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Comprehensive Evaluation of Dental Practitioners about Clinical Efficiencies and Success of Rotary Endodontics in Endodontic Therapies: An Original Research Study

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Abstract

Background and Aim: Rotary Endodontics in Endodontic Therapies is a novel modality that has been developed in recent years. It has revolutionized the overall approach of endodontic armamentarium. Rotary Endodontics has been shown to be more effective and efficient in clinical setups. The aim of this study was to evaluate the Dental Practitioners about Clinical Efficiencies and Success of Rotary Endodontics in Endodontic Therapies.

Materials & Methods: The present study was completed on a cross sectional ideology wherein information was collected from selected Dental Practitioners by Questionnaire. Sample size was restricted to 100 general dental practitioners. A set of 8 questions were arranged logically in the form of questionnaire and hard copies handed over to the selected practitioners at their work places. All 8 questions were about the Rotary Endodontics and associated factors. Results thus obtained was tabulated and subjected to basic statistical analysis.

Statistical Analysis & Results: Statistical analysis was done using statistical software Statistical Package for the Social Sciences (SPSS). Out of 100 General Dental practitioners, males were 65 and females were 35. Maximum total 30 practitioners were belonging to age group 36-40 years. Only 8 practitioners were falling to the age range of >55 years. In practicing general dentists, 69 possessed Under Graduate degree while 29 possessed Post Graduate degree. Maximum 41 General Dental Practitioners were in clinical practice since 2-5 years. 32 General Dental Practitioners have their practice since <2 years. 75 General Dental Practitioners think that Rotary Endodontics offer reliable treatment with high precision and success. Level of significance or measured p value was highly significant for question number 2,3,5.

Conclusion: Within the limitations of the study authors concluded that studied general practitioners had fair to good knowledge/awareness about clinical efficiencies and success of rotary endodontics in endodontic therapies. Many of them were already aware about the benefits and clinical challenges related with rotary endodontics.

Key words: Dental Practitioners, Rotary Endodontics, Success, Awareness, Knowledge, Pain

Introduction

Endodontic therapy is primarily required when the pulp is infected and inflamed in presence of external cause like caries, trauma, cracks in enamel.¹⁻³ Therefore endodontic instrumentation is performed to clean the infected pulp and to disinfect and seal the root canal. Rotary instrument was firstly described by Oltramare who used needle shaped metal attached with hand piece.⁴⁻⁷ The needle portion easily accesses to canal tip and rotated with attached motor system. Modern Rotary Endodontic instruments have several advantages over traditional systems. They offer high safety with consistent results. Researchers have also showed that Rotary Endodontic instruments less frequently bind in the root canal dentine hence diminishes undue stress concentration.⁸⁻¹² Presently there are several NiTi Rotary Endodontic instruments are available which can be used as per their peculiar design, shaping characteristics, breakage possibility and clinical performances.¹³⁻¹⁷ However, clinicians have also experienced certain disadvantages of using Rotary Endodontic instruments. These are primarily undue locking of instrument in the canal denting resulting into high level stress concentration.¹⁸⁻²² Rotary Endodontic instruments also end up with increased canal preparation which may induce propagation and initiation of micro-cracks. Few of the pioneer workers have showed structural fatigue in Rotary Endodontic instruments which may leads to fracture.²³⁻²⁶ Therefore, use of Rotary Endodontic instruments system always requires comprehensive understanding of canal anatomy and principles for selection of rotary system. The sole aim of this study was to evaluate the Dental Practitioners about Clinical Efficiencies and Success of Rotary Endodontics in Endodontic Therapies.

Materials & Methods

The present study was planned, abstracted and performed to chiefly evaluate the current knowledge and awareness of Dental Practitioners about Clinical Efficiencies and Success of Rotary Endodontics in Endodontic Therapies in Amroha District, India. This study was completed on a cross sectional ideology wherein information was collected from selected Dental Practitioners. Questionnaire model was employed for precise collection of unbiased data. In initial phase of study, authors contacted total 189 private dental practitioners of Amroha District, India. The contact details of the general dental practitioners were from the district association registry. Initial screening confirmed that there were total 189 general dental practitioners present in district. However, meticulous examination of the data revealed that out of 189, 59 were not actively practicing. Additionally, 30 general dental practitioners did not respond or unavailable. Hence, final sample size was restricted to 100 general dental practitioners. The mode of communication was email and questionnaire response sheet. Questionnaire based studies are highly useful since they are fast, efficient and inexpensive way of collecting bigger information from selected samples. Questionnaire based studies also measures about the subjective behaviors about any method/technique, intentions, attitude and group opinions. Authors explained the purpose and relative importance of the study to all selected general dental practitioners. Informed and signed consent was also obtained from all participating general dental practitioners. A set of 8 questions were arranged logically in the form of questionnaire and hard copies handed over to the selected practitioners at their work places. All practitioners were asked to respond truthfully and submit back the questionnaire within 2 weeks. All 8 questions were about the Rotary Endodontics and associated factors. The privacy guidelines and other rights of the study participants were totally ensured. Results thus obtained was tabulated and subjected to basic statistical analysis. P value less than 0.05 was considered significant ($p < 0.05$).

Statistical Analysis and Results

Responses those collected from questionnaire work out were sent for statistical analysis using statistical software Statistical Package for the Social Sciences version 22 (IBM Inc., Armonk, New York, USA). The consequential 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 Graph 1 showed that out of 100 General Dental practitioners, males were 65 and females were 35. Maximum total 30 practitioners were belonging to age group 36-40 years. Only 8 practitioners were falling to the age range of >55 years therefore we can believe that most of the general dental practitioners were belonging to younger age groups. P value was significant in group III of age range 46-50 years. Total 23 practitioners were found in the age of 41-45 years. Table 2 showed about the evaluation of General Dental Practitioners by Educational Degree. Among the practicing general dentists, 69 possessed Under Graduate degree while 29 possessed Post Graduate degree. Total 6 practicing general dentists have additional certified degree qualifications also (PhD/MBA/any other Degree). Table 3 illustrates about the evaluation of General Dental Practitioners according To the Number of Years of Private Practice. Data confirmed that maximum 41 General Dental Practitioners were in clinical practice since 2-5 years. 32 General Dental Practitioners have their practice since <2 years. 21 General Dental Practitioners have their practice since 6-10 years. Table 4 confirmed about the Questionnaire Responses Evaluation with Related Statistical Inferences for General Dental Practitioners. 81 Practitioners agreed that Rotary Endodontics offer speedy treatment with higher patient comfort (n=78). 75 General Dental Practitioners think that Rotary Endodontics offer reliable treatment with high precision and success. While 79 Dental Practitioners believe that Rotary Endodontics necessitates complicated armamentarium which is difficult to handle/manage. 91 General Dental Practitioners think that Rotary Endodontics could be proved as an ultimate tool in future dentistry/ Endodontics and related researches. 59 General Dental Practitioners agreed that the Rotary Endodontics is less damaging to the root canal walls. The cumulative assumed of p value was highly significant (0.010). Table 5 illustrates about the fundamental statistical description with level of significance evaluation using Pearson Chi-Square Test for Questionnaire Responses. Level of significance or measured p value was highly significant for question number 2,3,5.

Table 1: Age & Gender Wise Distribution of General Dental Practitioners

Age Group (Yrs)	Male	Female	Total %	P value
>55	4	4	8 [8 %]	0.09
51-55	10	5	15 [15 %]	1.50
46-50	18	6	24 [24 %]	0.01*
41-45	15	8	23 [23 %]	0.50
36-40	18	12	30 [30 %]	0.06
Total	65	35	100%	*Significant

Table 2: Evaluation of General Dental Practitioners by Educational Degree

Educational Degree	Number	Mean	Standard Deviation
Under Graduate/BDS	69	24.56	12.44
Post Graduate/MDS	29	11.67	5.56
MDS+ PhD/MBA/any other Degree	02	1.67	1.66
Total	100	-	-

Table 3: Evaluation of General Dental Practitioners According To the Number of Years of Private Practice

Years of Employment	Number	Mean	Standard Deviation
<2	32	11.77	1.44
2-5	41	8.27	2.16
6-10	21	3.27	2.68
>10	6	2.33	1.32

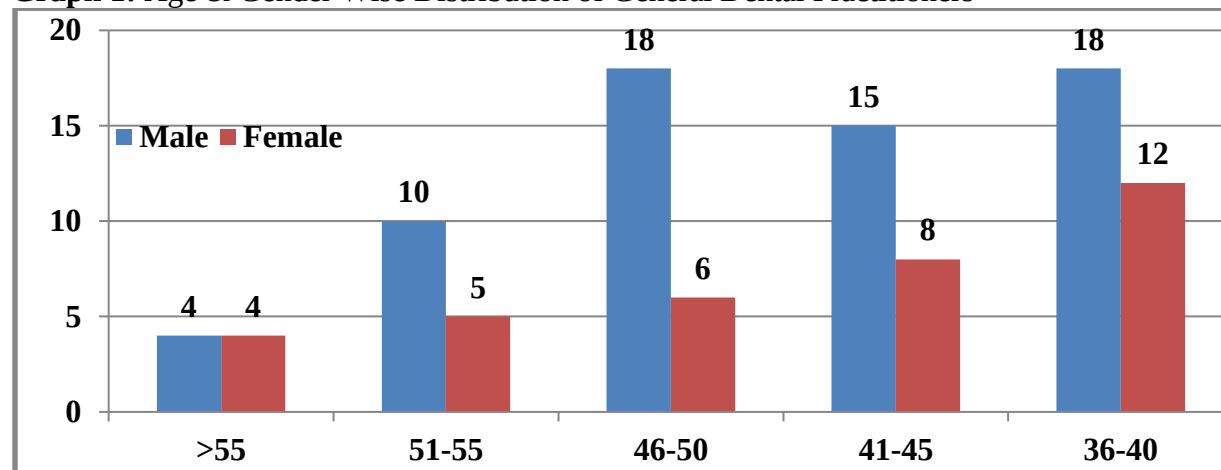
Table 4: Questionnaire Responses Evaluation with Related Statistical Inferences for General Dental Practitioners

Q. No.	Variables	Responses [Yes]	Responses [No]	p Value
1	Is Rotary Endodontics offer speedy treatment?	81	19	0.010*
2	Do you think that Rotary Endodontics offer higher patient comfort?	78	22	
3	Do you think that Rotary Endodontics offer reliable treatment with high precision and success?	75	25	
4	Do you think that Rotary Endodontics necessitates complicated armamentarium which is difficult to handle/manage?	79	21	
5	Do you believe that instrument failure is the prime cause of collapse of Rotary Endodontic therapy?	62	38	
6	Do you think that Rotary Endodontics is less damaging to the root canal walls?	59	41	
7	Do you think that Rotary Endodontics could be proved as an ultimate tool in future dentistry/ Endodontics and related researches?	91	09	
8	Do you actually advice your colleagues to switch from traditional Endodontics to Rotary Endodontics?	69	31	
*p<0.05 significant				

Table 5: Fundamental statistical description with level of significance evaluation using Pearson Chi-Square Test for Questionnaire Responses

Q. No.	Mean	Std. Deviation	Std. Error	95% CI	Pearson Chi-Square Value	df	Level of Significance (p value)
1	2.14	1.150	0.160	1.16	2.133	1.0	0.081
2	2.23	1.140	0.100	1.16	2.242	2.0	0.010*
3	2.11	2.324	0.078	1.96	2.411	1.0	0.010*
4	2.23	2.135	0.135	1.16	1.156	1.0	0.180

5	2.11	1.420	0.125	1.91	2.110	3.0	0.001*
6	2.13	1.140	0.029	1.91	2.413	1.0	0.135
7	2.17	2.174	0.116	1.16	1.211	1.0	0.311
8	2.13	2.165	0.033	2.13	1.119	1.0	0.114
*p<0.05 significant							

Graph 1: Age & Gender Wise Distribution of General Dental Practitioners

Discussion

Researchers has well evidenced about the various noticeable benefits using rotary endodontics over traditional techniques. Despite of these apparent advantages there are certain strict cautions also those are mandatory to follow. These primarily include maintenance of light pressure and usage of correct torque adjustments. Researchers and clinicians has also stated about some potential complications of using rotary endodontics which includes ledge formation, instrument separation and other issues. It is therefore highly recommended to comprehensively train the clinician/operator before inception of rotary endodontics. Also, precise selection of appropriate armamentarium for each case can help maximize overall therapeutic success. NiTi rotary files have great advantages of having extreme flexibility that allows rotating 360° in tortuous root canals. This feature facilitates rapid and effective biomechanical preparation. Therefore, Endodontic Rotary Files are effective in most of the clinical situations. Gavini and associates studied about the Resistance to flexural fatigue of reciproc R25 files under nonstop rotation and reciprocating movement. They recommended the intricate use of rotary endodontics only after meticulous training.²⁷ Pedullà and other coworkers have evaluated the effect of nonstop or reciprocating motion on cyclic fatigue resistance of 4 dissimilar nickel-titanium rotary instruments. They stressed the use of controlled and light pressure during rotary instrumentation.²⁸ Agrawal and colleagues had reviewed the advancements in nickel-titanium instrument surfaces. They also agreed that rotary endodontics has revolutionized the field of modern endodontics. This was in agreement to our study's results and inferences.²⁹ Subramanian and other researchers have studied about the electrochemical Properties of Nickel-Titanium Rotary Endodontic Instruments. They highlighted the use of rotary endodontics in terms of flexibility and super-flexibility.³⁰ De Pedro-Muñoz and other researchers have studied about the Cyclic Fatigue Resistance of Rotary versus Reciprocating Endodontic Files. It was a Systematic Review and Meta-Analysis which covered almost all aspects of rotary endodontics and stressed about the critical precautions.³¹ Kinjawari studied about the Post-endodontic pain in curved canals

prepared with different rotary instrumentation techniques. Their results were highly imperative and predictive in indicative cases.³² Pires and other pioneer workers have evaluated about the Guided endodontics of calcified canals. They confirmed the significant usage of rotary endodontics in calcified canals in terms of drilling path of rotary systems and intracanal dentin wear.³³ Grande and others have reviewed the latest developments in rotary NiTi technology and root canal preparation.³⁴ Dablanca-Blanco and other researchers have experimented about the endodontic rotary files in terms of their overall indications, contraindications and required precautions.³⁵ Therefore, clinical expertise and handling tactics must be the deciding factors for accurate selection of the rotary endodontic instrument system for a particular case or patient.

Conclusion

Authors meticulously executed this study to genuinely illustrate the current scenario and status of knowledge/awareness of Dental Practitioners about Clinical Efficiencies and Success of Rotary Endodontics in Endodontic Therapies. Within the limitations of the study authors concluded that studied general practitioners had fair to good knowledge/awareness about clinical efficiencies and success of rotary endodontics in endodontic therapies. Many of them were well aware about the benefits and clinical challenges associated with rotary endodontics. Since rotary endodontics is a promising innovation in the field of endodontics, educational programs and technique demonstrations must be conducted time to time. Our study inferences should be considered as suggestive for presuming clinical outcomes for similar clinical situations. Future long term studies also expected to establish other concrete guidelines in these regards.

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