



## Original Research Article

## Incidence of root canal treatment in anterior and posterior teeth and its association with the gender and age- A retrospective study

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## ABSTRACT

**Aim:** The objective of this survey is to assess the incidence of root canal treatment in specific teeth and its association with the patient's gender and age.

**Background:** A popular dental operation called root canal therapy (RCT) is used to preserve teeth with damaged or infected pulp. Anterior and posterior teeth have different incidences of RCT due to variations in tooth structure, function, and decay susceptibility. Age and gender can also have an impact on the requirement for RCT, which emphasises how crucial it is to comprehend these trends for improved clinical care.

**Materials and Methods:** The data for the present study was retrieved from the records of the dental department. Data of 2275 patients, out of which 797 were males and 1478 were females. The inclusion criteria for this study consisted of data from patients with teeth that had undergone endodontic treatment. Data collected included age, gender, and the specific tooth number that received endodontic treatment. Data was analyzed using a computer software program, SPSS 20.

**Result:** In this study, the majority of patients receiving endodontic treatment were between the ages of 31 to 40, accounting for 36% of the cases. The mandibular first molar was the most commonly treated tooth for root canal procedures, followed by the mandibular second molar. When gender and tooth count were correlated, the mandibular first molar underwent root canal therapy the most frequently in both genders.

**Conclusion:** The majority of patients getting root canal therapy were females, with mandibular first molars being the most common teeth for both genders.

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## 1. Introduction

Dental Caries commonness has expanded over the most recent forty years.<sup>1,2</sup> If the cariogenic climate persists in the oral cavity, the recently ejected long-lasting teeth might get decayed.<sup>1,3</sup> If left untreated, an infection in the dental pulp is likely to develop over time.<sup>1,4</sup>

Epidemiological studies that provide comprehensive documentation of dental health records have been instrumental in enhancing the understanding of the

incidence and distribution of individuals requiring endodontic treatment within a specific population.<sup>5</sup> Epidemiology involves the study of diseases that impact a community or population as a whole, rather than focusing on individual cases.<sup>5,6</sup>

Endodontic treatment involves various procedures aimed at repairing and addressing issues in a tooth with damaged or exposed pulp, as well as treating conditions affecting the periapical tissues. This treatment also covers situations where the tooth's pulp is severely damaged due to trauma or infection, necessitating its removal. When this procedure is required, the tooth must be sealed at the root, allowing it to

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maintain structural functionality.

Endodontic treatment aims to achieve the main objectives:

1. (a) To ensure a clean root canal by minimizing bacterial presence to a level that prevents pathological effects.
2. (b) Sealing the root at the apex blocks fluid entry, which could otherwise feed any lingering bacteria in the root canal. This barrier also prevents irritants from escaping into the periapical tissues.
3. (c) To establish a coronal seal that protects the pulp chamber from being re-contaminated by oral bacteria from the mouth.<sup>7,8</sup>

Root canals are intricate 3D structures with unique anatomical variations, making each one distinct. Ensuring a 3D obturation with thorough coronal, lateral, and apical seals is crucial for long-term success.<sup>9</sup>

It has been suggested that data on the indications and patterns of root canal treatment are essential for understanding disease trends, which aids in developing effective preventive and management strategies. This information also improves the understanding of common oral health issues across different gender and age groups.<sup>10,11</sup>

Several factors impact success rates, with patient age being particularly significant. Research shows that older patients generally experience higher failure rates than younger patients. This is also linked to the higher prevalence of periodontal disease in older adults, which can lead to bone loss around teeth and may eventually result in the extraction of the endodontically treated tooth.<sup>7</sup>

Hence the aim of the study is to evaluate the frequency of root canal treatments in particular teeth and analyze its correlation with the patient's gender and age.

## 2. Materials and Methods

The data for the present study was retrieved from the records of the dental department from December 2022 to May 2024. Data of 2275 patients, out of which 797 were males and 1478 were females. Ethical clearance was obtained. Medical records that lacked sufficient information were excluded.

For the present study, inclusion criteria were data of patients with endodontically treated teeth. Age, gender, and tooth number with endodontic treatment were the data collected. Microsoft Excel was used to tabulate all of the collected data. Data was analyzed using a computer software program, SPSS 20.

## 3. Results

In our study, the majority of the patients undergoing endodontic treatment were between 31-40 years of age (36%) (Table 3). The most common tooth to undergo root

canal treatment was mandibular first molar followed by mandibular second molar (Table 1). When gender and tooth count were correlated, the mandibular first molar underwent root canal therapy the most frequently in both genders (Table 2).

## 4. Discussion

Endodontic treatment is performed by practitioners to save a tooth that has experienced some form of pulp damage. This encompasses situations where the damage affects the periradicular tissues as well. It is performed because retaining natural teeth is crucial for ensuring the complete function of the dentition, along with the health benefits that come from having a fully functional set of teeth.<sup>7</sup>

Our study indicates that there were 1,478 female cases, which is slightly higher than the number of male patients that is 797 required endodontic treatment. A similar study conducted by Aditya Jain reported that 50.91% of the patients were female, while 49.09% were male who required endodontic treatment.<sup>1</sup> The same study conducted by Augusto César Braz Hollanda shows 61.9% of female cases whereas 38.1% of male patients.<sup>12</sup> However, the similar study done by Blake E Wayman shows high number of male patients than female patients (1958 male patients and 1392 female patients).<sup>13</sup> Research suggests that females tend to be more conscious of their breath and overall oral health, which likely makes them more proactive and motivated to seek oral healthcare services.<sup>1,12</sup>

Most patients, representing 36%, fell within the 31-40 age group, indicating a high incidence of endodontic treatment among this demographic survey. According to a survey conducted by Patro, individuals in the 35-44 age group exhibit a high incidence of dental caries, with 82.4% of participants affected.<sup>14</sup> A study conducted by Ogini AO reveals that individuals aged 17-34 have a greater need for dental treatment.<sup>15</sup> A similar survey conducted by TH Farrell indicated that individuals aged 21-30 had a higher prevalence of endodontic treatment.<sup>16</sup> Our findings align with those of Awotile et al., indicating a 24.1% incidence rate among individuals aged 30-39.<sup>17</sup>

According to our study, the mandibular first molar showed the highest incidence of endodontic treatment, with 564 cases, accounting for 47.8%. This was followed by the mandibular second molar, which had 385 cases, representing 32.6% of the individuals. The study done by Rosa Scavo shows right mandibular first molar high incidence 89 cases i.e. 9.12% whereas left mandibular second molar shows 65 cases i.e. 6.66% cases.<sup>5</sup> Survey done by Md.Asda Hussain also show higher incidence mandibular first molars i.e. 43.7% followed by mandibular second molar i.e. 26% for endodontic treatment.<sup>18</sup> The mandibular first molar is likely the most vulnerable to caries because it is the first tooth to erupt in the oral cavity. Additionally, mandibular molars tend to experience

**Table 1:** Table showing distribution of patients based on endodontically treated teeth

		Frequency	Percent
Maxillary Tooth-Anterior	Canine	65	27.5%
	Central Incisor	86	36.4%
	Lateral Incisor	85	36.0%
	Total	236	100.0%
Maxillary Tooth-Posterior	First premolar	110	14.2%
	First molar	309	39.9%
	Second premolar	149	19.3%
	Second molar	204	26.4%
	Third molar	2	.3%
	Total	774	100.0%
Mandibular Tooth-Anterior	Canine	34	40.0%
	Central Incisor	36	42.4%
	Lateral Incisor	15	17.6%
	Total	85	100.0%
Mandibular Tooth-Posterior	First premolar	65	5.5%
	First molar	564	47.8%
	Second premolar	166	14.1%
	Second molar	385	32.6%
	Third molar	0	0.0%
	Total	1180	100.0%

**Table 2:** Table showing association of gender with endodontically treated teeth

		Male		Sex Female		Total		Chi-Square	p-value
Maxillary Tooth-Anterior	Canine	27	30.3%	38	25.9%	65	27.5%	1.350	.509
	Central Incisor	34	38.2%	52	35.4%	86	36.4%		
	Lateral Incisor	28	31.5%	57	38.8%	85	36.0%		
	Total	89	100.0%	147	100.0%	236	100.0%		
Maxillary Tooth-Posterior	First premolar	34	13.6%	76	14.5%	110	14.2%	2.192	0.7
	First molar	102	40.8%	207	39.5%	309	39.9%		
	Second premolar	42	16.8%	107	20.4%	149	19.3%		
	Second molar	71	28.4%	133	25.4%	204	26.4%		
	Third molar	1	.4%	1	.2%	2	.3%		
	Total	250	100.0%	524	100.0%	774	100.0%		
Mandibular Tooth-Anterior	Canine	10	32.3%	24	44.4%	34	40.0%	1.783	.410
	Central Incisor	16	51.6%	20	37.0%	36	42.4%		
	Lateral Incisor	5	16.1%	10	18.5%	15	17.6%		
	Total	31	100.0%	54	100.0%	85	100.0%		
Mandibular Tooth-Posterior	First premolar	17	4.0%	48	6.4%	65	5.5%	5.933	0.115
	First molar	208	48.7%	356	47.3%	564	47.8%		
	Second premolar	52	12.2%	114	15.1%	166	14.1%		
	Second molar	150	35.1%	235	31.2%	385	32.6%		
	Third molar	0	0.0%	0	0.0%	0	0.0%		
	Total	427	100.0%	753	100.0%	1180	100.0%		

Table 3: Table showing association of age with endodontically treated teeth

		Age										Total	Chi-Square	p-value			
		10-20		21-30		31-40		41-50		51-60					>60		
Maxillary Tooth-Anterior	Canine	3	7.0%	18	25.0%	19	35.2%	24	48.0%	1	10.0%	0	0.0%	65	27.5%	45.408	.0001**
	Central Incisor	26	60.5%	34	47.2%	12	22.2%	6	12.0%	6	60.0%	2	28.6%	86	36.4%		
	Lateral Incisor	14	32.6%	20	27.8%	23	42.6%	20	40.0%	3	30.0%	5	71.4%	85	36.0%		
	Total	43	100.0%	72	100.0%	54	100.0%	50	100.0%	10	100.0%	7	100.0%	236	100.0%		
	First premolar	2	6.7%	30	16.0%	49	16.2%	21	11.7%	7	10.6%	1	14.3%	110	14.2%	19.141	0.513
Maxillary Tooth-Posterior	First molar	16	53.3%	78	41.5%	117	38.6%	72	40.0%	26	39.4%	0	0.0%	309	39.9%		
	Second premolar	4	13.3%	37	19.7%	59	19.5%	30	16.7%	16	24.2%	3	42.9%	149	19.3%		
	Second molar	8	26.7%	43	22.9%	76	25.1%	57	31.7%	17	25.8%	3	42.9%	204	26.4%		
	Third molar	0	0.0%	0	0.0%	2	.7%	0	0.0%	0	0.0%	0	0.0%	2	.3%		
	Total	30	100.0%	188	100.0%	303	100.0%	180	100.0%	66	100.0%	7	100.0%	774	100.0%		
Mandibular Tooth-Anterior	Canine	0	0.0%	9	50.0%	13	35.1%	8	61.5%	1	50.0%	3	37.5%	34	40.0%	12.785	0.236
	Central Incisor	4	57.1%	6	33.3%	19	51.4%	3	23.1%	0	0.0%	4	50.0%	36	42.4%		
	Lateral Incisor	3	42.9%	3	16.7%	5	13.5%	2	15.4%	1	50.0%	1	12.5%	15	17.6%		
	Total	7	100.0%	18	100.0%	37	100.0%	13	100.0%	2	100.0%	8	100.0%	85	100.0%		
	First premolar	3	4.1%	13	4.4%	25	5.9%	17	5.6%	4	6.9%	3	12.5%	65	5.5%	42.088	.0001**
Mandibular Tooth-Posterior	First molar	52	70.3%	153	51.9%	191	45.0%	135	44.3%	22	37.9%	11	45.8%	564	47.8%		
	Second premolar	4	5.4%	27	9.2%	71	16.7%	43	14.1%	14	24.1%	7	29.2%	166	14.1%		
	Second molar	15	20.3%	102	34.6%	137	32.3%	110	36.1%	18	31.0%	3	12.5%	385	32.6%		
	Third molar	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%		
	Total	74	100.0%	295	100.0%	424	100.0%	305	100.0%	58	100.0%	24	100.0%	1180	100.0%		

greater food stagnation compared to maxillary molars. This highlights the critical importance of implementing preventive measures specifically for lower molars.<sup>19</sup>

According to a survey, mandibular teeth undergo endodontic treatment more often (55.6%) than maxillary teeth (44.3%). In contrast, a survey by ARS Al-Nergrish shows that maxillary teeth are more frequently treated with endodontic procedures (77.7%) compared to mandibular teeth (22.3%).<sup>20</sup> Krystyna Pietrzyckamore also show mandibular teeth preserved more (average 9.26 teeth) than in the maxilla (average 7.88 teeth).<sup>21</sup> This may be attributed to aesthetic concerns, as upper teeth are more noticeable than lower teeth when smiling. Consequently, patients often prioritize maintaining the appearance of their upper teeth.<sup>1</sup>

## 5. Conclusion

Majority of the patients undergoing root canal treatment were females and mandibular first molars were the most common teeth to undergo root canal treatment among both the genders.

## 6. Source of Funding

None.

### 6.1. Conflict of Interest

None.

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