



PREVALENCE OF CORONAL PULP STONES IN RELATION TO CARDIAC AND THYROID DISORDERS: A SURVEY IN GUJARAT STATE POPULATION.

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ABSTRACT

Aim: To investigate the prevalence of coronal pulp stones in relation to Cardiac and Thyroid Disorders amongst Gujarat state population. **Materials And Methods:** Patients with cardiac disorders and patients with thyroid disorders of various parts of the Gujarat state, were involved in the study. Proper clinical history was recorded and after fulfilling the inclusion criteria, obtaining ethical clearance and patient's consent, the respective patient was included in the study for collecting the required data. Only the First Molars of all the four quadrants were considered for the study. A digital radiograph, (RVG) of all the first molars, of each patient, was recorded to check for the coronal pulp stones. The Data obtained was recorded and documented followed by statistical analysis. **Result:** The result values obtained were statistically significant ($p < 0.05$), for both patients with cardiac disorders and patients with thyroid disorders. **Conclusion:** Thus, it can be concluded that patients with cardiac disorders and patients with altered levels of thyroid hormones, do have a correlation with the prevalence of coronal pulp stones, in the Gujarat state population.

KEYWORDS : Cardiac disorder; Prevalence; Pulp stone; Thyroid disorder.

INTRODUCTION

Calcific masses in dental pulp, are known as pulp stones. They may be seen in healthy, pathologically affected, unerupted or impacted teeth¹. Pulp stones can be nodular, calcified masses present in coronal and/or root portions of the tooth. Teeth with pulp stones may appear quite normal in other respects. They are usually asymptomatic unless any impingement on the nerves or blood vessels. According to Johnson and Bevelander, a single tooth may have stones ranging from 1 to 12 or even more, with varying sizes that can occlude the pulp space². The etiology of pulpal calcifications is unknown². Pulp stones have been observed in patients with systemic or genetic disease like dentin dysplasia, dentinogenesis imperfecta and Vander Woude syndrome. Also, hypercalcemia, gout and renal lithiasis have been proposed to be pre-disposing factors for pulpal calcifications. Edds et al., reported that 74% of patients with reported cardiovascular disease had pulp stones. Bernick reported that calcifications were seen in patients with cardiovascular disease².

Osteopontin is found to be a new constituent of atherosclerotic plaques playing a role in plaque calcification³. Various factors thought to be the etiology behind the presence of pulp stones are age, genetic susceptibility, pulpal degeneration, circulatory derangements in the pulp, inductive interaction between the pulpal tissue and the epithelium and orthodontic tooth movements apart from a plethora of other factors and the unidentified, idiopathic ones⁴. Some authors have suggested that pulp stones can be caused as a result of an irritated pulp, attempting to repair itself⁵. Pulp stones are most commonly seen in molars⁵. Molars have been recorded for higher incidence of pulp stones compared to other teeth⁶. Pulp stones were present in 9.6% of all the teeth teeth examined, being most common in maxillary molars, followed by molars⁷. It becomes a challenge when a pulp stone is encountered in extirpating the pulp during endodontic treatment². Thus, presence of calcifications, might serve as a precursor to underlying systemic conditions. Thus, the following survey was carried out in Gujarat state population to check the prevalence of coronal pulp stone in patients with cardio-vascular disease and thyroid disorders, as such a survey has not been carried out for Gujarat state population.

Methodology

A total of 100 patients (50 of each condition), were included in the survey. Patients belonged to different cities of Gujarat State within the age group of 20-70 years. Patients were selected based on the criteria mentioned below.

Inclusion Criteria:

Patients with:

Cardiovascular Disease (CVD)
Thyroid Disorders

Exclusion Criteria:

Carious teeth involving pulp
Restored Teeth
Teeth with prosthesis
Pregnancy
Radiotherapy

Patient with more than one systemic condition other than the one being investigated.

For the patients with cardiovascular disease (CVD), a recent physician's report was investigated. All the patients with ongoing medication for the same and/or any history of cardiac episode or interventional treatment within the period of last one month were included in the survey. A written consent from the patient and their physician was recorded.

For the patients with thyroid disorder, a recent thyroid profile investigation was advised and physicians's opinion was sorted. Those patients who were on medication though with controlled levels of thyroid hormones, were included in the survey, along with those who have had been on medication for thyroid disorder in past less than a month.

All the participants were informed about the procedure and following their written consent, they were included for the study. Necessary precautions, like lead apron and thyroid collar were taken before subjecting the patients to the x-ray. Portable X-ray unit and RVG machine were used to minimize patient discomfort and radiation. Once patients were selected for the survey, a Radio Visuo-Graph (RVG) of Maxillary and Mandibular; Right and Left Molars of each patient was recorded. The radiographs were observed for the presence or absence of coronal pulp stones. The RVG recorded were documented digitally, analysed and noted under observation.

The Data obtained is as follows in Table 1:

Prevalence of Coronal Pulp Stones in Patients with Cardiac and Thyroid Disorders		
	Cardiac	Thyroid
Pulp Stone Present in Total No. of teeth	135	120
Pulp Stone Absent in Total No. of teeth	65	80
Total No. Of teeth	200	200
Percentage	67.5%	60%

Table 1: Data Showing The Prevalence Of Coronal Pulp Stones In Patients With Cardiac And Thyroid Disorder

This Data was subjected to statistical analysis with Chi Square Test using SPSS Software and following result was obtained, as shown in Table 2.

Comparison of prevalence of Coronal Pulp Stones in Patients with Cardiac and Thyroid Disorders		
	Cardiac	Thyroid
Pulp Stone Present in Total No. of teeth	135	120
Pulp Stone Absent in Total No. of teeth	65	80
Total No. Of teeth	200	200
Chi Square with Yates correction	2.124	
df	1	
Chi Square P value at significance level 0.05	0.145	

Table 2: Comparison Of Prevalence Of Coronal Pulp Stones In Patients With Cardiac And Thyroid Disorders

DISCUSSION

In our survey, a total of 100 patients were included and a total of 400 molars were examined. Amongst them, 50 patients were having CVD and 50 with Thyroid disorder. All first molars of each patient were examined and thus a total of 400 molars, with 200 for each condition, were examined for the study.

As recorded in the result table, for the patients with CVD, amongst the 200 observed molars, 135 molars showed the presence of coronal pulp stones and 65 molars did not show any presence of coronal pulp stones. Leila et al found out that 68.2% of the patients with CVD showed pulp chamber calcifications. Paiva concluded higher incidence of pulpal calcification in subjects with coronary atherosclerosis. Nayak et al reported that patients with CVD had the maximum pulp stones in comparison to other systemic diseases. Edds et al proposed that 74% of the patients with a history of CVD showed pulp stones⁸. The risk factors may vary with regional change⁹. It has been confirmed by cardiologists that calcium phosphate crystals generating inflammation within the arteries also play a major role in acute myocardial infarctions (MIs). All calcifications like joint calcifications, renal stones, atherosclerotic plaques and pulp stones are made up of calcium phosphate crystals. Zeng *et al.* elaborated that calcifying nanoparticle (CNPs) also called nanobacteria, give an explanation for pathological calcifications since they have been documented in the blood and blood products. The production of nucleate hydroxyapatite crystals by CNPs act as a key factor of these pathological calcifications⁴. Thus, correlating these facts with the data obtained through our survey, it suggests that there does exist correlation between the prevalence of CVD and presence of coronal pulp stones, in Gujarat state population.

Next, considering the patients with thyroid conditions, amongst the 200 observed molars, 120 molars showed the presence of coronal pulp stones and 80 molars without coronal pulp stones. Due to altered levels of thyroid hormones, there have been multiple oral manifestations. These may directly or indirectly affect the internal anatomy of the teeth, one of them being presence of coronal pulp stones. Periodontal diseases, Rheumatoid arthritis, osteoporosis these are some of the major conditions linked with altered level of thyroid hormone. These are thought to be causing disturbed blood and nutritional supply along with altered blood calcium level⁹. Dentin Dysplasia, is also considered as one of the common oral findings in patients with thyroid abnormality. According to a case report, published in 2017 in the Journal of Indian Academy of Oral Medicine & Radiology, Dentin Dysplasia poses higher chances of presence of pulp stones¹⁰. According to a review article on a case of hypothyroidism, published in 2018 in International Journal of Oral Health Sciences, due to other systemic conditions, mainly cardiac causes, there may be ectopic calcifications in the patient's body, which suggests the cause of prevalence of coronal pulp stone in patients with thyroid disorders.¹¹

In our study we have considered first molars, as numerous studies have shown the highest prevalence of pulp stones seen in molars compared to the other teeth of the oral cavity.^{6,7} Also, only first molars have been considered in our study as literature suggests these to be highly prone to prevalence of pulp stones.¹²

In the present survey, we haven't recorded any significant difference between gender predilection or the arch predilection.

Thus, to summarize, the data and the result from the current study

suggests that oral findings like presence of coronal pulp stones can serve as an early predictor for systemic conditions like Cardiovascular disease or Thyroid disorder.

CONCLUSION

Thus, within the limitations of the study, we can conclude that, there does exist a correlation between the prevalence of coronal pulp stones in patients with cardiovascular disease and Thyroid disorder, in Gujarat state population.

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