Frequency of endodontic treatment in a Nigerian Teaching Hospital

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Abstract

Objective: To determine the frequency of endodontic treatment in dental patients treated in a Nigerian Teaching Hospital.
Method: A survey of 470 patients undergoing endodontic treatment at the conservative clinic of the department of restorative dentistry of Lagos University Teaching Hospital was conducted to determine the frequency of endodontic treatment for each tooth, number of males versus females that needed endodontic treatment and the frequency of root canal therapy in the maxilla compared to mandible. The data on age, sex of patients, date of treatment and tooth treated were retrieved from patients' dental records.
Results: Endodontic treatment was carried out on a total of 490 teeth. The frequency of endodontic treatment was more in the females (56.4%) compared to males (43.6%). 58% of the treated teeth were maxillary teeth and 42% were mandibular teeth. There was predominance of endodontic treatment in the molars (49.8%) with the lower first molar being the most frequently treated and accounted for 18.8% of teeth treated.
Conclusion: A high proportion of endodontic treatment was now frequently performed on molars in patients treated at Lagos University Teaching Hospital dental centre which suggested the availability of more dentists with better facilities to attend to patients that needed endodontic treatment.

Keywords: Endodontic treatment, root canal therapy, frequency

Introduction

Endodontic treatment can be defined as the precautions taken to maintain the health of the vital pulp in a tooth, or the treatment of a damaged or necrotic pulp in a tooth to allow the tooth to remain functional in the dental arch[1]. The process of removing damaged or necrotic pulp, cleaning, shaping and obturating the root canals is called root canal therapy. Modern endodontics includes, pulp capping, pulpotomy, pulpectomy, root canal therapy and surgical endodontics which includes apicectomy, hemi section, root amputation and replantation[1]. Endodontic treatment is a safe and effective means of saving teeth that otherwise would be extracted due to pulp disease as a result of caries, trauma, failed restoration, tooth wear and perio-endodontic lesions. Most often dental patients opted for extraction due to reasons such as non-availability of endodontic treatment, high cost of endodontic treatment, post endodontic restorations and sometimes the belief that the tooth could later be symptomatic and have to be removed eventually.

A number of studies have reported the incidence and distribution of endodontically treated teeth in dental schools[2], military clinics[3, 4], general practice[5] and private practices[6]. An earlier study on reasons for endodontic treatment in the Lagos University Teaching Hospital reported endodontic treatment in the anterior, premolar and molar teeth with the molar teeth being the least endodontically treated[7]. This is because the molars were being extracted in these dental patients instead of being preserved through endodontic treatment[8]. The awareness of preservation and retention of as many teeth as possible by caries prevention methods, restoration of carious teeth and endodontic treatment of pulpally involved carious teeth is desirable and need to be created in the Nigerian populace.

Presently, there is no study in Nigeria on the frequency of endodontic treatment for each tooth in the maxilla and mandible. A previous study on reasons for endodontic treatment categorized the teeth as anterior, premolar and molars however did not report on individual tooth in the maxilla and mandible[7]. The purpose of this study was to determine the frequency of endodontic treatment for each tooth in the maxilla and mandible to facilitate comparison of a Nigerian study with earlier studies carried out in other countries.

Materials and Method

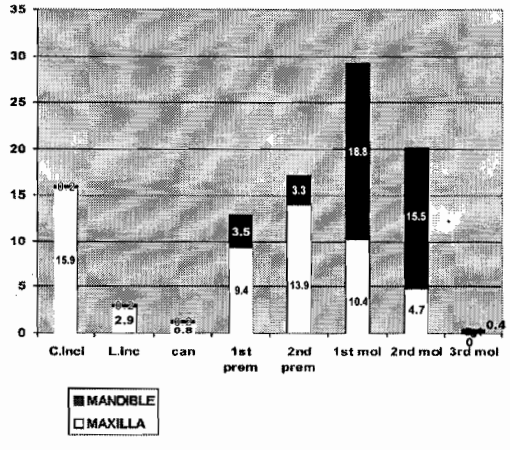
This is a retrospective study of patients who attended the conservative clinic of the Department of Restorative Dentistry, Lagos University Teaching Hospital between January 2006 and August 2007.Data on age, sex, type of

endodontically treated teeth and date of treatment were retrieved from the patients' dental records. The number of doctors that carried out endodontic treatment during the period of survey was also recorded. All endodontic treatment which involved root canals during the period of survey were included and there was no exclusion due to gender or age. There was no case of retreatment. The frequency of each endodontically treated tooth in the maxilla and mandible, number of males versus females who needed endodontic treatment were recorded and compared. The data was analyzed with Statistical Package for Social Sciences Software version 11 (SPSS, Chicago, IL) and significant differences between frequencies were determined using the chi square with p value less than 0.05 regarded as significant.

Results

Four hundred and seventy patients were evaluated in this study with a total of 490 teeth that were endodontically treated by 102 doctors. Only 4.2% of these patients had more than one tooth treated endodontically. There were more females (56.4%) than males (43.6%) who received endodontic treatment. Table 1 shows the number and relative frequency of endodontic treatment of each tooth type in this study. Figure 1. illustrates the predominance of endodontic treatment in the posterior teeth. The molars accounted for approximately half of all endodontic treatment, while 58% of the teeth treated were maxillary teeth and 42% were mandibular teeth. The most frequently treated tooth was the mandibular first molar (18.8%).

Figure 1. Percentage distribution of maxillary and mandibular teeth treated



C.inci.	Central incisor	2nd prem	Second premolar
L. inci	Lower incisor	1st mol	First molar
Can	Canine	2nd mol	Second molar
1st prem	First premolar	3rd mol	Third molar

Table 1. Frequency of endodontic treatment of each tooth type

	Maxilla		Mandible	
Tooth type	n	*(%)	n	*(%)
Central incisor	78	15.9	1	0.2
Lateral incisor	14	2.9	1	0.2
Canine	4	0.8	1	0.2
First premolar	46	9.4	17	3.5
Second premolar	68	13.9	16	3.3
First molar	51	10.4	92	18.8
Second molar	23	4.7	76	15.5
Third molar	0	0	2	0.4
Total	284	58	206	42

* Percentage of the total cases seen (n= 490) $X^2 = 36.0$ $P < 0.01$

Discussion

The most frequently treated tooth in this study was the mandibular first molar (18.8%). This finding agreed with the study done in the University of California, Los Angeles (UCLA) by Serene and Spolsky[2] (18.1%), the Kuwait study[10] (17.7%) and the Wayman study[3](18.8%) where the mandibular first molar was the most frequently treated tooth. However, the finding in this present study vary from the Washington study[9] (10.33%) and the Jordanian study[4] (7.5%) where the mandibular first molar was the third and fourth most frequently treated tooth respectively. The difference between these studies may be related to the period of study. The Washington study was carried out in the 1950's when endodontics was relatively a new form of dental treatment[3]. The evolution of instruments and knowledge now facilitates successful treatment of posterior teeth[3]. The Jordanian study[4] reported a lower percentage of molar endodontics compared with other surveys and attributed this to the fact that their study was carried out in a military clinic and it has been previously reported that dentists in the armed forces treated molars less frequently than their colleagues in the private clinics[11]
The frequency of endodontic treatment in the maxillary teeth was higher than that of the mandibular teeth which was consistent with the Jordanian,[4] Washington[9], and Kuwait[10] studies while an almost equal distribution of endodontic treatment in the maxilla and mandible were reported in Wayman[3] and UCLA[2] studies.
The frequency of male patients in the present study (43.6%) was in agreement with the UCLA study (45%) but higher than the Washington study (36%) and lower than the Wayman study(58%). In the present study, 49.8% of treated teeth were molars. This compares favourably with other previous studies[2,3,10,12]. The first molars contributed 29.2% of the total sample of teeth treated in the present study. The first molar is the first permanent tooth to erupt and susceptible to early caries attack and this is possibly responsible for it being the most frequently endodontically treated tooth. A previous study[7] carried out in the same institution in 2004 identified molars as the least frequently endodontically treated teeth (24.8%) compared to premolars and anterior teeth, even though the authors did not report the frequency of endodontic treatment of each

tooth in the maxilla and mandible.

The number of doctors that carried out endodontic treatment in the present study between January 2006 and August 2007 was 102 compared with 78 doctors that carried out endodontic treatment between July 2002 and January 2004 in the previous study.

This present study however shows that the frequency of endodontic treatment in the molars has doubled within a period of three years. This may be as a result of increase in awareness of conservation of teeth among dental patients created by the resident doctors undergoing rotation in Conservative Dentistry Unit of the hospital. The resident doctors are required to complete a specified number of molar endodontic treatments as part of their requirements for postgraduate training. The recent increase in the number of doctors undergoing postgraduate training programme in dental surgery coupled with regular update courses, seminars and availability of better facilities for endodontic treatment in the Dental Centre of the Lagos University Teaching Hospital may also be responsible for the increase in molar endodontic treatments. However, this was not the case in the 1980's when Nigerian dentists reported inadequate facilities for endodontic practice and poorly motivated patients as major problems encountered in endodontic practice[13].

The posterior teeth accounted for the majority of endodontically treated teeth in this study and this is consistent with the finding of Wayman[3] and the UCLA study[2]. This is in contrast with other studies which reported a lower frequency of endodontically treated posterior teeth[4,9,15]. There was a significant difference in endodontic treatment between age groups, with the 16 to 25 years group having the highest frequency of endodontic treatment followed by the 26-35 years group. There was no endodontic treatment carried out in the over 65years age group. A study done three years previously in the same institution reported that the younger age group (18 to 34 years) presented for dental treatment more than the older citizens in Nigeria[8]. It was also reported that extraction was the commonest treatment required in the Teaching Hospital and that molars were the most frequently extracted tooth type with the highest frequency occurring among age group 18 to 34 years. Incidentally this same age group had the highest frequency of endodontic treatment in this study.

Table 2. Comparison of frequency of endodontic treatment between present study and earlier study in the same institution

Tooth type	Present Study		Previous study	
	n	(%)	n	(%)
Anterior (incisors and canines)	99	(20.2)	102	(31.6)
Premolars	147	(30.0)	141	(43.7)
Molars	244	(49.8)	80	(24.8)
Total	**490**	**100**	**323**	**100**

$X^2 = 13.8$
$P < 0.05$

Table 3. Frequency of endodontic treatment among age groups

Age (years)	n	(%)
16-25	170	36.2
26-35	141	30.0
36-45	65	13.8
46 - 55	45	9.6
56 - 65	49	10.4
>65	0	0
Total	**470**	**100.0**

$X^2 = 31$
$P < 0.01$

Table 4. Percentage distribution of endodontically treated teeth compared with some previous study

Reference	Type of clinic	Total number of teeth treated	Incisors and canines	Premolars	Molars
Serene and spolsky 1981[2] (UCLA)	University	1000	28.4	27.2	44.5
Ingle and Taintor 1985[9] (Washington)	University	1229	62.3	15.8	21.8
Wayman et al 1994[3]	Military	3672	19.9	28.4	52.7
Zaatar et al 1997[10] (Kuwait)	Public hospital	846	22.4	31.5	48.1
Al-Negrish 2002[4] (Jordan)	Military	1404	60.4	19.3	20.3
Ridell et al 2003[12]	Public hospital	180	39.5	14.0	46.5
Present study	University	490	20.2	30.0	49.8

The maxillary central incisor was the second most frequently endodontically treated teeth in this study. This is supported by previous studies where a high frequency of endodontically treated maxillary anterior teeth was previously reported due to high prevalence of traumatised anterior teeth in these studies[13,14]. The availability and increase in endodontic treatment is desirable and should be further encouraged to ensure retention of increased number of teeth in the jaws so as to aid function and aesthetics.

Conclusion

This survey revealed that endodontic treatment was performed more frequently in the maxillary teeth than mandibular teeth with the mandibular first molars having the highest frequency of endodontic treatment followed by the maxillary central incisors. Endodontic treatment was also more frequently carried out in females than males. Further study to determine the quality of endodontic treatments carried out in Nigerian population is recommended.

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