

Most Common Reason of Root Canal Failure in Government and Private Sectors in South Punjab

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ABSTRACT

Aim: To determine the most common reason of root canal failure in public and private sectors of south Punjab.

Methods: This was a cross sectional study performed in Nishtar Institute of Dentistry Multan, from 1st January to 31st December, 2019. A total of 180 teeth with root canal treatment failure were selected from patients who reported for retreatment in operative department and divided into two groups; (i) treated in public sector and (ii) treated in private sector. In both groups, teeth with root canal failure were evaluated clinically and radiographically to determine most common reason of root canal failure.

Results: Among the patients studied, 56% patients were male while 44% were female. In public sector treated patients, the commonest reason of root canal failure was poor coronal seal (56.3 %) whereas in private sector treated patients it was poorly filled canals (58.8%). The most common symptom of root canal failure was pain (70 %) followed by swelling (34.4%).

Conclusion: According to our results, the most common cause of root canal failure in public sector is poor coronal seal while in private sector is poorly filled root canals.

Keywords: Root canal failure, Government sector, Private sector, South Punjab.

INTRODUCTION

Dental health problem is an emerging public health issue because of its ethical, medical and economic impacts on human beings¹. An important outcome in maintaining the dental health is preservation of patient's natural teeth. Root canal treatment has been proved to preserve compromised teeth that were carious or or fractured². By definition, root canal treatment (RCT) is the removal of infected or necrotic pulp remnants and thorough debridement of root canals followed by placement of an inert sealing material in root canals.³ The basic goal of root canal treatment is to facilitate the healing of periapical tissue by removing infected or dead pulp remnants so that tooth can be kept functional in the oral cavity⁴. The success rate of root canal treatment is 86% to 98%. If standard principles of root canal treatment are not followed, there is re-appearance of symptoms along with periapical radiolucency. This is called root canal treatment failure.⁵ Extraction rate due to root canal failure is about 8.6%⁴.

Root canal failure occurs due to persistent infection or due to recontamination of root canals.⁶

Literature shows that many factors are considered accountable for failure of root canal treatment.⁷ These are poorly filled root canals, over filled root canals, inadequate coronal restoration, residual infected pulp, missed root canals, broken files, periapical infection, periodontal problems, improper debridement and ledge formation⁸.

One of the major causes of endodontic failure is the bacterial existence in root canal system.⁶ These residing bacteria are major source of persistence of symptoms. In a study, Lin et al found a stronger relation was found

between bacterial presence in root canal system and periapical rarefaction in root canal failure. Major sources of bacterial presence in endodontically treated root canals are improper debridement, defective coronal or apical seal, poor obturation and untreated canals.⁶

Iatrogenic mishaps during mechanical root canal preparation also compromise treatment outcomes and so adversely affect the quality of treatment. Common iatrogenic errors include instrument breakage in the canal, perforations, ledge formation, under and over instrumentation⁹.

The professional education, practicing environment and advanced training are important determinants for the success of clinical dentistry¹⁰. So, the aim of this present study was to determine the most common reason of root canal failure in public and private sectors of South Punjab for improving the existing practice of dentistry in terms of quality of root canal treatment.

MATERIAL AND METHOD

This cross sectional study was done on the patients reporting for re-treatment in operative department of Nishtar Institute of Dentistry (NID), Multan. Duration of study was from July 1st to December 30th, 2019. The reporting patients got treatment either from public sector or private sector of South Punjab. They were divided into two groups accordingly. After obtaining informed consent, 180 teeth with post endodontic complaints were selected. Patients included in the study were having complete permanent dentition, satisfactory oral hygiene and complete root formation of teeth, while physically and mentally handicapped patients, teeth with root fractures, teeth with split crowns, un-restorable teeth and 3rd molars were excluded.

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Information about the root canal failure was collected on specially designed Performa. Clinical examination of teeth and surrounding tissues was done to check any swelling, tenderness, sinus tract formation, loss of restoration or fracture of tooth crown. A clear periapical radiograph of every included tooth was taken and examined under good illumination to check the status of root canal filling and to confirm any abnormality in root canal system.

Root filling with more than 2mm short of radiographic apex was considered under filled while filling which extends beyond radiographic apex was considered over filled. Any radiolucent space along entire or some of working length of root filling was considered poorly filled. Root canals which were prepared but not filled were considered unfilled and any undesirable deviation from natural canal path was considered as ledge. Perforations and broken instruments were also checked.

RESULTS

Among 180 patients, 102(57.5%) were male while 78(42.5%) were female. In public sector treated patients, the most common cause of root canal failure was found to be inadequate coronal seal whereas in private sector treated, it was poorly filled canals (Table 1). The most common symptom was pain followed by swelling, loss of restoration and sinus tract formation, given in Table 2.

Table 1: Reasons of Root Canal Failure

Reason of root canal failure	Public sector treated		Private sector treated	
	n	%age	n	%age
Poor coronal seal	45	56.3	6	7.5
Under filled canals	13	16.3	7	8.8
Over filled canals	9	11.3	5	6.3
Poorly filled canals	5	6.3	47	58.8
Broken instruments	4	5	2	2.2
Unfilled canals	3	3.8	11	13.8
Unknown	1	1.3	2	2.2

Table 2: Symptoms in Root Canal Failure.

Symptom	No. of patients (%age)
Pain	112 (70%)
Swelling	55 (34.4%)
Sinus tract formation	15 (9.3%)
Loss of restoration	43 (26.9%)

DISCUSSION

Success rate in root canal treatment is high, but there is also a large number of root canal failure cases¹¹. Complete removal of bacteria from the infected root canals and control of secondary infection is significant for the success of root canal treatment.¹² The results of this study shows that root canal failure occurs both in public and private sectors and the reasons behind are almost same. Some reasons are more prominent in government sector while others in private sector.

This study revealed that the most common reason of root canal failure in public sector was poor coronal seal. These findings are consistent with those of Ng et al., who concluded in their meta analysis that teeth having proper

coronal restorations had higher success rate than teeth having poor coronal restoration.¹³ The findings of this study are in contrast with another retrospective study, which concluded that main determining factor in root canal success was quality of root canal filling rather than quality of coronal restoration.¹⁴

However, this study confirms the findings of previous studies like Swanson and Madison demonstrated in their study that coronal leakage was important factor in root canal treatment failure.¹⁵ The importance of proper coronal restoration was also emphasized by Ray and Trope in their study.¹⁶

As this study was conducted in south Punjab that is heavily populated region but has few dental hospitals in government sector. These dental hospitals have a very large turnover of patients, so most of patients when get pain free, either do not visit hospital or delay their visit to get coronal restoration. This delay may make the poor coronal seal as the most common reason of root canal failures in the government sector.

Adequate density of root canal filling is also an important factor for the long term success of root canal treatment. Poor root canal fillings can cause microleakage along the root canal walls resulting in root canal failure. We showed that the most common reason of root canal failure in private sector was poor root canal filling. This is in agreement with the results of Buairiesh Nusair et al. They reported more than 34% root canal failure cases due to poor root canal fillings in their study.

Previous studies shows that most of the inadequate root canal fillings are carried out by general dental practitioners in private clinics.¹⁷ The reason may be due to not following standard techniques and basic principles of root canal treatment that are properly followed and taught at dental colleges¹⁸. A study in England showed that general dentists running the private clinics require more post graduate diplomas and continue education to improve clinical skills in the field of endodontics¹⁹.

Similarly, the results in another study conducted by Iftekhhar Akbar, shows that skilled endodontists are less likely to perform procedural errors that compromise the endodontic treatment like poor root canal fillings when compared to general practitioners²⁰.

Limitation of this study was the use of periapical radiograph to confirm the diagnosis of RCF. Periapical radiograph is a two dimensional image of three dimensional object. The superimposition of adjacent structures make it difficult to interpret the radiograph.

CONCLUSION

According to our results, the most common cause of root canal failure in public sector is poor coronal seal while in private sector is poorly filled root canals.

Conflict of interest: None declared

REFERENCES

1. Alrwitai SA, Latif DA. Radiographical study of success and failure with evaluation the cause of that failure of endodontically treated teeth. Saudi J. Oral. Dent. Res. 2018; 3(10): 314-318.

2. Elemam RF, Pretty I. Comparison of the success rate of endodontic treatment and implant treatment. *ISRN Dent.* 2011;2011: 640509. Doi: 10.5402/2011/640509
3. Marques-da-Silva B, Baratto-Filho F, Abuabara A, Moura P, Losso EM, Moro A. Multiple taurodontism: the challenge of endodontic treatment. *J Oral Sci.* 2010; 52(4): 653-658.
4. Rasheed D, Yasmeen R, Khan AU, Mansoor MA. Causes of root canal failure noted in AFID. *Pakistan Oral& Dental Jr.* 2013;33(2):377-9.
5. Olcay K, Ataoglu H, Belli S. Evaluation of related factors in the failure of endodontically treated teeth: A cross sectional study. *J Endod.* 2018; 44(1): 38-45.
6. Tabassum S, Khan FR. Failure of endodontic treatment: The usual suspects. *Eur J Dent.* 2016; 10(1):144-7.
7. Santos- Junior AO, Pinto LDS, Pinheiro CR. Success or failure of endodontic treatments: A retrospective study. *J conserve Dent.* 2019; 22(2):129-32.
8. Iqbal A. The factors responsible for endodontic treatment failure in the permanent dentitions of the patients reported to the college of dentistry, the University of Aljouf, Kingdom of Saudi Arabia. *J ClinDiagn Res.* 2016; 10(5):146-8.
9. Alamoudi RA, Alharbi AH, Farie GA, Fahim O. The value of assessing case difficulty and its effect on endodontic iatrogenic errors: A retrospective cross-sectional study. *Libyan J Med.* 2020;15(1):1688916.
10. Khan FR, Mahmud S, Rahman M. Comparison of knowledge regarding endodontic materials and techniques among dentists employed at dental institutions and private practices in Karachi, Pakistan. *J Pak Dent Assoc.* 2015;24(1):11-16.
11. Aljabri MK, Kensara JA, Mandorah AO, SUNBUL ma. Causes of root canal treatment failure: A prospective study in Makkah city, Saudi Arabia. *Saudi J Oral Sci.* 2020;7(1):40-45.
12. Endo MS, Ferraz CC, Zaia AA, Almeida JF, Gomes BP. Quantitative and qualitative analysis of microorganisms in root-filled teeth with persistent infection: Monitoring of the endodontic retreatment. *Eur J Dent.* 2013;7(3):302–9.
13. Ng YL, Mann V, Rahbaran S, Lewsey J, Gulabivala K. Outcome of primary root canal treatment: Systematic review of the literature - Part 2. Influence of clinical factors. *IntEndod J.* 2008;41(1):6–31.
14. Tronstad L, Asbjørnsen K, Døving L, Pedersen I, Eriksen HM. Influence of coronal restorations on the periapical health of endodontically treated teeth. *Endod Dent Traumatol.* 2000;16(2):218–21.
15. Swanson K, Madison S. An evaluation of coronal microleakage in endodontically treated teeth. Part I. Time periods. *J Endod.* 1987;13(1):56–9.
16. Ray HA, Trope M. Periapical status of endodontically treated teeth in relation to the technical quality of the root filling and the coronal restoration. *IntEndod J.* 1995;28(1):12–8.
17. Eckerbom M, Andersson JE, Magnusson T. Frequency and technical standard of endodontic treatment in a Swedish population. *EndodDentTraumatol.* 1987;3(5):245–8.
18. Stewardson DA. Endodontics and new graduates—Part I: Practice vs. training. *Eur J ProsthodontRestor Dent.* 2002;10(3):131–7.
19. McColl E, Smith M, Whitworth J, Seccombe G, Steele J. Barriers to improving endodontic care: the views of NHS practitioners. *Br Dent J.* 1999;86(11):564–8.
20. Akbar I. Radiographic study of the problems and failures of endodontic treatment. *Int J Health Sci (Qassim).* 2015; 9(2):111-8.
21. Tamse A, Kaffe I, Fishel D. Zygomatic arch interferences with correct radiographic diagnosis in maxillary molar endodontics. *Oral Surg Oral Med Oral Pathol.* 1980;50(6):563–6.