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Research Article

**STUDY TO DETERMINE THE CAUSES OF PERFORMING
ROOT CANAL TREATMENT**Dr Muhammad Ali Hassan¹, Dr Arooj Fatima²¹Rawal Institute of Health Sciences, Islamabad²Sharif Medical and Dental College, Lahore

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Abstract:

Aim: The aim of the study was to determine the frequency of various causes of root canal treatment in the Dental Department of Rawal General and Dental Hospital, Islamabad.

Methods: The study was conducted at the Dental Department of Rawal General and Dental Hospital, Islamabad for six-months duration from February 2020 to July 2020. 595 patients who came to the OPD department were selected for the study, regardless of gender. Teeth requiring root canal treatment were carefully assessed on the basis of their vitality, any trauma, prior treatment (if any) and / or deliberate treatment due to some restorative surgery. Socioeconomic status was also noted during the study as it has a significant impact on the patient's oral hygiene.

Results and Conclusion: Of the 595 patients included in the study, pulp necrosis (38.31%) was the most common cause of root canal treatment, followed by irreversible pulpitis (34.28%), targeted root canal treatment (3.36%), trauma (8.40%), failure of root canal treatment (10.92%) and other causes (4.70%).

Key words: Root canal treatment (RCT), Pulp necrosis, Irreversible pulpitis, Failed root canal treatment

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INTRODUCTION:

Information on causes and treatment regimen is essential to understand the disease pattern, the course of previous therapies, determine cost-effectiveness, and develop future amenities based on patients' needs. Pulp damage is caused by tooth decay, infection from an injury, or infection from surgery¹⁻². The main goal of root canal treatment is to make the diseased tooth or tooth root an appropriate functional unit, free from symptoms and biologically compatible. Four factors determine the decision to pursue root canal treatment: availability, rebuild ability, strategic value of the tooth, and overall patient resilience for success³⁻⁴. The most common diagnosis of root canal treatment (56.4%) was dental caries. Various studies have shown that 28% of injured teeth required root canal treatment. Pathological involvement of teeth requiring root canal treatment differs significantly from superficial pulpitis to pulp necrosis⁵⁻⁶.

Boykin et al. Found that the most common reasons for a dental visit for root canal treatment were toothache, abscess and tooth sensitivity, while tooth abscess or toothache was the main cause (s) of root canal treatment. Many teeth appear to develop pulp necrosis without the patient experiencing the pain associated with the pulp⁷. Failure of conventional root canal treatment may be evident either after the patient complains of pain, swelling, tooth movement, or a secretion of sinus, or may be less symptomatic or become apparent on radiographs. Patients were more positive about endodontic treatment, mentioning pain relief, appreciation of better food and self-esteem⁸⁻⁹. Recent changes have allowed root canal treatment to be performed more effectively, with greater precision and greater patient acceptance¹⁰. SeguraEgea et al. In their study showed that control clinical trials of root canal treatment using modern principles yielded favorable results with a healing rate well above 90%. The success of root canal treatment is a public health problem that has medical, economic and ethical implications. Few studies have also been conducted in developing countries to determine the causes and patterns of root canal treatment.

METHODOLOGY:

The study was conducted at the Dental Department of Rawal General and Dental Hospital, Islamabad for six-months duration from February 2020 to July 2020. A total of 595 patients were selected, regardless of their age and gender. The research included necrotic teeth, traumatic teeth in which the trauma exposed the pulp, teeth with irreversible pulpitis, teeth requiring repeated root canal treatment and teeth requiring targeted root canal treatment for reconstruction. Teeth

with periodontal damage, non-strategic teeth and teeth that could be saved through an alternative restoration procedure, e.g. pulp capping was excluded from the study.

Patients were asked to provide a detailed history. The patient's socioeconomic status was recorded as it had a significant impact on the patient's oral health, including oral hygiene, prior dental treatment, and awareness of the need for conservative treatment. They were divided into different socio-economic groups depending on the standard of living and the status of the population. The classification is given as:

- 1) Posh areas – High income group
- 2) Unsettled areas – Low-income group
- 3) Remaining area – Middle income group

The urban population was classified into the traditionally low, medium and high classes on the basis of monthly income, which is presented in Table 1. The main ailment with which the patient came was noted. The onset, duration, intensity, and pain aggravating factors were noted. A thorough clinical examination was conducted. Suspect teeth were clinically examined for any caries. Periapical and occlusal radiographs were performed to examine the extent of caries and the proximity of the pulp tissue.

To check the viability of the suspect tooth, pulp viability tests such as hot test, cold test and electrical pulp test were performed. Percussion tests on the suspect tooth were also performed. In the case of injuries or fractures, the history of the injury and the time since its occurrence were recorded. X-rays were taken to identify any fracture lines along with a clinical examination and the results were recorded. In the case of re-root canal treatment, a detailed history of previous treatment was recorded. X-rays were taken to assess the condition of the tooth. If the prognosis was not good, cases were referred for extraction. Re-root canal treatment was recommended for teeth with a good prognosis. Teeth that required root canal treatment in order to make various dentures were examined and root canal treatment was prescribed as required. The tooth number indicated for root canal treatment was entered on specific proformas. The teeth were divided into four quadrants and labeled upper left (UL) and upper right (UR) for the left and right maxillary quadrants, while the left and right mandibular quadrants were labeled lower left (LL) and lower right (LR). Each quadrant represented the teeth from the middle incisor to the third molar numerically from 1 to 8.

RESULTS:

Information on 595 patients on specific profiles was collected. Of the 595 patients, the majority of 391 patients (65.71%) were male and the remaining 204 (34.28%) were female (Table 2). The age of the patients ranged from 16 to 53 years, with the average being 31.1 years. Following the socioeconomic breakdown, 106 patients were upper-class, 278 middle-class, and 211 lower-class (Fig. 1). The

distribution of causes of root canal treatment is presented in (Fig. 2). In 65 cases indicated for re-treatment, the root canal treatment performed so far was unsuccessful. Of these 65 cases, 35 were due to short-term obstruction, 15 were due to excessive obstruction, and 15 were due to other causes. Another reason was incomplete root canal treatment and a periapical abscess.

TABLE 1: SOCIO-ECONOMIC CLASSIFICATION BASED ON INCOME DISTRIBUTION

Socio-Economic Group	Monthly Income
Low-Income Group	Up to Rs. 5,000/- per person per month
Middle-Income Group	Up to Rs. 12,000 /- per person per month
High-Income Group	More than Rs. 12,000 /per person per month

TABLE 2: GENDER DISTRIBUTION

Gender	Frequency	Percent
Male	391	65.71
Female	204	34.28

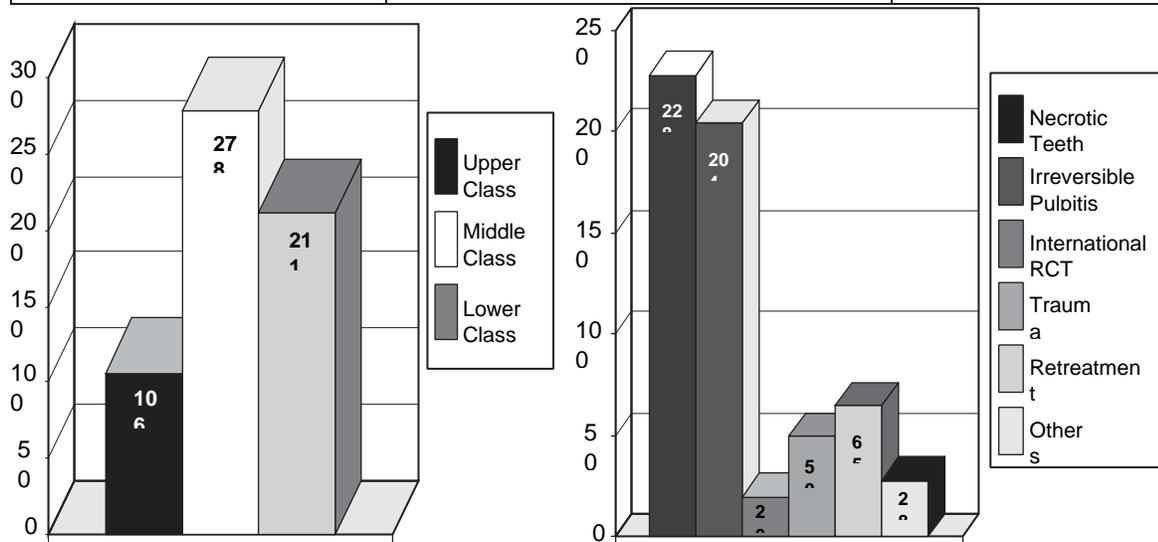


Fig 1: Distribution according to socio-economic status Fig 2: Distribution of Reasons for carrying root canal treatment

The most frequently indicated tooth for root canal treatment was the first molar of the mandible, which was recorded 193 times. Most of the root canals were found in the mandibular arch 382 (64.20%), the remaining 213 (35.79%) were located in the maxillary arch.

DISCUSSION:

This study provided useful information on the various reasons for root canal treatment. The age of the patients ranged from 16 to 53 years. The average age was 31.1 years. This showed that caries, the most common cause of root canal treatment, was more common in the younger age group and there were fewer reports in the upper group. This indicates a known fact that with age the tooth resistance to decay increases and the tooth becomes less prone to decay. This also shows the importance of caries control measures in the younger age group. Emphasis should be placed on the prevention of young teeth¹¹⁻¹². There was no effect of gender. Necrotizing pulp and irreversible pulpitis were the most common causes of root canal treatment. Both are the result of tooth decay. Hence, it was found that tooth decay is the most common cause of root canal treatment. However, when we compare the results with other studies conducted elsewhere, the percentage of tooth decay as a cause is much higher. Ridell and Sundin in their research found that caries is responsible for 56.4% of teeth treated with roots. Another obvious fact is that dental awareness in our population is much lower¹³. In general, the concept of regular dental check-ups is not very common. People don't come to dental clinics or hospitals until they begin to experience symptoms, such as pain or sensitivity. The idea of conservative dentistry, such as prophylactic cleaning, fissure sealing or prophylactic resin fillings, is not very common. This leads to many teeth, which can be prevented with small restorations, often go unnoticed and generally show symptoms when they are close to the exposed pulp. Then the patient comes to the dentist for treatment. Another factor identified in this study was the socioeconomic status of patients. Most of the patients came from middle and lower socioeconomic groups. People with higher incomes are likely to have access to private clinics more than hospitals. Another likely reason might be that higher income groups were aware of routine dental checkups and therefore their number was lower. By comparison, lower- and middle-class people who were less aware or had less exposure to dental treatment were more likely to require RCTs. The reported cases mainly involved front teeth requiring post and core reconstruction due to extensive caries, and endodontic treatment of other healthy teeth was recommended. There were several tooth roots that were indicated for root canal treatment as they were to be used under dentures¹⁴.

Tooth trauma was a significant reason for starting root canal treatment. The unsuccessful root canal treatment involved a significant number of teeth that were indicated for root canal treatment. Most of the failures

in the root canal treatment resulted from a short filling. There was also a high success rate with overcrowding in the presence of earlier apical translucency. The study also showed that the first molar of the mandible was the most frequently indicated tooth for root canal treatment. This was in line with earlier research by Ridell and Sundin. The most likely reason for this was that it is generally the first tooth to erupt in the mouth, hence it was more prone to caries if preventive measures such as sealing the fissures were not taken. The results also showed that the mandibular teeth (64.20%) were more susceptible to caries and thus to root canal treatment, compared to maxillary teeth, which were indicated for root canal treatment in 35.79% of cases. The jaw teeth are more prone to food stagnation on the chewing surfaces than the maxilla teeth. There seems to be little difference morphologically in the cracks and grooves of the teeth in both arches, but carious activity appears to be more pronounced in the mandibular teeth and the results of this study were similar to previous studies. It also points to the fact that preventive measures for molars are very much needed. Careful monitoring of these teeth from an early age during routine dental checkups is extremely important¹⁴⁻¹⁵. The most common traumatic teeth were the front teeth, which included both the mandibular and maxillary teeth. This was probably due to the fact that the front teeth, due to their location, are more susceptible to injuries compared to the other teeth. There is a need to implement effective prophylaxis, patient education and early treatment of carious lesions to reduce the need for root canal treatment. There is also a need to organize adequate monitoring of root canal treatment as part of general dental practice and to continue endodontic continuing education programs.

CONCLUSIONS:

Based on the results of the conducted research, it can be concluded that pulp necrosis and irreversible pulpitis are the main causes of root canal treatment. Both are a continuation of tooth decay. Therefore, tooth decay is the main factor causing root canal treatment. Repetitions were a significant part of the root canal treatment, mainly due to inappropriate techniques used during the procedure.

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