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Case Report **Oral & Maxillofacial Surgery**

Accidental Finding of Maxillary Lateral Incisor with Two Roots after Extraction of Tooth: A Rare Case Report with Review of Literature

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Abstract

Maxillary lateral incisors have a single root, according to many studies on internal anatomy. The primary objective of this article is to describe the two-rooted permanent maxillary lateral incisor and also a conduct a review on all reported cases of maxillary lateral incisors with two roots emphasizing on its etiology and prevalence among racial population.

Keywords: Maxillary Lateral Incisor, Two roots, Root Anatomy.

INTRODUCTION

A thorough understanding of the anatomy and morphology of the teeth's root canal system is essential for the effective completion of root canal therapy, as well as several other dental and surgical procedures. All dentists working in various dental specialties need to be aware of potential complications since differences in the internal and external anatomical and morphological characteristics of teeth affect the number of dental treatments come good.

Maxillary incisors are known to have a single root in most anatomical investigations, however there may be differences in the number of lateral canals and/or location of the apical foramen [1]. The latest editions of endodontic textbooks state that 100% of cases involving maxillary lateral incisors have a single root [2, 3]; however, there are other reports in the literature of cases with two canals[4] or dual roots [4-8]. Few reports have also have been documented anatomical differences, such as three root canals [9] or even four root canals [10].

A single root and one canal are typical features of the maxillary lateral incisors; nevertheless, reports of anatomic abnormalities, including supernumerary roots, have been made. Anatomical complications such as additional roots and canals can be very difficult to treat with endodontics, even if they are rare [11].

Unfavorable treatment outcomes might result from negligence and lack of knowledge regarding variations in root canal morphology, which can cause problems with cleaning and shaping the entire root canal system during endodontic treatment.

The aim of this paper is to present a rare case of maxillary lateral incisor with two roots without any developmental anomalies and also a conduct a review on all reported cases of maxillary lateral incisors with two roots emphasizing on its etiology and prevalence among racial population.

CASE REPORT

A 45-year-old Saudi male patient was referred to oral surgery student's clinic with the chief complaint of pain and difficulty in eating food. Clinical examination reveals Grade III mobility with #21, #22. Extraction of #21 and #22 was planned. Informed consent was taken from the patient for extraction. 2% lidocaine with 100,000 epinephrine was given as infiltration bucally and palatally. Extraction of #21 and

#22 was carried with maxillary anterior forceps. After the extraction of #22, the two roots of maxillary left lateral incisors was noticed (Figure 2, 3, 4). Hemostasis was achieved by gauze pressure. Post-operative instruction was given to the patient and patient was dismissed.

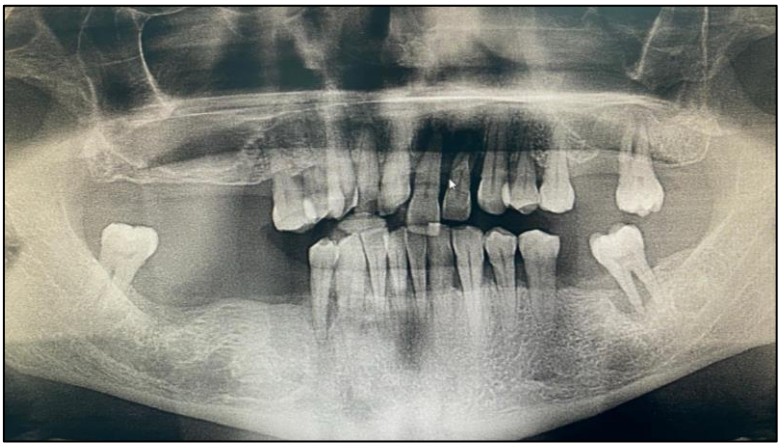

Figure 1: OPG of patient

Figure 2: Maxillary Lateral incisor showing two roots after extraction

Figure 3: Mesial View of lateral incior

Figure 4: Buccal view of extracted Lateral incisor

DISCUSSION

This case study presents a unique instance of maxillary lateral incisor teeth that have two roots and two root canals without showing any crown morphological abnormalities. In most cases, maxillary lateral incisor teeth have a single root and one canal.

A clinician should be made to take into account situations like fusion and gemination when two roots or two root canals are present in maxillary incisors. These changes are typically observed when the crown surface is defective labially or lingually, or when the crown is unusually large [12]. The tooth in question in this case report was not macrodont. Preoperative radiography made it difficult to identify, and the widespread belief that maxillary incisors always have a single root.

Table 1: Previous case reports of maxillary lateral incisor with two- roots

S. N	Author / Year	Country	Age	Gender	Side	Findings	Treatment
1.	Zillich RM / 1983 [13]	USA	31	Male	#22	Dentoalveolar abscess	Retreatment
2.	Fried & Winter/ 1984 [14]	-	28	Female	-	Palatal Groove	RCT
3.	Peikoff MD / 1985 [36]	Canada	34	Male	#22	Baddly carious; lingual groove.	Extraction
4.	Yoshikawa *et al*., 1987 [15]	Japan	13	Female	-	Palatal groove	RCT
5.	Pecora JD / 1991 [16]	Brazil	40	Male	#12	Non Vital	RCT
6.	Collins IJ / 2001 [1]	Australia	28	Male	#22	Non Vital	RCT
7.	Platt JA /1995 [17]	-	48	Female	-	-	Extraction
8.	Venugopal & Srirekha, 2010 [18]	India	24	Male	#12	Missed RCT in second root, grade II mobility	Re-treatment
9.	Ravindranath / 2011 [19]	India	16	Female	-	-	-
10.	Gandhi A / 2011 [20]	India	30	Male	#22	Radicular groove	Root resection
11.	Mohan AG/ 2012 [4]	India	25	Female	left	Non vital	RCT
12.	Matta MS/ 2012 [21]	India	20	Male	Right	-	RCT
13.	Lee MH / 2013 [22]	Korea	26	Male	#12	chronic apical abscess with sinus	RCT
14.	Das U / 2014 [23]	India	34	Male	Left	Previously RCT	Re-Treatment
15.	Hoseini A / 2014 [24]	Iran	16	Female	Right	Non vital tooth with acute apical periodontitis	RCT
16.	Makade CS / 2014 [25]	India	27	Male	left	Non vital	Retreatment
17.	Hafiz A / 2014 [26]	India	14	Male	left	Non vital	RCT

S. N	Author / Year	Country	Age	Gender	Side	Findings	Treatment
18.	Kulkarni VK / 20014 [27]	India	14	Male	right	Incomplete RCT	RCT with surgical amputation accessory root
19.	Aminsobhani / 2015 [28]	Iran	43	Female	Right	Incomplete RCT	Re-Treatment
20.	Yadav SS / 2016 [29]	India	27	Male	#22	Non vital	RCT
21.	Elbay *et al*., 2016 [30]	Turkey	12	Female	#22	Non vital	RCT
22	Hasan A [31]	Iran	20	Female		Missed untreated accessory root	Re- Treatment
23.	Iftekhar H / 2020 [32]	India	17	Male	left	Incomplete RCT	Re-Treatment
24.	Nunes E / 2020 [33]	Brazil	37	-	Right	Incomplete RCT	Re-Treatment
25.	AnithaKumari R / 2020 [34]	India	32	Male	#22	Non vital	RCT with the apexification
26.	Kayastha, Pujan Kranti / 2022 [35]	India	16	Female	#22	acute apical periodontitis	RCT

In 100% of the instances investigated, anatomic examinations by Pineda [37] and Vertucci [38] revealed that upper lateral incisors had a single canal and a single root. Compared to the classic dental anatomy description, Neville *et al.*, used the term "supernumerary roots" to describe the presence of extra roots in a tooth [39] Permanent molars from any arch, particularly the third molar, are the teeth that are most commonly affected [40].

The location of the maxillary lateral incisors is highly embryologically risky. These teeth have multiple developmental anomalies, including peg-shaped dens, radicular grooves, dens invaginatus, talon cusp, and two roots as a result of fusion/germination [41, 42].

Although the main etiology of this variation is unknown, the paired medial nasal processes (MNP) and maxillary processes (MP) fuse to produce the upper jaw, which is where the lateral incisors emerge, during the fourth and sixth weeks of human embryonic development. The premaxilla, which includes the primary palate and the medial portion of the upper lip (philtrum), is formed when the MNP fuse together [43]. There is uncertainty regarding the precise origin of the maxillary lateral incisor with respect to the MNP/MP fusion area as well as the exact location of the premaxillary/maxillary suture in humans. The MNP/MP fusion location can be located at the medial or middle third of the lateral incisor, or medial to the lateral incisor. The middle third of the canine or between the lateral incisor and canine is where the premaxillary/maxillary suture is located [44-46]. These factors may cause maxillary lateral incisors to exhibit different root canal morphologies [47, 48].

The primary cause of this difference, according to Bhasker [39], is thought to be a disruption in the epithelial root sheath development of Hertwig, which leads to the production of a horizontal flap. The development of an additional root is mostly explained by this theory. Kelly [49] hypothesized that traumatic injuries sustained during root formation to either the root's surface or the developing periodontium, which is Hertwig's epithelial root sheath.

Maxillary lateral incisors can have various configurations of root canals, especially in the Turkish population [50, 51]. Kuzekanani M reviewed the literature, it was shown that, compared to other racial groups, Turk, Asian, and South (Latin) American people are more likely to have extra roots and root canals in their maxillary lateral incisors [52].

A brief literature review for this paper revealed 26 cases reporting maxillary lateral incisors with two roots. 50% (13) of the cases are reported from India followed by Iran (3 cases). Most of the cases reveal that primary dentist failed to identify second root of maxillary lateral incisor during root canal treatment, hence needed re-treatment of root canal treatment. Only two cases (Peikoff [36] and Platt [17]) reported extraction of maxillary lateral incisor, Peikoff initially tried endodontic treatment. The tooth was opened and a copious amount of exudate was evacuated. The main canal was instrumented, but a canal orifice to the accessory root could not be found. Six month later the tooth was extracted. Whereas in our case (Fig 1, 2, 3, 4) two roots in maxillary lateral incisor was an accidental finding after extraction of grade III mobile tooth.

Before beginning an endodontic procedure, a thorough understanding of the internal anatomy of the root is required. Among the primary reasons endodontic treatment fails are a complex internal architecture and undiscovered canals [53]. Given the morphological variances in these teeth, the clinician must always assume the presence of missing canals when a patient presents with chronic discomfort or sensitivity to hot and cold following root canal therapy. In cases this complex, the prudent use of high-end diagnostic tools should also be taken into account [54].

In order to enhance their ability to identify anatomical abnormalities, periapical radiographs with different angulations might be taken. It is essential and strongly encouraged to perform thorough radiographic evaluations using Clark's rule and to take parallel angle radiographs both before and during endodontic treatments in order to correctly diagnose and treat these types of circumstances. Cone beam computed tomography (CBCT), one of the newest radiography techniques, can also be highly useful in identifying anatomical characteristics and variations of the root canal system [22, 55]. Notably, CBCT is a three-dimensional X-ray imaging technique with great resolution that can be highly helpful in detecting the exact position of any extra roots [55].

CONCLUSION

The present case report emphasizes that even in the absence of dental defects, maxillary lateral incisors may have abnormal root structure. It is imperative for increasing awareness among general dental practitioners regarding the facts pertaining to 100% single-rooted maxillary lateral incisors.

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