



ISSN Print: 2394-7489  
ISSN Online: 2394-7497  
IJADS 2019; 5(3): 215-218  
© 2019 IJADS  
www.oraljournal.com  
Received: 02-05-2019  
Accepted: 05-06-2019

**Sampann Chowdhry**  
Graded Specialist Endodontist,  
Command Military Dental  
Center, Western Command  
Chandimandir Cantt, Panchkula,  
Haryana, India

**Munish Verma**  
Graded Specialist Orthodontist,  
Command Military Dental  
Center, Western Command  
Chandimandir Cantt, Panchkula,  
Haryana, India

**Bhupinder Singh Bedi**  
Graded Specialist Oral and  
Maxillofacial Surgery, Command  
Military Dental Center, Western  
Command Chandimandir Cantt,  
Panchkula, Haryana, India

**Ritu Rana**  
MDS, Periodontology, Private  
Consultant, Haryana, India

**Correspondence**  
**Sampann Chowdhry**  
Graded Specialist Endodontist,  
Command Military Dental  
Center, Western Command  
Chandimandir Cantt, Panchkula,  
Haryana, India

## Comparison of outcome of single sitting root canal treatment done with reciprocating and rotary files

**Sampann Chowdhry, Munish Verma, Bhupinder Singh Bedi and Ritu Rana**

### Abstract

**Back Ground:** Single visit endodontic treatment is performed mainly using rotary files as it is time saving and better in biomechanical preparation compared to hand files. New single endodontic files have been introduced based on reciprocating motion as compared to rotatory motion of normal rotary files claiming similar results in less time.

**Material and Methods:** A total of 160 mandibular molar teeth which required endodontic treatment were randomly divided into two groups. Group I teeth treated in single visit with single file rotary system and Group II teeth were treated in single visit with multi file rotary system. Results were compared between two systems based on occurrence of swelling, intensity and duration of pain, need for analgesics or antibiotics and time required to complete RCT. The obtained data was statistically analyzed.

**Results:** The results have showed that when a meticulous technique is followed then type of rotary instruments used does not significantly affects the results. However there was significant difference in time taken in completion of RCT between single file and multi file rotary endodontics.

**Conclusion:** The results conclude that single file endodontic systems and multi file endodontic systems produces comparable outcome in single visit RCT but time required for completion of procedure is less in single file as compared to multi file rotary endodontics.

**Keywords:** RCT, endodontic files, acute pulpitis

### Introduction

Endodontic treatment is the only treatment option available other than extraction in cases with acute pulpitis. Initially it was advocated that root canal treatment should be completed in multiple visits to ensure that root canal is completely devoid of bacteria and is completely sterilized before doing obturation [1, 2] With these multiple visit, rct success rate achieved was around of 90% [3]. Till 1970's very few dentists were performing single visit rct as against multiple visit procedures but with the introduction of rotary NiTi instruments, the number of single visit procedure has increased because of simpler and faster preparation of canals [4, 5]. Obturation also has become simpler, easier and less time consuming [6] Now a days single visit rct is advocated by many because it is considered that there is less chances of root canal contamination during procedure due less number of appointments required for completion of procedure, less chances of loss of temporary seal which leads to coronal leakage and hence failure of rct, reduced procedural costs and minimal patient anxiety because of less number of appointments [7]. Single visit root canal treatment is indicated in cases of vital teeth with irreversible pulpitis, fractured anterior teeth where immediate rehabilitation is required because of esthetic concern, teeth requiring intentional endodontic treatment such as teeth serving as overdenture abutments, physically challenged patients who cannot come multiple times, non vital teeth which have sinus tract present. However necrotic teeth with periapical radiolucency has been considered as contraindication for single visit Rct [8].

Although post operative pain is not the criteria for success of endodontic treatment but it is still considered as parameter for success of endodontic treatment and of clinician's skills. Fear of post operative pain is the biggest reason for avoiding single visit endodontic treatment as it is considered that there is more postoperative pain in single visit than multiple visit endodontic treatment. A large number of studies have concluded that there is no significant difference in the incidence of pain after treatment done in single and multiple visit [9, 10]. In some studies more incidence of pain was observed when treatment was done in multiple-visit [11].

In some studies flare-ups occurred more in cases treated in single visit than multi-visit [12]. However this study was undertaken to compare the outcomes of single visit endodontic treatment in mandibular molars with acute pulpitis using two different types of endodontic systems based on their motion. One system based on reciprocating motion (Wave One Gold) and other on rotatory motion (Protaper) was used.

**Materials and Method**

160 patients with acute pulpitis requiring root canal therapy on mature permanent mandibular molars were selected for the study. The inclusion criteria included patients in the age range of 19-50 years with noncontributory medical history, teeth with fully formed roots and no calcification in canals, molars with no signs of internal / external resorption, mandibular molars with acute pulpitis and no signs of apical periodontitis (no pain on palpation or percussion). The exclusion criteria included pregnant patients, patients on antibiotics or corticosteroids at the time of treatment, immunocompromised patients or with any systemic diseases, temporomandibular joint problems or limited mouth opening, teeth with anatomic aberrations, periodontal disease or periapical pathosis. A total of 160 teeth which required endodontic treatment were randomly divided into two groups: -

1. Group I consisted of eighty (80) mandibular molar teeth treated in single visit with single file rotary endodontics (Fig 1-Wave one).
2. Group II consisted of eighty (80) mandibular molar teeth treated in single visit with multi file rotary endodontics (Fig 2-Protaper).

The standard procedure for root canal treatment was followed for both 'I' and 'II' groups and at the first appointment preoperative radiographs were taken at normal angulation and at 25° mesial angulation. Mandibular molars showing atypical anatomy were excluded from the study. After access preparation glide path was made with size #10 or #15 K-files. After working length confirmation, Group I teeth were prepared with wave one single file endodontic system and Group II teeth were prepared with protaper multifile

endodontic system. All instruments were used in conjugation with irrigation by 3% NaOCl and 17% ethylenediaminetetraacetic acid. Total time taken during the procedure in all cases of both the groups was recorded. Each patient was given a prescription for 500 mg of acetaminophen tablets to be taken 8 hrly with instructions to avail the same only if needed for pain. They were instructed to keep a record of number of tablets consumed. In case pain was accompanied with swelling, patient was given a prescription of amoxicillin 500mg TDS along with analgesics. The patient carried the VNRS scale form along with them. Pain was recorded preoperatively in front of operator. After this pain was recorded by patient on the scale postoperatively at 12hrs, 24hrs, 48hrs, 72hrs, 1 week. VNRS scales and record of medications taken were collected from the patients. The data was compiled and statistically analyzed.

**Results**

Total 160 patients were assessed for time taken to complete the endodontic procedure, incidence and intensity of pain, swelling, and need for analgesics and antibiotics. Of these 160 patients, none reported with swelling or need for antibiotics. The mean time taken in treating mandibular molars in Group I was 64.16 minutes and in treating mandibular molars in Group II was 65.93 minutes respectively. Time taken was more for treating mandibular molars in Group II as compared to mandibular molars in Group I and results were statistically highly significant ( $p \leq .001$ ) (Table 2). The mean pain score in mandibular molars treated in Group I preoperatively, at 12 hrs, at 24 hrs, at 48 hrs, 72 hrs and 1 week was 5.16, 0.66, 0.20, 0.0, 0.0 and 0.0 respectively. In Group II preoperatively, at 12 hrs, at 24 hrs, at 48 hrs, 72 hrs and 1 week mean pain score was 4.51, 0.64, 0.43, 0.03, 0.0 and 0.0 respectively (Table 3). Results showed that there was no statistical difference of pain in between both groups at different time intervals and was significant only preoperatively (Table 4). The mean number of analgesic tablets taken in Group I was 0.33 and in Group II was 0.35. Results showed there was no significant difference in analgesic tablets taken between two groups (Table 5).

**Table 1:** Statistical evaluation of time taken to complete endodontic procedure in both groups

Time Taken (in minutes)	Group Statistics				
	Group	N	Mean	Std. Deviation	Std. Error Mean
	1	80	64.16	3.227	.361
2	80	65.93	2.796	.313	

**Table 2:** Independent Samples Test

Time Taken (in minutes)	t-test for Equality of Means						
	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
						Lower	Upper
	-3.692	158	<.001**	-1.763	.477	-2.705	-.820

**Table 3:** Statistical evaluation of pain scores in both groups at different time intervals

Group		Descriptive Statistics							
		N	Mean	Std. Deviation	Minimum	Maximum	Percentiles		
							25th	50th (Median)	75th
1	Preop Pain score	80	5.16	2.028	1	9	4.00	5.00	6.00
	12 hrs Pain score	80	.66	1.201	0	5	.00	.00	1.00
	24 hrs Pain score	80	.20	.701	0	4	.00	.00	.00
	48 hrs Pain score	80	.00	.000	0	0	.00	.00	.00
	72 hrs Pain score	80	.00	.000	0	0	.00	.00	.00
	1 wk Pain score	80	.00	.000	0	0	.00	.00	.00
2	Preop Pain score	80	4.51	1.955	1	9	3.00	4.00	6.00

12 hrs Pain score	80	.64	1.214	0	5	.00	.00	1.00
24 hrs Pain score	80	.43	1.016	0	4	.00	.00	.00
48 hrs Pain score	80	.03	.224	0	2	.00	.00	.00
72 hrs Pain score	80	.00	.000	0	0	.00	.00	.00
1 wk Pain score	80	.00	.000	0	0	.00	.00	.00

**Table 4:** Statistical evaluation of pain scores in both groups at different time intervals by Mann-Whitney Test

Test Statistics(a)						
	Preop Pain score	12 hrs Pain score	24 hrs Pain score	48 hrs Pain score	72 hrs Pain score	1 wk Pain score
Mann-Whitney U	2591.000	3137.000	2948.000	3160.000	3200.000	3200.000
Wilcoxon W	5831.000	6377.000	6188.000	6400.000	6440.000	6440.000
Z	-2.106	-.274	-1.497	-1.000	.000	.000
Asymp. Sig. (2-tailed)	.035*	.784	.134	.317	1.000	1.000

a Grouping Variable: Group

**Table 5:** Statistical evaluation of analgesic used in both groups.

Test Statistics(a)	
	No of Analgesic tablets required
Mann-Whitney U	3105.000
Wilcoxon W	6345.000
Z	-.436
Asymp. Sig. (2-tailed)	.663

a Grouping Variable: Group

## Discussion

It has been shown by many studies there is not much difference in the outcome of endodontic treatment if done in single visit or multi visit if all the standard protocols are followed meticulously [13]. However, the purpose of this study was to evaluate the differences of outcome of treatment of mandibular molars with acute pulpitis in one visit using single file and multi file rotary instruments.

The reason for selecting mandibular molar teeth for present study was that they are the most difficult teeth to manage endodontically which is attributable to their position which gives limited access to work with and variations in their canal configurations which make them more susceptible to flare up [14]. Cases with acute pulpitis were selected because in such cases pulp tissue is vital and the chances of complete removal of bacterial infection with pulp is more as compared to non vital one [15, 16]. The postoperative pain in both the groups was evaluated with a Verbal Numeric Rating Scale. This scale has values between 0 and 10. VNRS when properly used is considered a reliable ratio scale for measuring pain intensity [17]. The results of the present study showed statistically insignificant difference in pain perception between both groups after treatment. Group II had less incidence of pain after 12 hrs but Group I had less after 24hrs although both results were insignificant. These results were in agreement with Genet JM (1986) [18]. Who found out that most of postoperative pain occurs on first day after initiation of endodontic treatment and subsequently decreases with time. The incidence of pain after 24 hrs was totally insignificant in both the groups. When endodontic treatment is done in single visit than any bacteria remained after biomechanical step in canals are rendered harmless as they get trapped inside and they don't get time and nutrition for multiplication and hence it also prevents the occurrence of pain resulting from re-infection of the canal due to leakage from temporary seal during multiple visits.

Although Group II had more analgesics used than Group I but difference was not significant statistically. Pain in all cases subsided with use of mild analgesics (acetaminophen) only. From this it can be considered that endodontic pain is best managed by completely eliminating the source of infection or

inflammation and if any pain is associated, it is usually due to periradicular inflammation and not because of periradicular infection [19-21]. So prescribing antibiotics for pain originating from inflammation is incorrect and of no use [22]. As there was no swelling in all treated cases so no antibiotic was required. The mean time required for completion of endodontic treatment was more in Group II as compared to Group I and results were statistically significant. The reason may be additional time required for using extra number of files during biomechanical preparation.

From this it can be considered that if all the protocols of endodontic treatment are followed judiciously than single visit endodontic treatment can be done effectively using either single file endodontic system or multi file endodontic systems as outcomes are almost similar. But single file system has little advantage as it takes less time and less number of files to complete treatment as compared to multi file system.

## Reference

- Grossman LI, Oliet S, Del Rio CE. Endodontic practice, 11<sup>th</sup> ed. Varghese, 1991.
- Field JW, Gutmann JL, Solomon ES, Rakusin H. A clinical radiographic retrospective assessment of the success rate of single-visit root canal treatment. *Int Endod J.* 2004; 37(1):70-82.
- Kenrick S. Endodontics: A multiple-visit or single visit approach. *Aust Endod J.* 2000; 26(2):82-5.
- Aguiar CM, Mendes DA, Camara AC, Figueiredo JA. Assessment of canal walls after biomechanical preparation of root canals instrumented with protaper universal rotary system. *J Appl Oral Sci.* 2009; 17(6):590-5.
- De-Deus G, Garcia-Filho P, LeJareiro R. Influence of the NiTi rotary system on the debridement quality of the root canal space. *Oral Surg Oral Med Oral Pathol Oral Radiol Endod.* 2009; 108(4):e71-6.
- Clauder T, Baumann A. Protaper NT System. *Dent Clin N Am* 2004; (48):87-111.
- Roane JB, Dryden JA, Grimes EW. Incidence of post-operative pain after single- and multiple-visit endodontic procedures. *Oral Surg Oral Med Oral Pathol.* 1983; 55:68-72.
- Inamoto K, Kojima K, Nagamatsu K, Hamaguchi A, Nakata K, Nakamura H. A. Survey of the incidence of single-visit endodontics. *J Endod.* 2002; 28:371-4.
- Eleazer PD, Eleazer KR. Flare-up rate in pulpally necrotic molars in one-visit versus two-visit endodontic treatment. *J Endod.* 1998; 24(9):6
- 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(2):91-9.
11. Albashaireh ZS, Alnegrish AS. Postobturation pain after single and multiple-visit endodontic therapy. A prospective study. *J Dent.* 1998; 26(3):227-32.
  12. Oginni AO, Udoye CI. Endodontic flare-ups: comparison of incidence between single and multiple visits procedures in patients attending a Nigerian teaching hospital. *BMC Oral Health.* 2004; 4(4):1-6.
  13. 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):1041-7.
  14. Genet JM, Hart AA, Wesselink PR, Thoden van Velzen SK. Preoperative and operative factors associated with pain after the first endodontic visit. *Int Endod J.* 1987; 20(2):53-64.
  15. Wang C, Xu P, Ren L, Dong G, Ye L. Comparison of post-obturation pain experience following one-visit and two-visit root canal treatment on teeth with vital pulps: a randomized controlled trial. *Int Endod J.* 2010; 43(8):692-7
  16. Trope M. Flare-up rate of single-visit endodontics. *Int Endod J.* 1991; 24(1):24-6.
  17. DiRenzo A, Gresla T, Johnson BR, Rogers M, Tucker D, BeGole EA. Postoperative pain after 1- and 2-visit root canal therapy. *Oral Surg Oral Med Oral Pathol Oral Radiol Endod* 2002; 93(5):605-10.
  18. Genet JM, Wesselink PR, Thoden Van Velzen SK. The incidence of preoperative and postoperative pain in endodontic therapy. *Int Endod J.* 1986; 19(5):221-9.
  19. Haas DA. Local and systemic therapeutics for the control of endodontic pain. *Alpha Omegan.* 1997; 90(4):73-6.
  20. Mickel AK, Wright AP, Chogle S, Jones JJ, DDS, Kantorovich I, Curd F. An analysis of current analgesic preferences for endodontic pain management. *J Endod* 2006; 32:1146-54.
  21. Yingling NM, Byrne BR, Hartwell GR. Antibiotic use by members of the American association of endodontists in the year 2000: Report of a national survey. *J Endod.* 2002; 28:396-404.
  22. Watkins CA, Logan HL, Kirchner HL. Anticipated and experienced pain associated with endodontic therapy. *J Am Dent Assoc.* 2002; 133(1):45-54.