

CAUSES OF ROOT CANAL FAILURE NOTED IN AFID

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ABSTRACT

The aim of the study was to determine the most common causes of root canal failure in patients who reported to the operative department of AFID (Armed forces institute of dentistry) for retreatment.

This was a cross sectional study carried out at the operative department of AFID Rawalpindi from January 2011 to December 2012. Among 200 patients included in the study, 112 (56 %) were male and 88 (44%) were female with mean age of 31.24 years (SD \pm 10.1). In the present study the most common cause of root canal failure was found to be underfilled (42%) followed by poor lateral condensation (22%) and unfilled / untreated (20%), overfilled (6%), fractured instruments (4%) and inadequate coronal restorations (3%). The patients presented with different symptoms The most common symptom being the tenderness (74%) followed by pain (20%) ,swelling (15%), loss of restoration (13%), sinus formation (6%), mobility (4%), fractured crown (4%) and split tooth (1%).

Key Words: Root canal failure, underfilled, overfilled, periapical radiolucency.

INTRODUCTION

In endodontic treatment, the dentist removes the dead or diseased tissue, cleans the inside of the tooth thoroughly, and then places a sealer material inside the tooth. It's important that the tooth be filled to the very end of the apex of the tooth.¹ Yet some people are so afraid of endodontic treatment that they choose to have a tooth extracted instead, which ends up being much more stressful for them than if they had the dentist save the tooth.²

Hession, reported the highest rate of success, 98.7% of 151 teeth.⁸ Nelson reported lower rates in England: 81.9% of 299 teeth. With re-treatment, however, Nelson salvaged 11 of the treatment failures, raising the success rate to 85.6%. Kerekas and Tronstad, using the standardized technique recommended in this text, had a success rate similar to the Washington study, as did Sjögren and his associates from Sweden.⁷⁻¹¹ Their

remarkable study of 356 endodontic patients, re-examined 8 to 10 years later, reported a 96% success rate if the teeth had vital pulps prior to treatment. rate dropped to 86% if the pulps were necrotic and the teeth had periradicular lesions and dropped still lower to 62% if the teeth had been re-treated.^{3-4,9-11}

Surprisingly, a Dutch group enjoyed as high a healing rate whether or not the canals were filled.¹⁶ The Dutch report was only a 2-year study.¹³⁻¹⁶ Unfilled canals had not been followed over a long period of time (such as 10 to 20 years). Most endodontically treated teeth should last as long as other teeth. Vire examined 116 root-filled teeth that were extracted because of failure and found that only 8.6% failed for endodontic reasons compared with 59.4% restorative failures and 32% periodontal failures.⁷⁻⁹

The aim of the study was to determine the most common causes of root canal failure in patients who reported to the operative department of AFID (Armed Forces Institute of Dentistry) for retreatment.

METHODOLOGY

This was a cross sectional study to determine the different causes of root canal failure carried out at the operative department of AFID Rawalpindi. The study period was from January 2011 to December 2012.

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After obtaining informed consent, total 200 patients with post endodontic complaints were selected from the OPD of operative department. Patients having complete permanent dentition (13 years and above), teeth with complete root formation and patients with satisfactory oral hygiene were included in the study, while physically and mentally handicapped patients, teeth with vertical root fractures, split crowns, worse fractured teeth / mutilated teeth/ un-restorable teeth, teeth with resorption defects and 3rd Molars were excluded from the study.

Informations regarding the failed cases were collected on a specially designed proforma. The teeth and surrounding tissues were examined for the presence of tenderness, swelling, fracture of crown of tooth or sinus tract. To determine the cause of failure by observing the status of root canal filling or any other abnormality in the root canal system, a well developed radiograph was taken for each case and read under good illumination.

The root filling more than 2 mm short of the radiographic apex was considered under filled while filling that ends beyond the radiographical apex were considered over filled. Any voids or radiolucent space running along the entire of some of the working length of root filling were considered poorly filled while those which were prepared but not filled were defined as unfilled canals and any undesirable deviation from natural canal path was considered ledge. Perforation and separated instruments were also looked for. All these patients were then subjected to re-treatment.

RESULTS

Among 200 patients included in the study, 112 (56%) were males and 88(44%) were females with mean age of 31.24 years(SD \pm 10.1).

In present study the most common cause of root canal failure was found to be underfilled followed by poor lateral condensation and unfilled RCT. The patients presented with different symptoms which are shown in Table 2.

The most common symptom was the tenderness followed by pain, swelling, loss of restoration, sinus formation, mobility which was also documented in study done by Misri khan et al.¹ The involvement of different teeth in the study are shown in figure 2.

DISCUSSION

Worldwide, most controlled studies seem to agree that a lower success rate is associated with overfilled

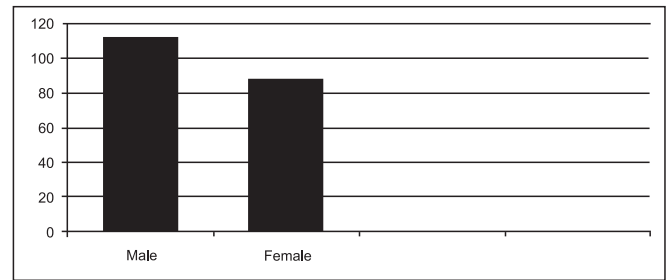


Fig. 1: Gender distribution of patients

TABLE 1: CAUSES FOR ROOT CANAL FAILURE

Reason for RCT failure	No. of patients	%age
Underfilled	84	42
Overfilled	12	6
Poor lateral condensation	44	22
Fractured instrument	8	4
Inadequate coronal restoration	6	3
Unfilled/untreated	40	20
unknown	6	3

TABLE 2: DIFFERENT SYMPTOMS OF PATIENTS

Symptoms	Percent	Number of Patients
Tenderness	74	148
Pain	20	40
Swelling	15	30
Mobility	04	08
Sinus formation	06	12
Loss of restoration	13	26
Split tooth	01	02
Fractured crown	02	04

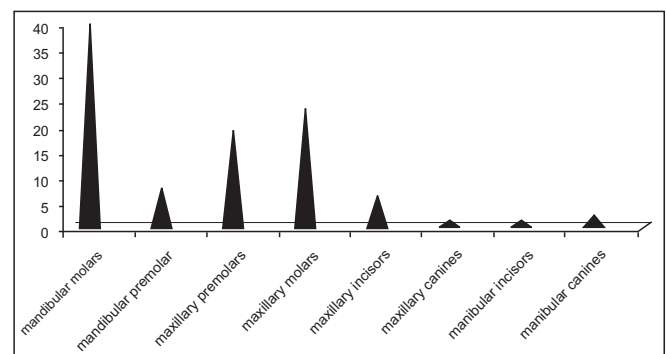


Fig. 2 :Distribution of failed teeth

canals, teeth with preexisting periradicular lesions, and teeth not properly restored after root canal therapy.⁷⁻¹² A Swedish group reported a high failure rate if canals were not totally obturated. Sjögren et al,⁸⁻¹¹ also noted a direct correlation between success and the point of termination of the root filling.⁸ Teeth filled

within 0 to 2 mm from the apex enjoyed a 94% success rate, which fell to 76% if the teeth were overfilled and fell further to 68% if they were filled more than 2 mm short.¹⁶⁻¹⁹ In reported re-treatment of initial endodontic failures, success figures have been unacceptably low. Only 50% of the overfilled teeth were acceptable.^{7-9,11}

The results of present study are consistent with the studies done in Pakistan and abroad.^{1-3,9-12} Similarly, a Japanese group reported a much higher failure rate if root fillings were overextended.⁹⁻¹³ Surprisingly, a Dutch group enjoyed as high a healing rate whether or not the canals were filled. The Dutch report was only a 2-year study. Unfilled canals had not been followed over a long period of time (such as 10 to 20 years).¹² Most endodontically treated teeth should last as long as other teeth. Vire examined 116 root-filled teeth that were extracted because of failure and found that only 8.6% failed for endodontic reasons compared with 59.4% restorative failures and 32% periodontal failures.^{9,15-17}

To see how successful is endodontic therapy, a study was undertaken at the University of Washington School of Dentistry to evaluate endodontically treated teeth to determine their rate of success.⁷ More important to the study, the rate of failure was also established, and the causes of failure were carefully examined.¹⁸ Analysis of the failures led to modifications in technique and treatment.^{1,7-12} A group at Temple University, reported a 95.2% success rate at the end of one year with 458 canals filled by the gutta-percha-euchapercha method.¹¹⁻¹⁴ They found that teeth that started with vital inflamed pulps had more success (98.2%) than teeth with nonvital pulps (93.1%). Contrary to other reports, however, they were far less successful with short-filled canals (71.1%) than with flush-filled or overfilled canals.¹⁵⁻¹⁸ South African researchers enjoyed a success rate similar to that of the Temple University group: 89% success at the end of one year. 6 Also, as with the Temple group, they were successful 92% of the time in teeth filled to the apex and 91% of the time if the canals were overfilled. Filling short of the apex reduced their success rate to 82%.¹⁶⁻²⁰

CONCLUSION

It was concluded that underfilled, unfilled and poor lateral condensation are the most common causes of root canal failure which is commonly seen in both mandibular and maxillary molars and pre molars.

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