



# PULP STONE;

## A STUDY ON RADIOGRAPHIC ASSESSMENT OF PULP STONE

1. BDS, FCPS  
Assistant Professor Operative  
Dentistry  
LUMHS.
2. BDS, FCPS  
Professor Operative Dentistry  
LUMHS.
3. BDS, MSc  
Lecturer  
Oral & Maxillofacial Surgery  
LUMHS.
4. BDS, MSc  
Lecturer Operative Dentistry  
LUMHS.

**Correspondence Address:**  
Dr. Salman Shams  
B ½ Sajjadabad Society Near  
Citizen Colony Hyderabad, Sindh.  
salman\_omfs@hotmail.com

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**Mahwish Memon<sup>1</sup>, Feroze Ali Kalhoro<sup>2</sup>, Salman Shams<sup>3</sup>, Saba Arain<sup>4</sup>**

**ABSTRACT... Objectives:** To detect the pulp stone radiographically and to investigate any association between the occurrence of pulp stone with age, gender, tooth type, dental arch and tooth status. **Study Design:** Prospective study. **Setting:** Department of operative dentistry LUMHS Jamshoro. **Period:** January 2014 to June 2014. **Methodology:** A total of 150 patients were randomly selected who came for treatment. All those patients with age range of 11-50 year who had undergone a diagnostic radiographs of premolar and molar region were included in this study. **Results:** Out of 150 patients pulp stones were detected in 66 patients (44%). we reported 42 females (48.27%) and 24 males (42.8%). most of the pulp stones were detected in patients with age 21-30 years (52.9%) followed by 31-40(42.8%). 540 maxillary and 420 mandibular teeth out of 960 total teeth and pulp stones were detected in total 124 teeth 76 maxillary and 48 mandibular. **Conclusion:** Pulp stone was found more in sound teeth followed by carious teeth and involved mostly molars.

**Key words:** Pulp Stone, Premolar, Molar, Calcification.

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## INTRODUCTION

Calcification of dental pulp may be diffuse and discrete in form. Discrete calcification may result in formation of pulp stone. Pulp stone also called as denticles or nodules. Diffuse calcification results in symmetric reduction in the size of pulp chamber and radicular pulp space.<sup>1</sup> Pulp stones can be found in healthy, diseased and even unerupted teeth. They have calcium phosphorous ratio similar to dentin.<sup>2,3</sup> They are found more frequently in coronal part of the pulp chamber than radicular canal. Radiographically they appear as radio opaque masses inside radiolucent pulp chamber.<sup>2</sup>

Pulp stones are classified according to structure as 'True' and 'False'. True pulp stones are rare and contain dentin with distinct dentinal tubules lined by odontoblasts. False pulp stones contain concentric layers of mineralized tissue formed by surface accretion around blood thrombi, dying or dead cells, or collagen fibers based on location, pulp stones can be embedded, adherent and free.<sup>4</sup>

Exact cause of pulp stone formation is largely unknown but The implicated factors for pulp stone formation include age, caries, restoration, long standing pulpal irritation, circulatory disturbances in the pulp, orthodontic tooth movement, transplantation of tooth, trauma and systemic problems like cardiovascular diseases<sup>5</sup>. There is also genetic predisposition and sometimes it is considered idiopathic.<sup>6,7</sup>

Prevalence of pulp stones by various studies have been reported to range from 8%-90%.<sup>8</sup> According to radiographic examination the prevalence is around 20%-25%.<sup>9</sup>

The purpose of this study is to detect the pulp stone radiographically and to investigate any association between the occurrence of pulp stone with age, gender, tooth type, dental arch and tooth status.

## MATERIAL AND METHODS

This prospective study was carried out at department of operative dentistry LUMHS

Jamshoro from January 2014 to June 2014. A total of 150 patients were randomly selected who came for treatment. All those patients with age range of 11-50 year who had undergone a diagnostic radiographs of premolar and molar region were included in this study.

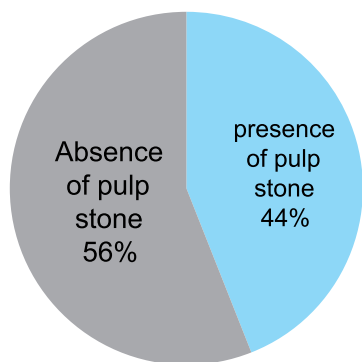
The radiographs were not taken for the purpose of study. radiographs examined were periapicals and bitewings and viewed under x ray viewer in a dimmed room. among those 150 patients a total of 960 teeth were examined. Patients demographics age, gender were recorded in a proforma. The tooth was scored as having a pulp stone when a radiopaque mass was present inside the radiolucent pulp chamber. The status of each tooth was categorized as (i) sound (ii) carious (iii) restored. Tooth type, site and dental arch was also recorded on proforma.

The data was analyzed on SPSS version 17 using Pearson chi square test.

**RESULTS**

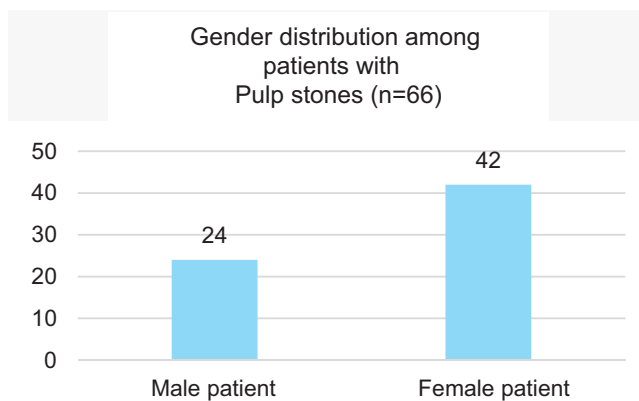
Out of 150 patients pulp stones were detected in 66 patients (44%) as shown in Figure-1.

**Total patient screened n=150**



**Figure-1.**

Out of 66 patients, we reported 42 females (48.27%) and 24 males (42.8%) as shown in Figure-2.



**Figure-2.**

In this study most of the pulp stones were detected in patients with age 21-30 years (52.9%) followed by 31-40(42.8%). Age distribution of patients in which pulp stone were positive is shown in Table-I.

Patient age (y)	No. of patients examined	No. of patients with pulp stones	% of patients with pulp stones
11-20	12	04	33%
21-30	68	36	52.94%
31-40	42	18	42.85%
41-50	28	08	28.57%

**Table-I. The distribution of pulp stones by Age.**

We examined 540 maxillary and 420 mandibular teeth out of 960 total teeth and pulp stones were detected in total 124 teeth 76 maxillary and 48 mandibular.

We detected more pulp stone in maxillary arch (14.07%) than the mandibular arch (11.42%). 1<sup>st</sup> molar was the mostly commonly involved tooth with pulp stone in both archs. Distribution and percentages of pulp stone among dental arch and tooth type is shown in Table-II and III.

	No. of Teeth Examined	No. of Teeth with Pulp Stones	%
Maxillary arch	540	76	14.07%
Mandibular arch	420	48	11.42%
Total	960	124	12.91%

**Table-II. Distribution of pulp stones by dental arch.**

Maxillary Arch	No. of Teeth Examined	Teeth with Pulp Stone	% of Teeth with Pulp Stones
1 <sup>st</sup> PM	55	01	1.8%
2 <sup>nd</sup> PM	85	03	3.5%
1 <sup>st</sup> M	200	43	21.5%*
2 <sup>nd</sup> M	200	30	15%*
Mandibular arch			
1 <sup>st</sup> PM	55	01	1.8%
2 <sup>nd</sup> PM	65	02	3.07%
1 <sup>st</sup> M	145	29	20%*
2 <sup>nd</sup> M	140	16	11.42%

Table-III. Distribution of pulp stone by Tooth type.

Tooth Status	No. of Teeth with Pulp Stone	%
Sound	59	47%
Carious	47	37.9%
Restored	18	14.5%

Table-IV. Association of pulp stone with tooth status.

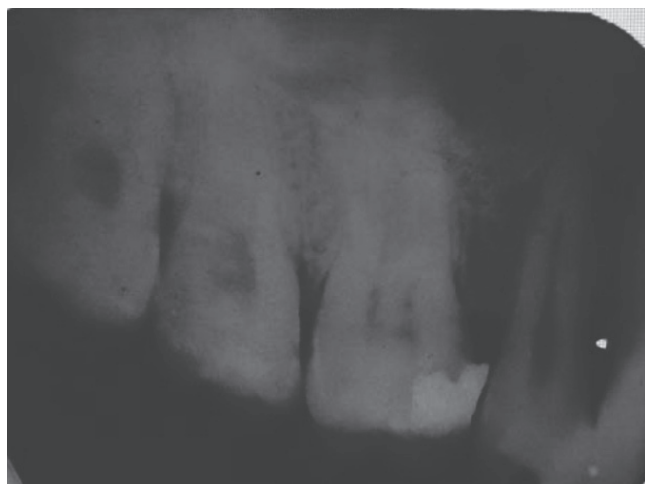


Figure-3. Pulp stone associated with maxillary 1<sup>st</sup> molar

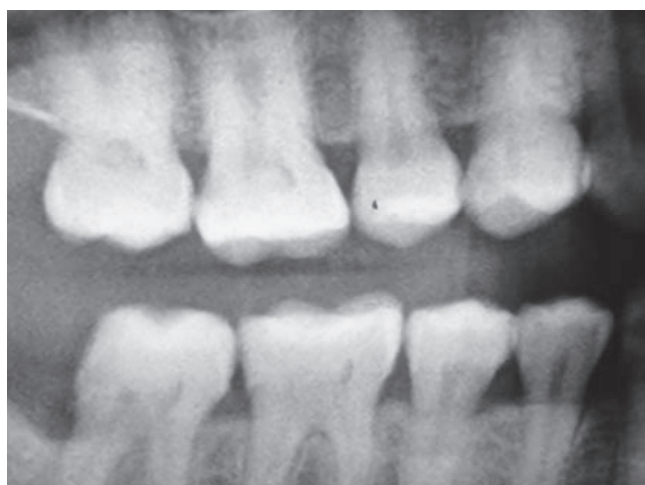


Figure-4. Pulp stone associated with intact molars

### DISCUSSION

Pulp stones can only be detected on radiographs when they are larger than 200µm in diameter.<sup>8</sup> Radiographs are the non-invasive technique of detecting the pulp stone in a clinical setting.<sup>5</sup> True prevalence is higher in microscopic examination of teeth than figures from radiographic studies.<sup>8</sup> In this study we used periapical and bitewing radiographs to detect presence of pulp stones. kannan et al<sup>10</sup> stated that bitewing do not show the complete radicular pulp, so they examined only periapical x-rays. However Tames et al<sup>11</sup> stated no significant difference in the identification of pulp stones by bitewing and periapical radiographs.

According to renjitker et al the reported prevalence of pulp stones in 217 Australian dental students were found to be 46% of the subjects and 10% of the teeth.<sup>5</sup> Another study on prevalence of pulpstones reported incidence to be 4.8% in 747 out of 15,326 teeth examined.<sup>12</sup> Kannan et al<sup>10</sup> examined 361 Malaysian and reported 44.9 of the subjects with pulp stones and 15.7% of the teeth examined.

In our study prevalence was higher in females compared with males. This is in accordance with previous studies which reported higher prevalence in women.<sup>10,13</sup>

In the present study the maximum numbers of pulp stones were detected in 21-30 years of age group followed by 31-40 years. This may be because most of the patients examined were in this age group. However, previous studies reported older adults i.e more than 60 years had significantly higher prevalence of pulp stones. In our study, more pulp stones were detected in maxillary arch than mandibular. This was in agreement with the Rangitker S.<sup>5</sup> Similar frequencies in both maxillary and mandibular arch<sup>10</sup>, and higher prevalence in mandibular arch have also been reported.<sup>14</sup> Occurrence of pulp stones was higher in first molar than second molar. This was also in agreement with most studies.<sup>5,10,13</sup> This finding may be related to the fact that the molars are the largest teeth in the arch, have a better supply of blood to the pulp tissue and have strong chewing force in the arch. This may lead to greater

precipitation for calcification.

In the present study significant association between presence of pulp stone and carious teeth was found. This may be because of pulpal irritation in carious teeth that may trigger a defense reaction in dentin pulp complex causing pulpal calcification. Occurrence of pulp stone was higher in sound and carious teeth than restored teeth (Figure-1 and 2) this was consistent with the finding of ranjitkar S. The presence of pulp stone in very young teeth and developing tooth germ, indicates that the pulpal pathology is unlikely to be only aetiological factor for pulp stone formation. One of the recent research isolated calcifying nanoparticles in the etiology of pulp stone formation long term use of medications also a contribution factor for pulp chamber calcification because of increase odontoblast activity.<sup>17,18</sup>

From the clinical perspective, the current view is that the pulp stones have no clinical significance other than causing difficulties during endodontic treatment leading to hindering canal location and negotiation. Investigators reported the correlation of pulp stone with cardiovascular disease and other systemic diseases.<sup>15</sup> One study reported higher prevalence of pulp stone in patients with hypertension, diabetes and gastritis.<sup>16</sup> This indicates that of pulp stone is found incidentally in the pulp tissue of asymptomatic vital pulps, may play an important role in the diagnosis of a serious underlying disease or condition. So further studies on association of pulp stones with systemic diseases should be recommended.

## CONCLUSION

The prevalence of pulp stones in the studied population of LUMHS was 44% of subjects and 12.9% of teeth examined. Pulp stone was found more in sound teeth followed by carious teeth and involved mostly molars.

The size, shape, location, and number of pulp stones on radiographs can be used as adjunctive feature for forensic identification.

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

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*Knowing The Truth, Seeing The Truth,  
but still Believing The Lies.*

– Unknown –

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#### AUTHORSHIP AND CONTRIBUTION DECLARATION

Sr. #	Author-s Full Name	Contribution to the paper	Author=s Signature
1	Mahwish Memon	Study conception and design.	
2	Feroze Ali Kalhoro	Acquisition of data.	
3	Salman Shams	Plagiarism check Analysis and interpretation of data.	
4	Saba Arain	Acquisition of data & Drafting of manuscript.	