Correlation of pulp stone prevalence with dietary habits - A pilot study

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Abstract

This study was aimed at determining the relationship between prevalence of pulp stones and dietary habits. A total of 58 patients in the age range of 20 to 24 years who were referred for full mouth radiographic survey to the Department of Oral Medicine and Radiology, KVG Dental College & Hospital, Sullia were selected for the study. A Detailed history of their diet habits was obtained. Bitewing radiographs of the posterior teeth was taken and evaluated for the presence of pulp stones. Results were tabulated and analyzed. Out of 58 patients, 22 were vegetarians and 36 were non-vegetarians. 12/22 (54.54%) vegetarians and 24/36 (66.66%) non vegetarians had pulp stones respectively. Maximum number of teeth affected in a single patient was 6 in vegetarians with a mean occurrence of 2.5 teeth per patient (15.62%). In non-vegetarians, maximum number of teeth
affected in a single patient was 10 with a mean occurrence of 4.16 teeth per patient (26%). Average size of pulp stones was larger in non-vegetarians compared to vegetarians. We conclude that pulp stones are found to be more prevalent in non-vegetarians as compared to vegetarians. They were involving more number of teeth and their size was comparatively larger.

**Introduction**

Pulp stones are calcified masses in the dental pulp of healthy, diseased or unerupted teeth. Stones may exist freely within the pulp or be attached to or embedded in dentin. Their size ranges from small microscopic particles to large masses that almost obliterate the pulp chamber. They are reported to occur more often in the coronal region but are also found in the radicular pulp. Being a degenerative disorder, pulp stone is more prevalent in old age. Occasionally they are seen in younger age. Dental caries, operative procedures, periodontal diseases, orthodontic tooth movement including genetic predisposition and idiopathic factors are the proposed etiologies of its occurrence in the early age. Considering the contribution of all these factors, a hypothesis was drawn that an Individual’s dietary intake may also play a role in the formation of pulp stone. For the purpose of verifying this hypothesis, a pilot study was undertaken to evaluate the relationship between dietary habits and the occurrence of pulp stones.

**Materials and Methods**

58 patients in the age range of 20-24 years who were referred to Department of Oral Medicine and Radiology, KVG Dental College & Hospital, Sullia for full mouth radiographic survey formed the study group. Subjects having full complement of non-curious posterior teeth and healthy periodontium or with minimal caries and / or restoration were included under the study. Restorations, if any were limited to enamel or shallow dentin. Subjects with class V restorations or those who have undergone previous radiographic survey and subjects with history of traumatic injuries to teeth, systemic diseases, tooth extraction due to pulpo-periapical lesions were excluded from the study. Following an informed consent, details of the subject’s food habits were documented in a proforma specifically designed for the study.

Bitewing radiographs were taken using Rinn - Extension Cone Precision Instruments under the exposure parameters of 70 KVP and 8mA for 0.4 seconds. Four bitewing radiographs to cover premolars and molars were obtained from each patient.
Radiographs were evaluated for the evidence of pulp stones with the help of low power magnification lens by the authors to determine the presence or absence of pulp stones. Only pulp chambers of posterior teeth were evaluated. According to their shape, pulp stones were recorded as round/oval/irregular/diffuse. Size of the pulp stones were measured with the help of a caliper. The results were tabulated and analyzed.

Results

Fifty eight subjects aged 20 – 24 yrs (mean 22 years) were examined. 22 of them were vegetarians and 36 non vegetarians. The mean occurrence of pulp stones in this study group was 60.6%. 12/22 (54.54%) vegetarians and 24/36 (66.66%) non vegetarians had pulp stones respectively.

In the vegetarian group, mandibular arch was frequently involved. Seven (58.33%) had pulp stones only in the lower arch; two (8.33%) had pulp stones only in upper arch whereas three (25%) subjects had pulp stones in both the arches. Maximum number of teeth affected in a single patient was 6 with a mean occurrence of 2.5 teeth per patient (15.62%). Mandibular molars were frequently involved with occurrence rate of 50%, followed by maxillary molars (23.33%) and mandibular premolars (20%). Maxillary premolars were least affected with occurrence rate of 6.66%.

50% of the pulp stones were more than 2 mm in size, 26.66% were 1-2mm and rest 23.33% were less than 1mm. majority of them were irregular in shape (43.33%) followed by diffuse calcifications in the pulp chamber (23.33%), round (20%) and oval (13%).

In the non-vegetarian group, majority of cases (62.5%) had pulp stones in both the arches; seven (29.16%) had pulp stones only in lower arch and two (8.33%) had in upper arch alone. Maximum number of teeth affected in a single patient was 10 with a mean occurrence of 4.16 teeth per patient (26%). pulp stones were almost equally present in maxillary molars (42%) and mandibular molars (41%) followed by maxillary premolar (9%) and mandibular premolars (8%). 54% of pulp stones were more than 2 mm, 36% were 1-2 mm and 10% were less than 1 mm. majority of the lesions had irregular shape (46%) followed by diffuse calcifications (24%) and round and oval (15% each).

Discussion

The study group included 59 patients between the age of 20 and 24 years. Even though the etiology of pulp stones is not well understood, it is considered by many authors as a degenerative disorder since the
probability increases as the age advances.\textsuperscript{3} Degenerative changes are less likely in the second decade of life. Patients with large carious lesions or restorations and periodontal diseases were excluded because these factors can normally induce pulp stones. Patients with class V restorations are excluded from the study because of possible false negative results in the bitewing radiographs. Patients with missing posterior teeth were excluded from the study. Bitewing radiographic technique was chosen over the periapical radiographs due to better visualization of pulp chamber.\textsuperscript{5,6} Only posterior teeth were considered for the study.\textsuperscript{2}

Prevalence of pulp stones in our study was 60.6\% in the age group of 20 – 24 years. Previous studies show that the prevalence of pulp stones above 40 years is 90\%.\textsuperscript{7} In teenagers of 12 - 13 years of age, occurrence was 19.2\%.\textsuperscript{2} In a study by Hamasha and Darwazeh, between the ages of 18-69 years, the frequency of pulp stones was 51.4\%.\textsuperscript{8} In another study, in the Australian dental students of age 17-35 years the incidence of pulp stones was 46.1\%.\textsuperscript{9} The true prevalence of the pulp stones may be higher because those with a diameter less than 200 \(\mu\)m cannot be appreciated in radiographs.\textsuperscript{10}

In the present study, teeth in the mandibular arch were more frequently involved with pulp stones in vegetarian group, whereas both maxillary and mandibular arches were almost equally involved in non-vegetarian group. Baghdady et al found significantly higher number of pulp stones in mandibular teeth.\textsuperscript{2} In our study, 78\% of patients had pulp stones in molars which are comparable with the findings of Tamse et al, who found higher prevalence of pulp stones in molars than in premolars.\textsuperscript{11}

In the study group 52\% of the pulp stones were more than 2 mm in size. 44.66\% stones were irregular and diffuse. According to Nitzan et al, increased incidences of diffuse calcifications are seen till 25 years. Thereafter they remain constant in the successive age.\textsuperscript{12} In their light microscopic study, Yaacob and Hamid (1986) found that free or attached pulp stones are the most common forms of pulp calcification.\textsuperscript{13}

The present study demonstrated a higher incidence of pulp stones in subjects following mixed diet. So also, greater number of teeth was involved in them and the size of the pulp stones was larger. This increase in occurrence of the pulp stones are may be due to higher masticatory forces exerted by non-vegetarians or due to increased calcium input in their diet.

The existing classification of pulp stones as true/false/diffuse and embedded/attached/free is based on histological examination. This
differentiation could not be appreciated in the radiographs during our interpretation. We therefore suggest a new classification of pulp stones based on the radiographic appearance of their anatomy as: round, oval, linear and irregular. Depending on their size, they can further be classified as: S0 - No pulp stones; S1 - Pulp stones less than 1mm; S2 - Pulp stones between 1-2 mm; S3 - Pulp stones more than 2mm; and SR – Pulp stones in the root canal.

Conclusion

Pulp stones are primarily a physiological degenerative process and may increase in number and/or size with advancing age. The etiological factors involved in their formation are still unknown. Within the limitations of a pilot study, this clinical work explains that there is significant association between the occurrences of pulp stones and dietary habits. However, in order to establish a definitive relationship, the study has to be done with larger sample size. Moreover a genetic background also has to be investigated as most of the patients with pulp stones in this study were from coastal areas of Kerala.

References


