



## Original Research Article

# A retrospective study investigating prevalent diagnosis prompting endodontic treatment in a local North Indian population

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## ABSTRACT

**Background:** Several risk factors, such as dental caries, periodontal disease, and trauma, can affect the dental pulp and lead to pulpitis. The main goal of root canal treatment are to eradicate infections within the canal and prevent future reinfection, creating an environment that supports healing. Endodontic treatment maintains the function of teeth while protecting the patient's overall well-being.

**Aim & Objective:** This study aims to investigate the factors influencing the demand for root canal treatment among patients, with a focus on diagnosis.

**Materials and Methods:** A retrospective review was conducted using hospital records of patients who visited the dental department and underwent root canal treatment between January 2023 and January 2024. Patient records provided information on age, gender, and indications for the treated tooth for endodontic treatment. Data analysis was performed using SPSS 20 software.

**Result:** A total of 2,280 patient records were reviewed, with 35.1% representing male patients and 64.9% female patients. The age range of the patients was 10 and above 60 years while the mean age was 36.26. The association of gender and age was statistically significant with p value of 0.001. The highest incidence of RCT was found in the 31-40 years age group. The commonest indication of RCT was symptomatic irreversible pulpitis.

**Conclusion:** The most prevalent reason for root canal treatment is symptomatic irreversible pulpitis. There is a need for dental awareness among patients so that carious lesions can be treated early. Additionally, educating patients will help prevent dental caries.

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## 1. Introduction

Endodontic treatment, commonly referred to as root canal treatment (RCT), is a highly specialized and technically challenging procedure within the field of restorative dentistry.<sup>1,2</sup> The primary goals of root canal treatment are to eliminate intracanal infections and prevent reinfection by establishing conditions that promote the healing of apical periodontitis.<sup>3</sup> Through biomechanical cleaning, shaping, and disinfection, the root canal system can be prepared for

three-dimensional obturation.<sup>1,4</sup>

The Various risk factors, including dental caries, periodontal diseases, and trauma, can impact the dental pulp cause pulpitis.<sup>1</sup> Pulpitis is an inflammation of the pulpal tissue that may be acute or chronic, with or without symptoms, and reversible or irreversible.<sup>5</sup>

Irreversible pulpitis is diagnosed when it is evident that the dental pulp is unlikely to heal, despite any treatment efforts. The pulp tissue displays a range of acute and chronic inflammatory changes. To provide the patient with lasting relief at this stage, the remaining pulp must be removed, or the tooth must be extracted. A key characteristic of

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irreversible pulpitis is that the pain arises spontaneously and is not triggered by sudden temperature changes. This pain tends to persist for an extended period, typically lasting more than 20 minutes, and may intensify or be triggered when the patient reclines.<sup>5</sup>

When inflammation extends beyond the root canal system into the periodontal ligament space surrounding the root, the patient may experience pain during chewing, percussion, or palpation. This condition, with or without radiographic signs of periapical pathology, is known as symptomatic apical periodontitis (SAP). If the pulp does not react to pulp testing, it typically indicates irreversible pulp damage, leading to pulp necrosis. Without endodontic treatment, necrotic pulp may become infected, resulting in a localized acute apical abscess (LAAA), characterized by pus formation and localized swelling.<sup>6,7</sup> If left untreated, the infection can spread to nearby fascial spaces or lymph nodes, potentially causing systemic symptoms such as fever, chills, malaise, or cellulitis.<sup>6</sup>

Ellis class 3 dental trauma refers to an injury that involves damage to the enamel, dentin, and pulp of the tooth. This type of trauma commonly affects the maxillary anterior teeth.<sup>8</sup> Prompt treatment is essential for an Ellis class 3 fracture because the exposed pulp can result in a loss of pulp vitality.<sup>8,9</sup>

The main objective of dentistry is to help the public preserve healthy, natural dentition teeth. Endodontic treatment aims to preserve the functionality of teeth while safeguarding the patient's overall health.<sup>10</sup>

This study examines the relevance of endodontic treatment patterns in relation to diagnostic incidence, considering associations with age and gender.

## 2. Materials and Methods

A retrospective review was conducted of the hospital records of patients who visited the dental department and had root canal treatment done from January 2023 to January 2024. Demographic data such as Age, Gender, indication for treated tooth for root canals, and tooth treated were retrieved from the patient's records. The data was collected by trained dentist using predesigned pro forma for each patient's record. Medical records that lacked sufficient information were excluded. Ethical clearance for this study was obtained before the commencement of the study. All the collected data were tabulated into Microsoft excel. Data was analyzed using a computer software program, SPSS 20.

## 3. Results

A total of 2280 patient's records were retrieved, out of which 35.1% were males and 64.9% were females (Figure 1). The age range of the patients was 10 and above 60 years while the mean age was 36.26 (Table 1). The commonest indication of RCT was Symptomatic irreversible pulpitis

(Table 2). The association of gender and age was statistically significant with p value of 0.001 (Table 4). The highest incidence of RCT was found in the 31-40 years age group, followed by the 21-30 years age group (Table 3 and Table 5).

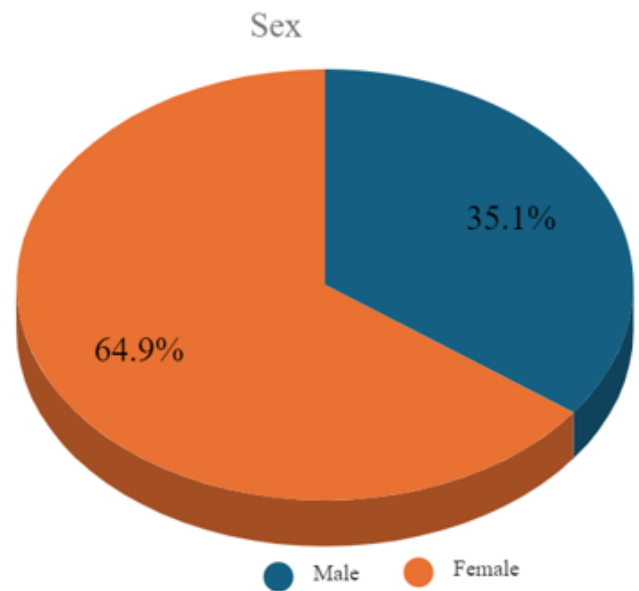


Figure 1: Distribution of patients according to gender

## 4. Discussion

This research analyzed the endodontic procedures conducted in the dental department over a one-year period. It is a retrospective study focusing on the most prevalent endodontic diagnosis that drives patients for endodontic treatment.

In this study, the demand for endodontic treatment was higher among females (64.9%) compared to males (34.1%). The reason for this finding remains unclear and was not specifically evaluated in this study. A similar study conducted by AdenikaololadeAwotile found that 54.5% of females and 45.4% of males opted for endodontic treatment.<sup>1</sup> However, it aligns with the general belief that females tend to be more health-conscious, which may lead them to seek treatment earlier and have cavities treated before they progress to pulpal and periradicular diseases.

The largest proportion of patients receiving endodontic treatment during the study period was in the 31-40 age group (36.1%), followed by the 21-30 age group (25%), and then the 41-50 age group (24%). Another study by Osadolor OO showed the highest age group for endodontic treatment as 20-29 years (39.6%), with the 30-39 age group following at 26.9%.<sup>11</sup> This emphasizes that caries, a primary contributor to dental disease and its complications, is more commonly observed in younger age groups. As a result, prioritizing consistent and effective preventive

**Table 1:** Distribution of patients according to age

<b>Age</b>	10-20	155	6.8%
	21-30	572	25.1%
	31-40	823	36.1%
	41-50	548	24.0%
	51-60	136	6.0%
	>60	46	2.0%
	Total	2280	100.0%
	Mean		36.26
Standard Deviation		10.53	

**Table 2:** Indications of endodontic treatment

<b>Diagnosis</b>	<b>Frequency</b>	<b>Percent</b>
	Asymptomatic apical periodontitis	91
Asymptomatic irreversible pulpitis	14	.6%
Acute apical Abscess	45	2.0%
Condensing osteitis	2	.1%
Symptomatic apical periodontitis	508	22.3%
Symptomatic irreversible pulpitis	1440	63.2%
Chronic apical Abscess	126	5.5%
Ellis class 3 fracture	54	2.4%
Total	2280	100.0%

**Table 3:** Demand for endodontic treatment (according to age and gender)

<b>Age</b>	<b>Sex</b>		<b>Total</b>	<b>Chi-Square</b>	<b>p-value</b>
	<b>Male</b>	<b>Female</b>			
10-20	81 10.1%	74 5.0%	155 6.8%	58.455	.0001**
21-30	203 25.4%	369 24.9%	572 25.1%		
31-40	258 32.3%	565 38.2%	823 36.1%		
41-50	164 20.5%	384 25.9%	548 24.0%		
51-60	64 8.0%	72 4.9%	136 6.0%		
>60	30 3.8%	16 1.1%	46 2.0%		
Total	800 100.0%	1480 100.0%	2280 100.0%		

**Table 4:** Indications for endodontic treatment in different genders

<b>Diagnosis</b>	<b>Sex</b>		<b>Total</b>	<b>Chi-Square</b>	<b>p-value</b>
	<b>Male</b>	<b>Female</b>			
Asymptomatic apical periodontitis	25 3.1%	66 4.5%	91 4.0%	22.391	.002**
Asymptomatic irreversible pulpitis	4 .5%	10 .7%	14 .6%		
Acute apical Abscess	20 2.5%	25 1.7%	45 2.0%		
Condensing osteitis	0 0.0%	2 .1%	2 .1%		
Symptomatic apical periodontitis	173 21.6%	335 22.6%	508 22.3%		
Symptomatic irreversible pulpitis	497 62.1%	943 63.7%	1440 63.2%		
Chronic apical Abscess	48 6.0%	78 5.3%	126 5.5%		
Ellis class 3 fracture	33 4.1%	21 1.4%	54 2.4%		
Total	800 100.0%	1480 100.0%	2280 100.0%		

**Table 5:** Indications for endodontic treatment in different age groups

	Age						Total	Chi-Square	p-value
	10-20	21-30	31-40	41-50	51-60	>60			
Asymptomatic apical periodontitis	2 1.3%	28 4.9%	38 4.6%	13 2.4%	8 5.9%	2 4.3%	91 4.0%	200.395	.0001**
Asymptomatic irreversible pulpitis	1 .6%	4 .7%	5 .6%	3 .5%	1 .7%	0 0.0%	14 .6%		
Acute apical Abscess	3 1.9%	8 1.4%	21 2.6%	13 2.4%	0 0.0%	0 0.0%	45 2.0%		
Condensing osteitis	0 0.0%	0 0.0%	0 0.0%	0 0.0%	2 1.5%	0 0.0%	2 .1%		
Symptomatic apical periodontitis	33 21.3%	132 23.1%	189 23.0%	117 21.4%	22 16.2%	15 32.6%	508 22.3%		
Symptomatic irreversible pulpitis	76 49.0%	352 61.5%	513 62.3%	377 68.8%	93 68.4%	29 63.0%	1440 63.2%		
Chronic apical Abscess	17 11.0%	28 4.9%	50 6.1%	21 3.8%	10 7.4%	0 0.0%	126 5.5%		
Ellis class 3 fracture	23 14.8%	20 3.5%	7 .9%	4 .7%	0 0.0%	0 0.0%	54 2.4%		
Total	155 100.0%	572 100.0%	823 100.0%	548 100.0%	136 100.0%	46 100.0%	2280 100.0%		

measures for children and young adults is essential.<sup>12</sup>

Throughout this study period, there were 91 cases (4.0%) of Asymptomatic apical periodontitis, while 508 cases (22.3%) involved Symptomatic apical periodontitis. Another study by Idon Paul Khodare found 129 cases of acute apical periodontitis and 59 cases of chronic apical periodontitis.<sup>13</sup> A study by AU Umanah reported 76 cases (35.7%) of apical periodontitis.<sup>12</sup> Similarly, research conducted by Md. AsdaqHussain found 141 cases (68.4%) of symptomatic apical periodontitis, while asymptomatic apical periodontitis was observed in 22 cases (10.7%).<sup>14</sup>

In our survey, there were 14 cases of asymptomatic irreversible pulpitis, while symptomatic irreversible pulpitis was observed in 1,440 cases. In another study, Andrea Soledad Sepulueda Perez identified 34.58% cases of irreversible pulpitis.<sup>15</sup> The study done by Rosa Scavo also showed the most frequent diagnosis for endodontic treatment is irreversible pulpitis.<sup>16</sup> AU Umanah's study also reported 46.9% cases of irreversible pulpitis. This could be linked to late patient presentation, as many people tend to seek dental care only when they experience pain or the condition has reached an advanced stage. This emphasizes the critical need for strengthened oral health education and awareness initiatives.<sup>17</sup>

The present study shows 45 cases (2%) of acute periapical abscess, while 126 cases (5.5%) exhibit chronic periapical abscess. Similarly, a study by Md. AsdaqHussain reported 20 cases (9.7%) of chronic periapical abscess and 8 cases (3.9%) of acute periapical abscess.<sup>14</sup> Idon Paul Khodare's study found 13 cases of acute periapical abscess and 19 cases of chronic periapical abscess.<sup>13</sup> The study done Sotunde O.A shows 5.9% cases of periapical abscess.<sup>18</sup> Another study by Chris Noel shows 53.33%

cases of periapical abscess.<sup>19</sup>

In our survey, 54 cases (2.4%) of Ellis class 3 fractures resulting from trauma were recorded during the survey period. A similar study by TaanyaImtiaz reported 65% cases of ellis class 3 fracture involving the dental pulp. Another study by Nivetha G documented 42.6% cases of ellis class3 fracture higher in the young age group,<sup>20</sup> while AU Umanah's research identified 22 cases (10.4%) involving dental pulp trauma.<sup>12</sup>

Geographical restrictions and a smaller sample size are the study's limitations. Larger sample sizes and a more comprehensive geographic focus in future research can aid in improved diagnostic and treatment planning for endodontic procedures.

**5. Conclusion**

The most common indication of root canal treatment is symptomatic irreversible pulpitis. There is a need for dental awareness among patients so that carious lesions can be treated early and also educating patients will help in preventing dental caries.

**6. Conflict of interest**

None

**7. Source of funding**

None

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