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Comparative Evaluation of Post Operative Pain and Oral Health Impact Profile in Patients with Root Canal Therapy by Multiple File and Single File Systems: An Original Research Study

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ABSTRACT

Aim: This study was conducted toevaluate post operative pain and oral health impact profile in patients with root canal therapy by multiple file and single file systems.

Materials & Methods: In this in vivo study total fifty patients were evaluated for post operative pain and oral health profile. Both male and female patients were included in the study. Only single rooted teeth (maxillary central incisors) were studied in each patient. Neoendo Flex multiple system and WaveOneNiTifile system was utilized to complete canal preparation. Patients were recalled for two follow up visits and asked to express their pain on vas scale. Overall oral health status and related improvement was measured by preformed Oral health impact profile. Results thus obtained was compiled and sent for necessary statistical analysis.

Statistical Analysis andResults: Statistical analysis was attempted by statistical software Statistical Package for the Social Sciences version 21. All participants were in the age range of 25-47 years in which 28 were males and 22 were females. For group I, mean VAS was 3.672 (for 2 days after obturation) and 2.092 (for 4 days after obturation). For group II,mean VAS was 3.938 (for 2 days after obturation) and 2.294 ((for 4 days after obturation). P value was highly significant for mean VAS seen 2 days after obturation (0.005).

Conclusion: Authors concluded that mean vas was higher in patients with WaveOneNiTi single file system. In both groups, patients had diminishing pattern of pain from the day of obturation to second follow up. Oral health impact profile was superior in patients with Neoendo Flex multiple system. Hence, Neoendo Flex multiple systems were overall superior toWaveOneNiTi single file system.

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Key words: Multiple File Systems, Single File Systems, Visual Analogue Scale, Oral Health Impact Profile

I. INTRODUCTION

Endodontic painpost operative phase is one of the very common and disturbing experiences for the patient. Usually, patients correlate these circumstances with the quality of root canal treatment provided by clinician.[1,2] In long term studies, researchers have shown that these conditions frequently weaken the patient clinician relationship and trust. In the last few decades, major developments in endodontic instrumentation have been occurred. Similarly, newer pharmacologicaladvancements have been noticed to control dental pain.[3,4]Despite of all these achievements, post operative pain in root canal treated teeth are very common. Many of the researchers have confirmed that this pain noticed in 1.8 to 39% patients in their follow up period.[5,6] Researchers have confirmed that range is not a clinically acceptable since it troubles the patients a lot. The possible reasons could be different study populations, different settings and pharmacological means, use of assorted canal irrigants. Biomechanical preparation is an integral step of root canal therapy which is completed by hand files and drills.[7,8] Literature has well evidenced that stainless steel hand files have numerous disadvantages. Stainless steel hand files system necessitatessequential hand files to effectively prepare the root canals.[9,10]Clinical usage of hand files may be very annoying especially in narrow canals with complexanatomy. With the introduction of Nickel titanium rotary shaping files,the overall shape of endodontic mechanics has been changed. They are capable of reaching into narrower canals also. This system has literally made the endodontic practice a fun. Since seventies, researchers are experimenting on the clinical outcomes of single and multiple file systems. Many of them have recommended that patients have more pain related symptoms with single file systems.[11,12]The new WaveOneNiTi singlefile system has been newly introduced with newer design specifications. Moderninvestigationshave suggested that single and multiple filesystems should be usedfor endodontic treatment as per the clinical requirements and patient response. Literature have shown that both systems are effective in reducing pain in post operative phase and therefore; significantly impart into improved quality oflife.[3,5,8]Hence, this study was conducted to evaluate post operative pain and oral health impact profile in patients with root canal therapy by multiple file and single file systems.

II. MATERIALS & METHODS

The study was performed in the department of conservative dentistry and endodontics of the institute. It was an in vivo study wherein fifty patients were evaluated forpost operative pain and oral health impactprofile. Two different commercially available single and multiple file systems were utilized for endodontic therapy of patients. Study was firstly planned and outlined for approval from institutional ethical committee.Patients were selected from the department opdwith their signed informed consent. All participants were explained about the study in detail. Both male and female patients were included in the study. Only single rooted teeth (maxillary central incisors) were studied in each patient. Hence, total fifty teeth were evaluated for two different file systems. As discussed earlier, patients have different responses for different file systems. Neoendo Flex multiple system was used to complete the canal preparation in first twenty five patients (group I). WaveOneNiTifile system was utilized

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in other twenty five patients to complete canal preparation (single file system: group II). Obturation procedure was completed in all teeth uniformly. Patients were recalled for two follow up visits (2 and 4days after obturation).Patients were asked to express their pain on vas scale. It has zero to ten markings to convey their feelings. Zero means no pain while ten means worst pain possible. Overall oral health status and related improvement was measured by preformed Oral health impact profile. This profile had questions to justify oral heal profile like; pain induced functional limitations, physical pain, pain related psychosocial discomfort, pain related physical disabilities, pain related psychosocial disabilities, pain related social disabilities. Patients were asked to fill all responses in their follow up visits (2 and 4 days after obturation). Results thus obtained was compiled and sent for necessary statistical analysis. P value less than 0.05 was considered significant ($p< 0.05$).

III. STATISTICAL ANALYSIS AND RESULTS

In this study, all obvious results and data were sent for statistical analysis using statistical software Statistical Package for the Social Sciences version 21 (IBM Inc., Armonk, New York, USA). The source data was subjected to suitable statistical tests to obtain p values, mean, standard deviation, chi- square test, standard error and 95% CI. Table 1 and graph1 show that all participants were in the age range of 25-47 years in which 28 were males and 22 were females. P value was significant for age range of 25-28 years (0.01). Maximum 19 patients were identified in age range of 29-32 years. Minimum 2 patients were seen in the age range of 44-47 years. P value was significant for this group (0.02). Table 2 demonstrate basic statistical description with level of significance assessment using Pearson chi-square test for group I. [Neoendo Flex multiple system; n=25] Mean VAS was 3.672 (for 2 days after obturation) and 2.092 ((for 4 days after obturation). P value was highly significant for mean VAS seen 2 days after obturation (0.001). Standard deviation and standard error was 1.028 and 0.923 respectively (2 days after obturation). Standard deviation and standard error was 1.136 and 0.692 respectively (4 days after obturation). Table 3 displayed basic statistical description with level of significance assessment using Pearson chi-square test for group II. [WaveOneNiTi single file system; n=25] Mean VAS was 3.938 (for 2 days after obturation) and 2.294 ((for 4 days after obturation). P value was highly significant for mean VAS seen 2 days after obturation (0.005). Standard deviation and standard error was 1.021 and 0.738 respectively (2 days after obturation). Standard deviation and standard error was 1.064 and 0.062 respectively (4 days after obturation).

Table 1: Age & gender wise distributionof patients

Age Group (Yrs)	Male	Female	Total	P value
25-28	8	7	15[30 %]	0.01*
29-32	11	8	19[38 %]	0.20
35-38	5	3	8[16 %]	0.09
41-44	3	3	6[12 %]	0.50
44-47	1	1	2[4 %]	0.02*

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Total	28	22	100%	***p<0.05 significant**

Graph 1: Age & gender wise distribution of patients

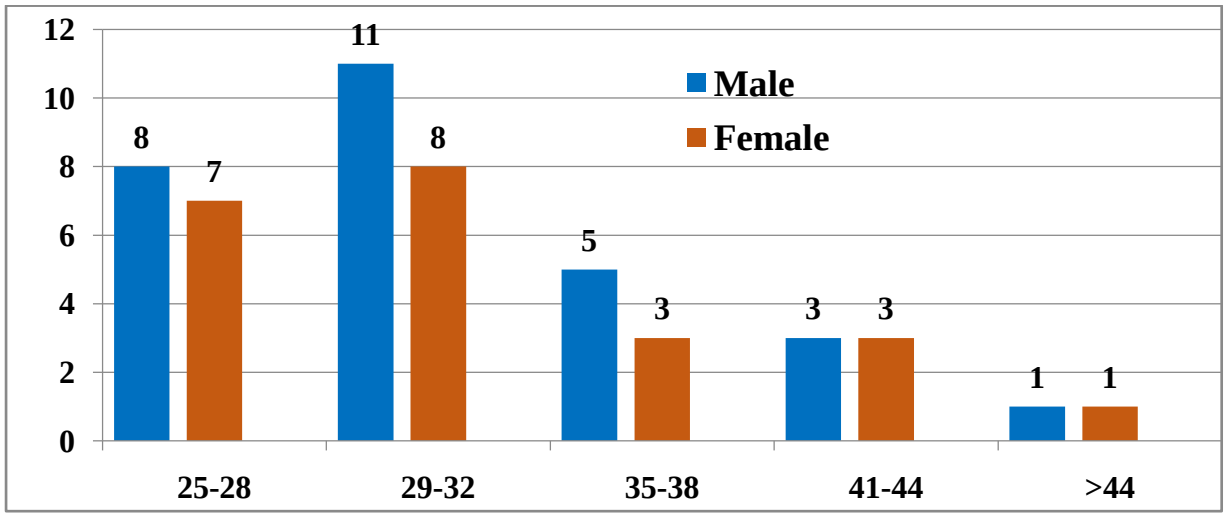

Table 2: Basic statistical description with level of significance assessment using Pearson chi-square test [Neoendo Flex multiple system; group I, n=25]

Parameters (MultipleFile RCT)	Mean VAS	Std. Deviation	Std. Error	95% CI	Pearson Chi-Square Value	df	Level of Significance (p value)
2daysafterobturation	3.672	1.028	0.923	2.32	2.826	1.0	0.001*
4 days after obturation	2.092	1.136	0.692	2.54	2.039	1.0	0.500
***p<0.05 significant**							

Table 3: Basic statistical description with level of significance assessment using Pearson chi-square test [WaveOneNiTi single file system; group II, n=25] with evaluation of mean score for oral health impact profile in both groups

Parameters (Single File RCT)	Mean VAS	Std. Deviation	Std. Error	95% CI	Pearson Chi-Square Value	df	Level of Significance (p value)
2 days after obturation	3.938	1.021	0.738	2.30	1.536	2.0	0.005*
4 days after obturation	2.294	1.064	0.062	2.48	2.603	1.0	0.080

Mean score for Oral Health Impact Profile in both groups			
Parameters	**Group II**	**Group I**	**p value**
2 days after obturation	2.021	2.682	0.001*

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4 days after obturation	3.335	3.893	0.500
			***p<0.05 significant**

IV. DISCUSSION

Many interrelated factors are responsible for pain initiation and progression in the post endodontic phases. They primarily include pre-operative symptoms, substandardroot canal cleaning and shaping, traumatic occlusion, peri-radicular bacterial infections, undue encroachment of debris into surrounding environment.[13]In a clinical study conducted by Neelakantanand associates, post endodontic pain was estimated after two single file systems. They compared their significance levels and relative mean.[14]The overall success of root canal treatment is clinically achieved by effective debridement, accurate canal preparation and perfect obturation. Expression of pain by patients is highly subjective therefore many clinicians have experienced severe problem in post operative pain interpretation.[15,16]Researchers have stated that extrusion of canal fragments into peri-radicular area is the principal reason of pain in post endodontic follow up period. Many practitioners experienced that even if they restrict the instrumentation inside canal, they cannot control extrusion of debris.[18]Shokraneh and colleagues have conducted a double-blind prospective and randomized in which they evaluated post-operative pain related to three dissimilar file systems. Their study sample was mandibular molar. Study results was highly comparable to ours.[17]It is therefore seems to be unavoidable especially when the peri apical tissues are already infected. To resolve this dilemma, many experimental in vivo studies have been conducted in the past to track pain patterns in post operative phase.Debris extrusion in root canal preparation is an unwantedconsequence of therapy which cannot be totally nullified.[19]Vaudt and co-workers did a study to evaluate two rotary nickel–titanium systems as related to post operative pain and other symptoms. Their results were in accordance with our inferences.[20]Many classical studies demonstrated that endodontic patients express differentmagnitudes of pain after endodontic therapy. With the newer advancements of single-file systems in endodontics, only a single file is sufficient for completion of all procedure. Therefore, all dentinal shavings and other fragments are restricted to only one file.[21]Gambarini and associates estimated relative prevalence and severity of post-operative pain and peri-radicular infections as related to two unlike file systems and techniques.[22]Tinoco and co-workers had studied apical encroachment of micro-organisms when utilizing single-file and multiple file systems. Their results were also highly comparable and in accordance with our results.[23]Almost all debris is confined within the flutes of single file. This appeared to have good impact on peri apical tissue health. However, it is not clinically true in all circumstances. Endodonticresearchesconducted by Kim et al and Saber et al

have demonstrated that the sequential patterns of new multiple file systems can also induce extrusion of debris in toradicular areas.[24,25] All these factors impart their significant role in the progression of pain in follow up period.

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V. CONCLUSION

Within the limitations of the study, authors concluded that mean vas was higher in patients with WaveOneNiTi single file system. In both groups, patients had declining pattern of pain from the day of obturation to second follow up (4^{th} day). Oral health impact profile was superior in patients with Neoendo Flex multiple system. Therefore, Neoendo Flex multiple systems were overall superior toWaveOneNiTi single file system. All these inferences should be correlated clinically before application. Furthermore, above mentions findings must be considered suggestive only and other long term studies needs to be conducted to formulate stronger recommendations.

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