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Original Research

Comparative evaluation of postoperative pain following root canal treatment in non- vital teeth using hand and rotary instrumentation technique in known population: A Clinical Trial

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***ABSTRACT*:**
AIM: To estimate and compare the postoperative pain after root canal treatment using hand and rotary instruments in non- vital teeth. **Materials & Methods:** A total of 50 patients requiring root canal treatment in non- vital molars were selected and subjected to root canal treatment were divided into Group1. hand instrumentation, Group2 ProTaper rotary instrumentation technique.Patients were instructed to complete a pain diary using a visual analog scale (VAS) at 24 hours, 72 hours and 7 days **Statistical Analysis:** VAS score 0 was seen in 21 at 24 hours, 23 at 72 hours and 25 at 7 days in group I and 23 at 24 hours, 25 at 72 hours and 25 at 7 days in group II. VAS score 1 was seen in 2 and score 2 in 2 patients in group I at 24 hours, in group II 1 patients each had score 1 and 2 at 24 hours.
Conclusion: Compared to hand instrumentation rotary instrumentation had less postoperative pain.
Key words: Pain, VAS, Root canal treatment, Rotary instrumentation, Post operative pain.

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INTRODUCTION

Postoperative pain is a frequent complication associated with root canal treatment, and can be influenced by insufficient root canal preparation, extrusion of irrigant, debris or intra canal medicament, presence of preoperative pain, presence of periapical pathosis, and apical patency during root canal instrumentation.[1-4] The apical extrusion of irrigant and debris, including bacteria and necrotic tissue, may lead to postoperative pain, inflammation. The instrumentation technique and file design may affect amount of debris extrusion. [5,6] During chemomechanical preparation of the root canals, all instrumentation techniques can produce apical extrusion of debris, even when short of the apical foramen. Some debris, such as dentin and necrotic debris, microorganisms, pulp tissue remnants, and irrigating solutions cause irritation to the periradicular tissue, thereby provoking different levels of postoperative pain.[7-11] Post-endodontic pain can be caused by several factors. The most important seems to be related to the instrumentation procedure, which can provoke an acute periapical inflammatory response secondary to mechanical, chemical and/or microbial injury to the periradicular tissues.[12-16] Inflammation may be produced by the extrusion of dentinal debris, pulp tissue, microorganisms, and irrigants to the periapical tissues during chemo-mechanical preparation. The intensity of pain seems to be correlated with the extent of tissue damage. In order to simplify endodontic instrumentation and improve the fracture resistance of rotary nickel-titanium (NiTi) files, the concept of shaping canals with a single file was introduced in endodontics. [17,18]

The purpose of the present study was to compare postoperative pain after root canal treatment using hand and rotary instruments in non- vital teeth.

MATERIALS & METHODS

The present study has been reviewed and approved from institutional ethical committee. All the patients were informed and their consent was obtained prior to the study. The initial sample size has been determined as 25 for each group.

The inclusion criteria:

1. patient in good health,
2. age 18 to 60,
3. non vital mandibular molar with1 -3 mm periapical radiolucency
4. No analgesic and antibiotic before endodontic treatment were used

The samples with following criteria were excluded allergy to lidocaine, NSAIDS, pregnancy or lactation, teeth with wide or open apex.

After explaining the nature ,purpose of the study and any probable risks written informed consent was obtained.

The non vital status of the pulp was determined by hot and cold thermal test, palpation, percussion and radiographic examination.In every tooth a negative response to hot and cold were recorded. After administering local anaesthesia using 2% lidocaine 1:100,000 epinephrine ,access cavity preparation was done using Endoaccess burs.(Dentsply Sirona) Working length of each canal was determined by using apex locator (Formatron D10,Parkell Inc). Mechanical preparation of the root canals for group 1 was performed using the hand instrumentation using K file, In group2 Protaper Gold Rotary instrument was used . Both the groups were prepared in crown down technique The canals were irrigated with 2ml of 3% sodium hypochlorite (Prime dental product pvt limited). Patients were instructed to complete a pair diary VAS AT 24 hr 48 hr and 78 hr after root canal instrumentation.The volunteers were instructed to write it by themselves. The recorded data were subjected to statistical analysis using Chi-square test and Man–Whitney U-test.

RESULTS

Satistical analysis of VAS score was done for 50 patients, keeping 25 patients for each group as shown in Table 1,In both the groups it was seen that the intensity of post operative pain decreased as the time interval increased,although statistically not significant the pain was least in 72hr group.

Table I Distribution of patients

Groups	Group I	Group II
Technique	Hand instrumentation	Rotary instrumentation
Number	25	25

Table I shows that hand instrumentation was performed in group I and ProTaper rotary gold instrumentation technique in group II. Each group comprised of 25 patients.

Table II Assessment of pain in both groups

VAS	Group I			Group II		
	24 hours	72 hours	7 days	24 hours	72 hours	7 days
0	21	23	25	23	25	25
1	2	2	0	1	0	0
2	2	0	0	1	0	0
3	0	0	0	0	0	0

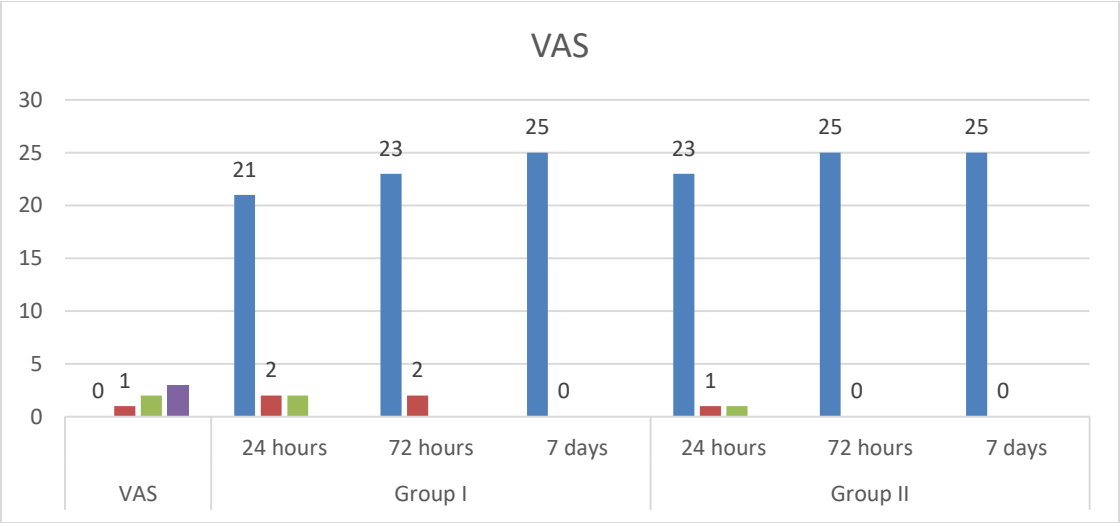
Table II, graph I shows that VAS score 0 was seen in 21 at 24 hours, 23 at 72 hours and 25 at 7 days in group I and 23 at 24 hours, 25 at 72 hours and 25 at 7 days in group II. VAS score 1 was seen in 2 and score 2 in 2 patients in group I at 24 hours, in group II 1 patients each had score 1 and 2 at 24 hours. The difference was significant (P< 0.05).

DISCUSSION

Postoperative pain, described as the perception of any annoyance after root canal treatment, is reported by 25- 40% of patients, regardless of their pulp and peri-radicular status. Post-endodontic pain usually occurs during the first 2 days after treatment, and generally diminishes after a few hours. However, it sometimes persists for several days. According to a recent systematic review, the prevalence of pain during the first 24 hours after root canal treatment is 40%, falling to 11% after 7 days. Thus, pain control, both during and after root canal treatment, poses a huge challenge to the clinician.[20-23]

The present study was conducted to compare postoperative pain after root canal treatment using hand and rotary instruments in non- vital teeth. In this study we enrolled 50 patients with non- vital mandibular molars requiring root canal treatment. Relvas et al[12] assessed postoperative pain in a prospective randomized clinical trial comparing two groups, using the Reciproc® system in one group and the ProTaper® rotary system in the other. The study included 50 male patients, aged 18–60years (mean age of 26 years), with asymptomatic pulp necrosis in mandibular molar teeth (n = 78). Mechanical preparation of the root canals was performed using the ProTaper® and Hand K Files instrumentation techniques.

Graph I: Graphical representation of patients reporting pain after 24hrs,72hrs and 1 week after hand and protaper rotary instrumentation



Postoperative pain was recorded using a verbal rating scale (VRS) and verbal description with well-defined categories at the three following time intervals: 24 hrs, 48 hrs, and 72hrs days after the endodontic procedure. The assessment of postoperative pain was recorded as no pain, mild pain, moderate pain, and severe pain or flare-up. The incidence of postoperative pain in the ProTaper group (PT) 24 h after the endodontic procedure was 17.9 and 5.1 % after 72 h. In the Hand Kfiles group the incidence after 24 h was 15.3 and 2.5 % after 72 h. No patients presented severe pain at the time intervals assessed. No significant difference ($p > 0.05$) in postoperative pain was found between the group 1 and group 2 instrumentation technique during endodontic treatment in this study.

We found that VAS score 0 was seen in 21 at 24 hours, 23 at 72 hours and 25 at 1 week in group I and 23 at 24 hours, 25 at 72 hours and 25 at 1 week in group II. VAS score 1 was seen in 2 and score 2 in 2 patients in group I at 24 hours, in group II 1 patients each had score 1 and 2 at 24 hours.

Clinically the incidence of postoperative pain after endodontic treatment using the Reciproc System, taking into account the operator's experience.[24-27] One hundred patients scheduled for routine endodontic treatment were enrolled in this study. Endodontic treatment was carried out in a single visit by undergraduate and postgraduate students. The chemomechanical preparation of root canals was performed with Reciproc instruments Pre-treatment and postoperative pain was recorded using a visual analogue scale (VAS). Postoperative pain and the need for analgesic consumption were assessed at 4, 8, 16, 24, 48 and72 hours post-treatment. The mean value of pain after root canal treatment was 1.13±1.94 and 1.91±2.07 on a VAS between 0 and 10 in treatments performed by undergraduate and postgraduate students, respectively. There was a significant difference in the incidence of postoperative pain between the two groups ($P < 0.05$).[27]

The shortcoming of the study is small sample size.

CONCLUSION

Within the limitation of the present study, postendodonic pain was substantially lowered by rotary instrumentation when compared with hand instrumentation.Further clinical studies should be carried about to analyze the potential of other file systems.

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