ATTAHADI MED J. 2025;2(4):408-417
https://doi.org/10.69667/amj.25411

Original article

CBCT Assessment of Root Canal Number in Maxillary Third Molars: A Retrospective Study in a Libyan Subpopulation (Zliten City)

A Alaali Ehbesh[1]*, Mohamed Attir[2], Ahmed Alteer[3]

[1]*Department of Conservative Dentistry, Endodontics, Dental Anatomy & Oral Histology, Faculty of Dentistry and Oral Surgery, Alasmarya Islamic University. Zliten, Libya*
[2]*German Board of Oral Implantology (GBOI), Middle East Branch, Jordan*
[3]*Faculty of Dentistry, University International Orthodontic Program, Cairo, Egypt*
***Correspondence**. aalaali.ehbesh@asmarya.edu.ly*

***Keywords**:*
Number of Root Canals, Cone Beam Tomography, Upper Third Molar, Libyan Subpopulation, Zliten.

ABSTRACT

This study aims to evaluate the number of roots of maxillary third molar teeth of the Libyan subpopulation at Zliten city, to compare the incidence of root number in different side locations, and to compare the prevalence of root number in different genders. Out of 2078 CBCT images, only 806 images that had been met the inclusion criteria of this study (the CBCT images were collected from Al-Tasneem Private Dental Poly-Clinics in Zliten city during the period January 2024 until May 2025). 432 (53.6%) of CBCT images were related to women, whereas 374 (46.4%) images were related to men. On another hand, 425 (52.7%) were right-sided teeth, while 381 (47.3%) were left-sided teeth. 367(45.5%) of CBCT images showed four root canals, which were the most common number of root canals of maxillary third molar teeth in the Libyan subpopulation at Zliten city, while five root canals were the lowest incidence. The incidences of single root canals and double root canals were higher in women than in men. Inversely, the prevalence of three and five root canals in men was higher than the women. The incidences of four root canals were almost equal in women and men (45.8% and 45.2% respectively). The incidences of all numbers of root canals were not significantly different based on tooth locations. The root canals of maxillary third molar teeth in the Libyan subpopulation at Zliten city ranged between 1 to 5 root canals. None of the five root canals had bilateral incidences.

Introduction

Cantatore et al had reported that it is difficult for general dentists to deal with untreated root canals due to the diversity of signs and symptoms and complicated treatment. The authors also stated that the detection and treatment of untreated anatomy frequently result in complete recovery clinically and radiographically [1]. Farman et al stated the success of endodontic treatment based on recognition of all root canals in the tooth by radiation as part of clinical assessment [2]. Giudice et al concluded that the demonstrated significant proportion of endodontic clues obtained through Cone beam tomography (CBCT) images do not appear in the associated intraoral radiograph [3].

Patel et al stated that the use of CBCT may suggest getting more details of the challenging morphology of root canals [4]. The authors also reported that the CBCT is a diagnostic tool in retreatment cases, the CBCT images deliver supplementary evidence than periapical radiographs, which may subsequently influence on treatment strategy of challenging retreatment cases [4]. In addition to that, Bueno et al stated that the detection of additional root canals based on the technique of handling CBCT images [5].

Methods

2078 CBCT images were collected from Al-Tasneem Private Dental Poly-Clinics in Zliten city during the period from January 2024 until May 2025; only 806 CBCT images met the inclusion criteria of this study, while 1272 CBCT images were excluded due to various reasons, which are illustrated in Figures 1(a) &1(b). The sample of this study were similar to our previous study under the following title " Roots Quantity of Maxillary Wisdom Teeth of Libyan Subpopulation at Zliten City Using CBCT; A retrospective study", in beginning it was single article include root and root canal of maxillary third molar but because the limited word permitted in original, we had decided to spilt them to two articles. The distribution's current study sample size is demonstrated in (Table 4 and Figure 2).

After selecting the CBCT image that met the inclusion criteria of this study, the CBCT images were displayed on a 32-inch TV linked to a PC in a dark room. The assessment was done independently by two examiners by scrolling the images in all three planes (i.e, axial, coronal, and sagittal planes). Five CBCT images were limited to each assessment time, then each examiner had a 5-minute break before assessing another five CBCT images.

***Received**: 31-10-2025 - **Accepted**: 02-12-2025 - **Published**: 07-12-2025*

ATTAHADI MED J. 2025;2(4):408-417
https://doi.org/10.69667/amj.25411

Table 1. Previous Studies illustrated the Number of Root Canals of Maxillary Third molars teeth

Author(s)	Year	Method	Sample	Country	Number of root canals (s) of Maxillary Third Molar					
					1	2	3	4	5	6
Stropko	1999	Clinical	25	USA	-	20%	60%	20%	-	-
Weng et al.,	2009	In Vitro	43	China	27.9%	11.6%	44.2%	16.3%	-	-
Faramarzi et al.,	2013	In Vitro	179	Iran	12.84%	10.61%	68.71%	8.93%	-	-
Ćosić et al.,	2013	In Vitro	56	Croatia	7.1%	7.1%	75.1%	10.7%	-	-
Singh & Pawar	2015	In Vitro	100	India	19%	33%	43%	5%	-	-
Ahmad et al.,	2016	In Vitro	49	Jordan	9%	6.7%	55.1%	27%	2.2%	-
Rawtiya et al., *	2016	CBCT	116	India	19%	-	37.9%	24.1%	3.4%	-
Razumova et al.,	2018	CBCT	238	Russia	13.8%	11.8%	72.3%	2.1%	-	-
Tomaszewska et al.,	2018	Micro-CT, Vitro	78	Poland	23.1%	15.4%	46.1%	15.4%	-	-
Rehman et al.,	2022	Clinical	100	Pakistan	44%	12%	30%	14%	-	-
Al-Qudah et al.,	2023	In Vitro	592	Jordan	5.91%	11.48%	52.36%	28.2%	2.03%	-
Gil et al.,	2024	Systematic Review	1070	Worldwide	8.97%	12.52%	52.71%	23.83%	1.87%	0.09%
Awais et al.,	2025	CBCT	39	Pakistan	12.8%	5.1%	76.9%	5.15	-	-

** Root canal incidence percentages as shown in the study.*

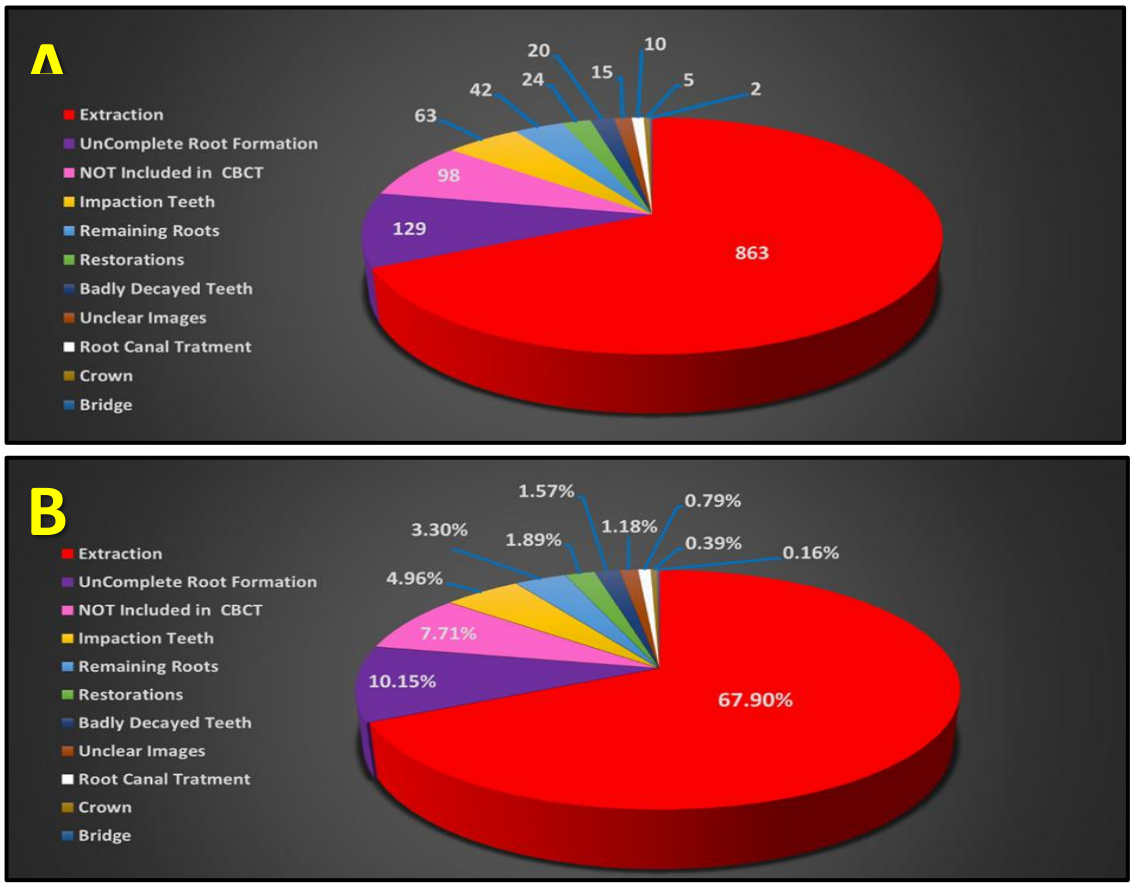


Figure 1. 1(A). Displayed the number of teeth that had been excluded in the current study. 1(B): Displayed the percentages of teeth that had been excluded in the current study.

Eligibility criteria

The study included patients of Libyan nationality who had available cone beam computed tomography (CBCT) images of maxillary third molars. Only teeth with complete root formation were considered, and the

***Received**: 31-10-2025 - **Accepted**: 02-12-2025 - **Published**: 07-12-2025*

ATTAHADI MED J. 2025;2(4):408-417
https://doi.org/10.69667/amj.25411

CBCT images had to be sufficiently clear for evaluation. Eligible images were those obtained between January 2024 and May 2025. Patients who were not of Libyan nationality were excluded from the study. Teeth with incomplete root formation, indistinguishable CBCT images, or those that had undergone restorative, endodontic, or prosthetic procedures were not considered. Additionally, maxillary third molars that were badly decayed, exhibited root resorption, or contained pulp stones or calcifications were excluded from the analysis.

Statistical Analysis

Using SPSS version 20 for Windows (IBM Corp., Chicago, IL, USA), descriptive statistical analysis was carried out to assess the number of root canals in maxillary third molar teeth and compare the prevalences based on the following categories: tooth position and patient gender. The overall distribution of numbers of root canals demonstrated no statistically significant asymmetry between the right and left sides ($x^2 = 2.475$, $p = 0.649$). This symmetrical pattern was consistent within each gender group, with no significant differences found between sides for males ($x^2 = 0.364$, $p = 0.985$) or females ($x^2 = 5.668$, $p = 0.225$) when analyzed separately. The Chi-Square test revealed no statistically significant difference, confirming that the number of root canal distributions is symmetrical between sides. The Kappa test was used to assess inter-rater agreement between the two examiners for root canal evaluations. The Kappa value of 0.73 indicated substantial agreement, which was statistically significant ($p < 0.001$). This demonstrates high reliability and consistency in the assessment methodology between both examiners, as illustrated in (Table 2).

Table 2. Inter-rater Reliability between First and Second Examiners

Reliability Measure	Value	p-value	Strength of Agreement
Kappa Coefficient	0.73	< 0.001	Substantial
Sample Size (N)	40	-	

Results

With 45.5% (367 out of 806), four root canals were the most common incidence of root canals of maxillary third molar teeth, followed by three root canals with 39.7% (320 out of 806). The lowest incidences of root canals were five root canals with 0.37% (3 out of 806). The prevalences of single and double root canals were almost equal (7.3% and 7.1% respectively), as illustrated in (Figure 3). The examples of four, three, and five root canals are shown in Figures 4, 5 & 6, respectively.

Table 3. Distribution of sample size based on Gender, Teeth location & CBCT type

Gender				Teeth Location				CBCT Type						Total	
Men		Women		Right		Left		Full		60*60		80*90			
N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%
374	46.4%	432	53.6%	425	52.7%	381	47.3%	720	89.3%	51	6.3%	35	4.3%	806	100%

The incidences of double and three root canals were slightly higher on the right sides than left sides, and the frequencies of single, four, and five root canals were slightly higher on the left sides than right sides, as illustrated in (Table 4).

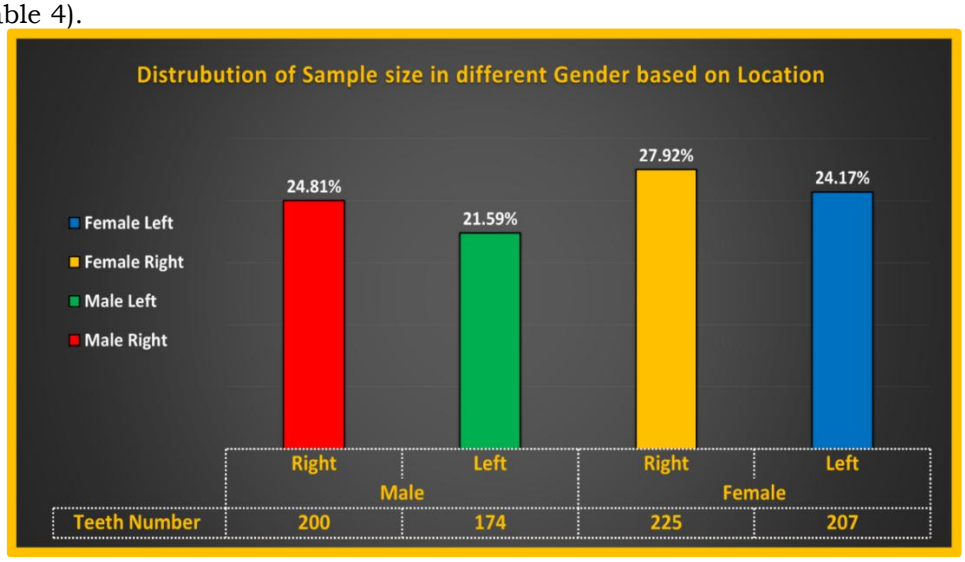


Figure 2. Distribution of sample size based on Gender and Tooth locations

Received: 31-10-2025 - **Accepted**: 02-12-2025 - **Published**: 07-12-2025

ATTAHADI MED J. 2025;2(4):408-417
https://doi.org/10.69667/amj.25411

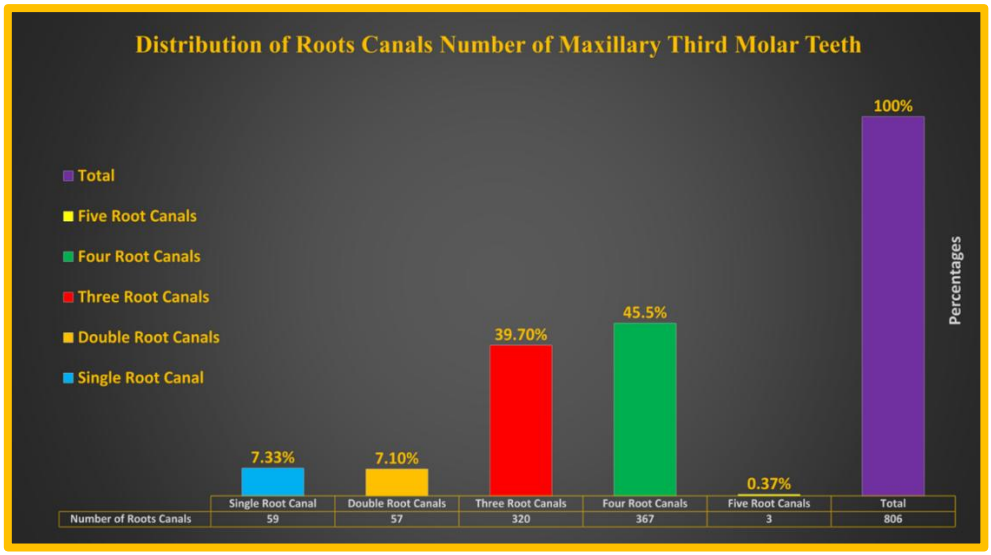


Figure 3. Distribution of Roots Canals Number of Maxillary Third Molar Teeth

Table 4. Distribution of Root Canal(s) Number of Maxillary Third Molar Based on Tooth Locations

Number of Root Canals	Right Side		Left Side		Chi-square statistic	P-value
	N	%	N	%		
One canal	28	6.59%	31	8.14%	2.475	0.649
Two canals	34	8%	23	6.04%		
Three canals	172	40.47%	148	38.85%		
Four canals	190	44.71%	177	46.46%		
Five canals	1	0.24%	2	0.52%		

The incidences of single root canals and double root canals were higher in women than in men. Inversely, the prevalence of three and five root canals in men was higher than the women**.** The incidences of four root canals were almost equal in women and men, as shown in (Table 5).

Table 5. Distribution of Number of Root Canal(s) of Maxillary Third Molar Based on Gender

Gender	One Root Canal		Two Root Canals		Three Root Canals		Four Root Canals		Five Root Canals	
	N	%	N	%	N	%	N	%	N	%
Women	37	62.7%	32	56.1%	164	38%	198	45.8%	1	33.3%
Men	22	37.3%	25	43.9%	156	41.7%	169	45.2%	2	66.7%
Total	59	7.3%	57	7.1%	320	39.7%	367	45.5	3	0.40%

In women, the occurrences of single root canals were higher on the left sides than the right sides, while the incidences of four and five root canals were slightly higher on the left sides than the right sides, as shown in (Table 6). In contrast to that, double and three root canals in men were higher frequencies on the right sides than the left sides.

Table 6. Number of Root Canals of Maxillary Third Molar Based on Gender and Teeth Location

Gender		One Root Canal		Two Root Canals		Three Root Canals		Four Root Canals		Five Root Canals		Chi-square statistic	P-value
		N	%	N	%	N	%	N	%	N	%		
Men	Left	9	5.2%	12	6.9%	72	41.4%	80	46%	1	0.57%	0.364	0.985
	Right	13	6.5%	13	6.5%	84	42%	89	44.5%	1	0.50%		
Women	Left	22	10.6%	11	5.3%	76	36.7%	97	46.9%	1	0.48%	5.668	0.225
	Right	15	6.7%	21	9.3%	88	39.1%	101	44.9%	0	0%		
Total		59	7.3%	57	7.1%	320	39.7%	367	45.5%	3	0.37%		

The incidences of single root canals on the right sides of men were slightly higher than on the left sides. Dissimilarly to that, the incidences of four root canals on the left sides of men were slightly higher than right sides. In the hand, the incidences of double, three, and five root canals were almost equal in both sides, as

Received*: 31-10-2025 -* ***Accepted****: 02-12-2025 -* ***Published****: 07-12-2025*

ATTAHADI MED J. 2025;2(4):408-417
https://doi.org/10.69667/amj.25411

displayed in (Table 6). The incidences of single root canals on the left sides in women were higher than the left sides in men, whereas the frequencies of double root canals in the left sides in men were slightly higher than the left sides in women, as shown in (Table 6). On another hand, the frequencies of three root canals on the left sides in men were higher than the left sides in women, while the incidences of four and five root canals were almost equal in the left sides in both genders. The incidences of single and four root canals on the right sides were almost equal in both genders, while the incidences of double root canals on the right sides in women were higher than right sides in men. Dissimilarly, the incidences of three and five root canals on the right sides in men were slightly higher than right sides in women, as shown in (Table 6).

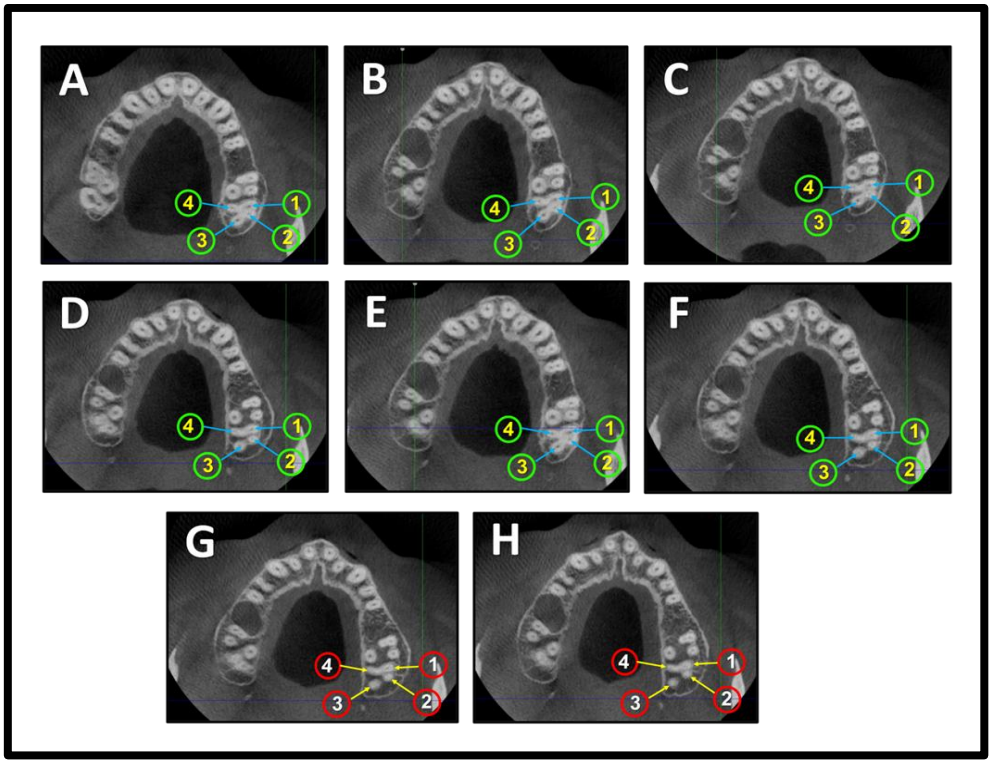


Figure 4. (A -F) Full CBCT images illustrated a scrolling left maxillary third molar tooth with four roots and four root canals. Images G&H images showed the apical part of the same tooth with four roots

.

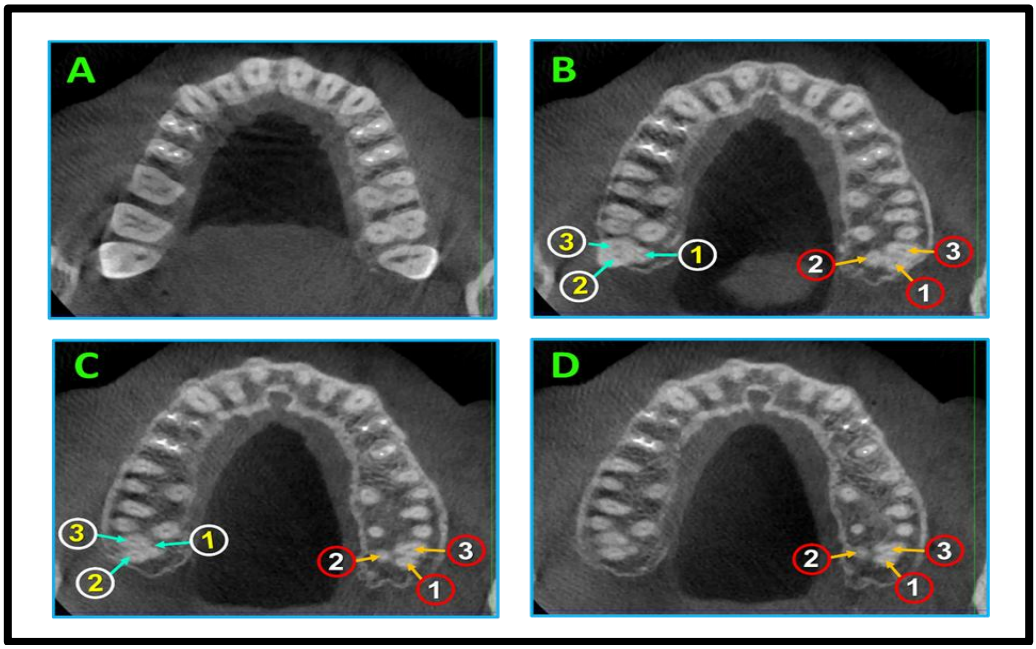
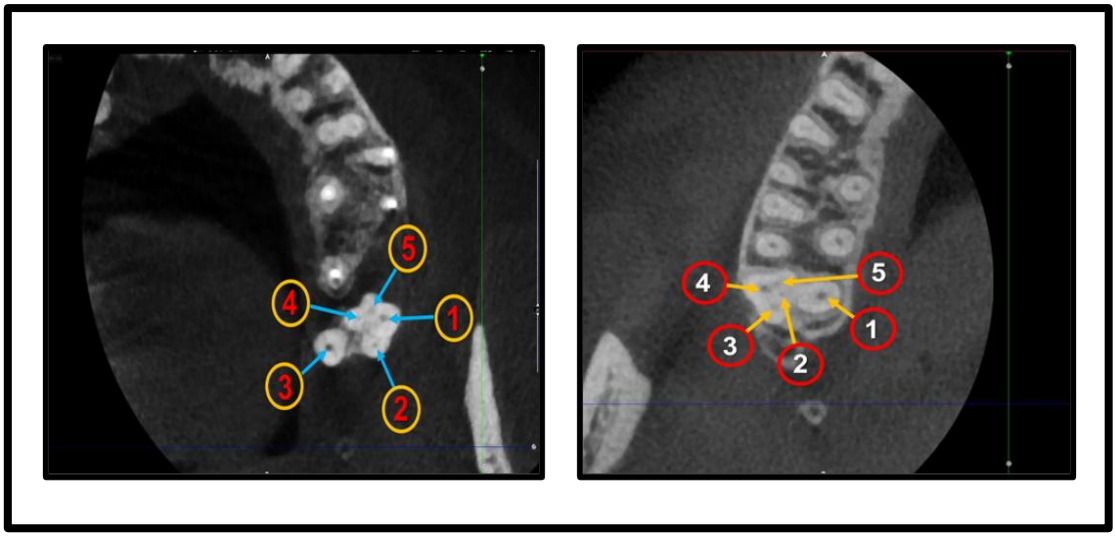


Figure 5. (A-D): Scrolling a Full CBCT Image from coronal to apical part of right and left side maxillary third molar with three root canals.

Received: 31-10-2025 - **Accepted**: 02-12-2025 - **Published**: 07-12-2025

ATTAHADI MED J. 2025;2(4):408-417
https://doi.org/10.69667/amj.25411



(A) (B)

Figure 6. (A); Left side Maxillary third molar tooth had 5 root canals; (B): Right side Maxillary third molar tooth had 5 root canals

None of the five root canals had bilateral incidences. In contrast to that, the three root canals had the highest total bilaterally incidences, whereas the total bilaterally incidences of single root canals were the lowest incidences, as demonstrated in (Table 7). The bilateral incidences of single and four root canals in women were higher than in men, while the bilateral prevalences of three root canals in women were slightly higher than in men. Dissimilarly, the frequency of two root canals was higher in men than in women, as shown in (Table 7).

Table 7. Bilateral Incidences of Number of Root Canals

Bilateral Incidences	**One Root Canal**		**Two Root Canals**		**Three Root Canals**		**Four Root Canals**		**Five Root Canals**	
	N	**%**	**N**	**%**	**N**	**%**	**N**	**%**	**N**	**%**
Bilateral Incidences in Men	4	40%	7	58.3%	39	48.8%	37	44.1%	0	0%
Bilateral Incidences in Women	6	60%	5	41.6%	41	51.2%	47	55.9%	0	0%
Total Bilateral Incidences	10	16.9%	12	21.1%	80	25%	84	22.9%	0	0%
Total Incidences of Root Canal(s)	59	7.3%	57	7.1%	320	39.7%	367	45.5%	3	0.4%

The most common bilateral incidences in women were three root canals at 25%, while the double root canals were the lowest bilateral incidences, as shown in (Table 8).

Table 8. Bilateral Incidences of Number of Root Canals Based on Gender

Bilateral Incidences	**One Root Canal**		**Two Root Canals**		**Three Root Canals**		**Four Root Canals**		**Five Root Canals**	
	N	**%**	**N**	**%**	**N**	**%**	**N**	**%**	**N**	**%**
Bilateral Incidences in Men	4	18.2%	7	28%	39	25%	37	21.9%	0	0%
Total Incidences in Men	22	37.3%	25	43.9%	156	48.7%	169	46.1%	2	66.7%
Bilateral Incidences in Women	6	16.2%	5	15.6%	41	25%	47	23.7%	0	0%
Total Incidences in Women	37	62.7%	32	56.1%	164	51.2%	198	53.9%	1	33.3%
Total Incidences of Root Canal(s)	59	7.3%	57	7.1%	320	39.7%	367	45.5%	3	0.4%

Figure 7 shows the number of root canals of the upper left second premolar and upper maxillary molar teeth in a 60*60 CBCT image in the current study.

Received*: 31-10-2025 -* ***Accepted****: 02-12-2025 -* ***Published****: 07-12-2025*

ATTAHADI MED J. 2025;2(4):408-417
https://doi.org/10.69667/amj.25411

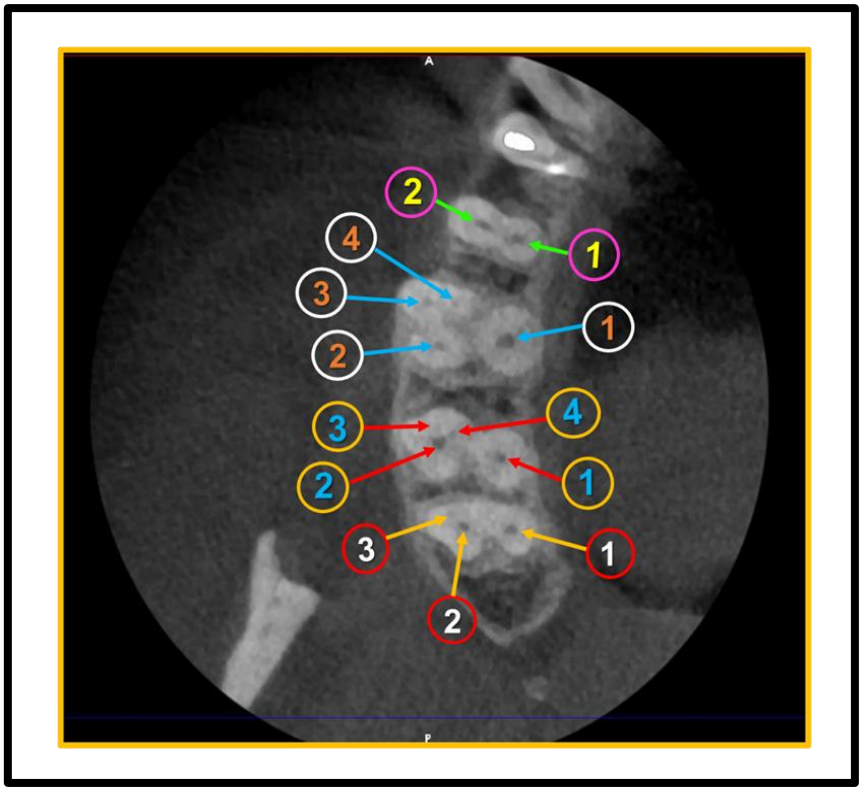


Figure 7. Coronal View of Right-sided sectional 60*60 CBCT image showing: Maxillary third molar with 3 root canals; Maxillary second molar with 4 root canals; Maxillary first molar with 4 root canals; Maxillary second premolar with 2 root canals

The most common bilateral incidences in men were two root canals at 28%, whereas the bilaterally incidences of single root canal were the lowest bilaterally incidences, as illustrated in (Table 8). The bilateral frequencies of single root canals in men were slightly higher in women, while the bilateral occurrences of double root canals in men were slightly higher in women, as illustrated in (Table 8). In contrast to that, the bilateral frequencies of four root canals in women were slightly higher in men. On the other hand, both genders had equal bilateral incidences of three root canals at 25%. Figure 8 shows right and left maxillary third molar teeth with a single root canal.

Discussion

The root canals of maxillary third molars in some previous studies [11,12,16] ranged between 1 to 5 canals, which resembles our result in this study. Whereas in a systematic review done by Gil et al, and in a study done by Sidow et al, the root canals ranged between 1 to 6 canals [17,19]. Many previous studies found that maxillary third molars had root canals that ranged between 1 to 4 canals [6-18]. In the current study, at 45.5% four root canals were the most common incidence of root canals, whereas the three root canals had the second highest incidence at 39.70%. However, the most common prevalence number of root canal in most previous studies that abovementioned in (Table 1) were three root canals [6-18]. In addition to that, in a systematic review done by Olczyk et al, the authors found that the three root canals were the most common incidences among different numbers of root canals [20]. While in study done by Rehman et al, the most common number of root canal incidence was single root canal [15].

Also, the lowest number of root canals in maxillary third molar teeth varied between the previous studies. In two systematic reviews done by Gil et al and Olczyk et al, the lowest frequency of root canals was six root canals (0.09% and 0.60, respectively) [17,20]. While in the current study, the lowest root canal incidences of maxillary third molars were five root canals at 0.37%, this result resembles some previous studies [11,12,16] (2.2%, 3.4% and 2.03% respectively). Whereas some previous studies by Faramarzi et al, Singh & Pawar, and Razumova et al found that the incidences of four root canals were the lowest incidences [8,10,13]. On the other hand, in studies done by Stropko and Tomaszewska et al, the lowest root canal incidences were in two and four root canals, at 20% in a study done by Stropko and 15.4% had a study done by Tomaszewska et al [6,14].

Received*: 31-10-2025 -* ***Accepted****: 02-12-2025 -* ***Published****: 07-12-2025*

ATTAHADI MED J. 2025;2(4):408-417
https://doi.org/10.69667/amj.25411

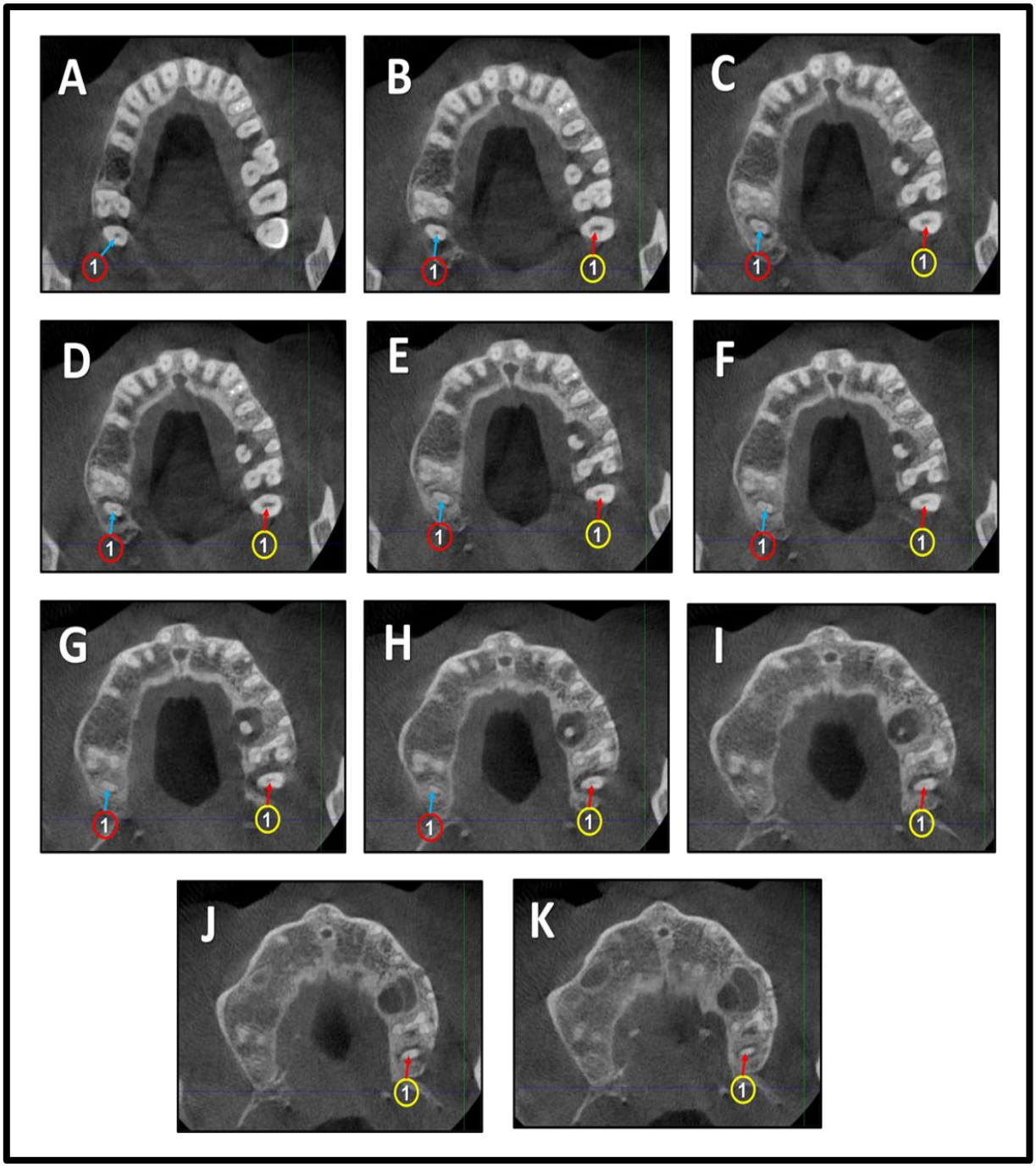


Figure 8. (A- K) Scrolling of a Full CBCT image showing bilateral maxillary third molar teeth with a single root canal

In studies done by Weng et al and Rehman et al, the lowest prevalence was in double root canals (11.6% and 12% respectively) [7,15]. In a study done by Ćosić et al lowest root canal incidences were in single and double root canals at 7.1% for each number of root canals [9]. In a study done by Awais et al lowest root canal prevalence was in the double and four root canals, which almost equal results (5.1% and 5.15% respectively) [18]. In current study the incidences of single root canal were higher in women than men (62.7% and 37.3% respectively), that similar to study had done by Ahmad et al [11] and were dissimilar to a study had done by Rehman et al in which the incidences of single root canal were slightly higher in men than women with 23% and 21% respectively [15]. In contrast to that, the incidences of three root canals in studies conducted by Ahmad et al and Rehman et al were higher in women than men, while in the present study, the prevalences of three root canals were slightly higher in men than women (41.7% and 38% respectively) [11,15].

In an existing study, the incidences of teeth with two canals were higher in women than men, with 65.1% & 43.9% respectively, whereas in a study done by Ahmad et al, in incidences of teeth with two root canals were lower in men than women (3.8% and 10.8% respectively) [11]. While a study done by Rehman et al in which

***Received**: 31-10-2025 - **Accepted**: 02-12-2025 - **Published**: 07-12-2025*

the incidences of double root canals were equal in women and men at 6% [15]. Also, the prevalence of teeth with four canals in the present study was almost equal in women and men (45.8% and 45.2% respectively), while in a study done by Ahmad et al, in incidence of teeth with four root canals was higher in men than women (40.5% and 17.3% respectively) [11]. While a study done by Rehman et al in which the incidences of four root canals were higher in women than men (10% and 4% respectively) [15]. The frequencies of five root canals in the present study were lower in women than in men, that similar to a study done by Ahmad et al, in which they reported the incidences of five root canals were 1.9% in women and 2.7% in men [11].
The right-sided prevalences of three root canals in the present study were slightly higher than the left side (40.47% and 38.85% respectively), that similar to a study done by Ahmad et al (55.3% and 54.8% for right and left sides, respectively) [11]. The right-side incidences of single root canal in the current study were slightly lower than the left side (6.59% and 8.14% respectively), that similar to a study done by Ahmad et al (9.5% and 8.5% for the left and right side, respectively) [11]. The right-sided prevalences of double root canals in the present study were slightly higher than the left side (8% and 6.04% respectively). These results are dissimilar to the study done by Ahmad et al, in which the prevalence of double root canals was higher on the left than the right side (11.9% and 2.1% respectively) [11].
The left side frequencies of four root canals in the present study were slightly higher than the right side (46.46% and 44.71% respectively), unlike to study done by Ahmad et al, in which the prevalences of four root canals were higher in the right than left side (31.9% and 21.4% respectively) [11]. The left side frequencies of five root canals in the present study were almost equal to the right side (0.52% and 0.24% respectively), which is similar to the study done by Ahmad et al (2.1% and 2.4% for right and left side, respectively) [11]. The prevalence of the number of root canals of maxillary third molar teeth in the Libyan subpopulation in Zliten city ranged between 1 to 5 root canals, whereas the number of root canals of maxillary first and second molar teeth in the same population ranged between 1 to 4 root canals [21,22].

Conclusion

The most common incidence of root canals number of maxillary third molar teeth in the Libyan subpopulation at Zliten city was four root canals at 45.5%, followed by three root canals at 39.7%. The lowest incidences of root canals were five root canals at 0.37%. In the present study, we also found that none of the five root canals had bilateral incidences, while the highest total bilateral incidences of maxillary third molars were in three root canals at 25%.

Conflict of interest. Nil

References

1. Cantatore G, Berutti E, Castellucci A. Missed anatomy: frequency and clinical impact. Endod Top. 2006;15(1):3-31.
2. Farman AG, Ramamurthy R, Hollender LG. Digital imaging for endodontics. In: Ingle JI, Bakland LK, Baumgartner JC, editors. Ingle's Endodontics. 6th ed. Hamilton: BC Decker; 2008. p. 573-588.
3. Lo Giudice R, Nicita F, Puleio F, Alibrandi A, Cervino G, Lizio AS, Pantaleo G. Accuracy of periapical radiography and CBCT in endodontic evaluation. Int J Dent. 2018;2018(1):2514243.
4. Patel S, Brown J, Pimentel T, Kelly RD, Abella F, Durack C. Cone beam computed tomography in endodontics–a review of the literature. Int Endod J. 2019;52(8):1138-1152.
5. Bueno MR, Azevedo BC, Estrela CRDA, Sousa-Neto MD, Estrela C. Method to identify accessory root canals using a new CBCT software. Braz Dent J. 2021;32(6):28-35.
6. Stropko JJ. Canal morphology of maxillary molars: clinical observations of canal configurations. J Endod. 1999;25(6):446-450.
7. Weng XL, Yu SB, Zhao SL, Wang HG, Mu T, Tang RY, Zhou XD. Root canal morphology of permanent maxillary teeth in the Han nationality in Chinese Guanzhong area: a new modified root canal staining technique. J Endod. 2009;35(5):651-656.
8. Faramarzi F, Shahriari S, Shokri A, Vossoghi M, Yaghoobi G. Radiographic evaluation of root and canal morphologies of third molar teeth in Iranian population. Avicenna J Dent Res. 2013;5(1):30-32.
9. Ćosić J, Galić N, Vodanović M, Njemirovskij V, Šegović S, Pavelić B, Anić I. An in vitro morphological investigation of the endodontic spaces of third molars. Coll Antropol. 2013;37(2):437-442.
10. Singh S, Pawar M. Root canal morphology of South Asian Indian maxillary molar teeth. Eur J Dent. 2015;9(01):133-144.
11. Ahmad IA, Azzeh MM, Zwiri AM, Haija MASA, Diab MM. Root and root canal morphology of third molars in a Jordanian subpopulation. Saudi Endod J. 2016;6(3):113-121.
12. Rawtiya M, Somasundaram P, Wadhwani S, Munuga S, Agarwal M, Sethi P. Retrospective study of root canal configurations of maxillary third molars in central India population using cone beam computed tomography part-I. Eur J Dent. 2016;10(01):097-102.
13. Razumova S, Brago A, Khaskhanova L, Howijieh A, Barakat H, Manvelyan A. A cone-beam computed tomography scanning of the root canal system of permanent teeth among the Moscow population. Int J Dent. 2018;2018(1):2615746.

Received*: 31-10-2025 -* ***Accepted****: 02-12-2025 -* ***Published****: 07-12-2025*

14. Tomaszewska IM, Leszczyński B, Wróbel A, Gładysz T, Duncan HF. A micro-computed tomographic (micro-CT) analysis of the root canal morphology of maxillary third molar teeth. Ann Anat. 2018;215(1):83-92.
15. Ateeq-ur-Rehman BM, Ahmad S, Iqbal S, Lodhi SK, Akram SM. Number of root canals in maxillary third molars analyzed in a selected Pakistani population. Age (Years). 25(30):54.
16. Al-Qudah AA, Bani Younis HAB, Awawdeh LA, Daud A. Root and canal morphology of third molar teeth. Sci Rep. 2023;13(1):6901.
17. Chaple Gil AM, Santiesteban Velázquez M, Afrashtehfar KI. Geographic patterns of the number of root canals in permanent molars. A systematic review. medRxiv. 2024 Jun.
18. Awais F, Shahbaz M, Kazmi F, Majeed HA, Manzar S, Zaheer N, Shahzad HB. Evaluation of maxillary molar root canal morphology in a tertiary care setting in Lahore, Pakistan. Ann Punjab Med Coll. 2025;19(2):127-131.
19. Sidow SJ, West LA, Liewehr FR, Loushine RJ. Root canal morphology of human maxillary and mandibular third molars. J Endod. 2000;26(11):675-678.
20. Olczyk A, Malicka B, Skośkiewicz-Malinowska K. Root anatomy and canal configuration of human permanent maxillary third molar—systematic review. Folia Morphol (Warsz). 2024.
21. Ehbesh A, Attir M, Alteer A. Frequency of second mesiobuccal canals in maxillary first molar using cone beam computed tomography in Libyan subpopulation in Zliten city. AlQalam J Med Appl Sci. 2024:1595-1602.
22. Alteer A, Ehbesh AA, Attir M. Incidence of second mesiobuccal canal in maxillary second molar teeth using cone beam tomography in Libyan subpopulation at Zliten city: a retrospective study. Attahadi Med J. 2025:69-74.

Received*: 31-10-2025 -* ***Accepted****: 02-12-2025 -* ***Published****: 07-12-2025*