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SURVEY OF THE TOOTH THAT CAN BE TREATED WITH ROOT CANAL TREATMENT, BUT ENDS UP WITH EXTRATION IN JIZAN, SAUDI ARABIA

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INTRODUCTION

Cross-sectional studies have shown that by the age of 50, 1 in 2 individuals have had at least one tooth affected by apical periodontitis (AP). This highly prevalent disease comprises a host defense response to a microbial challenge originating from the root canal system, resulting in inflammation and destruction of peri-apical tissues. AP, once diagnosed, can be treated by way of endodontic treatment (also known as root canal treatment, RCT) or by extraction of the affected tooth.[1] In case of the latter treatment, the space can then remain edentulous, or it can be restored with a prosthetic device, either a removable partial denture (RPD), fixed partial denture (FPD, also known as a bridge), or an implant-supported crown (ISC, also known as a single tooth or dental implant).

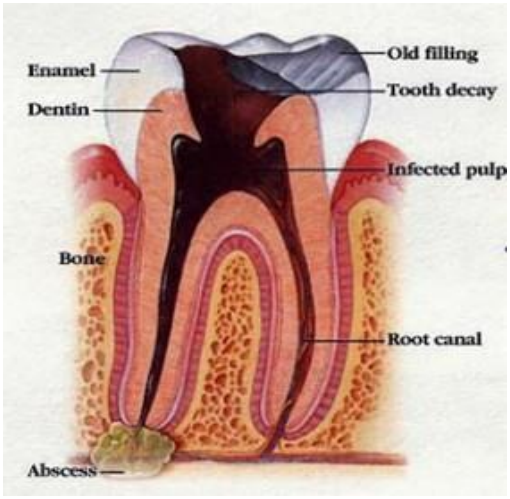

Figure No. 1: Figure showing infected tooth with apical periodontitis.

Apical Periodontitis

Periradicular, periapical or apical periodontitis can be defined as inflammation of all the supporting structures of the teeth in the area surrounding the apex of the tooth.[2,3] Periapical inflammation is usually due to tooth infection which characteristically causes pain of tooth in its socket. It is often accompanied by destruction of bone and occasionally, the root apex of tooth. However the periapical tissue has the ability to heal if the cause of inflammation is removed. **Periapical periodontitis** can be divided into acute and chronic apical periodontitis.

Causes of apical periodontitis

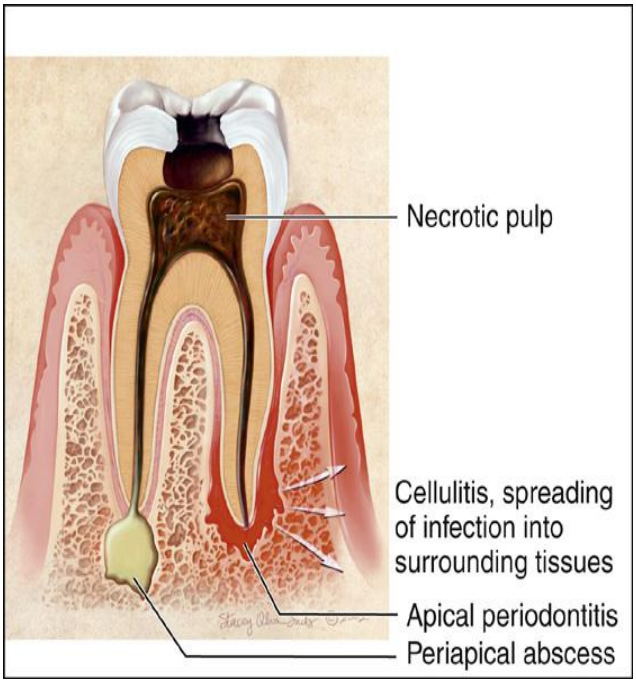

Figure No. 2: illustrates the causes for tooth infection.

• Infection – by far the most common cause, bacteria causes decay of tooth which leads to pulp inflammation (**pulpitis**) and death of the pulp (the soft inner part of the tooth). If pulpitis is not treated; bacteria, bacterial toxins or products of inflammation can extent down the root canal and cause periodontitis.

• Trauma – any direct blow to the tooth can sometimes cause the pulp of the tooth to die and it may become infected by bacteria from the gum margins, leading to apical periodontitis. A sudden bite on a hard object, undue pressure during orthodontic treatment or a filling that is high can sometimes cause acute periodontitis though usually short-lived.

- Root canal treatment – mechanical instrumentation through the tooth root during treatment or chemical irritation from root-filling materials may result in inflammation of the periapical region.

- **DEFINITION OF ROOT CANAL TREATMENT**
- "**Endodontology** is concerned with the study of the form, function and health of, injuries to and diseases of the dental pulp and periradicular region, their prevention and treatment; the principle of disease being apical periodontitis, caused by infection".[4]
- Endodontic treatment
- Endodontics, from "endo" the Greek word for "inside" and "odont" the Greek for "tooth," is the branch of dentistry concerned with the morphology, physiology and pathology of the human dental pulp and periradicular tissues. The universal goal of endodontic treatment is to prevent or cure AP, caused by infection of the root canal systems of the affected teeth.[5,6] In 2 order to achieve this goal, endodontic treatment is based on exclusion of microorganisms from the root canal system. Therefore, in order to retain and treat the tooth affected by the inflamed, infected, or necrotic pulp within the root canal space is removed by the way of a chemo-mechanical instrumentation and the prepared space is obturated with a biocompatible root filling material and cement. Afterwards, the tooth will be protected and restored to full function using a crown (full coverage) or other restoration. Several reviews of the high quality prospective studies on the outcome of "current" endodontic treatment have determined that the chance of teeth without AP to remain free of disease after endodontic treatment (i.e. initial treatment or non-surgical retreatment) is 92-98% while the chance of teeth with AP to completely heal (combination of normal radiographic and clinical presentation) after endodontic treatment is 74-86%, and their chance to be completely healed or healing in a fully functional asymptomatic stage over time is 91-97%. While such favourable stage is an apparent benefit to the patient, in the case of failure, the disease may persist and would necessitate further endodontic treatment (primarily and preferably nonsurgical retreatment and if not successful, not indicated, or not feasible, then surgical retreatment)[8] to alleviate pain and/or control and heal infection. If these treatments are not successful or feasible (technically or financially) or if the patient is not motivated to pursue them then the extraction of the offended tooth may become necessary to avoid the risk of more bone loss over time that make the bony site compromised, which may make additional bone grafting necessary before further implant treatment can be performed.

AIM AND OBJECTIVE OF STUDY

AIM: This study aimed to investigate treatment decision preferences with regard to selecting between retention of a tooth with AP using RCT, versus its extraction in Jizan, Saudi Arabia.

1.Systematic review of studies on primary and secondary root canal treatment.

2.To evaluate the Choice of treatment for the Dentist, Jizan, Saudi Arabia.

3.To evaluate the Choice of treatment for the patients in Jizan, Saudi Arabia.

MATERIALS AND METHODS

Design and Distribution of the Survey

After obtaining approval from the Supervisor, a Twenty five question survey and informed consent was developed and distributed to dentists in Jizan, Saudi Arabia. Questions evaluated both their perceptions of endodontic and tooth extraction treatment prognosis as well as their current and projected utilization. Also the sources of information upon which these opinions are based were assessed. A pilot questionnaire was sent out to non-surveyed dentists from the same survey population and feedback was incorporated into the final questionnaire. Graduation rosters were obtained from the dental school but contact information could not be released, therefore the Principal Investigator (PI) had to independently research this information. Mailing addresses, phone numbers and occasionally email addresses were located online. Phone calls were made to each dentist to obtain their preferred form of communication: fax, email or postal mail. Contact information was not obtained for 50 dentists. Twenty-nine dentists were retired from dentistry and 2 were deceased. The final number of dentists surveyed was thus: 150. The web interface www.surveymonkey.com was the central form of distribution with 120 dentists choosing to be emailed; the other 30 were faxed.

Collection of survey data

The data was collected during a 1-month period. Two reminder emails, after a two week interval, were sent to the dentists who chose to be emailed. To facilitate collecting unbiased data respondents were informed that the survey was completely anonymous and identification of the participant was not linked to the individual responses. The survey was formatted so that participants were allowed to skip questions and give partial answers. Any emails that were returned as undeliverable were resent with amended correct contact information.

Data Analysis

Raw data was entered into an Excel (Microsoft Corp, Redmond, WA) spreadsheet. Data analysis was performed using SPSS (ver. 16.0; SPSS Inc., Chicago, IL, USA). Since most of the orthodontists and pediatric dentists chose not to complete the questionnaire both groups were eliminated from statistical analysis. To analyze the data from question number 21 the Z-test was used and the level of significance was set at $P<0.5$. Multinomial logistic regression and linear odds ratios were used to evaluate significant differences among groups at the 95% confidence interval. Frequency distribution analysis was used to analyze the data sets in many of the questions.

Dependent variables were extraction versus root canal treatment of a vital pulp, extraction versus root canal treatment of a necrotic pulp, extraction versus a retreatment, endodontic treatment of a salvageable or restorable tooth versus an extraction, endodontic retreatment of a failing root canal treatment versus extraction. Independent variables were years since graduation, sources of information and specialist versus general dentist.

RESULTS

An overall 75% response rate was obtained (n=150); 120 from email, 30 faxed. 61.7% responders were general dentists and 33.3% were interns and 2.5% specialists. Many of the orthodontists and pediatric dentists responded that they were not going to complete the survey since it was not in their realm of dentistry. 90.7% responders were in private practice. 63.3% responders were in the age group between 25-35 years and 34.2% responder's were below 25 years as show in the figure below.

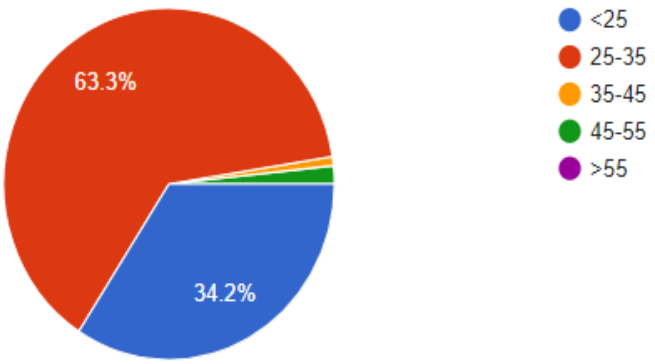

Figure No. 3: Showing the percentage age groups of Dentists.

The majority of the dentist who answered the survey were females, ranging about 80.8% responders being Females and 19.2% being Males as shown in the below figure.

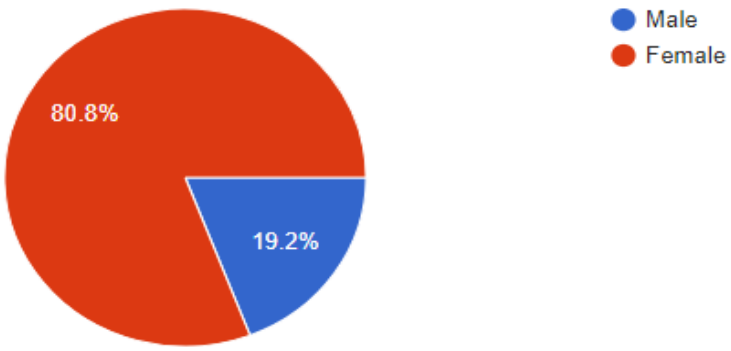

Figure No. 4: Showing the percentage of the Gender of the Dentist.

The Chart shows that 61.7% responders were General Dentist and 33.3% responders were interns.

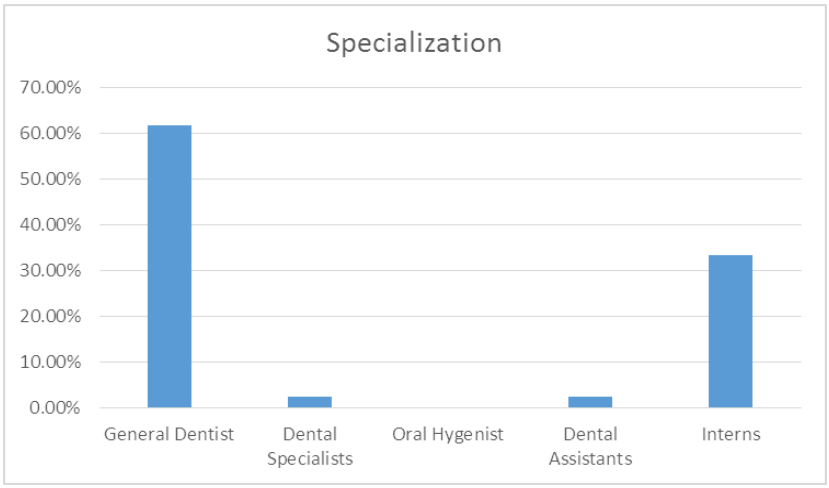

Figure No. 5: Illustrates the number of responders per specialty.

Almost 80% of the responders were experienced below 5 years and 11.5% responders were experienced in the range between 5-10 years of experienced. 54.2% of the responders said that Severe toothache pain upon chewing or application of pressure is a sign for tooth infection followed by 49.2% responders saying that Swelling and tenderness in nearby gums.

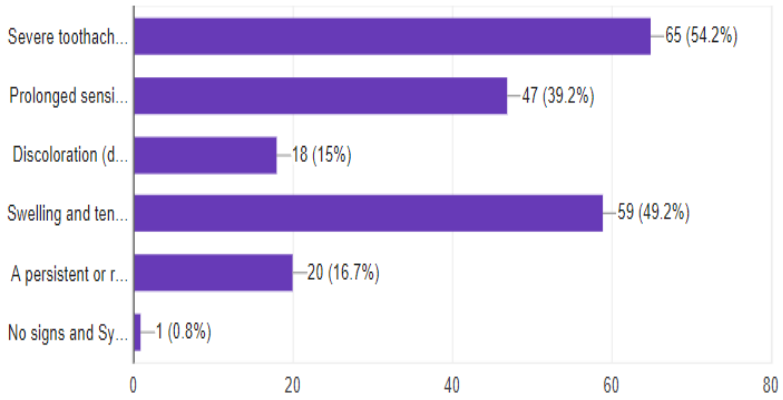

Figure No. 6: The common Signs and symptoms for tooth infection.

About 88.2% responders feel that Infection by bacteria in the Pulp of the tooth causes the tooth infection whereas 5.9% responders feel that infection by bacteria in the Enamel of the tooth causes the tooth infection among the patients in Jizan, Saudi Arabia.

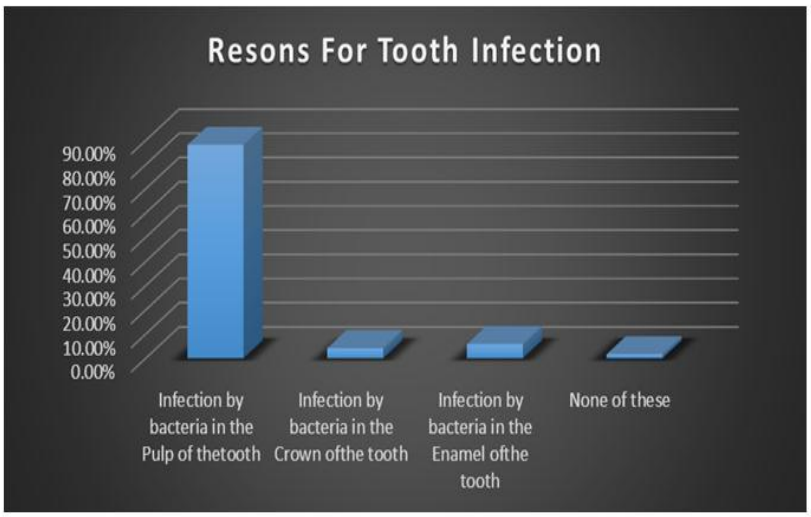

Figure No. 7: Chart showing the comparison of reasons for tooth infection.

88.3% responders confirm that tooth decay is the most common cause for the infection of the tooth with tooth abscess been the next most common cause of tooth infection with 23.3% responders confirming it.

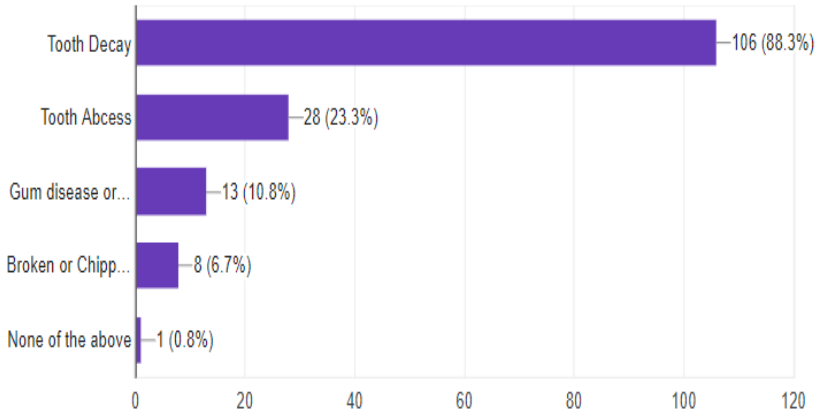

Figure No. 8: Illustrates the comparison of various causes of tooth infection.

For about 95.8% the choice of treatment of the tooth which could not be treated by medication is Root canal Treatment, and for 4.2% responder's extraction is the choice of treatment.

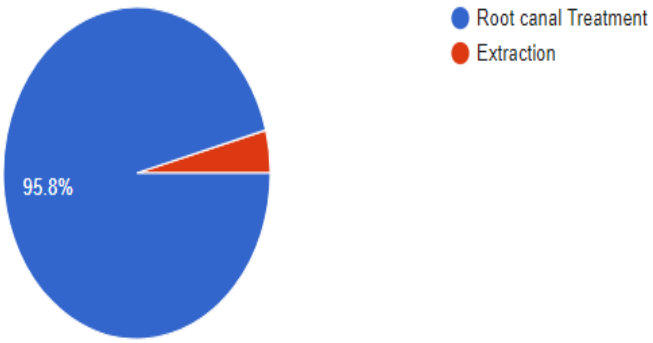

Figure No. 9: The percentage of choice of treatment for infected tooth.

About 98.3 % responders feel that Root canal treatment is better compared to extraction to treat the patients in Jizan, Saudi Arabia. 93.3% responders say that Root canal treatment is much more expensive than Extraction.

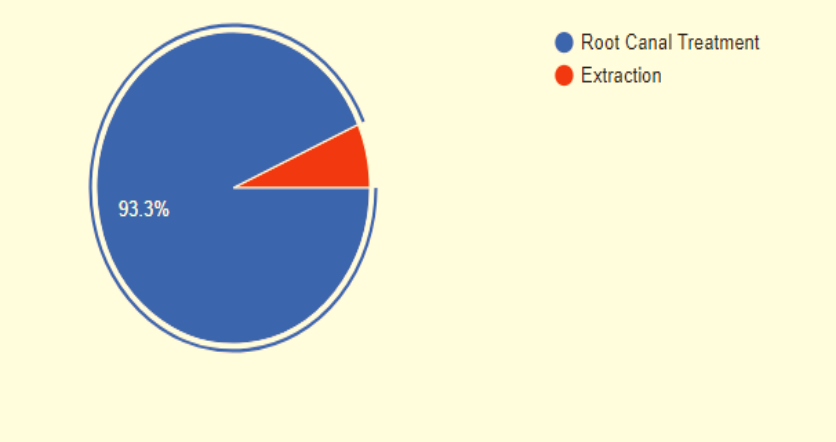

Figure No. 10: The percentage of comparison of RCT and extraction expenses.

According to 56.7% responders Extraction causes much less pain in the patients compared to 43.3% choosing Extraction to be less painful.

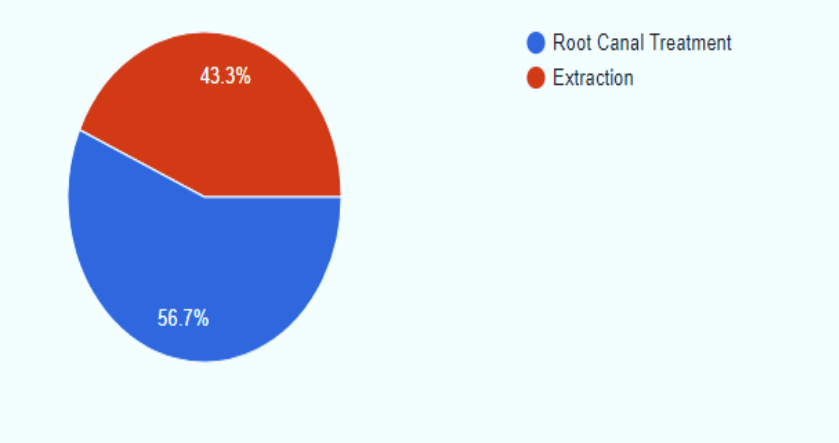

Figure No. 11: Illustrates the less painful tooth treatment.

The most common reason (55.5%) because of which the patients opt for Extraction over Root canal treatment is the Number of sittings required in the root canal treatment are more compared to extraction and 16.8% responders feel that the reason is Root canal been expensive over extraction.

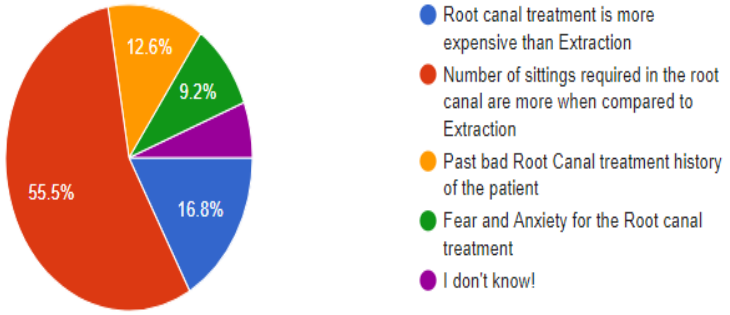

Figure No. 12: The most common reasons for opting Extraction over Root Canal Treatment.

DISCUSSION

A focus group of 8 individuals was performed in order to understand how survey questions will be perceived by respondents. This process advocated by Fowler is a valuable tool to refine question wording and refine the objectives. It is also important to determine what assumptions can be made about respondent's knowledge base. After reviewing the results of our focus group design changes were made to the lay out to decrease the number of questions per page. The literature also suggests that photo reduction (putting many questions on a page) reduces the response rate compared to when the questions are spaced more esthetically over more pages. We chose to keep the survey at 25 questions. Most of our respondents chose the electronic form of their preferred method of communication. A number of researchers have suggested that e-mail surveys cost less than mail surveys. Another positive is that electronic surveys reduce paper waste. Electronic surveys provide a faster reaction time than mail surveys.

Many studies have reported that most of their email responses arrive within two to three days following the initial e-mail contact. Although we found email to be a fast and cost effective method of distributing our survey. Individuals surveyed were contacted two weeks after the initial mailing of the survey as a first reminder and then a second reminder was emailed two weeks after the first reminder. It has been shown that the most important difference between a good survey and a poor survey is the amount of repeated contact made with the non-respondents. A response rate of 75% was obtained by this method of survey.

According to this survey, dentists feel the prognosis of root canal therapy of a tooth with a vital pulp is still superior to that of an extraction. This is in contrast to a survey of dentists in Virginia completed in 2007 where respondents preferred endodontic retreatment 66% of 26 the time over extraction. 43 Our results showed that 41% of the junior dentists disagree that retreatment is preferable to extraction and an extraction versus 50% of the senior dentists disagreeing. So our results contradicted these findings by reporting that the older dentists choose the implant more.

The recent AAE survey in part addressed this dilemma by assessing understanding of outcomes among dental educators and students. Our study complemented this data by broadening the scope of surveyed individuals to include all types of practitioners. The only area that did not increase was endodontic treatment completed by respondents. The increase in tooth treatment and referrals may be a result of an increase in insurance reimbursements by some carriers for tooth treatment. The interval of time surveyed represented a time of economic prosperity. As general dentists in the Connecticut area were overwhelmed by patient's restorative needs, their response in most cases was to increase referrals including the less complex endodontic cases.132 Over half of the survey respondents did not appreciate the difference in criteria for measuring outcome between endodontic and extraction prognosis studies. In addition, dentists reported receiving less information on endodontics compared to extraction and tooth replacement with implants. This represents an area for endodontics to educate the dental community.

CONCLUSION

- The majority of respondents were unaware that a difference in criteria for success exists between the endodontic and tooth extraction literature.
- Older dentists were the least likely to appreciate this difference.
- Dentists feel the prognosis of a vital pulp is still superior to tooth extraction. .

General Dentists have a more positive outlook on the prognosis of root canal treatment of a vital pulp than specialists.

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