

Evaluation of Post Operative Pain in Single and Multi Visit Endodontic Therapy with Rotary Instruments

1. Abdul Ghani Shaikh 2. Feroz Ali Kalhoro 3. Abdul Qadir Dall

1. Lecturer of Operative Dentistry, Institute of Dentistry 2. Assoc. Prof. of Operative Dentistry
3. Asstt. Prof. of Operative Dentistry, Institute of Dentistry, Liaquat University of Medical & Health Sciences, Jamshoro, Sindh, Pakistan

ABSTRACT

Objective: The objective of this study is to evaluate post operative pain in single and multi visit endodontics therapy with rotary instrument. This study may help the clinicians to decide to complete the RCT in one visit.

Study Design: Experimental Study.

Place and Duration of Study: This study was conducted in Department of Operative Dentistry LUH Hyderabad, from July 2010 to Jan 2011.

Materials and Methods: This study was performed to compare post obturation pain following single and multiple visit root canal treatment (RCT) with rotary instruments. Sample size was sixty six permanent anterior teeth which were divided into Group A (Single visit) and Group B (Multiple visit) with 33 teeth in each group. After taking informed written consent routine RCT steps were carried out like access opening, canal path finding, and radiographic working length determination. Canal preparation was done by Pro Taper rotary files up to F2 size file with 2.5% sodium hypochlorite irrigation. In Group A obturation was done at same visit lateral condensation and in Group B, after canal preparation calcium hydroxide as intra canal medication was given for 7 days.

Results: Then the canal was obturated by lateral condensation technique and temporized with cavit. The patients were recalled at three specific post obturation periods, after 24 hours, 7 days and one month and were evaluated to determine pain severity on verbal rating scale. Chi Square test and Fridman test were used to interpret the results.

Conclusion: The results of present study indicated almost same degree of post obturation pain in both groups.

Key Words: Post-Operative Pain, Pro Taper files, NiTi Rotary Files.

INTRODUCTION

Postoperative pain (POP) is one of the major concerns in endodontic therapy. It is defined as painful sensation of any grade that experienced after the commencement of root canal treatment (RCT), whilst endodontic flare-up has been defined as the perpetuation of pain and/or swelling after RCT which interrupts the patient's routine life with agony which requires an immediate appointment for active treatment.¹ RCT aims to halt and terminate the disease process and ultimately resolution of the signs and symptoms. POP in a previously asymptomatic patient puts clinician's skills in jeopardy in the opinion of the patient. Prevalence of POP or flare-up is key factor when making a clinical decision.² Recent endodontic literature challenges the traditional multi visit RCT to treat such cases, instead single visit endodontics therapy is advocated to address such cases with some obvious advantages over multi visit management mode but in selected cases.³ Attributed advantages of one visit RCT are reduction in patient appointment, decrease leakage, less time consuming, cost effective, and less traumatic than multi visits.⁴ Preferably single visit is executed in infected vital pulps, due to limited carious exposure or necrosed teeth with no acute periapical infection as there are less number of micro organisms are present, less

inflammation in apical periodontium & immediate sealing of the access opening. In such cases POP was observed up to 5% as supported by various studies against the conventional multi visit RCT.^{5,6} Single visit RCT appears to be slightly more effective than multi visit, that is, it had a 6.3% higher healing rate and offers several advantages.^{7,8} Few decades ago it was common notion among clinicians that there would be an increase pain if RCT was completed in single sitting.⁸ In due course of time these believes are changed due to technical advancement in the field of endodontics. As pain is the direct indicator of infection⁹, therefore; to decrease POP and improve the quality of RCT many instruments and devices has been introduced, Nickel Titanium (NiTi) rotary file system is one of them. Usage of NiTi rotary file seems be more advantageous to eliminate bacteria from root canal system as compare to conventional stainless steel file systems. Advantage of use of rotary file is to decrease microbes in root canal system. It also reduces the quantity of debris pushed beyond periapex, thus reduces the intensity of endodontic infection.^{10,11}

The objective of this study is to evaluate post operative pain in single and multi visit endodontics therapy with rotary instrument. This study may help the clinicians to decide to complete the RCT in one visit.

MATERIALS AND METHODS

This study was performed in department of Operative Dentistry, Dental OPD, Liaquat University Hospital, Hyderabad, from July 2010 to Jan 2011. This experimental study included 66 permanent anterior teeth of patients aged between 18 to 50 years, which were divided into Group A (Single visit) 33 permanent anterior teeth and Group B (Multiple visit) 33 permanent anterior single rooted teeth by envelope method. Teeth diagnosed clinically & radiographically with irreversible pulpitis or necrosed pulps but without periapical signs or symptoms were included in this study. Teeth with open apices, resorption defects, and symptomatic apical periodontitis and with grade 3 mobility were excluded. After written informed consent access preparation was performed under rubber dam, working length was determined by periapical radiograph after using path finding number 10 K-type hand file up to estimated working length. After glide path the canal was prepared through crown down technique using Pro Taper files (DENTSPLY) SX, S1, S2, F1 & F2 files with simultaneous 2.5% sodium hypochlorite irrigation.

In Group A obturation was done at same visit with F2 gutta percha cones (DENTSPLY) & accessory cones through lateral condensation and Calcium Hydroxide based Sealer (Sealapex-SybronEndo) was used as sealer and temporized with cavit (3M ESPE). In Group B, after canal preparation calcium hydroxide (Calcipulp - Septodont) as intra canal medication was given for 7 days. Then the canal was obturated & temporized by same technique. The patients were recalled at three specific post obturation periods, after 24 hours, one week and one month and were evaluated for POP. The level of discomfort was rated as severe, moderate, mild or no pain on verbal rating scale.

RESULTS

Out of sixty six patients, six patients did not report back for post endodontic evaluation therefore; total of 60 patients with permanent anterior teeth with vital pulps requiring RCT were included in the results with 30 patients in each group. The average age of the patients was 33.17 ± 9.71 years (95%CI: 30.66 to 35.68). Age distribution with respect to groups is presented in figure 1. Out of 60 cases, 36 (60%) were female and 24 (40%) were male. Age distribution with respect to group is shown in figure 2.

Table No.1: Descriptive statistics of age n=60

Statistics	Age (Years)
Mean $\pm$ SD	33.17 ± 9.71
95%CI	30.66 to 35.68
Median (IQR)	33.5(17)
Maximum Age	49
Minimum Age	18

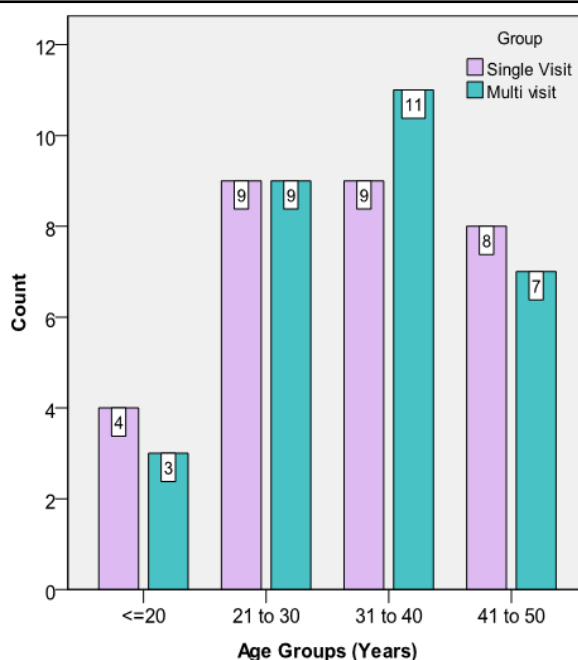


Figure No.1: Age distribution of the patients with respect to groups n=60

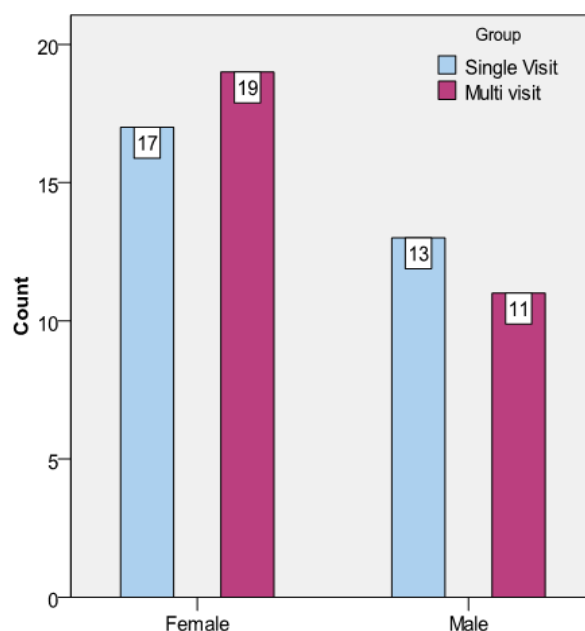


Figure No.2: Gender distribution with respect to groups n=60

Pain scores on scheduled visits for different age groups and gender distribution shown in table 2 and 3. The pain sensation was recorded for groups post-operative next day, one week and one month. Post operative next day, pain was observed in 10 (16.67%) patients in whom 7 (11.7%) moderate pain, 2 (3.3%) severe pain and 1 case had mild pain while 50 (83.3%) patients had no pain. Pain was not significant between groups at post operative next day ($p=0.748$). At one week, pain was observed in 9 (15%) patients in whom 7 (11.7%) had

mild pain and only 2 (3.3%) had moderate pain while 51(85%) patients had no pain. No pain was equally likely observed in both groups ($p=0.92$). At one month, mild pain was observed in 1(1.7%) patients while 59(98.3%) patients had no pain. Pain was not observed

in those cases with single visit and multiple visit at one months between groups (96.7 vs. 100 $p=0.313$). With respect to individual groups, pain was significantly reduced ($p<0.05$) in both groups as presented in table 4.

Table No.2: Age distribution and post operative pain

Age Groups	Next Day	Groups		Total	P-Value
		A	B		
<= 20	No Pain	3	2	5	0.35
	Moderate Pain	0	1	1	
	Severe Pain	1	0	1	
	Total	4	3	7	
21 to 30	No Pain	8	7	15	0.57
	Moderate Pain	1	2	3	
	Total	9	9	18	
31 to 40	No Pain	7	10	17	0.41
	Moderate Pain	2	1	3	
	Total	9	11	20	
41 to 50	No Pain	8	5	13	0.26
	Mild Pain	0	1	1	
	Severe Pain	0	1	1	
	Total	8	7	15	
Age Groups	1 Weeks	Group		Total	P-Value
		A	B		
<= 20	No Pain	3	2	5	0.35
	Mild Pain	0	1	1	
	Moderate Pain	1	0	1	
	Total	4	3	7	
21 to 30	No Pain	8	7	15	0.52
	Mild Pain	1	2	3	
	Total	9	9	18	
31 to 40	No Pain	7	10	17	0.41
	Mild Pain	2	1	3	
	Total	9	11	20	
41 to 50	No Pain	8	6	14	0.26
	Moderate Pain	0	1	1	
	Total	8	7	15	
Age Groups	1 months	Groups		Total	P-Value
		A	B		
<= 20	No Pain	3	3	6	0.35
	Mild Pain	1	0	1	
	Total	4	3	7	
21 to 30	No Pain	9	9	18	NA
	Total	9	9	18	
31 to 40	No Pain	9	11	20	NA
	Total	9	11	20	
41 to 50	No Pain	8	7	15	NA
	Total	8	7	15	

Table No.3: Gender distribution and post operative pain

Gender		Next Day		Groups		Total	P-Value
				A	B		
F	No Pain			14	15	29	0.82
	mild Pain			0	1	1	
	Moderate Pain			2	2	4	
	Severe Pain			1	1	2	
	Total			17	19	36	
M	No Pain			12	9	21	0.44
	Moderate Pain			1	2	3	
	Total			13	11	24	
Gender		1 Week		Groups		Total	P-Value
				A	B		
F	No Pain			14	16	30	0.98
	mild Pain			2	2	4	
	Moderate Pain			1	1	2	
	Total			17	19	36	
M	No Pain			12	9	21	0.44
	mild Pain			1	2	3	
	Total			13	11	24	
Gender		1 Month		Groups		Total	P-Value
				A	B		
F	No Pain			16	19	35	0.28
	Mild Pain			1	0	1	
	Total			17	19	36	
M	No Pain			13	11	24	NA
	Total			13	11	24	

Table No.4:

Comparison of postoperative pain with single visit Group A (n=30)				Comparison of postoperative pain with multiple visits Group B (n=30)			
Pain	Post Operative Evaluation			Pain	Post Operative Evaluation		
	Next Day	One Week	One Month		Next Day	One Week	One Month
No Pain	26 (86.7%)	26 (86.7%)	29 (96.7%)	No Pain	24(80%)	25(83.3%)	30(100%)
Mild Pain	0(0%)	3(10%)	1(3.3%)	Mild Pain	1(3.3%)	4(13.3%)	0(0%)
Moderate Pain	3(10%)	1(3.3%)	0(0%)	Moderate Pain	4(13.3%)	1(3.3%)	0(0%)
Severe Pain	1(3.3%)	0(0%)	0(0%)	Severe Pain	1(3.3%)	0(0%)	0(0%)
Friedman test; p=0.018				Friedman test; p=0.003			

DISCUSSION

NiTi rotary file system has certain advantages over conventional manual steel files. These rotary systems lead less treatment failures as they keep instruments well centered in the root canal, less procedural errors like canal transportation and ledge formation and less debris extrusion beyond apex. Apart from this, considerable reduction in canal preparation time which is crucial factor to decide to prepare single or multiple rooted teeth in one visit.^{12,13} Therefore; we designed

study to evaluate POP incidence not only to use NiTi rotary files but also explored post endodontic pain with relation to number of visits required to complete procedure and POP intensity. In this study post obturation pain of single vs. multiple visits was recorded through verbal rating scale.

There was no statistically significant difference was observed in different age groups in this study which is in accordance with the findings of Martin-Gonzalez et al. and Risso et al.^{13,14} On the contrary Cheng et al.¹⁵ noticed increased pain response in older patients. This

study found gender difference and female's predominance in pain prevalence is bit more but is not statistically significant. Findings of Ahmed et al. also similar to our results. Slight increase POP in females may be associated due to increase preoperative anxiety in females.^{16,17} Cheng et al. also found more post operative pain in females.¹⁵

In terms of timing of pain relieve, post endodontic pain dropped gradually after 24 hours persistence as noticed by Pak et al. and subsided within one week.¹⁸ Our observations are in agreement with Pak et al. as we recorded marked reduction after one month. Regarding pain and pulp status contrary to outcomes our study, Golter et al.¹⁹ found more pain in vital pulps with comparison to necrosed pulp, his findings are in disagreement with our results.

Regarding preference of single and multiple visit endodontics many researchers have evaluated effectiveness both modes of management and are of the opinion that there is no significant difference in POP with either approach.^{4,20,21} In a systemic review Su et al.²² even observed significant low levels of POP in one visit as compare to multi visit approach. We also found identical results as there was no significant POP after one month observation. To decrease post endodontic complications in multiple visit approach, intra canal medication has been widely used in an attempt to destroy bulk of the bacteria. But opinion is divided on the effectiveness of Calcium Hydroxide intracanal medication. Investigators are of the opinion that intracanal medications have no or little influence on the incidence of post-operative pain.^{23,24} Evidence suggests that suitable antimicrobial irrigation and NiTi rotary instrumentation substantially decrease bacterial numbers and contribute successful healing. Mustafa et al.¹² employed treatment protocol of single visit with NiTi rotary files and concluded that no difference between single and multiple visit RCT in terms of final outcome. Ince B et al.²⁵ recorded 69.9% post endodontic pain in teeth with single visit and 69.3% in multi-visit treatment groups, respectively. We used similar treatment protocols and our findings are similar with their results. From above discussion it is evident that use of proper treatment protocol and equipped with modern devices like NiTi rotary instruments decreases the incidence of post endodontic pain which ultimately is beneficial both for patients and clinicians.

CONCLUSION

Within the parameters of this study we conclude that single visit endodontic therapy has shown to be a safe and effective alternative to multiple visit treatment.

REFERENCES

1. Walton R, Fouad A. Endodontic interappointment flare-ups: a prospective study of incidence and related factors. *J Endod* 1992; 18(4):172-7.
2. Bodian CA, Freedman G, Hossain S, Eisenkraft JB, Beilin Y. The visual analog scale for pain: clinical significance in postoperative patients. *Anesthesiol* 2001; 95(6):1356-61.
3. Sathorn C, Parashos P, Messer HH. Effectiveness of single- versus multiple-visit endodontic treatment of teeth with apical periodontitis: a systematic review and meta-analysis. *Int Endod J* 2005;38(6):347-55.
4. Figini L, Lodi G, Gorni F, Gagliani M. Single versus multiple visits for endodontic treatment of permanent teeth: a Cochrane systematic review. *J Endod* 2008; 34(9):1041-47.
5. Al Bashaiah ZSM, Al Negrish AS. Post Obturation pain after single and multi visit endodontic Therapy: A prospective Study. *J Dent* 1998; 26:227-232.
6. Bergenholtz G, Spangberg L. Controversies in Endodontics. *Crit Rev Oral Biol Med* 2004; 15(2):99-114.
7. Fava LR. A comparison of one versus two appointment endodontic therapy in teeth with non-vital pulps. *Int Endod J* 1989; 22(4):179-83.
8. Calhoun RL, Landers RR. One-appointment endodontic therapy: a nationwide survey of endodontists. *J Endod* 1982; 8(1):35-40.
9. Siqueira JF Jr. Microbial causes of endodontic flare-ups. *Int Endod J* 2003; 36(7):453-63.
10. Al-Jabreen TM. Single visit endodontic incidence of post operative pain after instrumentation with three different techniques: An objective evaluation study. *Saudi Dental J* 2002; 14:136-139.
11. Bergmans L, Van Cleynenbreugel J, Wevers M, Lambrechts P. Mechanical root canal preparation with NiTi rotary instruments: rationale, performance and safety. Status report for the American Journal of Dentistry. *Am J Dent* 2001; 14(5):324-33.
12. Mustafa AS. Postoperative pain and flare-up in one- and multiple-visits endodontic treatment for pulpally vital molars. *Mustansiria Dental J* 2008; 5(4):348-53.
13. Martin-Gonzalez J, Echevarria-Perez M, Sanchez-Domínguez B, Tarilonte-Delgado ML, Castellanos-Cosano L, Lopez-Frias FJ, et al. Influence of root canal instrumentation and obturation techniques on intra-operative pain during endodontic therapy. *Med Oral Patol Oral Cir Bucal* 2012;17(5):912-18.
14. Risso PA, Cunha AJ, Araujo MC, Luiz RR. Postobturation pain and associated factors in adolescent patients undergoing one- and two-visit root canal treatment. *J Dent* 2008;36(11):928-34

15. Cheng Y, Cheung GS, Bian Z, Peng B. Incidence and factors associated with endodontic inter-appointment emergency in a dental teaching hospital in China. *J Dent* 2006; 34(7):516-21.
16. Ahmed A, Khattak O, Javed MQ, Raza Y, Shahnawaz A. Level of pain experience of patient during endodontics treatment procedure in the Islamic international dental college. *J Pak Dent Assoc* 2009; 18(2):1-4.
17. Watkins CA, Logan HL, Kirchner HL. Anticipated and experienced pain associated with endodontic therapy. *J Am Dent Assoc* 2002; 133(1):45-54.
18. Pak JG, White SN Pain prevalence and severity before, during, and after root canal treatment: a systematic review. *J Endod*. 2011; 37(4):429-38
19. Gotler M, Bar-Gil B, Ashkenazi M. Postoperative pain after root canal treatment: a prospective cohort study. *Int J Dent* 2012; 2012(310467):1-5.
20. Singh S, Garg A. Incidence of post-operative pain after single visit and multiple visit root canal treatment: A randomized controlled trial. *J Conserv Dent* 2012; 15(4):323-327.
21. Sathorn C, Parashos P, Messer H. The prevalence of postoperative pain and flare-up in single- and multiple-visit endodontic treatment: a systematic review. *Int Endod J* 2008; 41:91-99.
22. Su Y, Wang C, Ye L. Healing Rate and Post-obturation Pain of Single- versus Multiple-visit Endodontic Treatment for Infected Root Canals: A Systematic Review. *J Endod* 2011; 37(2):125-32.
23. Waltimo T, Trope M, Haapasalo M, Orstavik D. Clinical efficacy of treatment procedures in endodontic infection control and one year follow-up of periapical healing. *J Endod* 2005; 31:863-66.
24. Shuping GB, Orstavik D, Sigurdsson A, Trope M. Reduction of intracanal bacteria using nickel-titanium rotary instrumentation and various medications. *J Endod* 2000; 26:751-55.
25. Ince B, Dalli EEM, Dulgergil CT, Zorba YO, Colakb H. Incidence of Postoperative Pain after Single- and Multi-Visit Endodontic Treatment in Teeth with Vital and Non-Vital Pulp. *Eur J Dent* 2009; 3(4): 273-279.

Address for Corresponding Author:**Dr. Abdul Qadir Dall**House # F-171, Citizen Housing Society,
Jamshoro Road, Hyderabad.

Cell.03009379173

E mail: drqadirdal@hotmail.com