

## Points of view on pulp mineralization

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### Summary

The present paper tries to unravel, following the investigation of some clinical cases, the mystery of pulp mineralization processes and to find out which could be the causes of their formation. In the speciality literature numerous opinions about their various forms taken at the pulp tissue level (pulp stones, denticles, diffuse mineralizations) have been advanced, but their pathogeny has not been elucidated yet.

The investigation includes both young and older persons in which clinical and hystopathological exams have been made on pulp tissue obtained from bio-pulpectomy or following teeth extraction. The study brought some interesting, useful information to widen the knowledge in this domain and added new elements that helped the understanding of pulp mineralization pathogenesis.

The possible involvement of *Nanobacterium sanguineum*, recently discussed in literature, could explain many of the cases observed in the unerupted teeth or in the members of the same family.

The authors concluded that these mineralizations could be seen at all ages, but more frequently at senescence.

Although a lot of articles debate the causes of pulp mineralization, the mystery has not been elucidated yet. Some authors consider that pathological processes were produced by direct injuries on the pulp or appear in systemic diseases (especially vascular diseases); other authors consider that these processes are a consequence of ageing. None of them could support their theories. Pain is not a symptom, that is why practitioners as well as research fellows do not take it seriously into account. The only thing that detects pulp mineralization is the hystopahtologic examination, procedure that is not usually performed. Only big pulp stones can be detected by X-rays. The detection of these pulp stones in young and healthy population creates further misunderstandings. The actual opinion is that pulp mineralization could be present in all ages and teeth, but most authors agree that mineralization increases with age and is induced by external injuries.

In order to asses the frequency of pulp stones according to age, we compared two groups of patients, one including persons

between 18 and 35 and the other between 60 and 80 years old.

### Material and method

70 young and 90 old patients were investigated concerning the link between irritant factors (as possible causes) and the apparition of mineralization phenomena. The teeth were examined by X-rays. In those situations where pulpectomies or even extractions were needed, we also performed hystopathological examination to detect structural alterations.

### Results and Discussion

As *Table 1* reveals, decays and obturation were dominant in younger while abrasions and attrition including periodontal pockets were more often in elder. Sex distribution is not significant; the only thing that is observed is the low frequency of decays in women.

*Langeland* (1981) states that all dental pulps studied presented calcifications as time

goes by. *Cohen* (1998) considers that at least 50% of all teeth present pulpal calcification, showing that pulp stones are dominant at coronal pulp level while diffuse mineralization is dominant at radicular level.

In 2001, *Neva Ciftcioglu* and *Olavi Kajander* from Kuopio University-Finland, together with a Canadian group of researchers published on the Internet that a small bacterium called *Nanobacterium Sanguineum* would initiate these processes at pulpal level, as well as in other places in organism, surrounded by a mineral shell. In each specimen of demineralised pulp stones, nanobacterial antigens were found, proving the role of this bacterium in pulp stones formation. Beside this, it was shown the increased rate of mineral feature in members of the same family. The fact that Nanobacteria could pass the placenta and is also present in saliva demonstrates this fact, as well as the presence of pulp stones in unerupted teeth (published by some authors).

This new concept about pulp stones formation mechanism will be confirmed or negated by other researchers.

As it can be seen in *Table 2*, in the young group was found only one (1.4%) pulp stone in a male patient, while within the elder group 8 pulp

stones (8.8%) were observed. As regards the type of tooth, molars were the most affected.

Pulp stones were present in both young and old age groups (meaning that even children are predisposed to such pulpal complication) but the higher frequency seen on elders is probably a consequence of the longer period of irritants action.

Certainly, our results are relative because only the voluminous pulp stones can be seen on the X-ray examinations (*Figure 1*).

The smaller and diffuse mineralizations have been detected only by hystopathological examination (*Figure 2*).

Most cases have been found on devitalized teeth as a result of decays with septic necrosis evolution (*Figure 3*).

The appearance and development of these processes took place in a vital pulp under the irritant effect of certain factors (*Figure 4*).

The most credible scientific opinions state that circulatory disturbances could lead to dystrophic calcifications and the core of mineralization would appear around degenerated cells (plasmocytes), blood thrombi or even around collagen fibres. It is known that degraded cells are alkaline and this attracts the mineral salts.

**Table 1.** Possible causes of pulpal structural modifications

PATIENTS	DECAY	ABRASIONS	PERIODONTAL POCKETS	OBTURATIONS
Group I (age 18-35)	52 (74,2%)	3 (4.3%)	9 (12.8%)	48 (68.6%)
70 subjects	♀ 20 (64,5%)	♀ 0	♀ (9.6%)	♀ 21 (43.6%)
31 ♀, 39 ♂	♂ 32 (82%)	♂ 3 (7.6 %)	♂ 6 (15.4%)	♂ 27 (56.2%)
Group II (age 60-80)	36 (42.2%)	86 (95.5%)	61 (67.7%)	52 (59.9%)
90 subjects	♀ 12 (27.9%)	♀ 40 (88.3%)	♀ 23 (53.4%)	♀ 28 (65.1%)
43 ♀, 47 ♂	♂ 24 (51%)	♂ 46 (97.8%)	♂ 38 (80.8%)	♂ 32 (68%)
Total 160 subjects	88 (55%)	89 (55.6%)	70 (77.7%)	100 (62.5%)

**Table 2.** The presence of pulp stones in young and old patients groups

TOTAL SUBJECTS - 160		TYPE OF TOOTH				%	Total 9 pulp stones (5.6%)
		I	C	P	M		
Group I	♀-28	0	0	0	0	0	
	♂-42	0	0	0	1	2.3	
Group II	♀-37	1	0	0	1	5.4	
	♂-53	0	1	0	5	11.3	



Figure 1. Pulp stone in a maxillary molar

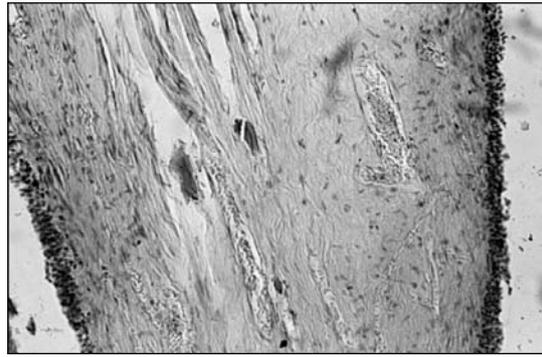


Figure 2. Dystrophic mineralization in a radicular pulp



Figure 3. Pulp stone in non-vital tooth



Figure 4. Pulp stones group

## Conclusions

1. Pulp stones can occur in any age;
2. The concept stating that nanobacteria could lead to these calcifications also

explains the pulp stones appearance in unerupted teeth.

3. The pulp stones formation mechanism, far to being fully explained, still needs further studies.

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