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Original Research

Multiple vs single file endodontics in dental practice- A comparative analysis

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ABSTRACT:

Background: The present study was conducted to compare multiple and single file system in endodontics. **Materials & Methods:** The present study was conducted on 60 patients requiring root canal therapy. Endodontic therapy was performed with different rotary nickel-titanium (NiTi) MF systems (Group I) and Wave One SF system (Group II). Assessment of post operative pain and improvement of oral-health-related quality of life was measured. **Results:** In this study in group I, endodontic therapy was performed with different rotary nickel-titanium (NiTi) MF systems and in group II root canal treatment was performed using Wave One SF system. We found that mean pain VAS in group I was 42.1 and after 14 days was 10.4 and in group II was 43.5 before and 9.6 after 14 days. Intergroup comparison was non- significant ($P > 0.05$). The mean OHIP-G 14 score in group I was 12.6 and 3.2 before and after 14 days respectively and in group II was 13.2 and 4.7 before and after 14 days respectively. Intergroup comparison was non- significant ($P > 0.05$). **Conclusion:** Authors found that both systems were comparable in terms of pain reduction and improving oral health related quality of life.

Key words: Root canal, Pain, Quality of life.

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INTRODUCTION

The long-term retention of root canal treated teeth depends on many factors but it has become evident that the most common reasons for extraction of these teeth are 'large carious lesion' or 'unrestorable tooth', followed by 'tooth fracture', 'periodontal disease' and last of all, 'endodontically related disease'.¹

Reciprocating single-file (SF) systems are the latest stage of development of nickel-titanium (NiTi) instruments for the preparation of root canals.² During the last years several systems as Reciproc, Genius files or the Twisted Files Adaptive System with a combination of rotary and reciprocating movement were introduced into the market.³

Over the decades, numerous display of files has emerged for negotiating and shaping files. Every new

file has a more developed canal preparation techniques through novelty in design, movements and materials.⁴ Now a days our profession has visualized preparing root canal using "single file technique". Recently the advances in endodontic root canal preparation focus on the idea that "less is more".⁵

Recent research advocates single and multiple file systems for endodontic treatment regarding pain reduction after treatment and improvement in quality of life. It is unclear if there exists an effectiveness-gap between the results of these controlled studies under the optimal treatment conditions of specialized treatment providers and the use of rotary multiple-file (MF) and SF systems in general dental practice.⁶ The present study was conducted to compare multiple and single file system in endodontics.

MATERIALS & METHODS

The present study was conducted in the department of Endodontics. We recruited 60 patients requiring root canal therapy in lower anterior of both genders. The approval for the study was obtained beforehand. All involved subjects were informed regarding the study and their consent was also taken.

Endodontic therapy with different rotary nickel-titanium (NiTi) MF systems (Group I) and with wave One SF system (Group II) was done. All endodontic treatments were performed according to the

manufacturer’s instructions. Assessment of post operative pain was done with Visual Analog Scale (VAS 100) and improvement of oral-health-related quality of life was measured with a patient questionnaire based on short version of the oral health impact profile (OHIP-G-14). The questionnaires were filled in by the patients before treatment started or while local anesthesia was taking effect. Results thus obtained were subjected to statistical analysis. P value less than 0.05 was considered significant.

RESULTS

Table I Distribution of groups

Groups	Group I	Group II
System	Multiple file (Rotary nickel-titanium)	Single file (Wave One)
Number	30	30

Table I shows distribution of groups based on file system used.

Table II Comparison of pain (VAS) both groups

Groups	Group I	Group II	P value
Before	42.1	43.5	0.92
After 14 days	10.4	9.6	0.81
P value	0.001	0.001	

Table II, graph I shows that mean pain VAS in group I was 42.1 and after 14 days was 10.4 and in group II was 43.5 before and 9.6 after 14 days. Intergroup comparison was non- significant (P> 0.05).

Graph I Comparison of pain (VAS) both groups

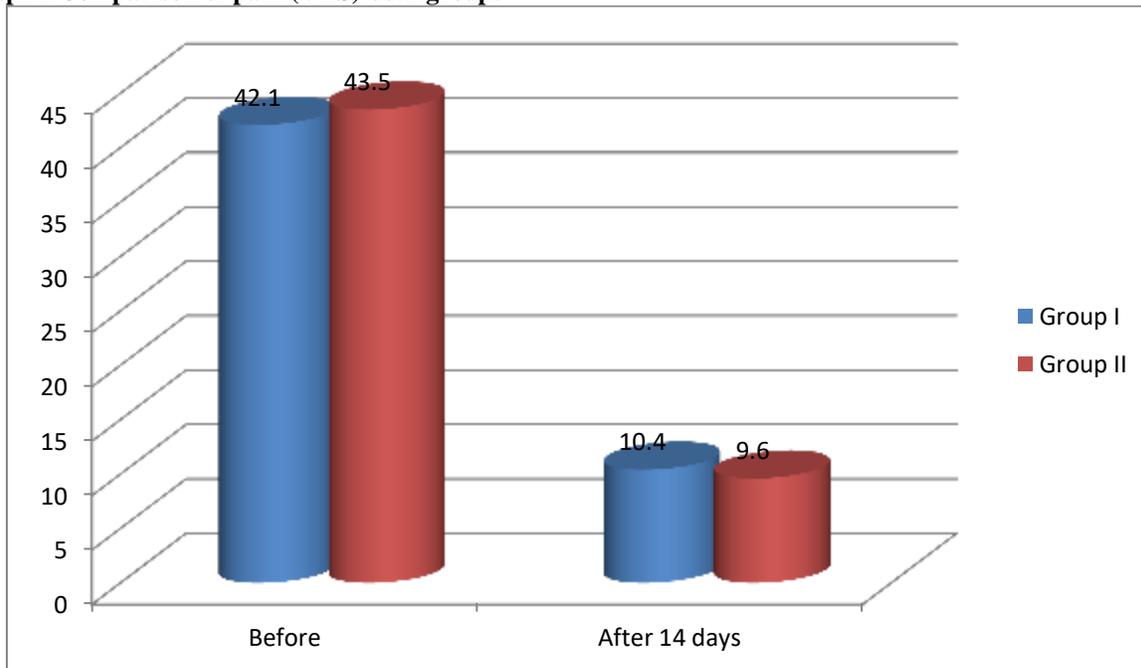
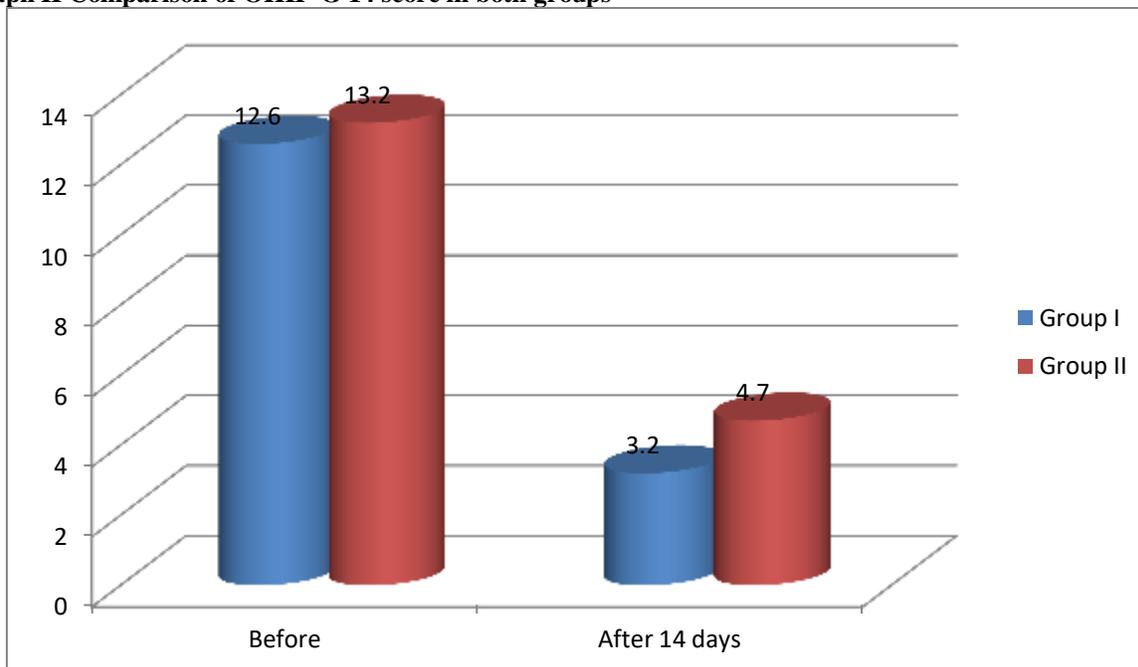


Table III Comparison of OHIP-G 14 score in both groups

Groups	Group I	Group II	P value
Before	12.6	13.2	0.72
After 14 days	3.2	4.7	0.84
P value	0.001	0.001	

Table III, graph II shows that mean OHIP-G 14 score in group I was 12.6 and 3.2 before and after 14 days respectively and in group II was 13.2 and 4.7 before and after 14 days respectively. Intergroup comparison was non-significant ($P > 0.05$).

Graph II Comparison of OHIP-G 14 score in both groups



DISCUSSION

The self-adjusting file (SAF), a new concept in cleaning and shaping, is developed to overcome the problems of the nickel-titanium instruments.⁷ The SAF is a hollow file system which is designed as an elastically compressible, thin-walled pointed cylinder, having 1.5 mm diameter, composed of 120- mm-thick nickel titanium lattice. It has high torsional and fatigue resistance. It is a single file that is used to achieve complete 3D root canal shaping and cleaning.⁸ The Wave One Ni-Ti single-file system has been introduced by Dentsply Maillefer. The system is designed to be used with a reciprocating motion motor. The Wave One single-file reciprocating system is available in lengths of 21, 25 and 31 mm.⁹ The present study was conducted to compare multiple and single file system in endodontics.

In this study in group I, endodontic therapy was performed with different rotary nickel-titanium (NiTi) MF systems and in group II root canal treatment was performed using Wave One SF system. We found that mean pain VAS in group I was 42.1 and after 14 days

was 10.4 and in group II was 43.5 before and 9.6 after 14 days. Intergroup comparison was non-significant ($P > 0.05$). Bartoals et al¹⁰ in their study ten general dental practitioners (GDPs) participated in the study as practitioner-investigators (PI). In the first five-month period of the study, the GDPs treated patients with MF systems. After that, the GDPs treated the patients in the second five-month period with a SF system (Wave One). The GDPs documented the clinical findings at the beginning and on completion of treatment. The patients documented their pain and OHRQoL before the beginning and before completion of treatment. A total of 599 patients were included in the evaluation. 280 patients were in the MF group, 319 were in the SF Wave One group. In terms of pain reduction and improvement in OHIP-G-14, the improvement in both study groups (MF and SF) was very similar based on univariate analysis methods. Pain reduction was 34.4 (SD 33.7) VAS (MF) vs. 35.0 (SD 35.4) VAS (SF) ($p = 0.840$) and the improvement in OHIP-G-14 score was 9.4 (SD 10.3) (MF) vs. 8.5 (SD 10.2) (SF) ($p = 0.365$). The treatment time per root canal was 238.9 s (SD

206.2 s) (MF) vs. 146.8 sec. (SD 452.8 sec) (SF) ($p = 0.003$).

We found that the mean OHIP-G 14 score in group I was 12.6 and 3.2 before and after 14 days respectively and in group II was 13.2 and 4.7 before and after 14 days respectively. Intergroup comparison was non-significant ($P > 0.05$). Relvas et al¹¹ compared one reciprocating SF system with a MF system (ProTaper (Dentsply)). Only asymptomatic teeth with apical periodontitis were included in the trial. Therefore patients were pain-free before treatment. Pain measurement was not performed with the VAS. Therefore, results can be hardly compared with our study. The different instrument systems showed no statistically significant differences in postoperative pain scores after 24 hours and 72 hours.

Pasqualini et al¹² investigated the ProTaper MF and the Wave One SF system. Compared were primary root canal treatments of every clinical condition (symptomatic, asymptomatic, vital and non-vital cases). Mean pain on VAS was 35.2 for SF before treatment and 24.6 for MF decreasing to very low rates of 1.3 (SF) and 0.9 (MF) after seven days.

The limitation of the study is small sample size.

CONCLUSION

Authors found that both systems were comparable in terms of pain reduction and improving oral health related quality of life.

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