

## Original Research

### Comparison of post-operative pain in root canal treated teeth using Hand and Rotary Instrumentation

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#### ABSTRACT:

**Background:** The primary objective of root canal preparation is to completely debride the infected content and provide a sterile space for obturation. The present study has compared hand and rotary instrumentation in reducing post-operative pain in root canal treated teeth. **Materials & Methods:** Sixty non vital mandibular molar teeth were divided into 2 groups. Group I teeth were instrumented with manual technique and group II teeth were instrumented with rotary technique using rotary ProTaper files. In both groups pain using visual analogue scale (VAS) and time taken for procedure was recorded after 12 hours, 24 hours, 48 hours and 72 hours respectively. **Results:** In group I, the pre-operative mean visual analogue scale pain (VAS) score was 6.8 and in group II was 6.9 after 12 hours, in group I was 6.4 and in group II was 5.3 after 24 hours, 5.3 in group I and 4.4 in group II after 48 hours, and 2.7 in group I and 1.3 in group II after 72 hours. The mean time taken for instrumentation in group I was 53.1 and in group II was 20.4. The mean time for obturation in group I was 42.7 and in group II was 21.6. The difference was significant ( $P < 0.05$ ). **Conclusion:** Hand instrumentation resulted in more post-operative pain as compared to rotary technique.

**Key words:** Hand instrumentation, Pain, ProTaper files.

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#### INTRODUCTION

The primary objective of root canal preparation is to completely debride the infected content and provide a sterile space for obturation. During root canal preparation, there may be unpredictable irritation to the periapex resulting in postoperative pain.<sup>1</sup> Postoperative pain can occur due to the extrusion of necrotic debris, dentinal chips or pulpal remnants into the apical region during root canal preparation. Endodontic treatment comprises of three main phases: Biomechanical preparation (cleaning and shaping), disinfection, and obturation of canals.<sup>2</sup>

Root canal preparation in primary teeth is a challenging and time-consuming step during pulpectomy. Root canal treatment in primary teeth is an intricate process due to the untraversable morphology of the root canal. The extruded material can induce an acute inflammatory reaction resulting in increase of periapical tissue pressure causing unendurable pain.<sup>3</sup>

Even when the highest standards are followed, post-endodontic pain of mild (with a frequency of 10-30%) and severe (6-12%) intensities have been reported in the literature. Several etiological factors are attributed to post-operative pain including a history of

preoperative pain, defective canal debridement, hyper occlusion, periapical disease and extrusion of debris into the periapical tissue. Extrusion of infected dentin into the periapical tissue has been suggested as a major source of pain after endodontic treatment. Although debris extrusion is an inevitable finding even when instrumentation is limited to the confines of the canal, different armamentarium seems to be associated with different amounts of debris extrusion.<sup>4</sup> Canal preparation can be carried out by manual or rotary instrumentation using single or multiple visit technique. Conventionally, manual technique with stainless steel files for biomechanical preparation has been more popular, but their usage has been associated with undesirable canal curvature or root canal that is difficult to fill.<sup>5</sup> Furthermore, they are more time consuming and may lead to extrusion of infected remnants or debris to the periapical tissues, thus causing more post-operative pain and flare-ups. Hence, attention has been directed towards the development of better root canal preparation technique.<sup>6</sup> The present study was conducted to compare hand and rotary instrumentations in reducing post-operative pain in root canal treated teeth.

## MATERIALS & METHODS

The present study comprised of 60 non vital mandibular molar teeth of both genders. All patients were informed regarding the study and written consent was obtained. The study was approved from institutional ethical committee. Demographic profile of patients such as name, age, gender etc were recorded. Teeth were divided into 2 groups. Group I teeth were instrumented with manual technique using step-back method of cleaning and shaping whereas group II teeth were instrumented with rotary ProTaper files. Pain using visual analogue scale (VAS) and time taken for procedure was recorded after 12 hours, 24 hours, 48 hours and 72 hours respectively, which were compared in both groups. Results were tabulated and subjected to statistical analysis. P value less than 0.05 was considered significant.

## RESULTS

**Table I: Distribution of teeth.**

Groups	Group I	Group II
Technique	Manual technique	Rotary technique
Number	30	30

Table I: shows that in group I hand technique and in group II rotary technique was used. Both groups had 30 teeth each. Table II, graph I shows that in group I, the pre-operative mean pain (VAS) score was 6.8 and in group II was 6.9, at 12 hours in group I was 6.4 and in group II was 5.3, after 24 hours was 5.3 in group I and 4.4 in group II, after 48 hours was 2.7 in group I and 1.3 in group II. The difference was significant ( $P < 0.05$ ).

**Table II: Assessment of pain in both groups**

Time (Hours)	Group I	Group II	P value
Pre-operative	6.8	6.9	0.91
12 hours	6.4	5.3	0.04
24 hours	5.3	4.4	0.03
48 hours	2.7	1.3	0.01
72 hours	0	0	0

**Table III: Assessment of time taken for procedure in both groups.**

Groups	Group I	Group II	P value
Time for instrumentation	53.1	20.4	0.01
Time for obturation	42.7	21.6	0.01

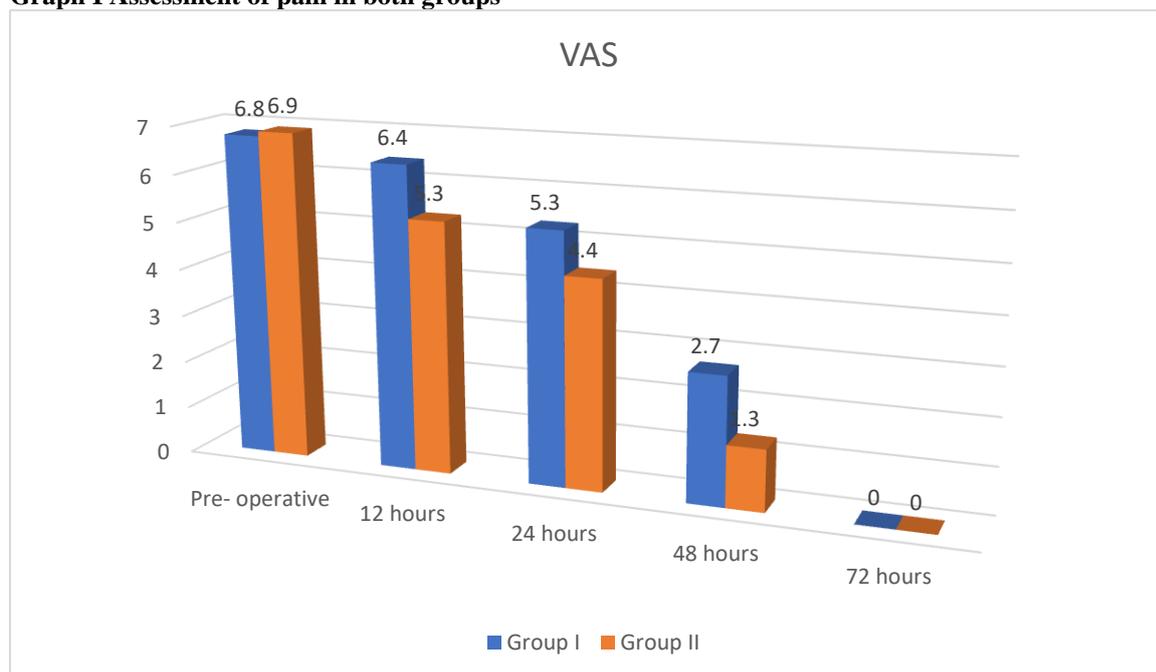
Table III, graph II shows that mean time taken for instrumentation in group I was 53.1 and in group II was 20.4. The mean time for obturation in group I was 42.7 and in group II was 21.6. The difference was significant ( $P < 0.05$ ).

## DISCUSSION

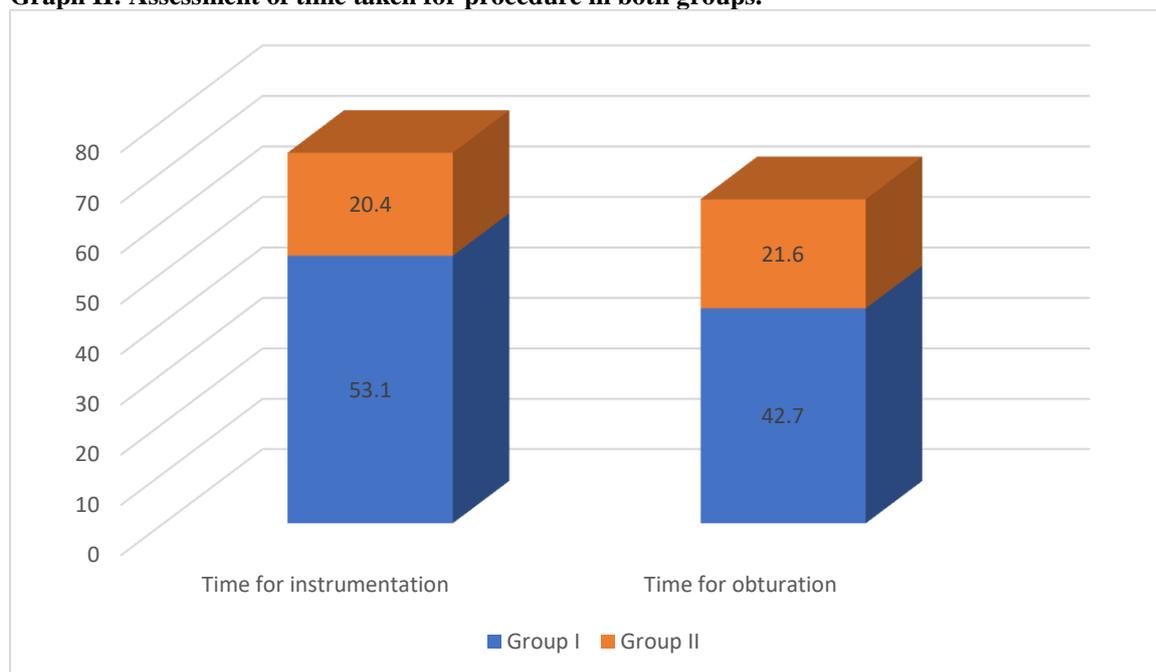
Pulpectomy is a root canal procedure involving complete removal of necrotic pulp tissue caused due to caries or traumatic injuries.<sup>7</sup> Proper cleaning and shaping during pulpectomy will aid in the success of the endodontic procedure.<sup>8</sup> In pediatric dentistry, root canal preparation is the most time consuming step of the pulpectomy procedure.<sup>9</sup> This drawback during pulpectomy is diminished with the use of different rotary systems in pediatric dentistry.<sup>10</sup> The present study was conducted to compare hand and rotary instrumentations in reducing post-operative pain in root canal treated teeth.

In present study, in group I hand technique and in group II rotary technique was used. Both groups had 30 teeth each. Mollashahi et al<sup>11</sup> compared the intensity of post-operative pain after endodontic treatment using hand files, single file rotary (One Shape) and single file reciprocating (Reciproc) systems. The teeth were randomly assigned to three groups according to the root canal instrumentation technique: hand files (control), One Shape and Reciproc. Treatment was performed in a single visit by an endodontist. The severity of the postoperative pain was assessed by the visual analogue scale (VAS) after 6, 12, 24, 48 and 72 hours. The patients in control group reported significantly higher mean postoperative pain intensity at 12, 24, 48, and 72 hours compared to the patients in the two other groups ( $P < 0.05$ ).

**Graph I Assessment of pain in both groups**



**Graph II: Assessment of time taken for procedure in both groups.**



There was no significant difference in mean intensity of postoperative pain between Reciproc and One Shape at 5 time points ( $P < 0.05$ ). The instrumentation kinematics (single-file reciprocating or single-file rotary) had no impact on intensity of postoperative pain. We found that in group I, the preoperative mean pain (VAS) score was 6.8 and in group II was 6.9 after 12 hours, in group I was 6.4 and in group II was

5.3 after 24 hours, was 5.3 in group I and 4.4 in group II after 48 hours, was 2.7 in group I and 1.3 in group II after 72 hours. The mean time taken for instrumentation in group I was 53.1 and in group II was 20.4. The mean time for obturation in group I was 42.7 and in group II was 21.6. Subbiya et al<sup>12</sup> assessed the incidence of pressure indicating paste (PIP) after root canal instrumentation with three different rotary endodontic systems which differ in their design,

namely, ProTaper, M two, and K3. A total of 150 patients between the age group of 25 and 50 were chosen for the study. Teeth with asymptomatic irreversible pulpitis due to carious exposure were selected. The patients received local anesthesia by inferior alveolar nerve block. After preparing the access cavity, root canal instrumentation was done with one of the three instruments (n = 50) and closed dressing was given. PIP was assessed every 12 hours for 5 days and tenderness to percussion was analyzed at the end of 1st, 3rd and 7<sup>th</sup> day. The PIP and tenderness were less in M two group when compared to ProTaper and K3 groups up to 84 hrs and 72 hrs respectively and statistically significant (P < 0.05). There was no statistically significant difference between ProTaper and K3 both in PIP and tenderness. Rotary endodontic instrumentation causes some degree of PIP and tenderness to percussion. Among the instruments used, Mtwo causes less PIP and tenderness when compared to ProTaper and K3 whereas there was no difference between ProTaper and K3.

Gupta et al<sup>13</sup> compared the frequency of post-operative pain and time taken after ProTaper (NiTi) rotary and manual step-back root canal preparation techniques in single-visit endodontics. In Group I, root canals were prepared by ProTaper (NiTi) rotary instrument and in Group II root canals were prepared by manual step back technique using hand files. Less time was taken with rotary NiTi instrument as compared to manual technique, with no difference in the incidence of post-operative pain in both the groups.

## CONCLUSION

From the above study we have concluded that hand instrumentation resulted in more post-operative pain as compared to rotary technique.

## REFERENCES

1. Mothana AL, Mujeeb AA. Single visit root canal treatment: Review. Saudi Endod J 2012;2:80-4.
2. Silva LA, Leonardo MR, Nelson-Filho P, Tanomaru JM. Comparison of rotary and manual instrumentation techniques on cleaning capacity and instrumentation time in deciduous molars. J Dent Child (Chic) 2004;71:45-7.
3. Kenrick S. Endodontics: A multiple-visit or single-visit approach. Aust Endod J 2000;26:82-5.
4. Bouillaguet S, Shaw L, Barthelemy J, Krejci I, Wataha JC. Long-term sealing ability of pulp canal sealer, AH-plus, guttaFlow and epiphany. Int Endod J 2008;41:219-26.
5. Ali SG, Mulay S, Palekar A, Sejpal D, Joshi A, Gufran H, et al. Prevalence of and factors affecting post-obturation pain following single visit root canal treatment in Indian population: A prospective, randomized clinical trial. Contemp Clin Dent 2012;3:459-63.
6. Ahmed MA, Dall AQ, Khoso NA, Jouhar R. Comparison of postoperative pain after protaper rotary and manual step back root canal preparation techniques in single visit endodontics. JPDA 2012;21:103-7.
7. Raju TB, Seshadri A, Vamsipavani B, Abhilash K, Subhash AV, Kumari KV, et al. Evaluation of pain in single and multi-rooted teeth treated in single visit endodontic therapy. J Int Oral Health 2014;6:27-32.
8. 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;43:692-7.
9. 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;41:91-9.
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. 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. Iranian endodontic journal. 2017;12(1):15.
12. Subbiya A, Cherkas PS, Vivekanandhan P, Geethapriya N, Malarvizhi D, Mitthra S. Effect of three different rotary instrumentation systems on postinstrumentation pain: A randomized clinical trial. J Conserv Dent 2017;20:467-73
13. Gupta S, Dhir S, Thakur BD, Talele KH, Bagwe AP, Gupta PP. Comparison of the Incidence of Post-operative Pain and Time Taken for Instrumentation Using Manual and Rotary Techniques and Obturation in Single-Visit Endodontics, in Young Permanent Teeth - An in Vivo Study. Int J Oral Care Res 2018;6(2):S15-18.