

Assessment of causes of failures in endodontic therapy- A clinical study

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Abstract

Background: Endodontic therapy or root canal therapy is a treatment sequence for the infected pulp of a tooth which results in the elimination of infection and the protection of the decontaminated tooth from future microbial invasion. The present study was conducted to assess the causes of endodontic failures. **Materials & Methods:** The present study was conducted on 100 patients of both genders. A total 220 endodontic treated teeth were evaluated. Intraoral periapical (IOPA) radiograph was used for assessment of presence or absence of periapical radiolucency, quality of obturation, missed canal, dislodged/fractured restorations, iatrogenic problems: perforation, file separation, ledges etc. **Results:** Out of 100 patients, males were 60 and females were 40. The difference was non-significant ($P < 0.05$). Common cause of failure was missed canal (maxilla- 40%, mandible- 45%), inadequate obturation (maxilla- 45%, mandible- 50%) and fractured coronal obturation (maxilla- 15%, mandible- 5%). The difference was significant ($P < 0.05$). **Conclusion:** Endodontic failure is not uncommon phenomenon. Common causes are missed canal, inadequate obturation and fractured coronal obturation. Periodic evaluations of cases are required to prevent developing complications.

Key words: Dislodged, Endodontic, Obturation

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This article may be Cited as : Sharma A Assessment of causes of failures in endodontic therapy- A clinical study HECS Int J Com Health and Med Res 2018;4(1):1-3

INTRODUCTION

Endodontic therapy or root canal therapy is a treatment sequence for the infected pulp of a tooth which results in the elimination of infection and the protection of the decontaminated tooth from future microbial invasion. It is widely used phenomenon in cases of apical periodontitis, periapical abscess, granuloma and cysts. The effectiveness of the treatment depends upon the careful following of all steps such as access opening, biomechanical preparation, obturation and restoration.¹

Increased dental patient education and awareness in conjunction with technological advancements have helped to promote the view that dentition should remain throughout people's lives. As a result, the need for performing conventional non surgical root canal therapy also has increased dramatically. Endodontic treatment has failure rates also.²

Endodontic treatment has failed if, after a sufficiently long period for healing, there is a residual, persistent, or progressive radiological translucency in periapical tissue. Furthermore, any kind of clinical complaint is to be considered an appropriate criterion for unsuccessful root canal treatment. Endodontic failure still occurs for a

variety of reasons, and presence of clinical signs and symptoms along with radiographic evidence of periapical bone destruction indicates the need for reintervention. The first and most important step is to determine the cause of endodontic failure. Normally, the etiologic factors of endodontic failure can be placed into four groups: (1) persistent or reintroduced intraradicular microorganism, (2) extraradicular infection, (3) foreign body reaction, and (4) true cysts.³ The present study was conducted to assess the causes of endodontic failures.

MATERIALS & METHODS

The present study was conducted in the department of Endodontics. It included 100 patients of both genders. All were informed regarding the study and written consent was obtained. A total 220 endodontic treated teeth were evaluated. General information such as name, age, gender etc was noted. Intraoral periapical (IOPA) radiograph was used for assessment of presence or absence of periapical radiolucency, quality of obturation, missed canal, dislodged/fractured restorations, iatrogenic problems: perforation, file separation, ledges etc. Results thus obtained were subjected to

statistical analysis using chi- square test. P value less than 0.05 was considered significant.

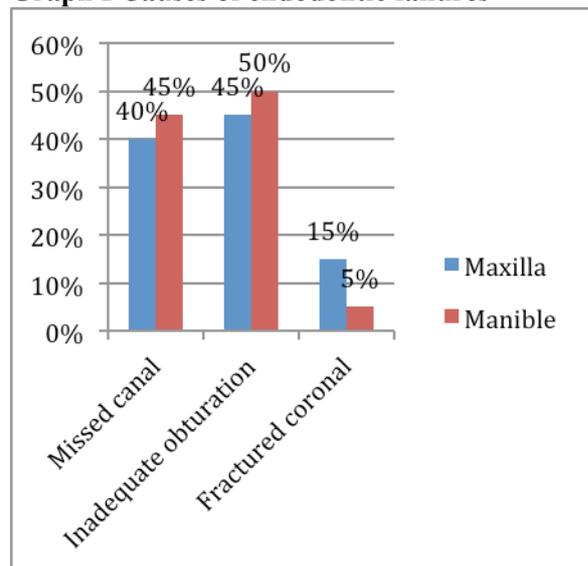
RESULTS

Table I Distribution of patients

Total-100	
Males	Female
60	40

Table I shows that out of 100 patients, males were 60 and females were 40. The difference was non-significant (P<0.5).

Graph I Causes of endodontic failures



Graph I shows that common cause of failure was missed canal (maxilla- 40%, mandible- 45%), inadequate obturation (maxilla- 45%, mandible- 50%) and fractured coronal obturation (maxilla- 15%, mandible- 5%). The difference was significant (P<0.05).

DISCUSSION

Endodontic failure related to microorganisms can be caused by anatomical difficulties such as apical ramification, isthmuses, and other morphologic irregularities as well as procedural errors such as missed canals, root perforation, ledge formation, and separated instruments. The quality of coronal restoration on favorable outcome of non surgical root canal treatment has been studied upon and has been established. According to the literature, failure to place an adequate coronal restoration results in a lower success rate. Based on the causes of failure decision is made by the clinician among nonsurgical endodontic re treatment, surgical treatment or extraction.⁴ The most frequent causes of endodontic treatment failure include insufficient

apical obturation, insufficient coronal obturation, insufficient disinfection of the root canal, specific microbial infection, protracted course of treatment, excessive use of instruments/excessive filling/false route.

In present study, out of 100 patients, males were 60 and females were 40. This is in agreement with Vertussi et al.⁵ We found that common cause of failure was missed canal, inadequate obturation and fractured coronal obturation. This is similar to Wolcott et al.⁶ Instruments may break during root canal treatment. The file segment may be left behind if an acceptable level of cleaning and shaping has already been completed and attempting to remove the segment would risk damage to the tooth. While potentially disconcerting to the patient, having metal inside of a tooth is relatively common, such as with metal posts, amalgam fillings, gold crowns, and porcelain fused to metal crowns. The occurrence of file separation is proportional to the narrowness, curvature, length, calcification and number of roots on the tooth being treated. Complications resulting from incompletely cleaned canals, due to blockage from the separated file, can be addressed with surgical root canal treatment.⁷ Another common complication of root canal therapy is when the entire length of the root canal is not completely cleaned out and obturated with root canal filling material (usually gutta percha). The X-ray in the right margin shows two adjacent teeth that had received bad root canal therapy. The root canal filling material does not extend to the end of the tooth roots. The dark circles at the bottom of the tooth roots indicated infection in the surrounding bone.⁸ Commonly found inadequacy was under obturation most frequently in curved canal cases. This may be due inadequate attention to preoperative radiograph and also less attention given to negotiate the curved canal. Due to inability to develop apical stop over obturation and over extension was found. Correct determination of working length and maintaining the length throughout the procedures cannot be less emphasized. Single cone 2% gutta percha was found to be used for obturation led to failure due to inadequate sealing of the root canal. This emphasizes the need of adequate shaping and cleaning while maintaining the proper working length followed by adequate obturation for proper sealing of the apex which leads to successful healing.⁹

CONCLUSION

Endodontic failure is not uncommon phenomenon. Common causes are missed canal, inadequate

obturation and fractured coronal obturation. Periodic evaluations of cases are required to prevent developing complications.

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Source of support: Nil

Conflict of interest: None declared

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