

A Radiographic Assessment of the Prevalence of Pulp Stones in Premolars Regarding the Dental Arches

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Abstract: ***Introduction:** Pulp stones or denticles are frequently found in the dental pulp. Denticles more often occur in molars than in premolars and incisive. **Materials and Methods:** The study was conducted at the University Dental Clinic Centre in Skopje "St. Pantelejmon". Were included random samples 150 patients aged between 20-60 years, or 3108 teeth, meanwhile using an appropriately designed survey questionnaire. The X-ray assessment of the jaws was being made by subjecting the suspected teeth to the Panoramix and retroalveolar X-ray according to Dick. Statistically computer analysis was confirmed to the 172 teeth – premolars. **Results:** From 150 patients or 3108 teeth, 623 teeth (20.04%) has pulp stones. From 623 teeth with pulp stones 425 (68.2%) – molars; 172 (27.6%) – premolars and 26 teeth (3.2%) - incisives. The results obtained from the carried out examinations showed that: 172 teeth – premolars: 98 (56.9%) - upper jaw (maxilla) and 74 (43%) - lower jaw (mandibula) in both the sexes. The variation is significant i.e. $Z = 2.470$; $P = 0.014$. **Conclusion:** The analyses we carried out by making advantage of the radiography showed that greater attention should be paid to the analysis of the X-rays, especially to the Panoramix X-rays, because they enable detection of the dental calcifications in the asymptomatic teeth regarding the jaws as a whole.*

Keywords: teeth, pulp stones, prevalence, premolars, the dental arches,

1. Introduction

Calcifications in the dental pulp, as a phenomenon with diverse occurrence and manifestation, represent a subject of constant interest not only from the perspective of being a separate dental entity but also because of the fact that they are interesting to observe and deal with from diagnostic and therapeutic aspect.

The fact that pulp stones are referred to as being provocateurs of pain with different intensity makes them cause difficulties in diagnosing.

When observed from therapeutic aspect, they appear to be of greater importance because they can make the access to the dental roots difficult or in some cases completely impossible, and they can also be the reason for groundless extraction of a tooth or a group of teeth.

Through the prism of literature findings there can be concluded that dental calcifications are not prevalent only at certain group of teeth.

They are identified to appear in both the dentitions (deciduous and permanent), but also in impact teeth, these findings were supported by Nitzan and his associates in year 1986 [1].

According to Moss Salentijn and Hendricks - Klyvert, diffused calcifications are usually located in the radicular part of the dental pulp, starting in the perivascular adventitia and the vascular wall [2,3].

Kannan S., Kannepady SK., Muthu K., Jeevan MB., Thapasum A., came to a conclusion that pulp stones is found significantly more in molars. There was no significant

correlation with sex, increasing age, dental arches, and ethnic races [4].

Molars had statistically more pulp stones than premolars. Pulp stones were significantly more common in the maxilla compared with mandible [5].

Pulp stones in premolars, can be localized radicular (Figure 1), and/or coronar (Figure 2,3).

2. Primary Teeth and Pulp Stones

Few studies deal with pulp stones in the primary dentition.

Robertson A, Lundgren T, Andreasen JO, Dietz W, Hoyer I, Noren JG., examined the prevalence of calcifications in the pulp of traumatized deciduous incisive teeth. 54 % of the cases were with a diagnosis of intrusion and luxation. In 41% of the examined teeth i.e. in 123 teeth, prevalence of denticles was discovered (6).

Kumar S, Mathur RM, Chandra S, Jaiswal JN. examined and made in-depth analysis of the phenomenon and the nature of calcification in the pulp of 120 deciduous teeth extracted from the maxilla and the mandibula. In 31 teeth there were identified calcifications in the dental pulp of the following two kinds: denticles and diffuse calcifications. Calcification had identical prevalence in all teeth, except in the first deciduous molar (7).

Delivanis HP., Sauer GJ., signal that certain literature data provides special warning regarding the orthodontic, which may further initiate secondary sedimentation of dentine inside the tooth, up to a point when this sedimentation shall provoke that the whole channel of the tooth root is closed. This conclusion was made by the authors after they had compared 46 patients subjected to orthodontic treatment

with a control group of patients who were not subjected to this kind of treatment; with this comparison there was identified calcification in the radicular pulp in a total of 3 teeth (8).

The prevalence of pulp stones varies from 7.5% to high 90% (3).

Long-term influences of various types such as: caries, deep restorations, chronic inflammations of the pulp, trauma injuries of the tooth as well as orthodontic interventions relate to the appearance of calcifications (9,10,11).

Ranjitkar S., Taylor JA., Townsend GC. , concluded that denticles as discreet calcified bodies in the dental pulp might be related to the tooth type, as well as with the dental arches. Their analyses showed a smaller prevalence of calcifications in the premolars (0.4%), compared to the molars (19.7%), which is a significant difference (12).

3. Materials and Methods

The study was conducted at the University Dental Clinic Centre in Skopje “St. Pantelejmon”. Were included random samples 150 patients aged between 20-60 years, or 3108

teeth, meanwhile using an appropriately designed survey questionnaire.

The X-ray assessment of the jaws was being made by subjecting the suspected teeth to the panoramix and retroalveolar X-ray according to Dick, to carry out programmed Rtg analysis and evaluation of suspected cases with the purpose of making temporary and correct functional assessment of teeth, which represents an assumption for making further prognostic evaluation.

From 150 random samples patients or 3108 teeth, 623 teeth has denticles. From 623 teeth with denticles - 425 – molars, 172 – premolars, and 26 – incisors.

Statistically computer analysis was confirmed to the 172 teeth – premolars.

4. Results

Below are the results obtained by application of the abovementioned methods, shown graphically, roentgenologically and statistically. Table 1.

Table 1: Prevalence of pulp stones in total teeth of 150 patients, aged 20-60 years

Total teeth	molars	per cent	premolars	per cent	incisives	per cent
	N	n (%)	N	n (%)	N	n (%)
623	425	68.2%	172	27.6%	26	3.2%

Table 1 its presentation of the prevalence of dental calcifications according to the type of teeth.

- Prevalence of dental calcifications in molars is 68.2 per cent
- Prevalence of dental calcifications in premolars is 27.6 per cent and
- Prevalence of dental calcifications in incisive teeth 3.2 per cent

There is a significant difference; denticles in molars have more frequent prevalence compared to the premolars and the incisive teeth.

Out of 3108 analyzed teeth with denticles, 172 teeth (27.6%) were premolars.

- 172 (27.6%) - premolars
- 98 (56.9%) - upper jaw (maxilla)

- 74 (43%) - lower jaw (mandibula) in both the sexes.

To determine the prevalence of dental pulp stones occurrence in accordance with the dental arches in premolars.

--- **Comparison of two proportions ---**

Group 1 n = 172 p = 0.569

Group 2 n = 172 p = 0.43

The variation is: 0.139

Standard deviation of the variation: 0.05392

95% secure interval in the variation: - 0.03333 to 0.2447

Z = 2.470; P = 0.014

The variation is significant i.e. Z = 2.470; P = 0.014.

The variation is significant i.e., the denticles in premolars are prevalent in the maxilla according in the mandibula with both the sexes.

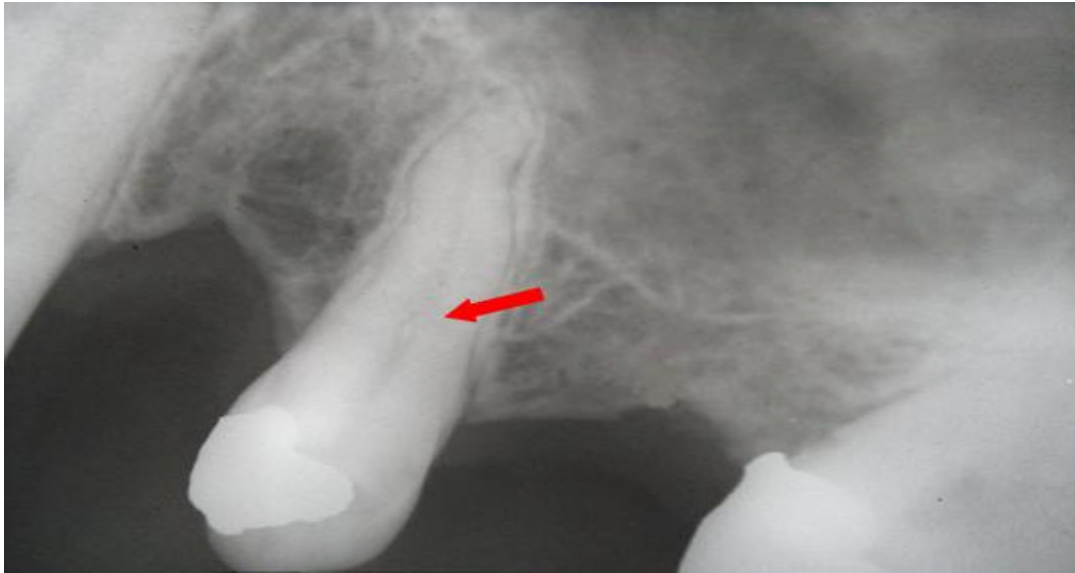


Figure 1. gives a pulp stones in the upper second leftt premolar, radicular localized.

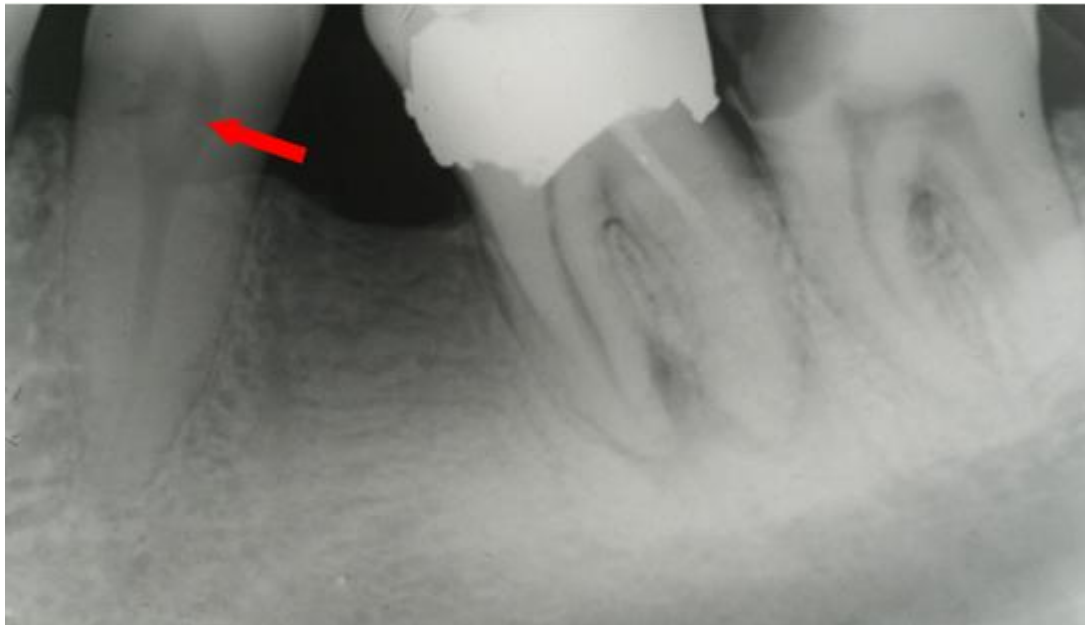


Figure 2: gives a pulp stones in the lower second left premolars



Figure 3: gives a pulp stones in the lower second left premolars

5. Discussion

With respect to the so-far made analyses and literature findings, which mainly refer to, and considering the presence of the continuous expansion of techniques and ways of monitoring certain pathological conditions of the dental pulp, this study paper provides a relevant evidence about the frequency of calcifications in the pulp of the premolars.

With this is made a try to use the epidemiologically processed data in the clinical assessment and prophylaxes. The anamneses evidence from the patients who had pains, were overlapping. All of them insisted that they had pretty intensive, random, neuralgiform pains, primarily in the molar and premolar area or with unclear location, with irradiation towards the temple. Also, there appeared to have general difficulties with intensive headaches, as well as difficulties of rheumatic, vascular and neurogene nature.

Due to the fact that up to present time there have been primarily presented single studies on dental calcifications, there was imposed the need for dental calcifications from clinical and roentgenological perspective, with special aspect on the diagnosis problem, especially regarding the intact gum, most often dislocated in a wrong therapeutic direction [13].

Such oversight at a final instance could represent an intolerable diagnostic and therapeutic mistake that can lead to a system tooth/teeth loss [13].

In the literature data there is no lack of presentations of separate descriptions of dental calcifications, from all actual aspects (etiological, histological, statistical examinations), which gives space for further tries to define and make clarifications regarding this dental entity that is prevalent in everyday casuistics, but does not appear to be always detected.

Still, small is the number of dentists who at the early diagnostic phase focus their attention to the possibility of dental calcifications, as a field of certain unclear symptomatology. Therefore, the obtained results refer to the variability of this morphological unit.

In that sense, the prevalence of denticles with 56.9% in the maxilla compared to the mandibula where the prevalence of denticles is 43% enables faster and easier detection of dental calcifications, and consequently faster and easier pain provocateur diagnosis.

Le May in 1991 concluded that in the basis of this process there lies initial calcification of some of the components of the pulp tissue (collagen fibers, necrotic cells, altered base substance etc.) which in that way forms ossification core around which there appears to form concentric-layer or irregularly amorphous sedimentation of mineral salts. This is how pulp stones and diffuse calcifications are formed (14).

Taking into consideration the obtained results, it can be pointed out that these results are primarily roentgenologically determined, regardless whether this has

been done accidentally, when it has been suspected that they are possible to occur or with other detailed analysis indicated from certain pathological processes of other dental tissues.

Thus, for the purpose of detecting and analyzing dental calcifications in their initial phase, it is essentially important to stress out the significance of "Panoramix" roentgen technique, as well as the retro-alveolar scanning according to Dick.

Radiographic determination of dental calcifications according to the above mentioned findings enables relevant statistical analysis, presentation of frequency of the distributions in various types of teeth, which largely corresponds to the findings of other authors (14, 15,16).

Through part of the x-ray images in the material presented in this study paper, this general conclusion is clearly visible through the presented photos and statistical analyse (table 1, figure 1,2 and 3).

The comparison of the teeth that had caries or teeth that had been restored, regarding the intact teeth, led us to a conclusion that denticles have more frequent occurrence in teeth with caries i.e. in teeth that had been restored, and less frequent or rare occurrence with the non-restored teeth (13,17,18).

The localization of denticles appears to be more frequent in the coronary and has less frequent or rare in the radicular part of the dental pulp (13,19,20)..

6. Conclusion

The analyses we carried out by making advantage of the radiography showed that greater attention should be paid to the analysis of the X-rays, especially to the Panoramix X-rays, because they enable detection of the dental calcifications in the asymptomatic teeth regarding the jaws as a whole We insist on this because of the fact that the present clinical image is not very specific, which on its behalf imposes the need for analysis which would be more than just a usual everyday routine method, and also the need for medical observation in order to avoid making oversight of any kind regarding these cases.

References

- [1] Nitzan WD., Michaeli Y., Windreb M., Azaz B. The effect of aged on tooth morphology : A study on impacted teeth. Oral Surgery 1986; Vol. 61 : 54 – 60.
- [2] Moss Salejtin L.,Hendricks – Klyvert M. Epithelialy induced denticles in the pulps of recently erupted, noncarious human premolar. Journal Endodontic 1983; Vol.9: 554 – 560.
- [3] Bevelander G, Johnson PL. Histogenesis and histochemistry of pulpal calcification. J Dent Res 1956;;35:714-22.[PUBMED]
- [4] Kannan S., Kannepady SK., Muthu K., Jeevan MB., Thapasum A. Radiographic Assessment of the Prevalence of Pulp Stones in Malaysians. J. Endod. 2015; Vol. 41(3):333-7.

- [5] Hakan Colak, Ahmed Arif Celebi, M. Mustafa Hamidi, Yusuf Bayraktar, Tugba Colak and Recep Uzgur. Assessment of the prevalence of pulp stones in a sample of Turkish Central Anatolian population. *The Scientific World Journal*.2012; Vol.2012,ArticleID804278.
- [6] Robertson A.,Lundgren T.,Andreasen JO.,Dietz W.,Hoyer J.,Noren JG.Pulp calcifications in traumatized primary incisors. A morphological and inductive analysis study. *European Journal Oral Scificent*, 1997; Vol. 105 : 196 – 206.
- [7] Kumar S., Mathur RM., Chandra S., Jaiswai JN. Pulp calcifications in primary teeth. *Journal Pedodontic*, 1990 Winter ; 14 : 93 – 96.
- [8] Delivanis HP.,Sauer GJ. Incidence of canal calcification in the ortodontic patient. *Journal Orthodontic*, 1982; 82 : 58 -61.
- [9] Baghadi SV., Ghose JL., Nahoom YH. Prevalence of pulp stones in trrnage Iraqi group. *Journal Endodontic*, 1988; 14 : 309 – 311.
- [10] Мамедова ФМ., Крахмалев ВА. Микроскопическаја анатомија корнја зуба Медицина 1998; Vol. 34 :3 – 11 [Article in Russian].
- [11] Siscos GJ., Georgoponlon M. Unusual case of general pulp calcification (pulp stones) in a yong Greek girl. *Endodontic Dental Traumatology*, 1990 Vol. Dec 6 : 282 – 284.
- [12] Ranjitkar S., Taylor JA., Townsend GC. A radiographic assessment of the prevail pulp stones in Australians.Australians dental Journal, 2002 Vol. Mar; 47 :36– 40.
- [13] Aleksova P. Dental calcifications-reason for special analysis. Master's Degree Paper (MD Paper), 2006; Skopje Vol. 1 : 62 -67.
- [14] Le May O., Kaqueler JC. Scanning electron microscopic study of pulp stones in human permanent teeth. *Scanning Microscopic*, 1991 ; Vol.5:257- 267.
- [15] Hamasha al – Hadi A., Darwazeh A. Prevalence of pulp stones in Jordanian adults. *Oral Radiology Endodontic*, 1998; Dec Vol; 86 : 730 – 732.
- [16] LIN C.T., Roan R.T., ROU W.J., Chen J.H., Chuang F.H., and Hsieh T.Y. A radiographic Assessment of the Prevalence of Pulp Stones in Taiwanese. *Svenska Massan*, 2003; Vol. 11 :12 – 15.
- [17] Goga et al. Pulp stones.*International Endodontic Journal*, 2008; 4:, 457–468.
- [18] Sisman Y., Aktan AM., Tarim-Ertas E., Ciftci Me., Sekerci AE. The prevalence of pulp stones in a Turkish population. A radiographic survey. *Medici Oral Pathology*, 2012; 17: 212-217.
- [19] Burkes EJ, Jr, Lyles KW, Dolan EA, Giammara B, Hanker J. Dental lesions in tumoral calcinosis *Journal of Oral Pathology and Medicine*, 1991; 20: 222–7.
- [20] SK Bahetwar, Ramesh Kumar Pandey, Rajeev Kumar Singh, TS Bahetwar, Ali Wahid. A biochemical and histopathological evaluation of generalized pulp calcification in young permanent teeth.*Indian J Dent Res – Mobile*, 2012; Vol.23:123.