

ONE VISIT ENDODONTICS IN TEETH WITH PULPAL NECROSIS AND ASYMPTOMATIC PERIAPICAL PERIODONTITIS

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ABSTRACT

The objective of this study was to determine the frequency of post obturation pain within 24 hours in teeth with pulpal necrosis and asymptomatic periapical periodontitis after one visit endodontics. This descriptive observational study was carried out in department of Operative Dentistry, Rawal Institute of Health Sciences, Islamabad, from 30th July 2015 to 1st February 2016. After approval by ethical committee of the college, patients consent was also obtained. One hundred forty five patients with non vital necrotic single rooted permanent teeth with age group 18-80 years were selected. Patients data collected through consecutive sampling consisted of 62(43%) males and 82(57%) females with a mean age of 41.52±14.26. After single visit endodontics procedure on tooth, five point scale was explained to the patients to record post obturation pain within 24 hours (6 hours and next 18 hours) and to return the questioners the next day. Data were analyzed by SPSS version 23.0. Frequency and percentages were calculated for pain, gender, type of tooth, arch involved and diagnosis. It was found that frequency and percentages of pain and other variables were statistically insignificant. Maxillary central incisor was the most commonly reported tooth. It was concluded that mean postobturation pain was low in one visit endodontics performed on teeth with pulpal necrosis and asymptomatic periapical periodontitis within overall 24 hours.

Key Words: Pain, Post operative pain, Dental pulp necrosis, nonvital tooth, root canal therapy, endodontics, flare up, necrosis of the pulp.

INTRODUCTION

Root canal treatment is a common procedure in dentistry for treatment of pulpal and periodontal pathosis.^{1,2} There can be two approaches to reduce bacterial persistence and reinfection of canals, either dress the canals with antibacterial agents in multiple visits or immediately obturate the canals in one visit to reduce the space for bacterial colonization.^{3,4} In past, multivisit approach was opted for endodontic treatment of necrotic tooth and one visit approach was considered as an inappropriate treatment protocol. Recently clinicians also started opting for one visit approach too because of improvements in treatment methods and techniques.⁵

One visit endodontics is defined as conservative non-surgical treatment of endodontically involved tooth consisting of complete biomechanical preparation and obturation of root canal system in one visit.⁶ Improved endodontics techniques and inventories make single visit endodontics the norm of today's practice. In 1995, Peters gave concept of entomb theory which was followed in one visit endodontics. This theory defends that after the obturation a low concentration of some bacteria remain inside canals but stay imprisoned inside dentinal tubules and isthmus. With lack of nutrients these bacteria will finally die.⁷

There are a number of advantages to one visit endodontics for example there are reduced number of appointments which is more convenient to patient, decreased pain and anxiety associated with every subsequent appointment and minimal chances of iatrogenic errors (perforation, ledging, stripping). It allows the dentists to obturate the canals that are well oriented and the operator is familiar with better tactile sensation. With one visit endodontics, there is no need for provisional restoration between appointments and thus no bacterial contamination through provisional restoration leakage. There is increased intimacy of sealer to canals and decreased logistical issues of pa-

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tient. Moreover it allows for resumption of the tooth function efficiently and immediately after treatment.⁸ Recent clinical report favor preference of one visit endodontics by patients.⁹ However, from an impartial view, the following could be classified as disadvantages: The longer single appointment could be tiring for some patients with temporomandibular problems. An inexperienced clinician may lack the skill to complete the endodontic therapy in one visit. Difficult cases like calcified canals, severe curvatures, weeping canal, may not qualify for treatment in one visit.¹⁰

Pain usually follows this procedure of one visit root canal treatment if it is related to non vital teeth.^{11,12,13} Pulp therapy and root canal treatment induce more frequent post operative pain than do other dental procedures. Post obturation pain might be considered by patient as a benchmark against which the clinician's skills are measured and also it might undermine patient's confidence in their dentists or patient satisfaction with the treatment.¹⁴ Prevention and management of this post obturation pain is an integral part of endodontic treatment. Post treatment pain severity demonstrate a steady decrease in pain over time persisting for few hours to one or few days. Gotler found patients with single visit endodontic treatment experienced mild pain around (38.5%).¹ An other study by Durre Sadaf and Zubair Ahmed reported pain to be more during initial post obturation hours and gradually decrease with time. Moreover, study by Sumita and Deepil reported mild pain in 48% of patients non-vital teeth.¹⁵ Although non vital teeth may show sustained presence of pain due to co-existent periapical and periodontal lesions in form of asymptomatic periapical periodontitis with pulpal necrosis, persistent anaerobic infection or external root resorption, recent inventions of Nickel titanium instrument systems along with improved irrigation dynamics and irrigation protocols give better post obturation result with minimum pain.¹⁶

This study aimed to determine the postobturation pain levels with one visit endodontics approach in teeth with pulpal necrosis and asymptomatic periapical periodontitis after initial 6 hours of treatment and then next 18 hours making overall 24 hour pain levels observation period for more accurate evidence-based treatment protocol.

METHODOLOGY

This descriptive observational study enrolled a total of 145 patients with pulpal necrosis and asymptomatic periapical periodontitis single rooted permanent teeth after approval of the study by ethical committee of Rawal Institute of Health Sciences. Sample size was calculated using World Health Organization sample size calculator with confidence interval of 95%. The study duration was from 29th July 2015 to 1st February 2016.

After obtaining informed consent of patients, these 145 endodontically involved single rooted permanent anterior teeth or premolars of patients fulfilling the inclusion criteria i.e subjects of both genders between age group 18-80 years, maxillary and mandibular permanent teeth with completely formed roots, single rooted necrotic teeth, absence of pre-operative pain were selected for the study. These patients reported to Department of Operative Dentistry, Rawal Institute of Health Sciences (RIHS). All the procedures were carried out by the trainee researcher herself. A data collection Performa was used for recording the required details.

A preoperative periapical radiograph was taken by paralleling technique using Velopex dental x-ray films. A thorough clinical examination and case history was documented. The standardized operative procedure included administration of local anesthesia, rubber dam isolation, access cavity preparation followed by pulp extirpation. After the confirmation of canal patency and when an electronic apex locator working length reading was achieved with the appropriate size K-file (Mani), canals were prepared with manual instrumentation. 17% EDTA gel was used as a lubricant. Irrigation was performed with 2.5% NaOCl after each instrument in all cases. All teeth were prepared to working length, dried with paper points (Pearl dent). Canals were filled with gutta-percha (Pearl dent) and zinc-oxide eugenol based sealer (Septodont) using lateral condensation technique and restored with temporary restorative material, Cavit (3M ESPE Dental, Seefeld, Germany) in the same visit.

Frequency of post obturation pain was evaluated using continuous five point scale within 24 hours. Patients were given forms to fill and instructed to mark on the continuous horizontal five point scale to grade pain levels they felt at 6 hours and 18 hours intervals after treatment where 1=no pain, 2=mild pain, 3=moderate pain 4=severe pain 5=very severe/unbearable pain. For the purpose of analysis ≤ 2 was considered as no pain and >2 was pain. Although no systemic medications were prescribed, the patients were instructed to take 400mg ibuprofen only if they will experience pain and asked to record maximum pain level before they take analgesics. Patients were contacted on telephone to remind them to complete and return the forms the next day after 24 hours completion.

Data were entered and analyzed using the Statistical Package for Social Sciences v 23.0 (IBM Statistics, Chicago, Ill). Frequency and percentages were described for pain, gender, type of the tooth, arch involved, and diagnosis. Mean \pm Standard deviation was calculated for age (18-80 years). Effect modifiers like age, gender, type of tooth and arch and diagnosis were controlled by stratification. Post stratification chi-square test

was then being applied. Level of significance of < 0.05 was considered to be statistically significant. Data was presented in the form of tables, charts and graphs.

TABLE 1: FREQUENCY DISTRIBUTION OF PAIN AT 24 HOURS AMONG BOTH GENDERS

Pain categories	Gender		P value
	Male n (%)	Female n(%)	
No pain	49 (79.0%)	63 (76.8%)	0.84
Pain	13 (21.0%)	19 (23.2%)	
Total	62 (100%)	82 (100%)	

TABLE 2: FREQUENCY DISTRIBUTION OF PAIN AT 24 HOURS AMONG DIFFERENT DIAGNOSIS

Pain categories	Diagnosis		P value
	Pulpal Necrosis n (%)	Pulpal Necrosis with Periapical Periodontitis n (%)	
No pain	85 (80.2%)	27 (71.1%)	0.26
Pain	21 (19.8%)	11 (28.9%)	
Total	106 (100%)	38 (100%)	

TABLE 3: FREQUENCY DISTRIBUTION OF PAIN AT 24 HOURS AMONG BOTH ARCHES

Pain categories	Arch		P value
	Maxillary n (%)	Mandibular n (%)	
No pain	58 (74.4%)	50 (82.2%)	0.31
Pain	20 (25.6%)	11 (18.0%)	
Total	78 (100%)	61 (100%)	

TABLE 4: INCIDENCE AND INTENSITY OF POST ENDODONTIC PAIN DURING THE FIRST 6 HOURS AND THE NEXT 18 HOURS

Diagnosis Groups	First 6 Hours		Next 18 Hours	
	Incidence Number (%)	Intensity Mean \pm SD	Incidence Number (%)	Intensity Mean \pm SD
Pulpal Necrosis	106 (73.6%)	1.65 \pm 0.79	106 (73.6%)	1.26 \pm 0.62
Pulpal Necrosis with Periapical Periodontitis	38 (26.4%)	1.89 \pm 0.92	38 (26.4%)	1.37 \pm 0.63
P value	0.15		0.39	

TABLE 5: PATIENT DISTRIBUTION ACCORDING TO GENDER, AGE AND TREATED TEETH FOR EACH OF THE TREATMENT GROUPS

Diagnosis Groups	Number of Patients (%)	Gender (M/F)	Age (Y)	Arch Type (Max/Mand)
Pulpal Necrosis	106 (73.6%)	46/60	41.1	50/53
Pulpal Necrosis with Periapical Periodontitis	38 (26.4%)	16/22	42.6	28/8

RESULTS

This study sample comprised of 145 patients with non-vital single rooted teeth. One patient did not report back to follow up and was excluded from data analysis. So 144 was the achieved sample size among which 5 patients diagnosed with non vital single rooted tooth were missed to be marked with arches on questionnaires. All patients were treated according to the laid out treatment protocol by single operator (Principal investigator: Post graduate trainee). All patients were evaluated for postobturation pain within 24 hours. Gender distribution is shown in Fig 1 Frequency of patients among different age groups is illustrated in bar chart (Fig 2). Mean and standard deviation calculated for age is found to be with values 41.52 ± 14.26 . As five point scale was used, result was calculated as dichotomous variables as no pain and pain where less than 2 on scale is considered no pain and more than 2 on five point scale is considered as pain. Frequency and percentages were calculated for pain. Chi square test was applied to assess any difference in frequency distribution pattern in different pain categories between males and females, diagnosis of pulpal necrosis and asymptomatic apical periodontitis and arches. No significant difference was found with P-value (0.84), (0.26) and (0.31) respectively as shown in Table 1, 2 and 3. Incidence and Intensity of Post-endodontic Pain (PEP) during the first 6 hours and the next 18 hours and patient distribution according to variables are also shown in Table 4 and 5. Frequency distribution of teeth were also calculated with maxillary central incisor being the most reported single rooted teeth with non vitality as shown in Fig 3. The second most commonly reported tooth was mandibular right canine and third most was maxillary right lateral incisor.

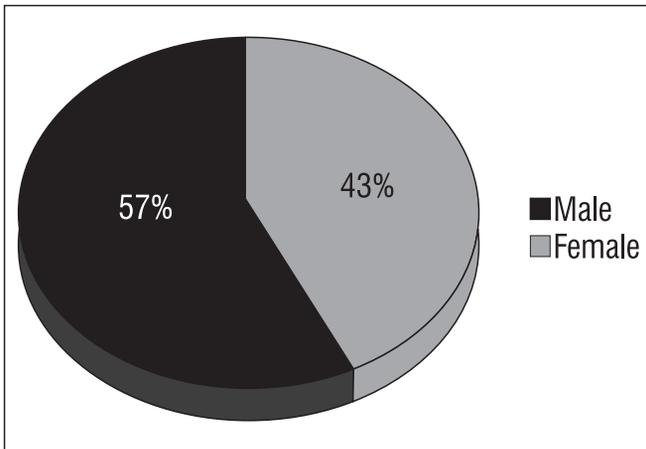


Fig 1: Gender distribution among patients

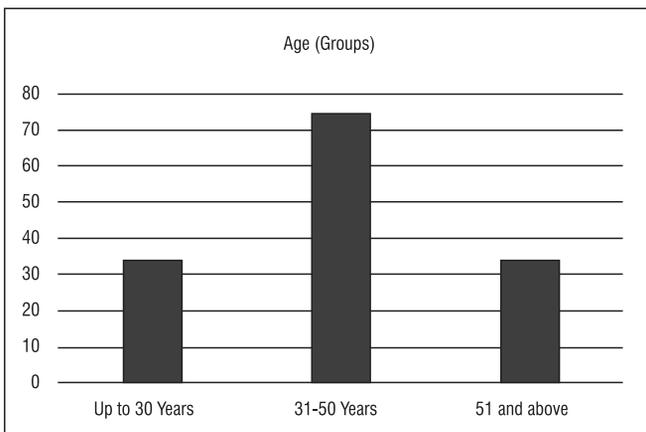


Fig 2: Frequency of patients in different age groups

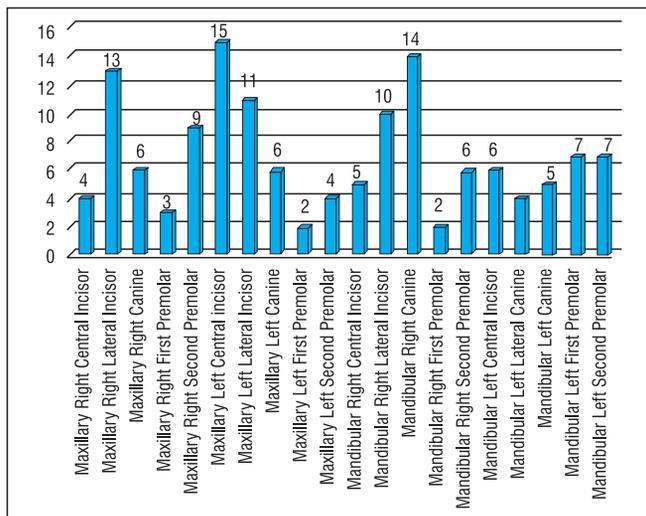


Fig 3: Frequency distribution of various teeth

DISCUSSION

Non vital teeth may or may not show pain after procedure due to coexistent periapical involvement, persistent anaerobic infections and root resorption.^{17,18} In a retrospective study by Smith et al it was shown that patients with pulpal necrosis and asymptomatic periapical lesions have 5.5% incidence of pain. It is

further supported by another study in which two teeth with periapical lesion out of 22 teeth developed pain.¹⁹ Doyle and colleagues found that prognosis of complete healing of teeth with pretreatment diagnosis of apical periodontitis is approximately 10% to 15% lower than non vital teeth without apical periodontitis.²⁰ We take initial hours of pain within twenty four hours, as pain can aggravate or maximize in initial hours when defense and healing mechanism got active proved by previous literature.^{21,22,23} Present research showed subsequent decrease in mean pain intensity from initial 6 hours to next 18 hours, making the observation period of overall 24 hours with decrease mean pain (Table 4). Short term follow up reported low pain in single visit by Su et al and Jalil Modaresi and other researchers also reported that pain after obturation decreased over time having its peak during first 24 to 48 hours and steadily reduced.^{24,25} Researchers reported the similar findings with present study results with more mean pain intensity in initial 6 hours and its gradual decrease in next 18 hours.²⁶ This study was undertaken to determine frequency of postoperative pain in teeth with non vital pulps that were prepared and filled with one visit disinfection.

Most of the studies focused on procedure descriptions without taking the pretreatment pulpal status thoroughly. This present study did take the initial diagnosis to interpret the post treatment pulpal statuses and level of pains which is consistent with previous studies. Wide variations existed in the literature concerning the incidence of post treatment pain and some conflicting conclusions were reached which may be due in part to great variation in the preoperative condition of teeth however, all teeth included in this study were non vital. It is the limitation associated with the present study by selecting only those cases that were without pre operative pain and were asymptomatic. However again their exist a paradox of opinions in past studies between the association of preoperative and post obturation pain.^{5,7,27}

Inadequate sample size is another limitation because the measurements are based on small number of subjects reporting to Rawal Institute of Health Sciences. The dental check-ups were not performed in a blinder manner, which may bias the result. Study subjects were included as sample of convenience, therefore generalization without bias is needed for further post obturation pain research in future.

Frequency differences and post obturation pain in current study were found to be non significant between males and females. Female patients experienced more pain than male patients in general and it is supported by emerging evidence that biological differences between genders may explain increased pain prevalence in females.^{18,28} Another study reported pain to be more

in males as compared to females.¹⁰ This present study took patient samples non uniformly so females were seen to be reported more with non vital diagnosis in this study but pain gradual decrease levels almost remain same between males and females.

Evaluating the probability and intensity of post obturation pain showed that patient age was not a significant factor in pain development. El Mubarak et al reported opposing results of more pain among younger patients and rarely in elderly because of narrowing of canals and less debris extrusion, decreased blood flow in alveolar bone resulting in weak inflammatory responses.¹¹ Few researchers said that age related decrease in pain is not related to changes in physiological pain system and Gufran et al showed patient age as key factor in level of pain perception.^{7,29,30}

This study included teeth with single roots and mostly anterior. It was concluded by Field et al that the success rate associated with one visit endodontics is more in anterior teeth. He reported success of 89% to 95% with single visit in anterior teeth. Present study reported most common tooth with non vitality and necrosis as maxillary left central incisor with maxillary arch having more pain categories in mild, moderate, severe form. Egle and other researchers like Talha reported contrasting results with maxillary lateral incisor to be the tooth most commonly involved endodontically.^{9,31,32}

Despite the above mentioned limitations, this study may serve as an initial good step in arena of descriptive research. Further studies should be done with greater sample sizes of teeth, hence clarifying the factors related to presence of post treatment pain sequel.

CONCLUSION

This study concluded that mean post obturation pain was low in one visit endodontics performed on teeth with pulpal necrosis and asymptomatic periapical periodontitis.

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- 3 Manzoor Ahmed Manzoor:** Keywords, discussion, conclusion, overall reviewing and help with the study concept.