

ASSESSMENT OF REASONS FOR INITIAL ENDODONTIC THERAPY FAILURE BASED ON RADIOGRAPHIC FINDINGS

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ABSTRACT

Objective: To assess the reasons for failure of beginning endodontic therapy.

Material and Method: This descriptive cross-sectional study was carried out at University of Lahore during the period from February, 2016 to December, 2016. Total 400 patients were included in which males were 214 (53.50%) and female patients were 186 (46.50%). Age ranges of all the patients were 13-years to 70-years. To find out the reasons for failure of beginning root-canal therapy, examination of periapical radiographs of these four hundred patients was done.

Results: Canal under-obturation was found in 182 (45.50%), poor-obturation in 104 (26.0%), missed canals had 58 (14.50%), over-obturation observed in 20 (5.0%) and iatrogenic error was found in 9% as a reason for failure of beginning root-canal therapy out of these 400 radiographs.

Conclusion: It was concluded that root-canal under-obturation was the most general reason for beginning endodontic treatment failure subsequently poor-obturation, over-obturation, missed canals and iatrogenic errors.

Keywords: Radiographic Findings, Obturation, Failure, Root-Canal Treatment, Iatrogenic Error,

INTRODUCTION

Endodontic treatment is a treatment methodology that goes for safeguarding of regular dentition. The most progressive aspect of modern dentistry is known as endodontic therapy. It is a traditionalist treatment of unhealthy tooth prompting high long haul tooth survival rate.¹

The goal of introductory endodontic treatment is to hold the treated tooth in normal function, and to avert or recuperate the periapical pathosis beginning-root canal treatment has been appeared to be an anticipated treatment demonstrating high level of progress. The achievement rate of beginning root-canal treatment has been accounted for in the vicinity of 86% & 98%.^{2,3} Notwithstanding this high level of accomplishment, failure can happen after treatment and teeth give post treatment illness.

The most incessant causes behind failure of essential endodontic treatment incorporate insufficient cleaning and canal shaping, both major and accessory missed canals, over-obturation, under-obturation, poor lateral condensation, separation of instruments ledge formation as well as perforation. Leakage of coronal has also blaming for post treatment sickness. These etiologies might be clear at the period of diagnosing the

unhealthy root filled teeth, or they may stay indeterminate until the culmination of fruitful treatment. The fundamental purpose behind every one of these causes is constant microorganisms that stay after treatment or canal system recontamination due to deficient seal.^{2,4,5}

The root treated teeth failure is for the most part analyzed on clinical signs and manifestations and radiographic outcomes. Radiographic assessment is the principle instrument for appraisal the nature of root-canal treatment. Radiograph informs us regarding the filling length of root canal, taper, thickness and homogeneity. Periapical healing to a great extent relies upon the nature of root-canal filling.⁶

Quality guidelines for treatment of root-canal have been given by the European Society of Endodontology. Radiograph should be used to check the quality of root-canal filling in accordance with these guidelines. Root apex shown by radiograph with preferably 2-3MM at least of periapical region obviously identifiable. Completely filled the prepared root-canal and there should be no space seen between canal wall and canal filling. No canal space beyond end point of root-canal filling should visible. The tooth ought to be satisfactorily re-established after filling of root-canal to

counteract bacterial recontamination the system of root-canal or break the tooth.⁷

Failure happen after starting endodontic treatment when one stays unfit to satisfy the typical norms required for the effective results. Numerous clinical investigations have demonstrated that filling of root-canal with poor buildup, between filling material presence of voids and off base apical cutoff results in endodontic treatment failure.^{8,9}

MATERIAL AND METHODS

Present descriptive cross-sectional study was conducted on patients, who visit operative outpatient department of University of Lahore during the period from February, 2016 to December, 2016. There were 400 patients in present study who fulfill the inclusion criteria. Patients with mobile teeth, with any root fracture, any type of systemic disorder, non-restorable teeth were excluded. Non probability purposive sampling technique was used in this study. Before study obtained consent from all patients. Patient's demographic information i.e. address, gender, age and name was also obtained. During study, a detailed history obtained followed by clinical investigation of patients. Two periapical radiographs, one with straight angle and the other one with either mesial shift, were taken in each patient or distal shift, for maxillary molars, by using paralleling method with inclusion of 2-3MM periapical area. A standard X-Ray illuminator with magnifying glass was used to examine all radiographs. All radiographs were investigated by the primary author and where fundamental, counsels were made with second and third examiners.

Root-canal obturation which was discovered in excess of 2-MM shorter from radiographic apex considered under-obturation. The obturation which was reaching out past, the radiographic apex was thought about over-obturation. Non homogenous filling or inside spaces of root filling was contemplated as poor-obturation. Through furcation expulsion of filling of multi rooted teeth was considered as furcal aperture and filling material expulsion in horizontal mass of any root was considered strip aperture. In a root-canal detection of broken instrument was considered as an instrument partition. The information with respect to endodontic treatment failure for every patient was noted on uniquely planned/designed proforma for examination. In this study all the cases were than endodontically re-treated by the specialists. The analysis of obtained information was done through SPSS Version-20.

RESULTS

There were 214 (53.50%) males and 186 (46.50%) were females (Table 1). Thirty four years with standard

deviation ± 12 -years was the mean age of the patients. Root-canal under-obturation was the general cause of failure of root-canal, secondly poor-obturation and after that missed canals and the causes for failure of root canal along with their percentage and frequency is shown in Table 2.

Table 1: Frequency of gender in cases of failure initial endodontic (n=400)

Gender	No.	%
Male	214	53.50
Female	186	46.50

Table 2: Frequency of failure causes of Initial Endodontic

Root Canal Failure Reason	No.	%
Under-obturation	182	45.50
Over-obturation	20	5.0
Missed-canals	58	14.50
Poor-obturation	104	26.0
Strip-perforation	6	1.50
Furcal-perforation	2	0.50
Ledge-formation	10	2.50
Separated instrument	16	4.0
Coronal-leakage	2	0.50

DISCUSSION

Microorganism eliminate from tainted root-canal and keeping their reentry are essential to guaranteeing a good endodontic treatment result. It is by and large acknowledged that endodontic treatment result is decidedly corresponded with the specialized nature of root-canal filling. Root canals which are well filled, relied upon to give a three dimensional seal against bacteria entrance.¹⁰

The radiographic translation of root-canal filling is a typical technique used to survey the achievement or endodontic treatment failure⁶, along these lines in this investigation periapical radiographs were utilized to evaluate the reason for failure of root-canals.

The present examination demonstrated that most basic explanation behind root-canal failure was under-obturation of root-canals and the rate was observed to be 45.50%. This finding is predictable with that of numerous local and remote investigations. A radiographic study conducted by Akbar I in 2015 to decide the reasons for endodontic disappointments and he found under-obturation filling as a reason for disappointment in 46.90% of root-canals.¹¹ Similarly Iqbal¹² conducted a study at Saudi Arabia in 2016, he found that under-obturation was the most responsible factor for failure of endodontic treatment and 33.30%

frequency was reported. Under-filled canals upon radiographic evaluation as reported by Arigbede et al in his study conducted in 2016.¹³

In 26% of the cases, poor-obturation was observed in the present study which was the second general cause of failure of endodontic treatment. These findings were similar to Akbar I & Rasheed et al studies.^{12,14}

14.50% missed-canals occurrence was found in present study. Deepthi and Praveena reported in a recent study that failure of endodontic treatment caused by untreated canals and these were 13.0%¹⁵ but different studies reported failures about to 17.7% & 20.0% because of missed canals.^{12,14}

Another cause of failure of endodontic treatment is root-canals over-obturation which reported in literature. In this present study only 5.0% of cases were found in which over-obturation was the failure cause. These results comparable with the outcomes of Praveena et al¹⁴, Rasheed¹⁵ and Khan¹⁶ but the other studies shown over-obturation percentage at great level.^{11,12}

Another essential reason for root treated teeth failure is iatrogenic errors since they result in root-canal system areas which escape appropriate compound and mechanical debridement bringing about relentless intraradicular disease. Disappointments because of iatrogenic error in this examination were observed to be 9.0% of aggregate cases. These procedural blunders incorporate isolated instrument, ledge formation, strip perforation, furcal perforation and coronal leakage each with revealed level of 4.0%, 2.5%, 1.5%, 0.5% and 0.5% individually. These outcomes coordinate with the examination by Akbar¹¹ in which instrument detachment was 3.1% and coronal leakage 0.8%. In a recent report conducted at AFID during 2013, the level of instrument division in treatment of root-canal failure cases was additionally answered to be 4%¹³ which affirms the unwavering quality of the outcomes delivered by introduce examine.

However, the after effects of this examination with respect to coronal leakage as a reason for endodontic treatment failure, contrast from the investigations completed by Iqbal¹² and Rasheed et al¹⁴, who observed coronal leakage to be available in 14.50% and 3.0% of cases individually. One constraint of current investigation is the utilization of periapical radiographs for assessment of reasons for failure of root-canal treatment since radiographs give two dimensional picture of three dimensional items and super inconvenience of nearby anatomical structures additionally, which make the understanding of radiographs troublesome. Propelled imaging strategies like CBCT can give more important data when contrasted with traditional radiographs and could be

more particular for the assessment of reasons for endodontic treatment failure.¹⁷

CONCLUSION

During present study, it was come to know that most general reason for initial / beginning root-canal treatment failure was root-canal under-obturation follow by missed canals, over-obturation, iatrogenic errors and poor-obturation.

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