

# Prevalence of Pulp Stones- A Radiographic Study

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## A B S T R A C T

**Introduction:** Pulp stones are calcified masses present in any portion of coronal and radicular pulp. They usually do not cause any symptom. The incidence of pulp stones varies in different group of populations ranging from 10-66%.

**Material and Methods:** The present study included 1,000 digital panoramic radiographs which were available in the Dept. of Oral Radiology. Subjects with complete set of teeth [32 in number] were only included in order to assess the presence/absence and prevalence of pulp stones in third molars. Age of the subjects ranged from 18-60 yrs. Intra-pulpal dense radio-opaque structures seen in the panoramic radiographs were considered as pulp stones. The number of pulp stones, tooth type and jaws were recorded with respect to the gender. Further, chi-square test was used for statistical analysis to assess the correlation of frequency of occurrence of pulp stones, jaws and tooth types.

**Results:** the overall prevalence of pulp stones in the present population was found be 51.4%. Females constituted 53.76% and males constituted 49.34%. 16.5% was the incidence of pulp stones in maxillary first molar and 16.05% in mandibular first molar which were considered to be the highest frequency compared to all other teeth.

**Conclusion:** Females had greater prevalence of pulp stones compared to males. First molars had maximum number of calcifications compared to any other teeth. Incidence of pulp stones in maxillary and mandibular third molars was found to be 4.9% and 5.35% respectively. Incidence of pulp stones in decayed teeth was found to be 8.77%. All this information regarding incidence and prevalence of pulp stones could be of help during endodontic procedures.

**Keywords:** Pulp Stones; Denticles; Prevalence; Incidence; Panoramic Radiograph

## INTRODUCTION

Pulp stones are calcified masses present in any portion of coronal and radicular pulp. They usually do not cause any symptom. Size and number of pulp stones present in a tooth can vary from person to person and according to the tooth type.<sup>1</sup> The incidence of pulp stones varies in different group of populations ranging from 10-66%. Stafne and Szabon correlated pulp stones with local and systemic diseases like kidney stones, gout, arteriosclerosis, pagets disease, hypercementosis etc.<sup>3</sup> Broadly pulp stones are classified as discrete and diffuse calcifications. Based on their structure they can also be classified as true and false denticles. True denticles are further classified as attached or free types.<sup>1</sup> Permanent dentition has significantly greater prevalence of pulp stones, although rare association of deciduous teeth have also been documented. Pulp stones are reported to be associated with certain systemic

conditions like Vander woude syndrome, dentinogenesis imperfecta, dentin dysplasia, cardiovascular disease, etc.<sup>4</sup> Since the prevalence of pulp stones varied in different populations, this study was conducted to assess the prevalence of pulp stones in Tirupati population in Andhra Pradesh, India.

## MATERIAL AND METHODS

The present study included 1,000 digital panoramic radiographs which were available in the Dept. of Oral Radiology. Subjects with complete set of teeth [32 in number] were only included in order to assess the presence/absence and prevalence of pulp stones in third molars. Hence 3200 teeth were included in the present study for evaluation of pulp stones. The study comprised of males and females. Age of the subjects ranged from 18-60 yrs. Intra-pulpal dense radio-opaque structures seen in the panoramic radiographs were considered as

pulp stones. The number of pulp stones, tooth type and jaws were recorded with respect to the gender. Further, chi-square test was used for statistical analysis to assess the correlation of frequency of occurrence of pulp stones, jaws and tooth types.

## RESULTS

The prevalence of pulp stones in relation to gender, number of teeth affected, jaws, decayed teeth and site [radicular vs coronal] was evaluated in the present study. The overall

prevalence of pulp stones was found to be 51.4%. females had higher prevalence than males with statistically significant difference. The total number of teeth affected by pulp stones was found to be 3026 [9.44%] out of 32000 radiographically examined teeth. The association of pulp stones with decayed teeth was found to be 8.77%. in both the jaws, the least tooth affected by pulp stones was central incisors and highest affected was first molars. Maxillary and mandibular third molars had prevalence rate of 9% and 9.2% respectively. The results of the present study are

Pattern	Female		Male		Total		Sig
	N	%	N	%	N	%	
Patient with pulp stones	250	53.76	264	49.34	514	51.4	<0.001**
Patient without pulp stones	215	46.24	271	50.66	486	48.6	
Total No of patients	465	100	535	100	1000	100	

\*\* -Statistically Highly Significant (p<0.01)

**Table-1:** Percentage distribution of presence of pulp stones according to gender

Pattern	Female		Male		Total		Sig
	N	%	N	%	N	%	
Teeth with pulp stones	1952	13.48	1434	8.34	3026	9.44	<0.001**
Teeth without pulp stones	12528	86.52	271	91.66	486	90.56	
Total No of Teeth	14880	100	17120	100	32000	100	

\*\* -Statistically Highly Significant (p<0.01)

**Table-2:** Percentage distribution of no of teeth with pulp stones

Tooth Type		Male		Female		Total		Sig
Maxilla	Number	Number of teeth with pulp stones	% of teeth with pulp stones	N	%	N	%	
Central Incisor	2000	0		0	0	0	0	-
Lateral Incisor	2000	4	0.2	2	0.1	6	0.3	0.564
Canine	2000	3	0.15	3	0.15	6	0.3	0.99
First Premolar	2000	9	0.45	9	0.45	18	0.9	0.99
Second Premolar	2000	47	2.35	53	2.65	100	5	0.124
First Molar	2000	330	16.5	324	16.2	654	32.7	0.211
Second Molar	2000	275	13.75	272	13.6	547	27.35	0.842
Third molar	2000	98	4.9	82	4.1	120	9	0.231

**Table-3:** Distribution of number of pulp stones in Maxillary teeth

Tooth Type		Male		Female		Total		Sig
Mandible	Number	Number of teeth with pulp stones	% of teeth with pulp stones	N	%	N	%	
Central Incisor	2000	1	0.05	0	0	1	0.05	0.998
Lateral Incisor	2000	2	0.1	1	0.05	3	0.15	0.788
Canine	2000	3	0.15	2	1	5	0.25	0.844
First Premolar	2000	3	0.15	10	0.5	13	0.8	0.547
Second Premolar	2000	25	1.25	33	1.65	58	0.29	0.124
First Molar	2000	321	16.05	328	16.4	649	32.45	0.211
Second Molar	2000	309	15.45	286	14.3	595	29.75	0.597
Third molar	2000	107	5.35	77	3.85	184	9.2	0.231

**Table-4:** Percentage distribution pulp stones in Mandibular teeth

Site	Maxilla		Mandible		Total		Sig
	N	%	N	%	N	%	
Radicular	56	3.69	44	2.91	100	3.3	<0.001**
Coronal	1269	83.81	1325	87.63	2594	85.72	
Both	42	2.77	25	1.65	67	2.21	
Decayed	147	9.73	118	7.81	265	8.77	
Total	1514	100	1512	100	3026	100	

\*\* - Statistically Highly significant (P<0.01)

**Table-5:** Distribution of pulp stones according to site

tabulated as follows

## DISCUSSION

Pulp stones are calcified masses present in any portion of the pulp. Coronal pulp stones are more common than radicular ones. Radiographically they appear as dense radio-opaque masses. Previous studies have performed research on prevalence of pulp stones using panoramic radiographs, intra-oral peri-apical radiographs and bite-wing radiographs. The present study of assessment of prevalence of pulp stones was done using panoramic radiograph. Similar studies were done by Zainab Het al,<sup>5</sup> Satheeshkumar PS et al,<sup>6</sup> Syrynska M et al,<sup>7</sup> Turkal M et al,<sup>8</sup> Sreelakshmi et al.<sup>9</sup> However al-Hadi Hamasha et al<sup>10</sup> performed such similar study using intra-oral periapical radiographs. Sisman Y et al<sup>11</sup> and Ranjitkar S et al<sup>12</sup> performed similar studies using bite-wing radiographs.

Female subjects had higher prevalence rate of pulp stones than males in the present study, which was highly statistically significant. Such similar results were also obtained by Sreelakshmi et al<sup>9</sup> and Turkal M et al.<sup>8</sup> The higher incidence in females could be attributed to the fact that parafunctional habits like bruxism is common in females which may lead to degenerative changes in pulp. Out of 32000 teeth examined for pulp stones, 3026 teeth had pulp stones constituting to 9.44%. This was comparable to results obtained by Sreelakshmi et al<sup>9</sup> where 6% of the teeth examined had pulp stones.

In maxilla, the maximum number of calcifications were observed in first molars followed by second molar, third molar, second premolar and first premolar. No pulp stones were observed at all in maxillary central incisors. Interestingly third molars had more number of pulp stones compared to premolars in the present study. In mandible, the maximum number of pulp stones were observed in first molars followed by second molar, third molar, second premolar and first premolar. Again mandibular third molars had greater prevalence of pulp stones compared to premolars in the present study. Higher incidence of pulp stones in first molars was also reported by Sisman et al,<sup>11</sup> Ranjitkar et al<sup>12</sup> and Sreelakshmi et al.<sup>9</sup> First molars are first teeth to erupt and because of greater surface area they bear majority of occlusal forces perhaps leading to early degenerative changes.

As expected coronal location of pulp stones clearly

outnumbered the radicular pulp stones. In the present study the association of decayed teeth with pulp stones was found to be 8.77%.

Incidence and prevalence of pulp stones in third molars were not evaluated in any of the previous studies. In the present study the incidence of pulp stones in maxillary third molars was found to be 9% and in mandibular third molars was found to be 9.2%.

## CONCLUSION

In conclusion, females had greater prevalence of pulp stones compared to males. First molars had maximum number of calcifications compared to any other teeth. Incidence of pulp stones in maxillary and mandibular third molars was found to be 9% and 9.2% respectively. Incidence of pulp stones in decayed teeth was found to be 8.77%. All this information regarding incidence and prevalence of pulp stones could be of help during endodontic procedures.

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