

Comparison of Single Visit Endodontic Treatment Using Wave One & One Shape File System In Controlling Pain: A Clinical Study

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ABSTRACT

Background: The study evaluated the post operative pain after single visit root canal treatment using single-file rotary and reciprocating system.

Materials & Methods: The present study was conducted on 72 teeth of patient age between 20-50 yrs. Seventy two teeth were divided into 2 study groups. In group I, instrumentation with One Shape file systems (n=36) was done with subgroup A1 having patients without periapical lesion (n=18) and subgroup A2 having patients with periapical lesion (n=18). In Group II, instrumentation with Wave One file systems (n=36) was done with subgroup B1 having patients without periapical lesion (n=18) and subgroup B2 having patients with periapical lesion (n=18). The root canal shaping procedures was performed according to the manufacturer's instructions for each instrument system. Presence of post obturation pain was accessed by VAS scale (0-10), where 0 showed no pain, 1-3 (mild pain), 4-6 (moderate pain), 7-9 (severe pain) and 10 (worst possible pain).

Results: The intensity of pain was measured with VAS score in patients without periapical lesions and with periapical lesions using Wave one system on 1st day, 2nd day, 3rd day and 7th day. VAS score found to be non-significant on 1st day, 2nd day, 3rd day and 7th day in both groups ($P > 0.05$). The intensity of pain was measured with VAS score in patients without periapical lesions and with periapical lesions using one shape file system on 1st day, 2nd day, 3rd day and 7th day. VAS score found to be non-significant on 1st day, 2nd day, 3rd day and 7th day in both groups ($P > 0.05$). Intergroup comparison of VAS score found to be non-significant ($P > 0.05$).

Conclusion: Both systems found to be effective in controlling post-operative pain. However, Wave One single file system had less pain as compared to one shape system. Large scale studies are required to substantiate the result obtained in this study.

Keywords: One shape, Single visit endodontics, Wave one.

INTRODUCTION

The basic principles of endodontic therapy are the removal of irritants of root canal, root canal system obturation and maintenance of natural dentition. Post obturation pain prevalence which is even though of short duration is thwarting both for

patient and for dental surgeon and is infuriating, especially if there was no symptom in tooth previous to treatment. Despite revolutionary modifications in root canal treatment, literature

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showed that there is variation in intensity and frequency of pain after endodontic treatment.¹

Several studies revealed that single visit root canal treatment performed in vital pulp cases have reproduced good outcome. There is more chances of flare up's, discomfort and post operative pain with single visit endodontic treatment as compared to multiple visit endodontic treatment. Common method of instrumentation in bio-mechanical preparation of the root canal is in "rotary motion", but a new method of "reciprocating" motion is developed to reduce the risks associated with rotary movement of instruments.²

Wave One and One shape are amongst the common systems having rotary and reciprocating movement of instrument respectively.³ The One- Shape file (Micro Mega) is used in continuous clockwise rotation. Wave One by Dentsply is another single file system. The reciprocating motion of these instruments vary in clockwise and counter clockwise rotations. The present study was to evaluate the post operative pain after single visit root canal treatment using single-file rotary and reciprocating system.

MATERIALS & METHODS

The present study was conducted in the department of Endodontics. It consisted of 72 teeth. Inclusion criteria was single rooted teeth requiring root canal treatment, asymptomatic teeth, patient age between 20-50 yrs. Patients with hypoplastic teeth, deciduous teeth were excluded.

Sixty eight teeth were divided into 2 study groups as follows:-

Group I - Instrumentation with One Shape file systems (n=36)

Subgroup A1=Patients without periapical lesion (n=18), subgroup A2 =Patients with periapical lesion (n=18)

Group II- Instrumentation with Wave One file systems (n=36)

Subgroup B1=Patients without periapical lesion (n=18), subgroup B2=Patients with periapical lesion (n=18)

In all patients, access cavity preparation was done using round diamond abrasive point # ISO BR 41 and the root canal shaping procedures was performed according to the manufacturer's instructions for each instrument system. For, One Shape ® Endodontic File System one shape file #25/.06 was used in a slow in and out pecking motion. For Wave One ® Endodontic File System, the Primary file (#25/.08) in the Wave One file system was used. Lateral condensation technique was followed and again digital radiograph will be taken to confirm obturation without voids. Temporary restoration with Cavit was placed in access cavity. Post operative instructions were given. A questionnaire was given to patient to be filled with respect to post-obturation pain on 1st, 2nd, 3rd & 7th day. Presence of post obturation pain was accessed by VAS scale (0-10), where 0 showed no pain, 1-3 (mild pain), 4-6 (moderate pain), 7-9 (severe pain) and 10 (worst possible pain).

Data was tabulated and subjected to statistical analysis using SPSS version 21.0. Chi- square test was applied. P value less than 0.05 was considered significant.

RESULTS

Table I shows that in group I without periapical lesions the number of patients with no pain was 11 and in group II was 12. Worst pain was seen in 1 in group I and 1 in group II on 1st day. Both the groups showed decrease in number of patients with worst pain, severe pain and moderate pain on 2nd day, 3rd day and 7th day. Group I had 15 patients and group II had 14 patients with no pain on 7th day. VAS score found to be non- significant on 1st day, 2nd day, 3rd day and 7th day in both groups (P> 0.05).

Table II shows that 4 patients in group I and 6 in group II had no pain and 6 patients each had worst pain in both groups on 1st day. The number of patients with worst pain reduced to 4 in group I and 5 in group II on 2nd day which further reduced to 2 in group I and 3 in group II on 3rd day. On 7th day, no patient had worst pain in both groups. 4 patients each had moderate pain in both groups, 7 and 6 patients had mild pain in group I and II respectively. 6 patients in group I and 7 patients in group II had no pain. Intergroup comparison of VAS score found to be non- significant (P> 0.05).

Table I Intergroup comparison of pain in teeth without periapical lesions in group I- A1 & group II- B1

Time and intensity of Pain using VAS		Group I- A1		Group II- B1		P value
		Value	%	Value	%	
1 st day (24 hrs)	No pain	11	58.8	12	64.7	0.21
	Mild pain	2	11.7	2	5.9	
	Moderate pain	2	11.7	2	11.7	
	Severe pain	2	11.7	1	5.9	
	Worst pain	1	5.9	1	11.7	
2 nd day (48 hrs)	No pain	12	70.6	13	76.4	0.13
	Mild pain	4	17.6	3	5.9	
	Moderate pain	1	5.9	1	5.9	
	Severe pain	1	5.9	1	11.7	
	Worst pain	0	0	0	0	
3 rd day (72 hrs)	No pain	14	82.3	13	76.4	0.52
	Mild pain	2	11.7	3	11.7	
	Moderate pain	2	5.9	2	11.7	
	Severe pain	0	0	0	0	
	Worst pain	0	0	0	0	
7 th day	No pain	15	76.4	14	82.3	0.14
	Mild pain	3	11.7	4	17.6	
	Moderate pain	0	0	0	0	
	Severe pain	0	0	0	0	
	Worst pain	0	0	0	0	

Table II Intergroup comparison of pain in teeth with periapical lesions in group I- A2 & group II- B2

Time and intensity of Pain using VAS		Group I- A2		Group II- B2		P value
		Value	%	Value	%	
1 st day (24 hrs)	No pain	4	17.6	6	29.4	0.51
	Mild pain	2	11.7	1	5.9	
	Moderate pain	2	11.7	3	17.6	
	Severe pain	4	23.5	2	11.7	
	Worst pain	6	35.2	6	35.2	
2 nd day (48 hrs)	No pain	4	17.6	6	29.4	0.23
	Mild pain	3	17.6	2	11.7	
	Moderate pain	4	23.5	2	11.7	
	Severe pain	3	17.6	3	17.6	
	Worst pain	4	23.5	5	29.4	
3 rd day (72 hrs)	No pain	5	23.5	7	35.2	0.14
	Mild pain	4	23.5	5	29.4	
	Moderate pain	5	29.4	2	11.7	
	Severe pain	2	11.7	1	5.9	
	Worst pain	2	11.7	3	17.6	
7 th day	No pain	7	35.2	8	41.1	0.52
	Mild pain	7	41.1	6	35.2	
	Moderate pain	4	23.5	4	23.5	
	Severe pain	0	0	0	0	
	Worst pain	0	0	0	0	

DISCUSSION

Root canal treatment or endodontic therapy is a common treatment option in many cases for eradication of pain. The root canal treatment (RCT) significantly reduces the severity of pain. In few instances, there is variation in severity of pain immediate after treatment. The severity of pain immediately following treatment may show higher level as compared to pain level before the treatment. This results from penetration of pulpal tissues, dentinal debris, microorganisms and irrigants to the periapical tissues during root canal treatment leading to peri-radicular inflammation.⁴

Pain perception is subjective and varies from person to person. Possible causes of persistent post-obturation pain involves inadvertently missed strands of pulp tissue, failure to adequately seal the access cavity and even non-cooperation of the patient with respect to postoperative instructions. Any injury to the periapical tissue during root canal treatment promotes more intensive secretion of inflammatory mediators, such as prostaglandins, serotonin, leukotrienes, histamine and bradykinin which are considered to be mediators of pain.⁵

The endodontic treatment may be multiple visits or single visit. There are certain criteria to be followed for performing single visit endodontics. There has been debate since many years regarding rationale of single visit and multiple visit endodontics. One opinion for less post operative pain in single visit endodontics is due to immediate obturation after root canal preparation and hence preventing penetration of medications, irrigants and repeated instrumentation which is considered precipitating factors for post operative pain.⁶

In present study, we evaluated and compared post operative pain in single visit root canal treatment using One Shape® (rotary) and Wave One® (reciprocating) single file systems. Many techniques such as visual analogue, verbal, functional, coloured analogue, numerical, finger-reach rating scales, cortical evoked potentials and calibrated questionnaires have been used to assess pain intensity.⁷ In present study for pain assessment, a modified visual analogue scale (VAS) was used in both groups.

We observed that in group I (One Shape single file system) subgroup A1 (i.e without periapical lesion) patients on 1st day, 11 (58.8%) patients had no pain which became 15 (82.3%) on 7th day. There was no patient of moderate, severe and worst pain on 7th day.

Similarly in group I (One Shape single file system) subgroup A2 (i.e with periapical lesion), there were 4 (17.6%) patients with no pain and 6 (35.2%) patients with worst pain on 1st day. On 7th day, the number of patients with no pain increased to 7 (35.2%) and there was no patient with worst pain. However, there were more patients who had post operative pain in this subgroup as compared to A1 subgroup. This shows that OS (rotary) single file system is effective in controlling pain in group I patients with no periapical lesions. Our results are in agreement with Neelakantan et al (2015).⁸ In their study, there were 507 patients treated with RECIPROC system and 462 treated with one shape. Both systems offered statistical significant difference in terms of incidence of postoperative pain. This can be postulated by the concept that teeth with periapical lesions have more pain as compared to teeth without lesions due to release of pain mediators such as bradykinin, leukotrienes.⁹

In group II (Wave One single file system) subgroup B1 (i.e without periapical lesion), teeth were instrumented with WO (reciprocating) single file system. It was observed that on 1st day, 12 (64.7%) patients had no pain and only 2 (11.7%) patients had worst pain. With progression of days, number of patients with worst pain, severe pain and moderate pain decreased significantly and on 7th day, 14 (82.3%) patients had no pain. Our results are in agreement with Ramazani N et al.¹⁰ In sub group B2 (i.e with periapical lesion), WO (reciprocating) single file system was used to instrument root canal. There was significant difference of VAS scale on different days on comparison group I patients with group II ie. teeth with no periapical lesions and teeth with periapical lesions in both groups. This shows that OS (rotary) single file system is effective in controlling pain in group I patients with no periapical lesions. Our results are in agreement with Kherlakian D et al.¹¹ There was less pain score but the difference was statistically not significant. This shows that reciprocating system is better in terms of controlling pain as compared to single rotary file

system. However, De Melo Ribeiro et al¹² in their study found that SAF system in the apical third, the created cleaner inner canal walls when compared to a rotary system. The results of this study demonstrated similar pain values in both the reciprocating and rotary instrumentation groups.

The flexibility of One Shape's instrument insures a perfect follow of curvature and canal path. It has cross sections which is capable of showing its cutting ability in 3 zones of the canal.¹³ Wave one (WO) Nickel-Titanium (Ni-Ti) file system which works in a reciprocating motion. There is rotation of the instrument initially is in a counterclockwise direction resulting in penetration and cutting of the dentin.¹⁴

CONCLUSION

Both systems found to be effective in controlling post-operative pain. However, Wave One single file system had less pain as compared to one shape system. Large scale studies are required to substantiate the result obtained in this study.

CONFLICTS OF INTEREST

The authors declare they have no potential conflict of interests regarding this article.

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