

Research Journal of Pharmaceutical, Biological and Chemical Sciences

Incidence Of Retreatment Of Anterior Root Canal Treated Tooth In South Canara Population, India.

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ABSTRACT

Retreatment of root canal therapies are very common in endodontics and it happens when the initial treatment is carried out inadequately. The aim of the study was to determine the incidence of the retreatment of the anterior root canal treated tooth in South Canara population. 2000 patients were evaluated using diagnostic instruments and x rays for the need of retreatment, followed by the questionnaire which evaluated incidence of the retreatment of anterior root canal treated tooth. Data collected were statistically analysed using IBM SPSS version 24 and results were evaluated. Total incidence of retreatment of anterior root canal treated tooth is found to be 12.2 %. According to this study retreatment of anterior root canal treated tooth was found to be more in age groups 15-30 years and when the initial RCT is done by general dentist. The primary cause for the RCT was found to be in trauma in the anterior jaw. The maxillary jaw was found to be more affected and central incisors was the common tooth to get affected.

Keywords: Retreatment, root canal therapy, anterior tooth, trauma

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INTRODUCTION

Endodontic treatment by nature is pretty predictable. The prediction success rate is stated to be 86-98%[1]. The principle objective of endodontic treatment should be focussed on execution of a meticulous chemical and mechanical cleansing of root canals by thorough debridement and cleaning of infected pulp tissue so that the canal space can be biomechanically prepared to receive the filling with any advocated inert material and thus helps in avoiding or diminishing any chances of reinfection[2]. However systematic follow ups with clinical and radiographic evaluation is necessary for the root canal deemed to be successful[3].

Bacteria and their by-products are measured as the chief causative factors for the failure of root canal treatment[4]. Failure to achieve the complete elimination of pulp tissue and microbes existing in the root canal systems have been projected as preliminary reason for endodontic treatment failure.[5,6]. Sometimes it is due to inaccessibility of infection sites or existence of accessory canals which are far apart for instruments, medication or irrigants which are usually the apical thirds of the root canal[7]. Various studies suggests that the predominant bacteria found in first time treatments, as well as reinfection cases are restricted to a very specific diversity of micro-organisms, especially *Enterococcus faecalis*. The genus *Enterococcus* is a gram-positive, facultative anaerobe type coccus bacteriae[8]. The persistence of *Enterococcus faecalis* in root canals are due to its ability to colonize and infect dentin tubules [9,10] and potential resistance of the bacteria against calcium hydroxide, which is a very effective antibacterial medication maximum frequently used within the root canal system during endodontic therapy[11].

Any division of the main canal which interconnects with the outer surface of the root is accessory canals and the same situated in the coronal or middle third of the root, usually spreading horizontally from the main canal are lateral canals[12]. Anterior teeth may exhibit unusual anatomical variations in case of number of roots and root canals.[13]. For a successful treatment a thorough study of both external and internal anatomical characteristics of the roots is essential so that chances of missing out roots and root canals can be reduced and controlled.[13,14]. According to an article[12] incidence of teeth with accessory canals in the apical 3 mm was 46% for maxillary central incisors, 29% for lateral incisors and 38% for canines[12].

According to earlier studies, instrumentation and antibacterial irrigation with sodium hypochlorite solution will help to keep half of canals free from bacteria and the rest may contain few recoverable bacteria (Byström & Sundqvist 1985). The remaining bacteria can be eliminated by applying antimicrobial dressing during biochemical preparation in the cleaned canals for some time before root filling (Byström et al. 1985, Sjögren et al. 1991). However in some patients where treatment has been finished in single visit where the scope for an interappointment antimicrobial dressing is less there are high chances of bacterial existence in the canal at the period of root filling[15].

Other causes of failure of RCT are insufficient cleaning and obturated canals, overextensions of root filling materials, inappropriate coronal seal, missing canals, clinician induced procedural errors such as improper access cavity design and problems of instrumentation (ledges, perforations, or separated instruments[3].

Most common reason of all dental injuries is falls, followed by sports injuries[16]. Most Important predetermining factor of anterior teeth trauma is none other than malocclusion which includes proclined teeth and other reasons can be orthodontic appliances, medical problems like seizures, cerebral palsy etc[17].

Hence the aim of this study is to evaluate the incidence of the retreatment of anterior root canal treated tooth

MATERIALS AND METHODS

The study was conducted on a total population of 2000 patients over a period of one month from May 2018-June 2018, out of which 1000 were examined from Out-patient section of Department of Conservative Dentistry and Endodontics and other 1000 were examined in Rural Health Centers of A.B. Shetty Memorial Institute of Dental Sciences, Nitte University, Deralakatte, Mangalore. Permission to conduct the study was sought from the relevant authorities. Informed verbal consents were obtained. Failure to consent did not affect patients' treatment and confidentiality of the information given was assured. Direct assessment

consisted of visual examination with a standard mouth mirror, a sharp-ended explorer, and supplementary lighting from a dental operatory lamp. Diagnosis of retreatment was made according to the signs and symptoms given by the patient at the time of examination, preoperational radiographs showing any defect in the previous root canal treatment procedure or any existing apical radiolucencies or presence of any sinus or fistula near the tooth. All these cases are thoroughly examined and retreatment diagnosis was made. Patients were recorded under different age groups, sex, tooth affected, reason for the initial RCT, who has done the treatment. Patients were selected on basis of inclusion and exclusion criteria.

INCLUSION CRITERIA

Individuals who are under age groups 1) 15-30 yrs 2)30-45 yrs 3)45-60 yrs 4)>60 yrs
Individual who are willing for the study

EXCLUSION CRITERIA

Individuals undergoing orthodontic treatment Edentulous patients

RESULTS

Out of 2000 patients examined, 430 subjects belonged to urban strata, 692 subjects belonged to periurban strata whereas 878 belonged to rural strata. (Table 1)

Table 1: Total number of subjects in study population in relation to location

LOCATION	SUBJECTS
Urban	430 (21.5%)
Peri urban	692 (34.6%)
Rural	878 (43.9%)

Males formed 55.2% of the study population and females were 44.8%. (Table 2)

Table 2: Total number of subjects in study population in relation to gender

GENDER	SUBJECTS
Males	1104 (55.2%)
Females	896 (44.8%)

Incidence of the retreatment of anterior root canal treated tooth was found to be most significant in age group of 15-30 years in 51.22% of cases followed by 30-45 years of age group in 26.63% of cases and 45-60 years of age group in 14.75% of cases and >60 years in 7.37% of cases. (Table 3). P value was found to be <0.001 which is significant.

Correlation between incidence of retreatment with age group

Table 3: Highest incidence of retreatments with age groups 15-30 years(p value<0.001)

AGE GROUP(years)	CASES
15-30	125 (51.22%)
30-45	65 (26.63%)
45-60	36 (14.75%)
>60	18 (7.37%)

In the present study correlation with gender and retreatment was calculated and no significant difference is seen with p value 0.21. Out of 244 positive subjects 50.8% were males and 49.1% were females.

On comparing the presence of pain following the failure of root canal therapy is seen in 34.83% of

cases and rest 65.16% of cases reported were with no pain. (Table 4)

Correlation between incidence of retreatment and presence of pain

Table 4: Highest incidence of retreatments with absence of pain

PAIN	CASES
Present	85(34.83%)
Absent	159(65.16%)

In the present study when comparing the incidence of retreatment and time of the initial root canal therapy, 42.21% of cases were reported after 3 years, 26.22% of cases reported after 2-3 years, 16.39% of cases reported after 1-2 years and 15.1 % of cases reported after 0-1 years. (Table 5)

Correlation between incidence of retreatment and time of the initial root canal therapy

Table 5: Highest incidence of retreatments seen after more than 3 years(p value< 0.0001)

TIME DURATION	CASES
0-1years	37 (15.1%)
1-2 years	40 (16.39%)
2-3 years	64 (26.22%)
>3	103 (42.21%)

In the present study incidence of retreatments found to be significant when the initial root canal therapy is done by general dentist in 84% of cases and specialist in 16% of cases. (Table 6)

Correlation between incidence of retreatment and whom did the treatment

Table 6: Highest incidence of retreatments when initial root canal therapy is done by general dentists. (p value<0.0001)

DOCTOR	CASES
General dentist	205 (84%)
Specialist	39 (16%)

In the present study cause of the initial root canal therapy is caries in 19.65 % of cases and trauma in 80.3 % of cases. (Table 7)

Correlation between incidence of retreatment and reason for the primary root canal therapy

Table 7: Highest incidence of retreatments seen when primary cause of RCT was trauma (p value<0.0001)

REASON FOR RCT	CASES
Caries	48 (19.65)
Trauma	196 (80.3%)

In this study maxilla was found to be affected in 92.6% of cases and mandible in 7.3% of cases. (Table 8)

Correlation between incidence of retreatment and the jaw affected

Table 8: Highest incidence of retreatments seen in maxillary jaw(p value<0.0001)

JAW AFFECTED	CASES
Maxilla	226 (92.6%)
Mandible	18 (7.3%)

In the present study maxillary central incisor was affected in 81.9% of cases, maxillary lateral incisor in 6.5% of cases, maxillary canine in 4.09% of cases, mandibular central incisors in 4.9% of cases, mandibular laterals in 1.6% of cases and mandibular canine in 0.81%. (Table 9)

Correlation between incidence of retreatment and the tooth affected

Table 9: Highest incidence of retreatments seen in central incisors (p value< 0.0001)

TOOTH AFFECTED	CASES
Maxillary central incisor	200 (81.9%)
Maxillary lateral incisor	16 (6.5%)
Maxillary canine	10 (4.09%)
Mandibular central incisor	12 (4.9%)
Mandibular lateral incisor	4 (1.6%)
Mandibular canine	2 (0.81%)

DISCUSSION

Retreatment of Root canal treatment can be attributed to various errors like improper cleaning and shaping, inadequate filling of the canal, overextensions of root filling materials, inappropriate coronal seal, missing canals, iatrogenic procedural errors such as poor or improper access cavity design and faults or difficulties of instrumentation like ledges, perforations, or separated instruments etc.[3].

The purpose of this study was to evaluate the incidence of retreatment of anterior root canal treated tooth along with its correlation with gender, age group, causes of the root canal therapy, tooth and jaw affected with some other parameters. The incidence of retreatment of anterior root canal treated tooth is found to be 12.2 %.

The results obtained further confirmed that the retreatments of anterior root canal treated tooth is mostly found in age groups between 15-30 years in 51.22 % of subjects followed by 30 -45yrs in 26.63%. This may be related to the primary cause of the root canal therapy. Traumatic dental injuries are commonly seen in children and young adults because of their ignorant and vigorous nature, involvement in different sports and extra curricular activities and their nature of taking risk[18]. Literature has given evidences of traumatic dental injuries seen as the most common reason for the anterior root canal therapies and due to neglects by the patient and lack of follow ups it may result in internal or external resorption and ultimately resulting in retreatments.[19].

Similar findings were observed by Hegde and Sajnani where highest prevalence of fracture of anterior tooth was seen in the age group of 15–30 years that is, 53.9% and, followed by the age group of ≤15 years, that is, 20.2%[20]. Also according to a study by Lars Andersson the maximum incidence of dental injuries per 1000 population was found to be maximum in 12 years and the incidence seen to decrease with the age , which is seen similar in this study also[21].

In this study the presence of pain following the failure of root canal therapy is seen in 34.83% of cases and rest 65.16% of cases reported were with no pain. This may be due to the non vital nature of the tooth.

When comparing the time gap between initial root canal therapy and and time of reporting of RCT failure, most of the cases found to be a reported after 3 years from initial RCT.

The results obtained further confirmed that retreatments are more common when the primary root canal treatment is performed by general dentist with 84% of failure rate whereas failure rate of specialist was 16%. This is justified in similar studies conducted by Alley BS et al in the year 2004 concluded that out of 350 teeth, 195 teeth were treated by general dentists with a success rate of 89.7%. 155 teeth were treated by specialists, with 98.1% success rate. The increased failure rates by general dentist is due to the lack of knowledge, experience and skill in endodontic procedures[22].

In the present study Maxilla was affected in 92.6% of cases and mandible was affected in 7.4%. This can be justified because Trauma is seen to be more in maxilla due to the proclined tooth and inadequate lip coverage[13]. Also presence of sublingual salivary gland and ducts and increased salivation by them help to keep the lingual portion of lower anteriors clean and reducing the carious lesions whereas maxillary anteriors will be more prone to caries due to reduced salivary flow in that region[23].

In the present study primary reason for the initial root canal therapy was found to be trauma in 80.3% of cases and caries in 19.6% of cases. Literature reviews demonstrates that the prevalence of dental caries is fading more quickly than traumatic dental injuries. If this tendency lasts, traumatic dental injuries may become more prevalent than dental caries[24].

In the present study central incisors were most commonly affected. This is seen in similar studies by of Hamdan and Rajab and Nik-Hussein who also found that maxillary central incisors were injured in 78% and 79.2% of traumatic cases, respectively.[25,26]. This may be due to the early eruption of maxillary central incisors than lateral incisors and canine and thus they are prone to injuries for an extensive period of time. Also any blows to mandibular teeth are dissipated due to nonrigid joining of mandible to cranial base, making maxillary centrals more prone to injuries than mandibular centrals[16].

CONCLUSION

The failure of root canal therapies are very common in endodontic department. According to the present study retreatment of anterior root canal treated tooth was found to be more in age groups 15-30 years and when the initial RCT is done by general dentist. The primary cause for the RCT was found to be in trauma in the anterior jaw. The maxillary jaw was found to be more affected and central incisors was the common tooth to get affected. Most of the cases reported were asymptomatic with no pain and on comparing the time gap between initial root canal therapy and time of reporting of RCT failure, most of the cases found to be reported after 3 years from initial RCT.

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