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Practice Of Endodontic Re-Treatment In Four Cities Of Pakistan

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ORIGINAL ARTICLE

PRACTICE OF ENDODONTIC RE-TREATMENT IN FOUR CITIES OF PAKISTAN

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Background: Root canal re-treatment is the procedure of choice when the primary root treatment fails but patient is inclined toward salvage of the tooth. The re-treatment is often a challenging procedure owing to lack to the predictability in the outcomes. Since, there is a no single way of planning and executing such procedure, a study was planned to assess the knowledge, attitude and practice regarding endodontic re-treatment among Pakistani dentists. The effect of clinical experience on the re-treatment planning was also determined. **Methods:** A survey was conducted by distributing a questionnaire among 240 dentists practicing in four major cities of Pakistan. Frequency distribution of the gender, experience, designation of the participants etc. was determined. A case scenario was also shared and responses upon decision making were noted. Chi square test was applied to see if re-treatment decision of experienced dentists (>5 years' practice) was significantly different than less experienced dentists. **Results:** Out of 240 forms, 160 were received (response rate of 66.67%). The most commonly reported reason for endodontic re-treatment was under prepared/ under filled canals. Nearly 40% participants reported doing re-treatment with hand instruments only and 15% did not employ any solvent during re-treatment. There were no significant differences between the less experienced and the more experienced dentists on re-treatment decisions. **Conclusions:** Almost half of the dentists reported inappropriate decision making in re-treatment. This shows that in endodontic re-treatment practice in major cities of Pakistan falls short of internationally accepted standards. There is a significant difference in treatment planning done by more experienced dentists compared to ones with <5 years' clinical experience.

Keywords: Endodontics; Failed root canals: Re-treatment; Survey; Root canal
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INTRODUCTION

Primary endodontic treatment is done by means of the mechanical preparation of the root canal space by utilizing a combination of hand and rotary instruments as well antimicrobial chemicals. The objective is to obtain a funnel shaped canal that is receptive of an inert and biocompatible root filling material to hermetically seal the canal space. In the due process, the microorganisms and the diseased tissues are removed and thus an environment conducive for periradicular tissue healing is achieved.[1]

Endodontic re-treatment is indicated when the primary endodontic treatment has failed due to any reason. The common causes of failures are inadequate root filling, over obturation and leaky coronal restoration etc.[2–4] Nonsurgical re-treatment of previously filled root canals requires removal of the previously filled gutta-percha and the sealer from the canal space followed by a fresh obturation of the root canal.[5,6] A number of challenges are encountered during endodontic re-treatment.[7] These include untreated canals, ledging, perforation, transportation, weaking of the root, over extension of filling, under preparation, blockage, remaining fractured instrument and inflammatory apical resorption etc.[8–11] The guidelines of the American Association of Endodontists (AAE) and the British Society of Endodontists (BSE) recommend that an orthograde re-treatment should be performed prior to undertaking any surgical procedure for the failed root canals.[12,13] A study reported that up to 16% of all root canal treatment exhibited failure within five years of the primary treatment.[14] A meta-analysis on the outcome of nonsurgical re-treatment and endodontic surgery show that endodontic surgery and nonsurgical re-treatment have an overall success rates of 92% and 80% respectively.[15] The predictable outcomes and the long term success in re-treatment is attributed to the advancement in the surgical endodontics.[12,13]

A number of studies have investigated the primary endodontic techniques used in the dental practice. However, very few studies have focused on the re-treatment. Moreover, the local data on the re-treatment practices is also scarce. Therefore, it was decided to carry out a survey to map the current practice of endodontic re-treatment in the four major cities of Pakistan and to assess whether clinical experience affects decision making of re-treatment. The objectives of the present study are to assess the endodontic re-treatment practice

offered by teaching dentists in the four major cities of Pakistan and to compare the decision making regarding endodontic re-treatment done by dentists with less than 5 years' experience with that of dentists with more than 5 years' experience.

MATERIAL AND METHODS

A survey was conducted at the dental institutions of Karachi, Lahore, Islamabad and Peshawar during March to August 2015. Dental faculty and postgraduate residents were distributed a structured, self-administered *pro forma*. Teaching dentists who reported carrying out the endodontic re-treatment were included in the study whereas, dentists who were not active in the clinical practice were excluded. An approval was obtained from the ethics review committee prior to the conduct of the study (Ref# 2824-Sur-ERC-13).

Sample size was calculated using statistical calculator "Sample size determination in health studies, WHO from a study on root canal re-treatment by Nagi *et al*.[16] The investigators observed that 45.8% of dentists with more than five years of clinical experience opted for endodontics re-treatment of failed incisor teeth. The level of confidence was kept at 95% and specified relative precision was 15%. The sample size requirements turned out to be 203. We inflated this number by 20% to compensate for refusals. The final sample size was 240.

Thus, 240 forms were distributed among the participants using non-probability, convenience sampling. The written informed consent was included in the proforma. It gained information on the aspects such as the number of re-treatment cases seen per month, most frequent cause of re-treatment encountered in practice, use of medicaments and solvents, number of visits for re-treatment, antibiotic prescription etc. A case scenario was also presented in the end with various treatment options. The proforma was distributed and collected back by the data collectors. The forms that were not collected within 2 weeks of distribution were considered as refusals.

Data were analyzed using SPSS-20.0. Descriptive statistics and frequency distribution were computed. *Chi* square test was applied to compare the difference between dentists with clinical experience of less than 5 years versus those with more than 5 years of clinical experience. Level of significance was kept at<0.05.

RESULTS

The survey questionnaire was distributed to 240 participants working in dental institutions located in four bog cities of Pakistan, out of which 160 were received, resulting in a response rate of 66.7%. The attributes of the participants are shown in table 1. Participants from all four cities were evenly distributed. Similarly, both genders were almost equally distributed. Half of the sample had more than 5 years of clinical experience. Over 60% of the dentists see attend 1–3 cases of endodontic re-treatment in their practice per month. Under-filled canals [63/160 (39%)] and apical periodontitis [54/160 (33%)] was the most common patient presentation and diagnosis for endodontic re-treatment. More than 76% dentists reported never using any magnification tool for endodontic re-treatment

The comparison of re-treatment decision making by more experienced dentists versus less experienced dentists is shown in table-2. The clinical scenario shared with dentists, on whom they were asked to carry out decision making is shown as figure-1. The preferences of the dentists regarding management of the case scenario are shown in figure-2.

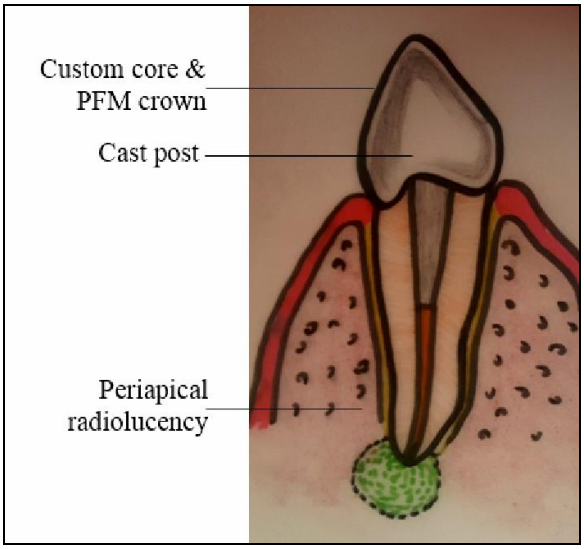

Figure 1:

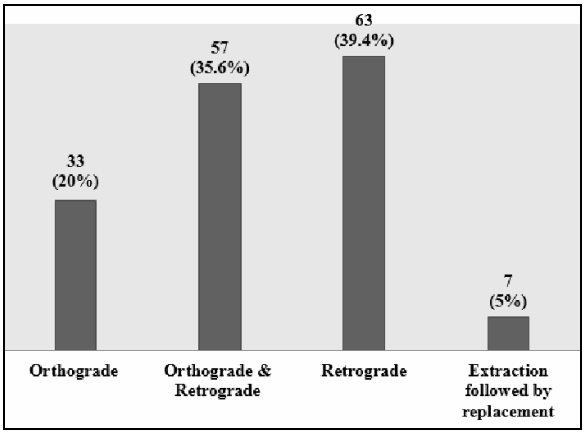

Figure-2: Treatment option for the case scenario. (n=159)

Table-1: Attributes of the participants (n=160)

Variables	Categories	n	%
Gender	Male	78	48.8
	Female	82	51.2
Cities	Karachi	44	27.5
	Lahore	42	26.3
	Islamabad	36	22.5
	Peshawar	38	23.8
Clinical experience	More than 5 years	82	51.3
	Less than 5 years	78	48.8
Designation	Post grad Trainees	60	37.5
	Instructors	68	41.5
	Assist Prof. & above	15	9.4
	Others	17	10.6
Scope of practice	Private	13	8.2
	Hospital/ University only	105	65.6
	Both	42	26.2
Cases of retreatment seen per month	1–3	101	63.2
	3–8	54	33.8
	8–15	5	3.0

Table-2: Decisions regarding retreatment practice (n=160)

Variables	Categories	Clinical experience		n	*p*-value
		>5 years	< 5 years		
Most frequent cause of retreatment	Periapical periodontitis	29	25	54	0.21
	Lack of coronal seal	9	4	13	
	Un-identified canal	10	17	27	
	Under-filled canal	32	31	63	
	Extrusion of filling material	0	1	1	
	Fractured instrument	2	0	2	
Frequency of use of magnification	All the time	5	6	11	0.48
	Frequently	5	10	15	
	In selected cases	7	5	12	
	None	65	57	122	
Instruments utilized in retreatment	Hand instruments	28	38	66	0.05
	Hand and rotary	50	33	83	
	Ultrasonic, hand, rotary	4	7	11	
Rotary instruments used	ProTapers	30	52	82	0.07
	None	40	38	78	
Use of solvents	Chloroform	21	6	27	0.01
	Orange oil	11	10	21	
	Xylol	11	10	21	
	Ethyl acetate	0	5	5	
	None	8	20	28	
Visits preferred for retreatment	1 visit	3	0	3	0.01
	2 visits	61	46	107	
	3 visits	18	29	47	

DISCUSSION

There is no general consensus on the standardized technique for endodontic re-treatment. Although, AAE and BSE have provided guidelines for secondary endodontic management of failed teeth but still the contemporary practice of the endodontic re-treatment is largely influenced by the clinical experience and the personal choice of the dentist. Therefore, we decided to assess the trends of current practices among the practicing dentists of Pakistan. The responders were employed at four major cities across the country. This ensured that we cover a diverse group of participants in the sample.

As the practicing patterns are ever changing entity, it's not alarming to note that Cruz *et al*.[17] and Good[18] reported from the dental schools of Philippines and UK, respectively, showed that hand files are the predominant instrument for mechanical debridement of failed root canal treatment. Khan *et al.*[19] in 2014 reported endodontic practicing pattern of the private and public dental institutions of Karachi. Their study showed that the hand files and Gates-Glidden drills were the most commonly employed instruments for carrying out root canal re-treatment. These findings are contrary to the present study, where we report both hand and rotary instruments (51%) for this task. (Table-2) this shows that use of rotary endodontic instruments has risen rapidly in last couple of years.

An interesting finding of the present study is that a big proportion of dentists reported carrying out re-treatment in two visits. This is explained by the fact that majority of the participants were academic dentists. Whereas the participants of the studies mentioned earlier[17,18] comprised of dental students.

For the selection of intracanal medicaments, the participants clearly voted in favor of calcium hydroxide and the most preferred solvent turned out to be chloroform. This is in agreement with the Hommez,[20] in which the same set of chemicals were reported as the most preferred items by the dentists. In the present study, calcium hydroxide was found to be the most preferred intracanal medicament in teeth receiving primary endodontic re-treatment. Similarly, chloroform was found to be the primary chemical employed by the dentists to remove existing gutta percha from the canal. This is in agreement with the results of previously conducted local studies in which majority of the dentists preferred calcium hydroxide as the most frequently utilized intracanal medicament and Chloroform as the commonly employed gutta percha solvent.[16,19,21]

The present study shows that the use of magnification of endodontics has been alarmingly low. Over 76% dentists reported never using any magnification tool for endodontic re-treatment. This is opposite of what has been observed in survey of dentists in USA, where over 80% dentists routinely employ magnification for endodontics.[22] The outcomes of endodontic re-treatment are highly

dependent on correction of primary deficiency or pathology. This can be achieved only if there is proper access, visibility and illumination. Inability to use magnification in endodontic re-treatment simply translates into poor outcomes.

A case scenario was included in the current study in order to assess the approach of dentists for a particular case and the ability to provide a correct treatment plan. The case of a 25-year-old lady was presented with a complaint of painful maxillary canine; the tooth was endodontically treated and restored with a cast post core and crown. Upon presentation, the tooth was tender to percussion and the radiographs revealed a 2 mm of radiolucency at the apex. The participants were asked to choose the most appropriate management option for the case. Majority of the participants in present study opted for retrograde treatment (39.4%). This is in contrast to Hommez[20] study where participants had chosen orthograde re-treatment when a similar scenario was presented. Therefore, the treatment plan opted in the current study, falls below the standard of care when compared to international academic standards and clinical practices. A previously conducted local study involving the dental institutions of Karachi showed that 47% of the dentists had opted for retrograde treatment when presented with a similar case scenario as the current study which shows an inappropriate decision making in terms of treatment planning.[16]

There is a considerable need of improvement in re-treatment practice in terms of appropriate decision making, case selection and treatment planning. Moreover, clinicians should be encouraged to use contemporary equipment along with latest materials and techniques for re-treatment procedures. This in turn, would provide an efficient effective treatment for the patients and dentist would be able to comply with evidence based practice. Hence, the need of attending structured training programs in the specialty of endodontics is truly evident. Such programs would encourage dentists to enhance and update their knowledge regarding latest procedures, advanced equipment and be to practice according to international standards.

Strength of the present survey is that it's one of the few local studies on the endodontic re-treatment practices. Moreover, an attempt was made to cover dentists from four major cities of the country and include major aspects of the re-treatment practice. The limitations of the study include purposive sampling, data on knowledge and reported practice rather ascertaining than actual practice conducted at individual clinic. Moreover, questions on use of rubber dam and use of digital radiography were not asked.

CONCLUSION

There is a significant difference in the endodontic re-treatment planning done by more experienced dentists compared to ones with < 5 years' clinical experience.

Almost half of the dentists reported inappropriate decision making in endodontic re-treatment. This shows that endodontic re-treatment practice in major cities of Pakistan falls short of professionally accepted standards.

Recommendations: It is suggested that difficult cases of re-treatment should be referred to the specialists for management. Frequent arrangements of continuing dental education (CDE) programs and workshops should be conducted to keep the practicing dentists' knowledge up to date.

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AUTHORS' CONTRIBUTION

SEN wrote the manuscript, carried out data collection and data entry. FRK did the statistical analysis and critically reviewed the manuscript. MR supervised the project.

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