How to Cite:
Saurabh, S., & Bhullar, H. K. (2022). Comparative evaluation of three rotary file systems in decreasing pain during follow up of endodontic therapy: An original research study. *International Journal of Health Sciences*, *6*(S5), 10416–10422. https://doi.org/10.53730/ijhs.v6nS5.11270

Comparative evaluation of three rotary file systems in decreasing pain during follow up of endodontic therapy: An original research study

Saurabh
Reader, Department of Conservative Dentistry and Endodontics, Kalka Dental College and Hospital, Meerut, Uttar Pradesh, India

Dr. Harkanwal Kaur Bhullar
Reader, Department of Conservative Dentistry and Endodontics, Kalka Dental College and Hospital, Meerut, Uttar Pradesh, India
Corresponding author email: harkanwal0387@gmail.com

***Abstract*---**Aim: The comparative study was conducted to evaluate three rotary file systems in decreasing pain during follow up of endodontic therapy. Materials & Methods: Total 60 patients were selected by simple random sampling. Three commercially available rotary file systems One Shape Rotary Files, Neoendo Flex Rotary Files, Waldent Wal-flex Gold Rotary Files was used to execute endodontic therapy. Patients were divided into three study groups based on their rotary file systems. Each group has 20 teeth under assessment. For evaluation of post operative pain during follow up, patients were contacted by single doctor every alternate day till first 10 days. All findings related to pain was recorded and entered as per VAS scale and scorings. Results were sent to statistical analysis. P value less than 0.05 was considered significant. Statistical Analysis & Results: Statistical analysis was completed by software (SPSS). Out of 60 patients, males were 38 and females were 22. In group I, maximum mean VAS was 49.02 after 1 day and minimum VAS was 6.64 after 9 days. P value was highly significant for after 1 day. In group II, maximum mean VAS was 46.12 after 1 day and minimum VAS was 4.04 after 9 days. In group III, maximum mean VAS was 39.42 after 1 day and minimum VAS was 1.01 after 9 days. Evaluation among the 3 study groups using ONE-WAY ANOVA confirmed highly significant p value (0.001). Conclusion: Authors concluded that Waldent Wal-flex Gold Rotary Files was most efficient in reducing post operative pain. One Shape Rotary Files system was shown to be least valuable in reducing post operative pain. Neoendo Flex Rotary Files system showed moderate responses in relation to post operative pain.

Keywords---Rotary files, Endodontic, One Shape Rotary Files, Neoendo Flex Rotary Files, Waldent Wal-flex Gold Rotary Files.

Introduction

Root canal therapy is one of the most commonly advised treatments for managing grossly decayed tooth. Before its inventions, badly decayed teeth were directly advised for extraction. Endodontics has literally opened the doors for the real conservation of teeth.[1,2] Extraction can be easily avoided by endodontic therapies. Pain is the most common symptom of patients suffering from teeth decay. It is mostly because of the inadvertent involvement of dental pulp. It eventually leads to the infection and inflammation of the pulp.[3,4] All these processes develop various signs and symptoms including pain. Clinical management of pain is the foremost priority of dental surgeon since it is badly affecting routine activities of individuals.[5,6] Many researchers have already experimented different analgesic methods to control pain in follow up periods. Researchers have discussed various measures for reducing pain after endodontic therapy.[7,8,9] With the advanced invention of rotary file systems, endodontic techniques have been revolutionized. Different systems exhibit different post operative symptomatic patterns. Therefore to create a clear outline about post operative pain with rotary file systems, this comparative study was conducted to evaluate three rotary file systems in decreasing pain during follow up of endodontic therapy.

Materials & Methods

The present study was abstracted, finalized and performed in the department of Conservative Dentistry and Endodontics of the institute. Total 60 patients were selected from the regular opd of the institute. Only one tooth per patient was included in the study. Simple random sampling was utilized to effectively sample the accessible subjects. The study draft and protocol was sent for approval from institutional ethical committee. Following clearance, study was initiated comprehensively. Inclusion criteria included; patients with no severe systemic problems like high blood pressure, no hormonal imbalance. Also, patients must not be on corticosteroid therapy. Exclusion criteria included; teeth with no gross anatomical anomaly, teeth with acceptable sound tooth structures, teeth without severe dilacerations and root fusion. Patients were selected and finalized on the basis of their diagnosis and requirement of endodontic treatment. Only multi-rooted posterior teeth of mandibular arch were entertained owing to its easy access. Three commercially available rotary file systems One Shape Rotary Files Neoendo Flex Rotary Files Waldent Wal-flex Gold Rotary Files was used to perform endodontic therapy. Patients were divided into three study groups based on their rotary file systems. Each group has 20 teeth under evaluation. Root canal treatment in Group I samples was completed by One Shape Rotary Files. Root canal treatment in Group II samples was completed by Neoendo Flex Rotary Files. Root canal treatment in Group III samples was completed by Waldent Wal-flex Gold Rotary Files. All standard guidelines were followed during endodontic therapy. Local anesthetic agent was applied to have ideal access and pathway. Concomitant irrigation of the root canals was also ensured using prescribed concentration of NaOCl. For evaluation of post operative pain during follow up,

patients were contacted by single doctor every alternate day till first 10 days. All responses related to pain was noted and entered as per VAS scale and scorings. The scoring of each patient were tabulated and analyzed statistically to frame results. Results were sent to statistical analysis. P value less than 0.05 was considered significant.

Statistical Analysis and Results

Statistical analysis was completed by using statistical software Statistical Package for the Social Sciences series 22 (SPSS). The main endeavor was to find and obtain p values, mean, standard deviation, chi- square test, standard error and 95% CI. Table 2 and Graph 1 show that out of 60 patients, males were 38 and females were 22. Maximum 35 patients were reported in the age range of 31-40 years. Age range of 41-50 years has 19 patients. Age range of 51-60 years has only 6 patients (minimum). P value was highly significant here (0.01). Table 1 show about distribution of sample teeth according to systems and groups. Table 3 illustrate about statistical details including mean, standard deviation, p value for group I. Maximum mean VAS was 49.02 after 1 day and minimum VAS was 6.64 after 9 days. P value was highly significant for after 1 day. Table 4 shows about statistical details including mean, standard deviation, p value for group II. Maximum mean VAS was 46.12 after 1 day and minimum VAS was 4.04 after 9 days. P value was highly significant for after 1 day. Table 5 demonstrates about statistical details including mean, standard deviation, p value for group III. Maximum mean VAS was 39.42 after 1 day and minimum VAS was 1.01 after 9 days. P value was highly significant for after 1 day and after 7 days. Table 6 shows about assessment among the 3 study groups using ONE-WAY ANOVA [for all three groups of One Shape Rotary Files, Neoendo Flex Rotary Files, Waldent Wal-flex Gold Rotary Files]. P value was highly significant (0.001).

Table 1: Distribution of sample teeth according to systems and groups

Groups	Group I	Group II	Group III
System	One Shape Rotary Files	*Neoendo Flex Rotary Files*	Waldent Wal-flex Gold Rotary Files
Number	20	20	20

Table 2: Age & gender wise allocation of patients

Age Group (Yrs)	Male	Female	Total	P value
31-40	22	13	35	0.08
41-50	12	7	19	0.20
51-60	4	2	6	0.01*
Total	38	22	60	*Significant

Table 3: Statistical details including mean, standard deviation, p value for group I

Timings	Mean (VAS data)	Std. Deviation	Std. Error	95% CI	Pearson Chi-Square Value	df	Level of Significance (p value)
1 Day	49.02	0.532	0.930	1.63	1.033	1.0	0.01*
3 Day	32.85	0.837	0.035	1.45	2.537	1.0	0.28
5 Day	23.63	0.431	0.251	1.94	2.947	2.0	0.20
7 Day	13.94	0.864	0.644	1.54	1.234	1.0	0.80
9 Day	6.64	0.404	0.503	1.12	2.462	1.0	0.08

Table 4: Statistical details including mean, standard deviation, p value group II

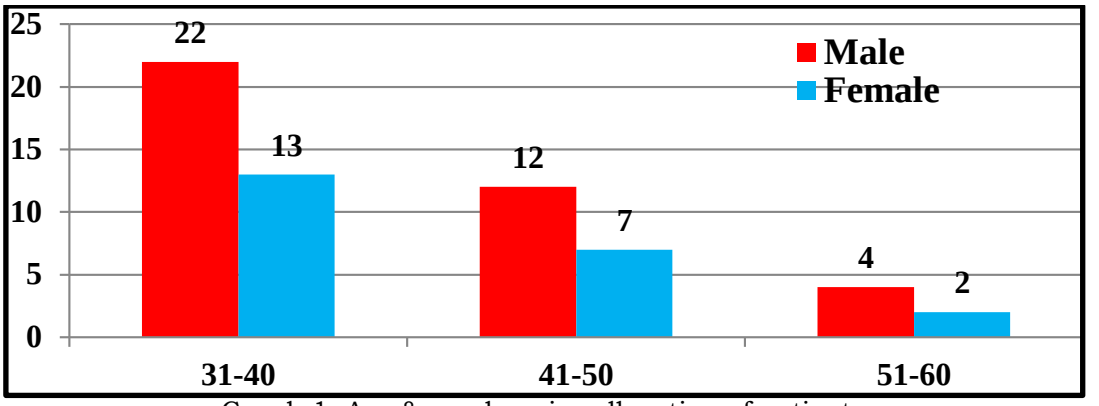
Timings	Mean (VAS data)	Std. Deviation	Std. Error	95% CI	Pearson Chi-Square Value	df	Level of Significance (p value)
1 Day	46.12	0.492	0.345	1.49	1.537	1.0	0.02*
3 Day	30.15	0.046	0.703	1.04	2.059	1.0	0.50
5 Day	19.02	0.127	0.511	1.78	2.392	2.0	0.90
7 Day	9.24	0.476	0.386	1.12	1.047	2.0	0.10
9 Day	4.04	0.483	0.236	1.82	1.027	1.0	0.20

Table 5: Statistical details including mean, standard deviation, p value for group III

Timings	Mean (VAS data)	Std. Deviation	Std. Error	95% CI	Pearson Chi-Square Value	df	Level of Significance (p value)
1 Day	39.42	0.948	0.647	1.96	1.324	1.0	0.02*
3 Day	26.15	0.941	0.504	1.96	2.535	2.0	0.09
5 Day	18.22	0.543	0.634	1.12	2.027	1.0	0.06
7 Day	6.02	0.450	0.698	1.42	1.398	1.0	0.01*
9 Day	1.01	0.718	0.745	1.93	2.937	1.0	0.20

Table 6: Assessment among the 3 study groups using ONE-WAY ANOVA [for all three groups of One Shape Rotary Files, Neoendo Flex Rotary Files, Waldent Wal-flex Gold Rotary Files]

Variables	Degree of Freedom	Sum of Squares ∑	Mean Sum of Squares m∑	F	Level of Significance (p value)
Between Groups	2	1.589	1.029	1.031	0.001*
Within Groups	11	2.276	0.820	-	
Cumulative	67.36	7.688	-		
*p<0.05 significant					



Graph 1: Age & gender wise allocation of patients

Discussion

Siqueira has conducted an occurrence based study to assess post treatment pain. Their study was solely based on policy of antibiotic administration after root canal instrumentation.[10] They concluded that clinical administration of antimicrobial agents are very effective in reducing the pain after endodontic treatment. They also supported the concept of rotary file system over conventional file systems. Imura and associates studied in details about parameters related with endodontics. Their study was based on prospective model. They agreed that pain is the most deleterious symptoms and must be minimized at earliest particularly in follow up periods.[11] Few other authors has also conducted the similar studies with comparable outcomes.[12,13] Cunningham and Mullaney studied pain control measures in endodontics which was published in the year 1992.[14] Formocresol was first employed as root canal analgesia by Buckley in 1904. Since then, Formocresol is most widely used intra canal medicament utilized for instant pain control or analgesia. Even after hundred years, Formocresol is still used as a first line of pain control in most of the endodontic clinics across the globe. Koçak and associates also agreed with these concepts and trends.[15] Gambarini and associates studied in detail about the effects of dissimilar instrumentation methodologies on the frequency of post operative pain after root canal therapy.[16] Inferences of Gambarini was further agreed by various researchers. In the literature, pain control was demonstrated by different techniques and concomitant medications.[17,18,19] Occurrence of post operative pain (short span), which is often very uncomfortable for the dentist and irritating for the patient, particularly if the tooth was painless before the beginning of treatment.[20,21,22]

Conclusion

Within the limitations of the study the authors have concluded that all the three studies file systems are effective in diminishing pain in post operative phase of endodontic therapy. However, among all three tested systems, Waldent Wal-flex Gold Rotary Files was most effective in reducing post operative pain. One Shape Rotary Files system was shown to be least effective in reducing post operative pain. Neoendo Flex Rotary Files system showed moderate responses in relation to post operative pain. So, selection of the right system must not be based only on

pain related parameters. Clinical correlation and patient related factor must also be considered during selection of appropriate system.

References

1. Atesci AA, Topaloglu-Ak A, Turan E, Oncag O, Kaval ME. Evaluation of Postoperative Pain Following Single-Visit Root Canal Treatment with Rotary and Reciprocal Ni-Ti File Systems in Children. Medicina (Kaunas). 2021 Dec 29;58(1):50.
2. Bürklein S, Benten S, Schäfer E. Quantitative evaluation of apically extruded debris with different single-file systems: Reciproc, F360 and OneShape versus Mtwo. Int Endod J. 2014;47(5):405–9.
3. Bürklein S, Schäfer E. Apically extruded debris with reciprocating single-file and full-sequence rotary instrumentation systems. J Endod. 2012;38(6):850–2.
4. Cunningham C, Mullaney T. Pain control in endodontics. Dent Clin North Am. 1992;36(2):393–408.
5. de Oliveira Alves V. Endodontic flare-ups: a prospective study. Oral Surg Oral Med Oral Pathol Oral Radiol Endod. 2010;110(5):e68–e72.
6. De-Deus G, Neves A, Silva EJ, Mendonça TA, Lourenço C, Calixto C, et al. Apically extruded dentin debris by reciprocating single-file and multi-file rotary system. Clin Oral Invest. 2015;19(2):357–61.
7. Diniari, N. K. S., & Aryani, L. N. A. (2022). Characteristics and pharmacological treatment options of delirium patients treated at Sanglah Central General Hospital . International Journal of Health & Medical Sciences, 5(1), 37-43. https://doi.org/10.21744/ijhms.v5n1.1835
8. ElMubarak AHH, Abu-bakr NH, Ibrahim YE. Postoperative pain in multiple-visit and single-visit root canal treatment. J Endod. 2010;36(1):36–9.
9. Gambarini G, Testarelli L, De Luca M, Milana V, Plotino G, Grande NM, et al. The influence of three different instrumentation techniques on the incidence of postoperative pain after endodontic treatment. Ann Stomatol (Roma) 2013;4(1):152.
10. Harrison JW, Baumgartner JC, Svec TA. Incidence of pain associated with clinical factors during and after root canal therapy Part 1 Interappointment pain. J Endod. 1983;9(9):384–7.
11. Imura N, Zuolo M. Factors associated with endodontic flare-ups: a prospective study. Int Endod J. 1995;28(5):261–5.
12. Jain P, Sanjyot M, Bhosale S. Assessment of Postoperative Pain after Single-Visit Root Canal Treatment using Wave One® and One Shape® Single File System: A Clinical Study. J Pharm Bioallied Sci. 2021 Nov;13(Suppl 2):S1506-S1512.
13. Jethi N, Beniwal J, Yadav R, Kaur S, Nain VJ, Gupta C. The Effect of Speed and Rotation for Protaper File Systems on Postobturation Pain in a Single Visit and Multiple (Two) Visits in Root Canal Therapy: An In Vivo Study. J Int Soc Prev Community Dent. 2021 Sep 28;11(6):695-702.
14. Koçak S, Koçak MM, Sağlam BC, Türker SA, Sağsen B, Er Ö. Apical extrusion of debris using self-adjusting file, reciprocating single-file, and 2 rotary instrumentation systems. J Endod. 2013;39(10):1278–80.

15. Mehrvarzfar P, Abbott P, Saghiri M, Delvarani A, Asgar K, Lotfi M, et al. Effects of three oral analgesics on postoperative pain following root canal preparation: a controlled clinical trial. Int Endod J. 2012;45(1):76–82.
16. Menke ER, Jackson CR, Bagby MD, Tracy TS. The effectiveness of prophylactic etodolac on postendodontic pain. J Endod. 2000;26(12):712–5.
17. Mickel AK, Wright AP, Chogle S, Jones JJ, Kantorovich I, Curd F. An analysis of current analgesic preferences for endodontic pain management. J Endod. 2006;32(12):1146–54.
18. Mohammadi Z, Shalavi S, Giardino L, Palazzi F, Asgary S. Impact of Ultrasonic Activation on the Effectiveness of Sodium Hypochlorite: A Review. Iranian endodontic journal. 2015;10(4):216–20.
19. Moskow A, Morse DR, Krasner P, Furst ML. Intracanal use of a corticosteroid solution as an endodontic anodyne. Oral Sur, Oral Med, Oral Pathol. 1984;58(5):600–4.
20. Seltzer S, Naidorf IJ. Flare-ups in endodontics: I. Etiological factors. J Endod. 1985;11(11):472–
21. Sinha S, Singh K, Singh A, Priya S, Kumar A, Kawle S. Quantitative Evaluation of Apically Extruded Debris in Root Canals prepared by Single-file Reciprocating and Single File Rotary Instrumentation Systems: A Comparative In vitro Study. J Pharm Bioallied Sci. 2021 Nov;13(Suppl 2):S1398-S1401.
22. Siqueira JF, Rôças IN, Favieri A, Machado AG, Gahyva SM, Oliveira JC, et al. Incidence of postoperative pain after intracanal procedures based on an antimicrobial strategy. J Endod. 2002;28(6):457–60.
23. Sun C, Sun J, Tan M, Hu B, Gao X, Song J. Pain after root canal treatment with different instruments: A systematic review and meta-analysis. Oral Dis. 2018 Sep;24(6):908-919.
24. Suryasa, I. W., Rodríguez-Gámez, M., & Koldoris, T. (2021). Get vaccinated when it is your turn and follow the local guidelines. International Journal of Health Sciences, 5(3), x-xv. https://doi.org/10.53730/ijhs.v5n3.2938