The Composition of the Calcified Bodies in Human Dental Pulps

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Abstract: Introduction: Pulp stones or dental calcifications are the calcified bodies in human dental pulps. <u>Purpose</u>: The intention of the study is to present new classification of dental pulp stones according to their composition and clinical implication. <u>Material and method</u>: The research was made on 40 pulps of the extracted teeth and 60 extirpated pulps of teeth with endodontic diagnosis of chronic pulpitis. The standard histological analysis of the pulp tissue was being made on material provided by means of endodontal extirpations and vertical cross-section made after indicated teeth extractions. <u>Results</u>: The results obtained from the carried out examinations showed that dental calcifications can be classified such: dentinal and non-dentinal. The dentinal calcifications are spherical, nodular, solitary and more numerous, they contain greater amount of organic matrix, they occur at early age and have hamartomatous aspect. The non-dentinal calcifications could be nodular spherical, irregular in shape or with punctform encrustations. <u>Conclusions</u>: 1. Using the experience from present classifications of dental calcifications and the classifications of other diseases and syndromes, together with our results, can be a reason to propose a new classification of dental calcifications, according to their composition (dentinal and non-dentinal). This can be confirmed histologically. 2. The new classification will enable us to determinate the composition of denticles according to the age of patients, without any histological analysis. 3. When they are classified such non-dentinal, dental practitioner is obligated to send the patient to subsequent or supplementary inspection, primarily echo survey to abdomen, for early detecting of calcifications and calculus in other organs. Pulp stones have been compared to kidney and gall bladder stones.

Kay words: composition, pulp stones, classification, dentinal calcifications, non-dentinal calcifications.

1. Introduction

Pulp stones are discrete calcifications and are amongst changes that include more diffuse pulp calcifications such as dystrophic calcification. Stones may exist freely within the pulp tissue or be attached to or embedded in dentine (Johnson & Bevelander 1956). Two types of calcified bodies in the dental pulp have been described (Moss-Salentijn & Klyvert 1983): denticles possessing a central cavity filled with epithelial remnants surrounded peripherally by odontoblasts, and pulp stones being compact degenerative masses of calcified tissues [1].

The calcifications in dental pulp appeared to consist of discrete, smooth-surfaced laminated denticles and irregularly shaped, non-laminated denticles, together with a diffuse calcification characterized by small foci scattered throughout the fibrous pulp matrix

Both the laminated and non-laminated denticles had an organic matrix consisting of collagen fibres together with a background of electron dense material between the fibres [2].

The composition of the calcified bodies varies. They may be composed of "ortho" dentin, nontubular "fibro" dentin or irregular calcified material. Frequently the calcified bodies are conglomerates of these different tissues. The traditional classification of true and false denticles, based on histological characteristics, is difficult to maintain in view of this complexity of composition. Clinically, pulpal calcifications most likely are symptoms, not the cause of pathosis [3].

2. Material and Method

The research was made on 40 pulps of the extracted teeth and 60 extirpated pulps of teeth with endodontic diagnosis of chronic pulpitis. The standard histological analysis of the pulp tissue was being made on material provided by means of endodontal extirpations and vertical cross-section made after indicated teeth extractions.

For the purpose of histological processing, various methods and procedures were used, such as:

- fixation,
- decalcification,
- tissue processing, processor Citadela 2000 Shandon
- provision of paraffin sections,
- standard colouring,
- differential colouring,
- microscopy and morphological analysis with photographies, with Nikon Labophot 2 and Laica with magnify og 10 x 4, 10 x 10, 10 x 20, 10 x 40.
- Hardver and softver Image analyser Lucia M.

3. Results and Discussion

The results obtained from the carried out examinations showed that dental calcifications can be classified such:

1.dentinal and

- 2. non-dentinal.
 - 1. The dentinal calcifications are spherical, nodular, solitary and more numerous, they contain greater amount of organic matrix, they occur at early age and have hamartomatous aspect.

2. The non-dentinal calcifications could be nodular spherical, irregular in shape or with punctform encrustations. They contain smaller amount of

organic matrix, they occur in the middle or older age and have inflammatory dystrophic background.

Dentinal calcifications:



Figure 1: HE colouring (magnify.10x10) formation of decalcified spherical pulp stones, dentinal composition



Figure 2: HE colouring (magnify.10x20) formation of decalcified spherical pulp stones, dentinal composition



Figure 3: HE colouring (magnify.10x40) formation of decalcified pulp stones, dentinal composition, anarchic dentinal tubules

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Figure 4: HE colouring (magnify.10x20) formation of decalcified spherical pulp stone, dentinal composition, radial and anarchic dentinal tubules



Non-dentinal calcifications

Figure 5: HE colouring (magnify. 10x4) - formation of non-dentinal calculus, with fine granulated structure, the size of which occupies the pulp almost across all its width and along its length. Visible congested blood vessels



Figure 6: HE colouring (magnify 10x20), formation of non-dentinal calculus with fine granular structure



Figure 7: HE colouring (magnify 10x10) formation of solitary partial decalcified spherical pulp stone, nondentinal composition, the structure being partially lamellar partially compact. In the surrounding a hyalinised pulp stroma is present with reduction of the vascular compartment



Figure 8: HE colouring (magnify 10x20), formation of solitary pulp stone with composite elements in the structure (towards the periphery with greater dentin content, towards the middle area with transformation of morphology of non-dentinal calculus, resulting most probably from the abundant deposit of calcium in the organic nidus). Hyalinised pulp in the surrounding area

The dental calcifications represent a separate model of pathological calcification, fitting into overall pathological classification, although with different composition.

The dental calcifications represent a separate model of pathological calcification, fitting into overall pathological classification, although with different structure. Literature is rich with descriptions of dental calcifications. The greatest attention is paid to the significance of denticles 4,6,7,15,19,21,22. The influence of the tablet fluoridation on primary teeth is often analyzed 8,9, but studies on the composition of dental calcifications are scarce, which leaves possibility to try to define it in a more accessible manner (Figure 1,2,3,4,5,6,7 and 8), and to clarify this dental entity.

4. Conclusions

1) Using the experience from present classifications of dental calcifications and the classifications of other

diseases and syndromes, together with our results, can be a reason to propose a new classification of dental calcifications, according to their composition (dentinal and non-dentinal). This can be confirmed histologically.

- 2) The new classification will enable us to determinate the composition of denticles according to the age of patients, without any histological analysis.
- 3) Clinical implication
- 4) When they are classified such non-dentinal, dental practitioner is obligated to send the patient to subsequent or supplementary inspection, primarily echo survey to abdomen, for early detecting of calcifications and calculus in other organs. Pulp stones have been compared to kidney and gall bladder stones (Martin 2002).

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