

Prevalence Of Pulp Stones In Radiograph- A Retrospective Study

Research Article

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Abstract

Pulp stones are separate calcified mass that are seen in the dental pulp. Pulpal calcification can occur separately or it can be found diffused in dentin or pulpal tissue. The etiology of pulp stones is still unknown. Pulp stones are diagnosed through radiograph or by histological slides. Pulp stones are usually detected in the radiograph as radiopaque structure with different shapes and sizes. The aim of this study is to analyze the prevalence of pulp stones in Saveetha Dental College patients sample using radiographs. The study is conducted to find out the prevalence of pulp stones using radiograph among Saveetha Dental College Patients. The radiographs that consist of 96 male and 104 female radiographs were evaluated. Association of pulp stones with sex were noted. Pulp stones were seen predominantly in the males but was statistically significant ($P=0.038$; $P>0.05$). An association between age and the presence or absence of pulp stones also does not show any significant association ($P>0.05$).

Keywords: Pulp Stones; Radiograph; Pulpal Diseases; Pulp Necrosis.

Introduction

Pulp stones or denticles are nodular calcified structures that appear in either or both radicular or coronal part of the pulp [1]. It can be found in the pulp of primary and permanent dentition, healthy or diseased pulp and have been reported in unerupted teeth [2]. They are usually asymptomatic. Size and number of pulp stones found in a pulp chamber can vary from one person to another and according to the tooth type [3, 4]. Pulp stones can occur freely within the pulp tissue also in dentin [5]. In a single pulp, quantity of pulp stones can vary from 1 to 12 or more with varying sizes. The exact source of pulp stones is unknown. The pulp stones can be divided structurally as true and false pulp stones and it can also be embedded, adherent or free and morphologically diffuse or amorphous which is more irregular in shape compared to the false type of pulp stones. True pulp stones are known to be lined by odontoblasts and They are comprised of tubular structure resembling the dentin. Hence, it is presumed that epithelial mesenchymal interactions causes true pulp stones

[6]. They are usually found in radiographs as radiopaque structure within the pulp chamber or root canal with variable shapes and sizes [5]. Pulp stones can be seen in all tooth types predominantly in molars [7-9].

Pulp stones are associated with some systemic conditions like dentin dysplasia, cardiovascular diseases, dentinogenesis imperfecta and Vander woude syndrome [10]. Although the etiology and pathophysiology of pulp stones is unknown, numerous etiological elements have been affirmed to cause the formation of pulp stones, which includes aging, attrition, compromised blood supply of the pulpal tissue, orthodontic treatment, abrasion, caries, epithelial rest in pulp tissue, degeneration of pulp tissue, operative procedures, and periodontal pathology. Pulp stones in the root canal acts as an obstacle during endodontic procedures [11]. A correlation was identified and determined between the chronicity of the renal disease and the pulp narrowing in bicuspid and molar enamel [12]. The outcome of endodontic therapy also been associated with the preoperative diagnosis of the tooth, microbial factors, maintenance of root canal treatment

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standards and individual factors such as the dentist knowledge, attitudes and skills [13]. Denticles, formed as the result of epithelio-mesenchymal interactions, are composed of tubular dentin in the earliest stage of their development. Odontoblasts line the periphery of the denticles, but as the diameters of these calcified bodies increase, most or all of the odontoblasts become reduced in height and apparently perish [14]. Even with the introduction of modern rotary instrumentation, complete cleaning of canals is reported to be very difficult [15]. Better endodontic outcome are achieved when canal is preserved by using less invasive method [16]. Ultimate aim of root canal treatment is to completely eliminate microorganisms from root canal system through mechanical and chemical debridement [17]. Effective and efficient infection control in the dental office is essential for the safety of patients and to ensure that productivity does not suffer [18]. A considerable percentage of dental pain originates from acute and chronic infections of pulpal origin, which necessitates operative intervention, rather than antibiotics [19]. The main aim of root canal therapy is the removal of microbial contaminants in conjunction with the total closure of the root canal system [20].

The aim of this study was to assess the prevalence of pulp stones in the adults based on age and gender.

Materials and Methods

Study population

The archived patient records of the department of Oral Medicine and Radiology, Saveetha Dental College were collected and the data was assessed from the time period of June 2019 - April 2020. During this time period a total of 86000 case records were collected. From this population 42350 cases had radiographs taken for the patients.

Sample Size calculation

From this record of 86000 cases, on purposive convenience sampling a total of 200 samples were decided to be included in the study.

Ethical Clearance

Ethical clearance was obtained from the Institutional Ethics Committee of Saveetha Dental College(SDC/SIHEC/2020/DI-ASDATA/0619-0320).

Data Collection

The selected samples were examined by three people; 1 reviewer, 1 guide and 1 researcher. The patient data were picked up from the case sheets and the variables recorded were the age, gender, and the presence or absence of pulp stones. The data was randomly cross verified by either recalling the patients and having telephonic conversations with the patient. The main advantages of this study were that the data was all prevalidated and the main disadvantages were that it was a unicentric study and only a single ethnicity of the population was studied.

The internal validity of the study was established as the data was collected from a verifiable and standardised database. The external validity is established as the data is from a clinical setup which is duplicatable.

Data Analysis

From the variables collected, the independent variables were the age and gender and the dependent variable is the presence or absence of pulp stone. A pretested format was used to record the data. Data analysis was done using SPSS PC Version 23.0 (IBM; 2016) software for statistics. Both independent and dependent variables were recorded and analysed using chi-square test.

Results and Discussion

Results showed that, in this study it was observed that the prevalence of pulp stones were higher in females than in males. Graph 1 shows prevalence of pulp stones with age distribution. The people in the age group of 31-60 had 108 patients followed by 65 patients in the 1-30 year age group and 27 patients in 61-90 years age group. Graph 2 shows frequency of males and females in this study which is 96 males and 104 females. Graph 3 shows presence and absence of pulp stones in the radiographs assessed based on the gender. In males a total of 27 patients had pulp stones and in females a total of 19 patients had pulp stones. An association analysis reveals no significant association ($P > 0.05$). Graph 4 shows the association between the age group and the presence or absence of pulp stones where it was seen that 31-60 year age group had the maximum number of pulp stones but was not significant ($P > 0.05$).

In the present study IOPA was the criteria for the identification of pulp stone, although the best method is microscopy which re-

Figure 1. Bar Graph showing the age distribution of patients. X axis gives the age group and Y axis gives the percentage of cases. From the graph it can be inferred that majority of patients are seen in the 31-60 year age group with 54.00% (108).

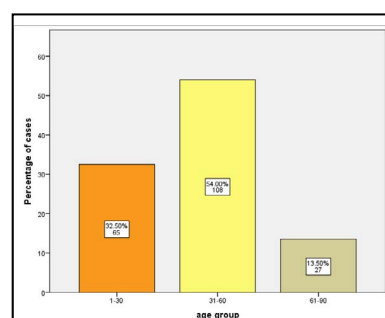


Figure 2. Pie chart showing the gender distribution of the samples. The blue colour denotes male and green colour denotes female. The predominant gender is female (Green) which is 52% and followed by male (blue) 48%.

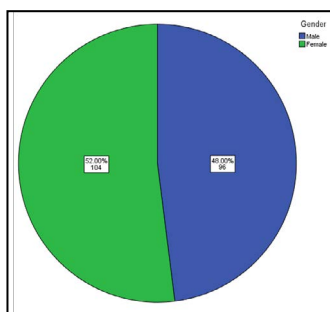


Figure 3. Bar graph showing association between presence and absence of pulp stones with gender. X-axis represents the presence/absence of pulp stones and Y-axis represents the percentage of cases. The majority of cases did not have pulp stones. Chi-square association was done between gender and presence of pulp stones (Chi square - 2.7 df-1 p-0.038(p<0.05)) which is statistically significant implying gender and the presence of pulp stones have an association.

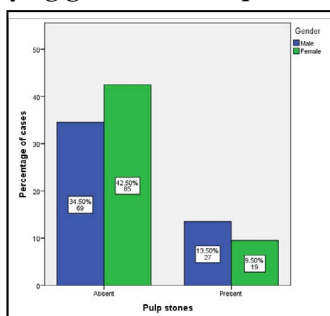
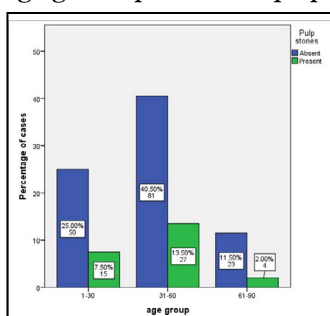


Figure 4. Bar graph showing the association between presence of pulp stones and age group. X-axis represents the age group, Y-axis represents the percentage of cases. Majority of pulp stones were seen in the 31-60 year age group. Chi-square association was done between the presence of pulp stones and age group (chi-square-1.266, df-2, p-0.05(p>0.05)) which is statistically not significant implying age and presence of pulp stones don't have an association.



ports more frequency because of its high level of accuracy. However, radiography method is considered as a non-invasive method as well as most common. Pulp stones may provide useful information in forensics during examination of dental records to identify deceased persons. It would appear that pulp stones are primarily a physiological manifestation and may increase in number and/or size as a result of local or systemic pathology. The aetiological factors involved in pulp stone formation are still not fully apparent. The prevalence of pulp stones in teeth, by radiographic examination method, has been reported to be around twenty to twenty-five percent while histological examinations reveal higher percentages [21].

In this study it was observed that patients who have prevalence of pulp stones are higher in females than males, (p>0.05). Graph 1 shows 48% males and 52% females among the study population. Graph 2 shows the presence of pulp stones, 23% while absence of pulp stones, 77%. A supporting study by Sisman et al shows that pulp stones were more frequently seen in females than in males [2]. Whereas in another contradicting study by Baghdadly

et al it was noticed that pulp stones were more in males than females [22]. No significant gender difference with the occurrence of pulp stones was noticed in a study by Fatemah et al. A study done by M.A Fysal Yousuf et al [12] used radiograph assessment in analysis of prevalence of pulp stones, and reported that subjects were observed with pulp stones. From the study, the prevalence of pulp stones was found to be greater in women than men which is similar to our study. The distribution and prevalence of pulp stones according to gender of patients found to be detected 65% of female subjects and 35% of male subjects. In another study by Kalaji Mn et al, the overall prevalence of pulp stones was 18% for individuals which is 170 out of 913 subjects. However, no significant difference in the occurrence of pulp stones was detected between genders or among age groups. A study conducted by Gulsahi A et al shows that amongst the 13474 teeth examined, 627 had pulp stones which is 5%. There was no significant difference between pulp stones occurrence and gender. However, the prevalence of pulp stones increased with age.

Limitations to this study include limitation to geographic area,

data may have discrepancies and single ethnicity was used.

Future scope: This study can be utilised to to larger scope of exploration in regards to presence of pulp stones with a more widely carried out study in different parts of the world not just confined to a single geographical location.

Conclusion

Pulp stones do not show any clinical symptoms however proper assessment is important in endodontic treatment. Within the limits of the study, the prevalence of pulp stones is more in males than in females which is statistically significant and it has no association to age but the results are not statistically significant.

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