International Endodontic Journal*. <https://doi.org/10.1111/j.1365-2591.1986.tb00482.x>.
3. Katge, Afarhin, Pdevendra Patil, and Dbhaves Rusawat. 2016. "Knowledge and Attitude of Pediatric Dentists, General Dentists, Postgraduates of Pediatric Dentistry, and Dentists of Other Specialties toward the Endodontic Treatment of Primary Teeth." *Journal of Orofacial Sciences*. <https://doi.org/10.4103/0975-8844.195917>.
4. Madan, N., A. Rathnam, A. L. Shigli, and K. R. Indushekar. 2011. "K-File vs ProFiles in Cleaning Capacity and Instrumentation Time in Primary Molar Root Canals: An in Vitro Study." *Journal of Indian Society of Pedodontics and Preventive Dentistry*. <https://doi.org/10.4103/0970-4388.79907>.
5. Martin-Gonzalez, J., M. Echevarria-Perez, B. Sanchez-Dominguez, M. L. Tarilonte-Delgado, L. Castellanos-Cosano, F. J. Lopez-Frias, and J. J. Segura-Egea. 2012. "Influence of Root Canal Instrumentation and Obturation Techniques on Intra-Operative Pain during Endodontic Therapy." *Medicina Oral Patología Oral Y Cirugía Bucal*. <https://doi.org/10.4317/medoral.18234>.
6. Panchal, V., G. Jeevanandan, and E. M. G. Subramanian. 2019. "Comparison of Post-Operative Pain after Root Canal Instrumentation with Hand K-Files, H-Files and Rotary Kedo-S Files in Primary Teeth: A Randomised Clinical Trial." *European Archives of Paediatric Dentistry*. <https://doi.org/10.1007/s40368-019-00429-5>.
7. Pawar, Bhaggyashri A., Ajinkya M. Pawar, Jatin Atram, Alexander Maniangat Luke, Anuj Bhardwaj, Anda Kfir, Zvi Metzger, and Dian Agustin Wahjuningrum. 2021. "Apical Debris Extrusion during Instrumentation of Oval Root Canals in Primary Teeth Using Manual versus Motorized Files: An Ex Vivo Study." *Scientific Reports*. <https://doi.org/10.1038/s41598-021-83522-4>.
8. Ramamoorthi, Surendar, Malli Sureshbabu Nivedhitha, and Madras Jeyaprakash Divyanand. 2015. "Comparative Evaluation of Postoperative Pain after Using Endodontic Needle and EndoActivator during Root Canal Irrigation: A Randomised Controlled Trial." *Australian Endodontic Journal*. <https://doi.org/10.1111/aej.12076>.
9. Sathorn, C., P. Parashos, and H. Messer. 2008. "The Prevalence of Postoperative Pain and Flare-up in Single- and Multiple-Visit Endodontic Treatment: A Systematic Review." *International Endodontic Journal* 41 (2): 91–99.
10. Shokraneh, Ali, Majid Ajami, Nastaran Farhadi, Mohsen Hosseini, and Bitra Rohani. 2017. "Postoperative Endodontic Pain of Three Different Instrumentation Techniques in Asymptomatic Necrotic Mandibular Molars with Periapical Lesion: A Prospective, Randomized, Double-Blind Clinical Trial." *Clinical Oral Investigations* 21 (1): 413–18.

11. Topçuoğlu, Gamze, Hüseyin Sinan Topçuoğlu, and Firdevs Akpek. 2016. "Evaluation of Apically Extruded Debris during Root Canal Preparation in Primary Molar Teeth Using Three Different Rotary Systems and Hand Files." *International Journal of Paediatric Dentistry / the British Paedodontic Society [and] the International Association of Dentistry for Children* 26 (5): 357–63.
12. Winters, John, Angus C. Cameron, and Richard P. Widmer. 2013. "Pulp Therapy for Primary and Immature Permanent Teeth." *Handbook of Pediatric Dentistry*. <https://doi.org/10.1016/b978-0-7234-3695-9.00007-9>.

Table 1: This tabular column shows the percentage distribution of the total number of patients with postoperative pain at different time intervals of 6, 24, 48 and 72 hours.

NO. OF PATIENTS (%) AT VARIOUS TIME INTERVAL WITH PP				
	6 HOURS	24 HOURS	48 HOURS	72 HOURS
SIDE VENTED NEEDLES (25)	20 (8.0%)	16 (6.4%)	22 (8.8%)	18 (7.2%)
OPEN ENDED NEEDLES (25)	23 (9.2%)	22 (8.8%)	23 (9.2%)	20 (8.0%)

Figure 1: Represents the Wong- Baker faces pain scale with values from 0 to 8.

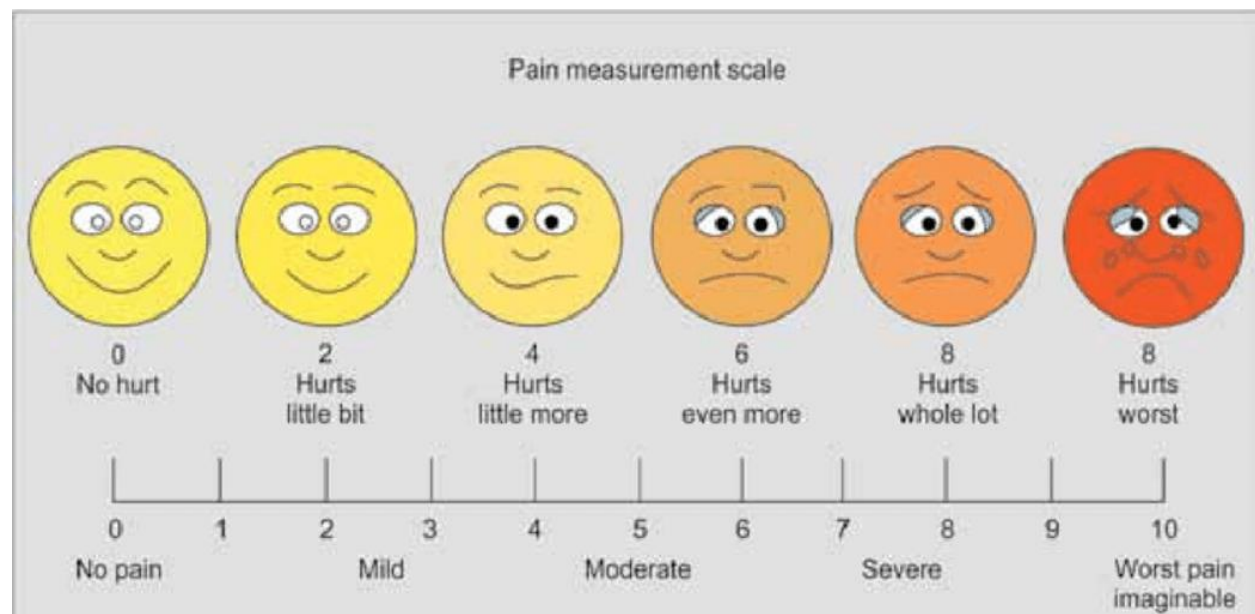


Figure 2: Represents the Visual Analog Scale with values from 0 to 10.

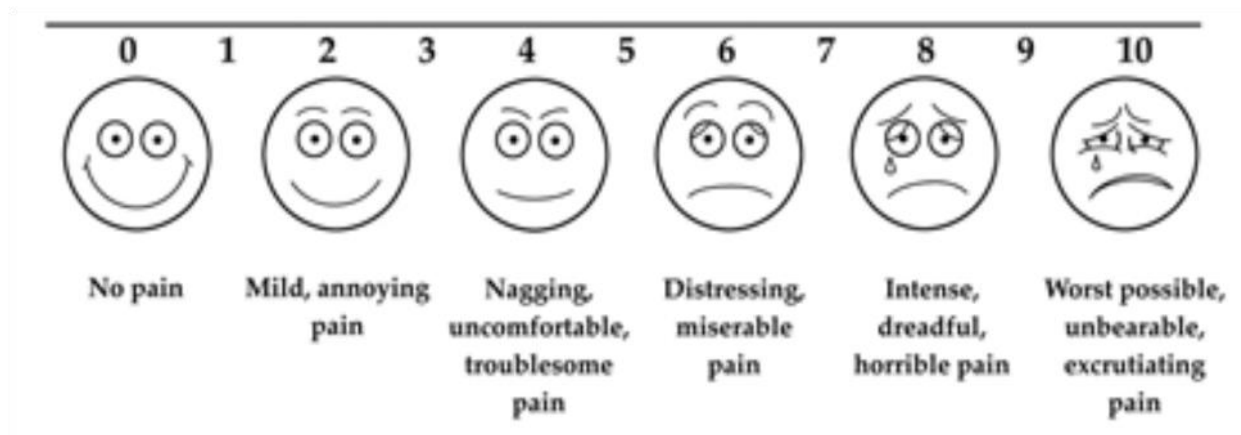


Figure 3: Bar chart representing the variation of patients at various time intervals with a statistical significant correlation at the 24 hour interval.

