

The Outcome of Two Diverse Irrigation Needles on Post Operative Pain after PULPECTOMY in Permanent Dentition

Dr. Imran Saleem Qureshi¹, DR .NOOR UL AMIN², Dr Syed Hassan Jan³, Dr Sana Naeem⁴, Dr Sakina Qazi⁵, Dr.Riaz khan⁶, Malik ASAD Iqbal⁷

¹Assistant Professor, Department of Operative Dentistry, Frontier Medical & Dental College, Abbottabad.

²Consultant Periodontist ,Head of periodontic Department , Frontier Medical and Dental college Abbottabad

³Assistant professor, Department of Oral Biology Frontier medical and dental college

⁴Assistant Professor, Oral Biology, Frontier Medical and Dental College, Abbottabad.

⁵Periodontology department Rawal institute of health sciences islamabad

⁶Trainee Medical Officer , oral and maxillofacial surgery Department khyber college of Dentistry Peshawar

⁷Consultant oral and maxillofacial surgeon, Trauma center, civil hospital karachi

ABSTRACT:

OBJECTIVE: The main objective of the current study is to analyze the consequences of type of syringes on post-operative pain after pulpectomy.

STUDY DESIGN: Randomized Control Trial

STUDY SETTING: Frontier Medical and dental college, Abbotabad, Pakistan

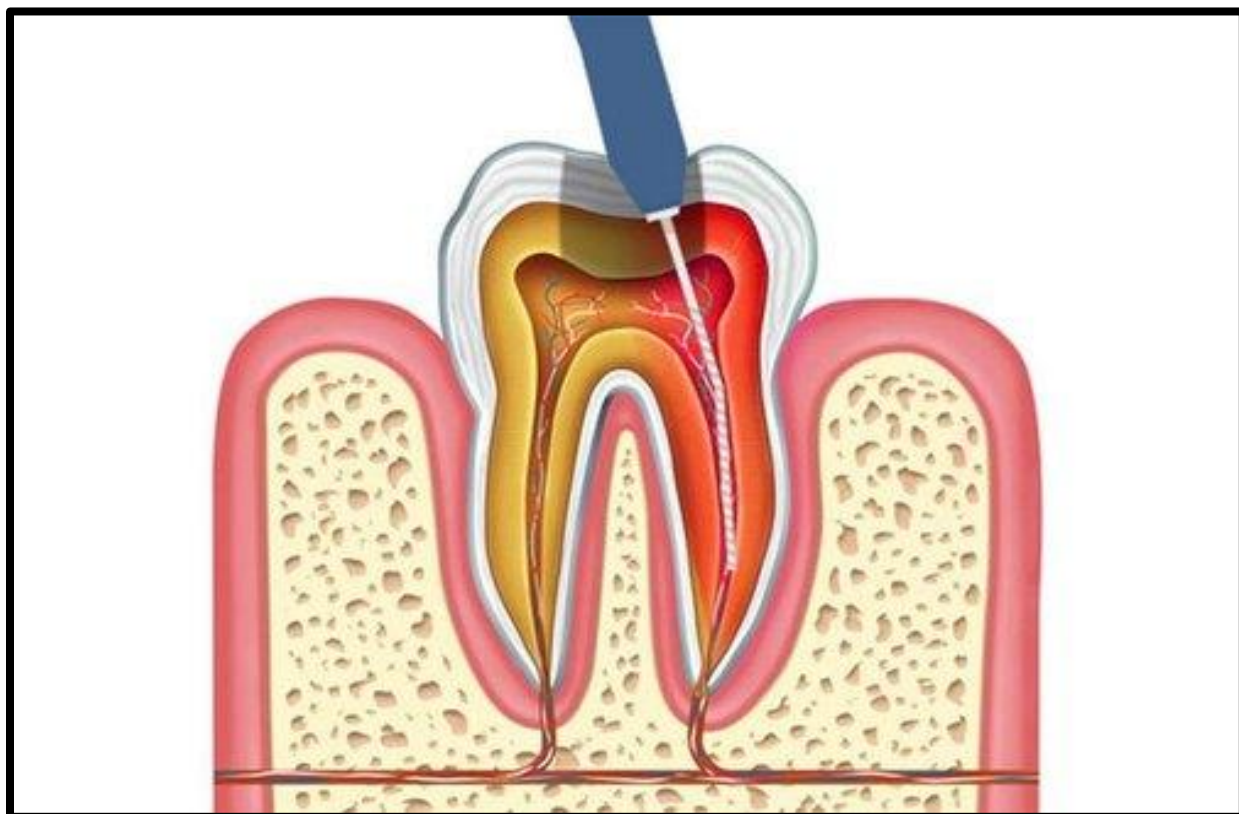
METHODS: The participants are sub categorized into two groups. Pulpectomy in participants of one group will be carried with the Open ended needle type of irrigation whereas pulpectomy will be accomplished using the double side vented type of needle in the other group. Periapical tooth viability is assessed with periapical radiography. The intensity of PP is determined after pulpectomy. Based on these observations, the type of pulpectomy needle best suited for PP control will be studied.

RESULT: Participants who were treated with an open-ended needle in their permanent dentition demonstrated post operative pain with greater intensity compared to those treated with a double side-vented needle at 6, 12, and 24 hours (P.05). However, no significant change between the groups was seen after 2, 3 and 7 days (P >.05).

CONCLUSION: In permanent dentition, side vented needles would be considered to reduce Post operative pain during the first 24 hours following the removal of pulp.

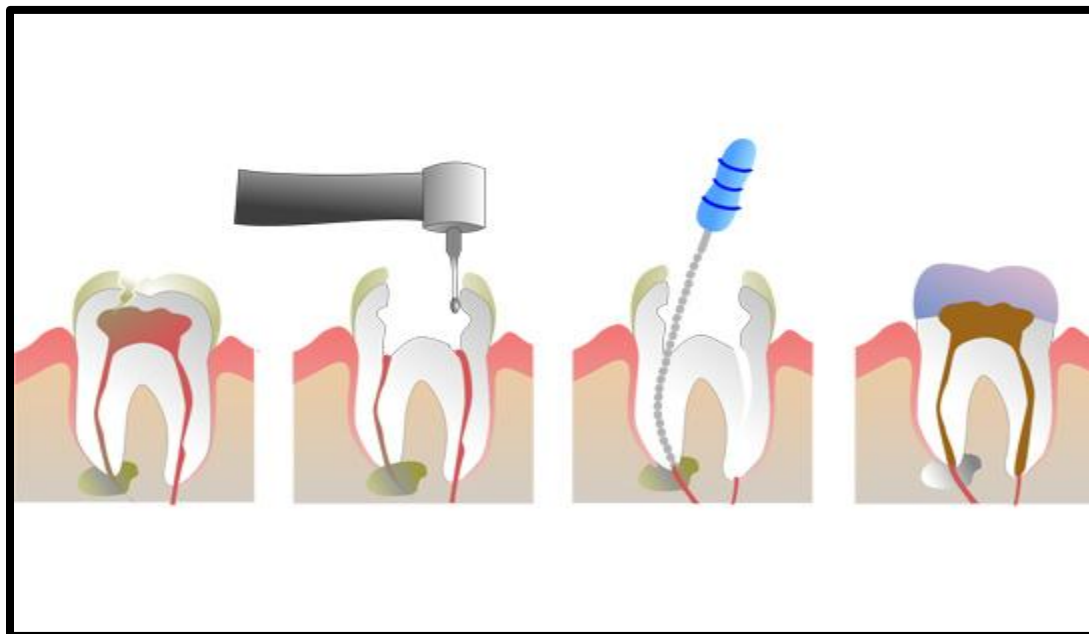
INTRODUCTION:

The ceiling of the pulp chamber is removed to get entrance to the canals of permanent teeth, which are subsequently lavage, reshaped, removed the infection, and clogged up with a suitable dental material. As a consequence, teeth can be retained in the bone without sacrificing vitality of pulp, while still functioning normally. 1.1 Following therapy, the most frequent pain after pulpectomy and bulge associated with pulpectomy begin. Awkward circumstances for both patients and professionals can be observed in this situation. Apical discharge of contamination or disinfected fluid during channel planning or water system may expand the inflammatory reaction and result in periradicular irritation¹.



The accumulation of apically extruded debris (AED) produced by hand files and all nickel-titanium rotary files was studied through canal reshaping in the dentition, and the results indicate that AED is produced by hand files and all nickel-titanium rotary files through reshaping of the canal². The established type of irrigation utilized has an effect on the accumulation of debris in canal. Yeter et al evaluate the accumulation of debris extruded during root canal reshaping with two separate files and needle tips, namely open-ended needle and side-vented needle, concluding that one end needle extruded considerably more debris than side vented ones. According to Alkahtani et al, side vent needles removed much less irrigant fluid than one end needle.

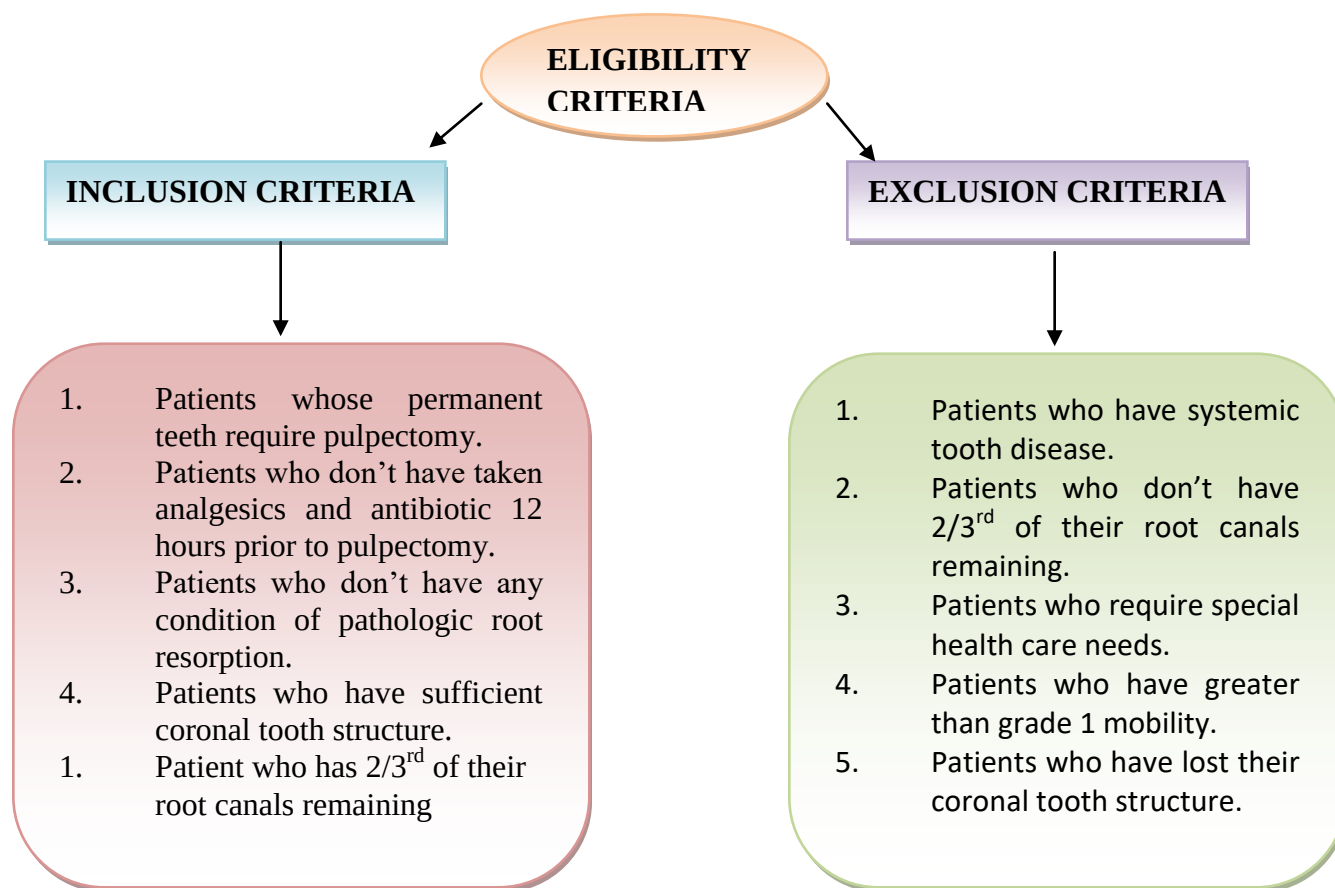
However, a search of the endodontics dentistry literature revealed a dearth of evidence on the irrigation procedure's effect on the debris in permanent teeth. Due to the linkage between debris removed and Post op pain, it is necessary to evaluate the influence of type of needle used on the strength of post op pain in dentition³.



Many researchers compared the impact of canal reshaping on the severity and time period of post op pain in teeth. Although, studies did not conduct to determine the impact of various files type on the severity and time period of post op pain, following pulpectomy in permanent dentition. With the help of this knowledge, this study evaluates the strength and duration of post op pain in permanent teeth following pulpectomy with one end needle and side vented needle⁴.

MATERIAL AND METHODS:

To determine the sample size, a pilot research with 20 patients was done. Twenty patients (n = 10) were assigned at random to one of two categories. The mechanism of randomization is detailed later. The pilot trial followed the same protocol as the full trial. According to the research data, size of sample was identified using a type I error of 0.05 and an 80 percent power setting, demonstrating that eighty participants (40 patients in both category) would be mandatory to detect a 20% dissimilarity in post op pain prevalence among the categories. At last, fifty individuals were chosen for both categories. Participants were informed adequately about the obligatory handling. Subjects enrolled in the trial voluntarily, and agreement was obtained in writing⁶.



A total of 100 subjects were allocated randomly to either of the category based on the nature of files used during pulpectomy by means of a computer programme developed by a skilled subordinate who was blinded to the research protocols prior to receiving the participants. The dental assistant recorded the participant and group numbers on paper. When the subject enters the clinic and it was determined that they met the inclusion requirements, the record was assessed to ensure the participant was assigned to the correct group. Variables relevant to the patient such as age and gender were recorded, and also the variables which are relevant to the particular tooth. Pulpectomy procedures were done on all patients by an experienced operator who was unaware of the purpose of the investigation. The participants were not aware of their assignment⁷.

When topical anaesthesia was applied, a mixture of articaine and epinephrine anaesthetized the tooth. The upper visible lesion was excavated and the canal cavity is open for further access, following rubber dam isolation. The absence of bleeding in the canal indicated the necrotic pulp. An electronic apex finder was used to determine the working length (WL). The root canal's WL was fixed to be 1 mm shorter than the apex locator's '0.0' mark. In all groups, root canals were formed at a speed of 300 rpm to the size of 35.⁸

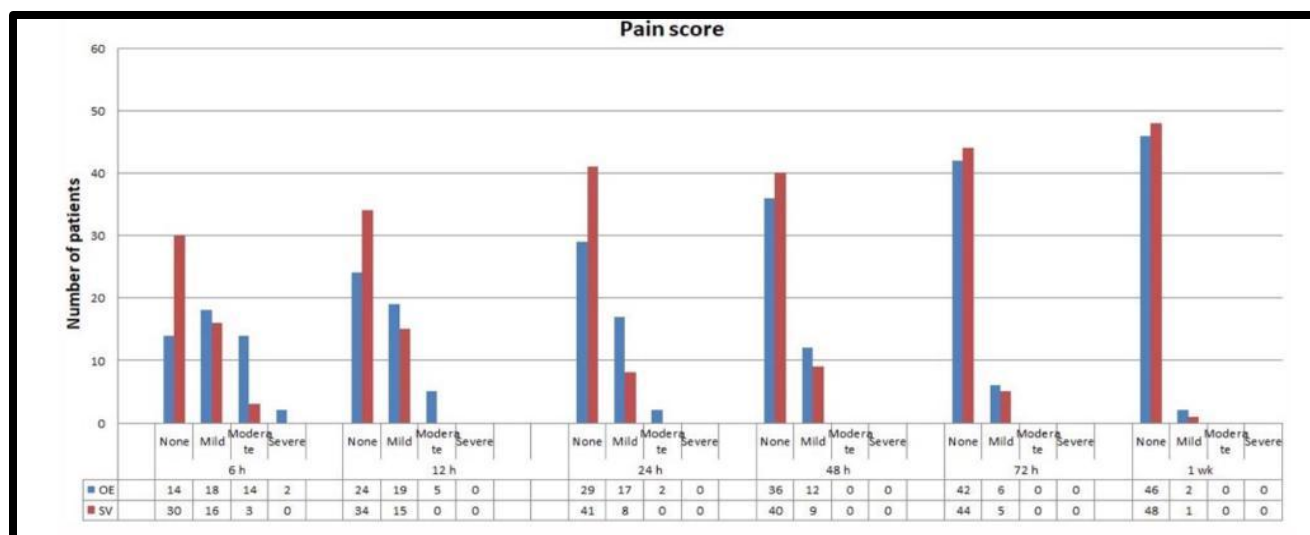
During canal preparation, canals were filled with 5ml of sodium hypochlorite 1% with the help of syringe and a 30-G one end file positioned through working length of the canal 2mm shorter . Canals were provided with 5ml of 1% NaOCl using a 30-G double Side vent needle positioned through the working length 1mm shorter during canal preparation in the SVN group. After drying the canals, they were obturated with Vitapex paste. The paste was put into the canals at a slow speed using a lentulo spiral. Periapical radiography was used to check the standard of the root filled, and the affected tooth was subsequently lastingly repaired. The occlusion has been verified⁹.

RESULT:

The variations between demographic data groups and analgesic provides were insignificant ($P > 0.05$)

	One end needle	Side vented needle	P value
Age in years and Standard deviation	7.04	7.02	.836
Males	27	26	.549
Females	25	22	.354
Upper 1 st molar	27	23	.266
Upper 2 nd molar	21	25	.875
Post op analgesia	3	1	

3 patients were omitted from the study (2 from the one end needle category and 1 from the side vent needle category) due to their failure to attend the follow up. There was no dissimilarity between the groups in terms of the distribution of teeth which were treated ($P > 0.05$). Three participants in the one end needle category and four participants in the side vented needle category overfilled ($P > 0.05$). Figure 3 depicts the mean post op pain scores. At 6, 12, and 24 hours, the one end needle category reported significantly elevated post op pain values than the side vented needle category ($P > 0.05$). After 2, 3 and 7 there was no considerable differentiation in pain severity between the two categories ($P > 0.05$). The maximum post op pain severity was observed 6 hours after treatment in both groups, with pain diminishing with the passage of time^{8, 10}.



DISCUSSION:

Many researchers found that the rates of success of root canal pulpectomy of necrosed teeth with damage pulp and apical radiation were not different. 10 Bharuka and Mandroli examined the clinical/ X-ray result of 1- versus 2-visit permanent teeth pulpectomy with necrosed pulp and periodontitis in the apex and confirmed the feasibility of single-visit pulpectomy as a feasible substitute for the pulp removal of these teeth¹¹. This study consisted only of necrotic pulp molars treated in one visit. The identical treatment techniques were conducted in both categories to achieve standardization, apart from for the kind of pulpectomy flushing needle. It is established that the presence of preoperative discomfort is a powerful post op pain predictor. Therefore, this study has included only patients without such symptoms to limit the variety of factors. It is fundamental to verify the working length properly to prevent excessive fulfilling, as physiological resorption is sometimes not precisely identified through imaging. Therefore, it is advisable to utilise an apex locator in primary teeth for root canal therapy, as in the case of permanent teeth. The electronic apex locator measurement is not impacted by the tooth type, root resorption or pulp clinical state. Electronic apex locators have been shown to have a good accurateness in teeth, with and without root resorption. The working length was evaluated by an apical finder in this investigation^{11, 12}.

Barr et al introduced rotary files into endodontics in 1999. In primary teeth, it has been found that rotary files produce higher canal cleanliness and require less time to complete canal preparation than manual files. Most rotary file systems feature a predetermined file sequence for crown-down canal preparation. Previous research indicates that this procedure may result in less postoperative discomfort than other procedures¹². Post of pain is frequently used in conjunction with debris during canal preparation. According to the literature review, possible causes of debris ejection include the preparation methodology, the rotary file design, the rotary file movement type, and the watering strategy. In a previous study, the authors compared the quantity of debris extruded by rotary files and hand files during root canal shaping in primary teeth and found that

hand files extruded more debris than the rotary files tested. To minimize debris extrusion in this investigation, the canals were prepared using a continuous motion rotary device¹².

According to Zehnder, root canal preparation and irrigation with an inert solution alone are insufficient to effectively eliminate bacteria from the root canal system. As a result, irrigation solutions containing 1 percent sodium hypochlorite and/or chlorhexidine are necessary to provide adequate canal disinfection. During root canal irrigation, a strong irritant for the periapical tissues, such as NaOCl, must not be extruded beyond the apex¹³.

In a recent study, the authors found that using a low or high concentration of NaOCl had no significant effect on the clinical outcome of root canal treatment in permanent teeth with pulp necrosis and chronic apical periodontitis. In this context, a low concentration of NaOCl (such as 1%) should be preferred as an fluid in teeth with or without necrosed pulp in the absence of physiological root resorption. As a result, 1% NaOCl was used as the flushing fluid in this investigation of canal contouring. The majority of cases of PP are associated with apical damage caused by canal debris^{13, 14}.

Other possible causes include soft tissue injury caused by the use of a rubber dam clamp or matrix, pain caused by an anaesthetic injection, and pain caused by excessive occlusal contact during coronal restoration, particularly in child patients.⁸ As a result, the source of PP cannot be determined completely. When clinical research evaluating PP are interpreted, these factors could be viewed as study limitations. Pain thresholds vary amongst people, which may have an effect on pain scores. This could be viewed as another shortcoming of these investigations¹⁴.

According to Boutsoukis et al.²², the OEN resulted in greater irrigant extrusion than the SVN. As needles moved further from the WL, irrigant extrusion reduced (from 1 to 3 mm). Boutsoukis et al.²³ found that the irrigant replacement extended beyond 2 mm or 2 mm apically to the tip of the OENs, but was confined to within 1–1.5 mm apically to the tip of the SVNs. The authors concluded that SVNs should be placed within 1 mm of the WL, while OENs should be placed within 2 or 3 mm of the WL. In this investigation, SVN and OEN groups were positioned within 1 and 2 mm of the WL, respectively, in accordance with these authors' recommendations¹⁵.

Pain scores in the one end needle category were considerably greater than those in the side vent category during the first day in this trial. This outcome could be explained by the fact that one end needle ejected a greater amount of debris than the side vented needle category. It is established that utilizing a side vented needle throughout the canal irrigation procedure avoids applying constructive force directly on the apical side. This could have resulted in a decrease in the amount of canal debris used throughout the irrigation protocol. 3 participants in one end needle category and four patients in the side vented needle category had canal filling extruded in this study. Riccucci et al demonstrated that in cases with little canal filled, the extrusion had no

significant effect on the treatment outcome, and there was no association between extrusion and post op pain¹⁶.

CONCLUSION:

1. Compared to one end needle used during the first day, root canal flushing with an side vent needle resulted in reduced post op pain¹⁸.
2. In tooth pulpectomy, SVN's would be considered to reduce the severity of post op pain¹⁷.
3. Additional research is required to investigate the impact of numerous factors on post op pain during tooth pulp removal¹⁸.

REFERENCES:

1. AAPD. Guideline on pulp therapy for primary and immature permanent teeth. *Pediatr Dent*. 2012;34:222-229.
2. Kratunova E, Silva D. Pulp therapy for primary and immature permanent teeth: an overview. *Gen Dent*. 2018;66:30-38.
3. Pak JG, White SN. Pain prevalence and severity before, during, and after root canal treatment: a systematic review. *J Endod*. 2011;37:429-438.
4. Buldur B, Hascizmeci C, Aksoy S, Nur Aydin M, Guvendi ON. Apical extrusion of debris in primary molar root canals using mechanical and manual systems. *Eur J Paediatr Dent*. 2018;19:16-20.
5. Topçuoğlu G, Topçuoğlu HS, Akpek F. Evaluation of apically extruded debris during root canal preparation in primary molar teeth using three different rotary systems and hand files. *Int J Paediatr Dent*. 2016;26:357-363.
6. Yeter KY, Evcil MS, Ayranci LB, Ersoy I. Weight of apically extruded debris following use of two canal instrumentation techniques and two designs of irrigation needles. *Int Endod J*. 2013;46:795-799.
7. Alkahtani A, Al Khudhairi TD, Anil S. A comparative study of the debridement efficacy and apical extrusion of dynamic and passive root canal irrigation systems. *BMC Oral Health*. 2014;14:12.
8. Topçuoğlu G, Topçuoğlu HS, Delikan E, Aydınbelge M, Dogan S. Postoperative pain after root canal preparation with hand and rotary files in primary molar teeth. *Pediatr Dent*. 2017;39:192-196.
9. Fergusson D, Glass KC, Waring D, Shapiro S. Turning a blind eye: the success of blinding reported in a random sample of randomised, placebo controlled trials. *BMJ*. 2004;328:432.

10. Manfredi M, Figini L, Gagliani M, Lodi G. Single versus multiple visits for endodontic treatment of permanent teeth. *Cochrane Database Syst Rev.* 2016;12:CD005296.
11. Bharuka SB, Mandroli PS. Single- versus two-visit pulpectomy treatment in primary teeth with apical periodontitis: a double-blind, parallel group, randomized controlled trial. *J Indian Soc Pedod Prev Dent.* 2016;34:383-390.
12. Arias A, Azabal M, Hidalgo JJ, de la Macorra JC. Relationship between postendodontic pain, tooth diagnostic factors, and apical patency. *J Endod.* 2009;35:189-192.
13. Ahmed HM. Anatomical challenges, electronic working length determination and current developments in root canal preparation of primary molar teeth. *Int Endod J.* 2013;46:1011-1022.
14. Angwaravong O, Panitvisai P. Accuracy of an electronic apex locator in primary teeth with root resorption. *Int Endod J.* 2009;42:115-121.
15. Barr ES, Kleier DJ, Barr NV. Use of nickel-titanium rotary files for root canal preparation in primary teeth. *Pediatr Dent.* 1999;21:453-454.
16. Soares F, Varella CH, Pileggi R, Adewumi A, Guelmann M. Impact of Er,Cr:YSGG laser therapy on the cleanliness of the root canal walls of primary teeth. *J Endod.* 2008;34:474-477.
17. Goreva LA, Petrikas AZH. Postobturation pain associated with endodontic treatment. *Stomatologiya (Mosk).* 2004;83:14-16.
18. Mollashahi NF, Saberi EA, Havaei SR, Sabeti M. Comparison of postoperative pain after root canal preparation with two reciprocating and rotary single-file systems: a randomized clinical trial. *Iran Endod J.* 2017;12:15-19