

УНИВЕРЗИТЕТ “ГОЦЕ ДЕЛЧЕВ” ШТИП

Факултет за медицински науки  
ДЕНТАЛНА МЕДИЦИНА



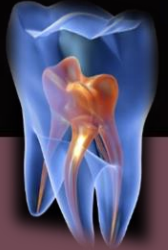
# ПУЛПОЛИТИ – ЛОКАЛНО ПРИСУСТВО ИЛИ СИМПТОМ НА СИСТЕМСКИ ЗАБОЛУВАЊА



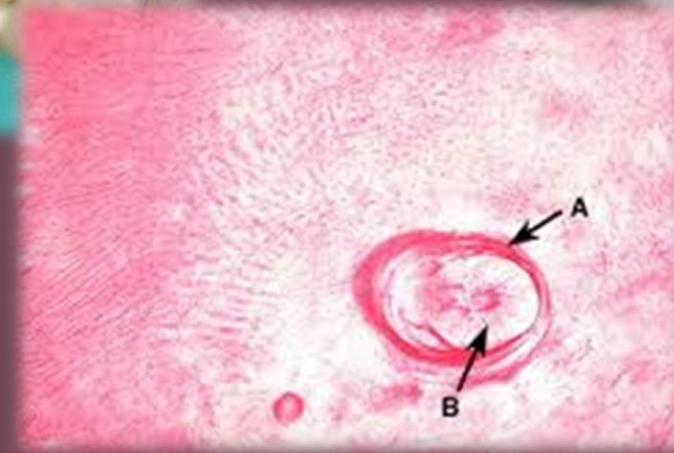
*проф. д-р Ивона КОВАЧЕВСКА*

**ПУЛПОЛИТИ – ЛОКАЛНО ПРИСУСТВО ИЛИ СИМПТОМ ...**

**дентикли – пулполити – пулпни каменчиња**



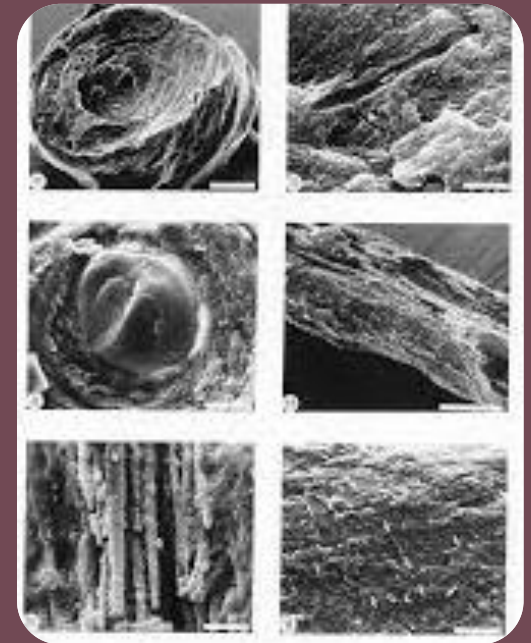
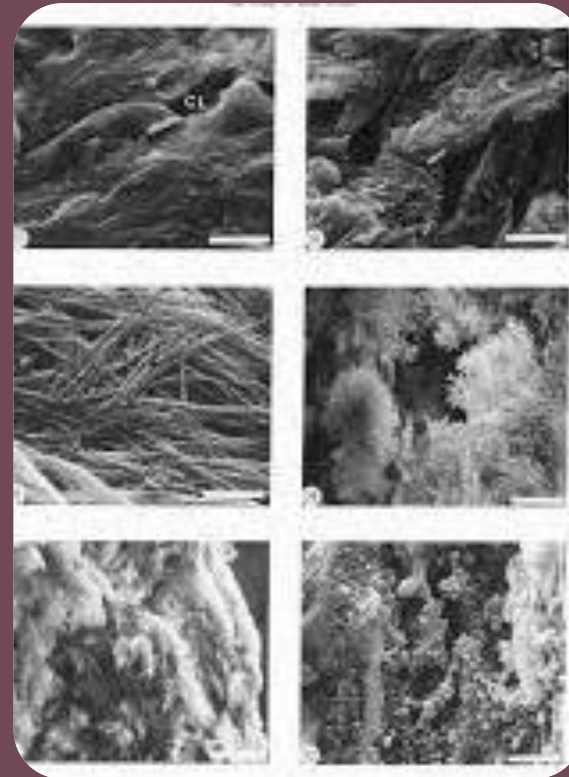
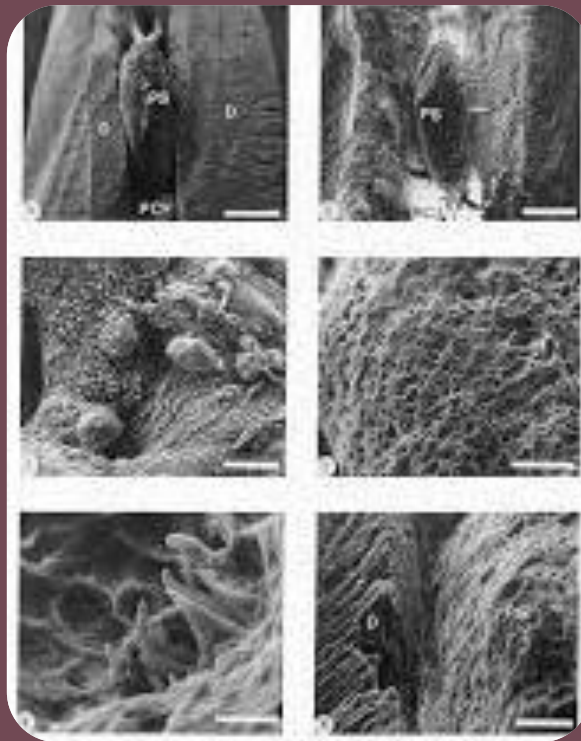
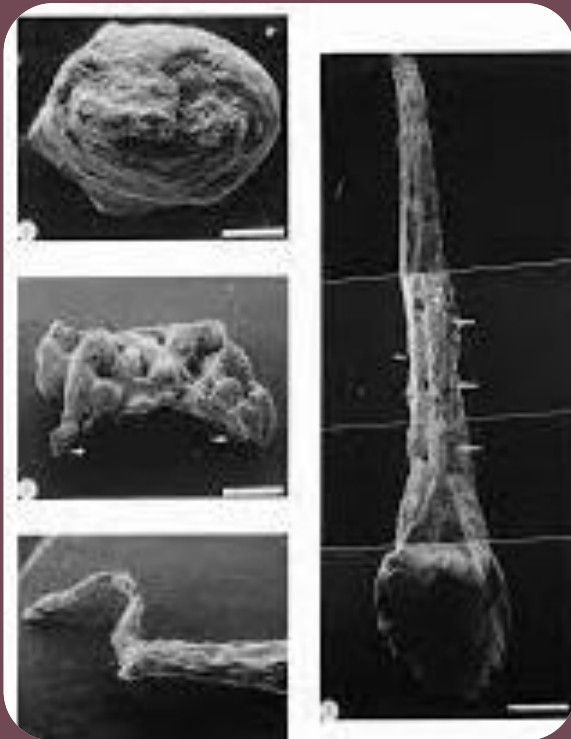
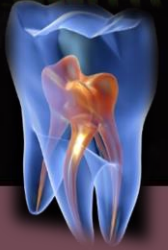
**од локален карактер таложење на минерали и калцификати**



ПУЛПОЛИТИ – ЛОКАЛНО ПРИСУСТВО ИЛИ СИМПТОМ ...

ДЕНТИКЛИ

скенинг електронски микроскоп

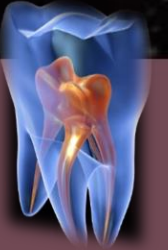


O. Le May J. C. Kaqueler *Scanning Electron Microscopic Study of Pulp Stones in Human Permanent Teeth*  
Scanning Microscopy, Vol. 5, No. 1, 1991 (Pages 257-267)

## ПУЛПОЛИТИ – ЛОКАЛНО ПРИСУСТВО ИЛИ СИМПТОМ ...

### ЕТИОЛОГИЈА :

- се уште непозната и целосно дефинирана
- пореметување во метаболизмот и структурата на дентинот или во пулпата
- заостанати клеточни елементи кои калцифицираат
- можност за бактериски остатоци кои понатаму минерализираат
- траума и ортодонтско оптоварување
- идиопатска...



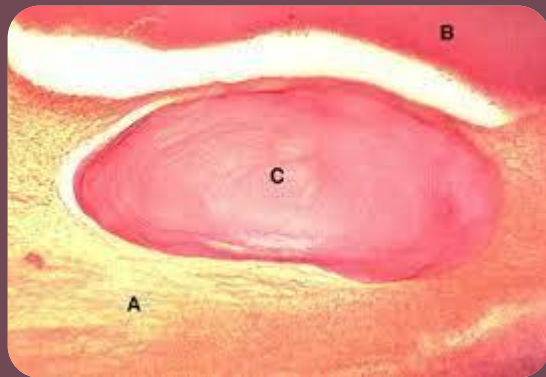
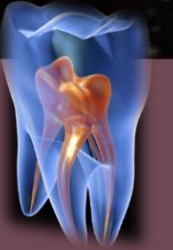
# ПУЛПОЛИТИ – ЛОКАЛНО ПРИСУСТВО ИЛИ СИМПТОМ ...

**ДЕНТИКЛИ - МИНЕРАЛНА КРЕЧНА ДЕГЕНЕРАЦИЈА**

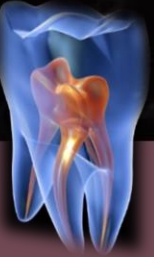
**калцификација на пулпата – ограничено - дентикли**

**дифузно депонирање на минерали**

**неоргански материји и калцификација на пулпата**



## ПУЛПОЛИТИ – ЛОКАЛНО ПРИСУСТВО ИЛИ СИМПТОМ ...



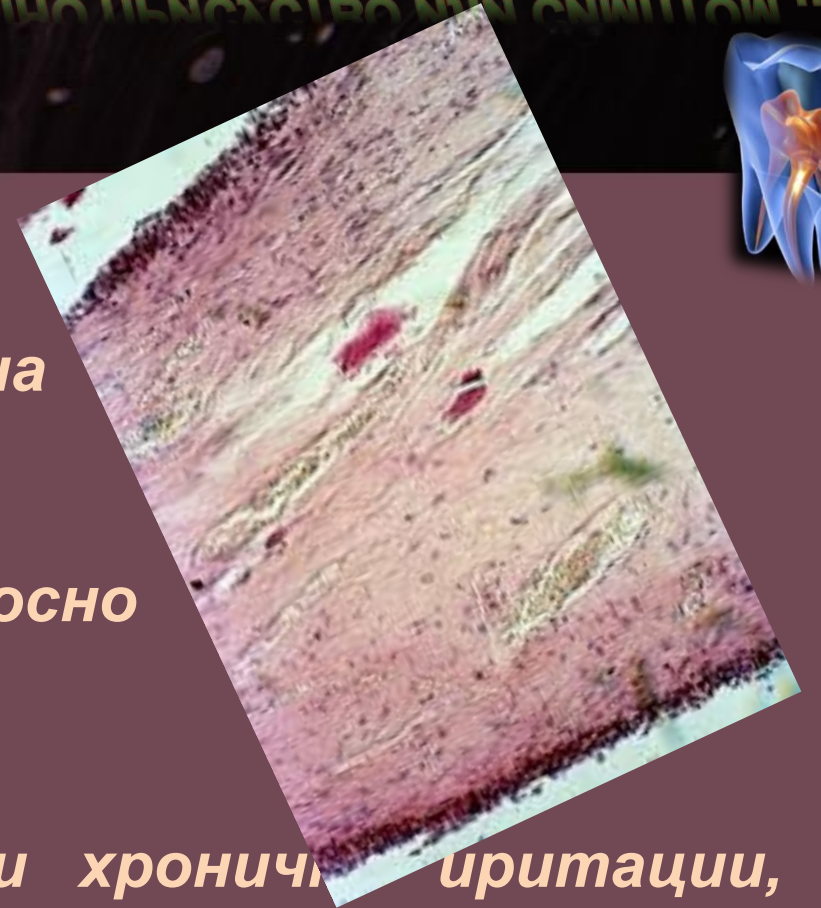
### **ХИСТОЛОШКИ:**

*таложeње примарно во клетките и сидовите на крвните садови на калциум и минерали*

*постепено спојување на калцификатите и целосно склерозирање и закрепчување на ткивото*

*се очекува кај возрасни пациенти, или при хронични иритации, пореметување на дентоногенезата, метаболизмот...*

*после ортодонтски третман*

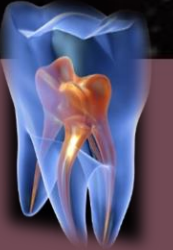


## ПУЛПОЛИТИ – ЛОКАЛНО ПРИСУСТВО ИЛИ СИМПТОМ ...

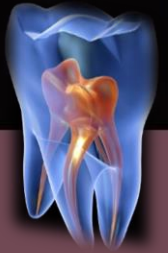
### КЛАСИФИКАЦИЈА:

### СТРУКТУРА:

- ❖ прави – со каналикуларна морфологија и периферно поставени одонтобласти слично на терциерниот дентин
- ❖ лажни – аморфна конфигурација и потекнуваат од дегенерирани или некротични заостанати клетки околу кои концентрично се таложат минерални соли
- ❖ централно органски матрикс база за минерализација и калцификација



## ПУЛПОЛИТИ – ЛОКАЛНО ПРИСУСТВО ИЛИ СИМПТОМ ...

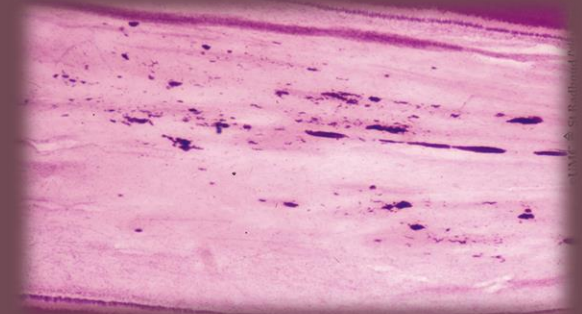
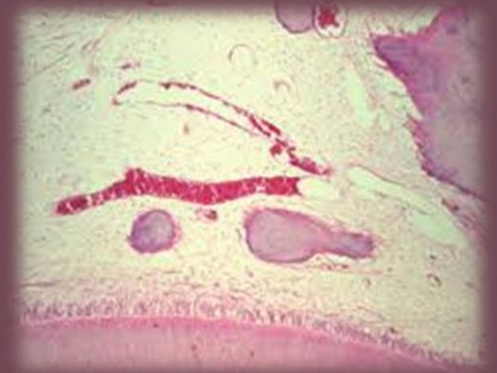
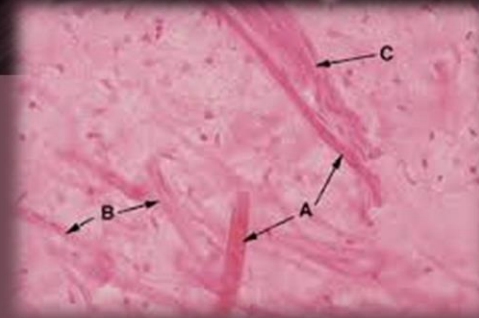


### ГОЛЕМИНА:

фибриларни фини – се забележуваат како калцификати на нервните влакна или сидовите од крвните садови во форма на тенки и фини фибрилни калцификации

колагените влакна минерализираат

етиолошки – пореметување во метаболизмот на мукополисахаридите





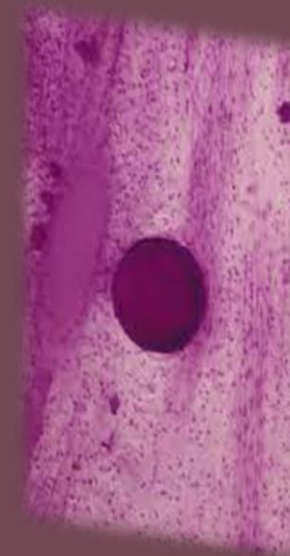
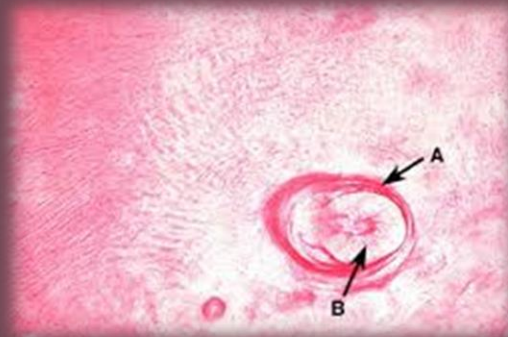
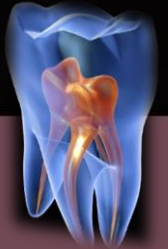
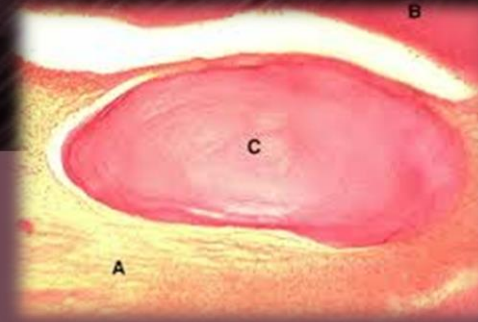
# ПУЛПОЛИТИ – ЛОКАЛНО ПРИСУСТВО ИЛИ СИМПТОМ ...

## ГОЛЕМИНА:

минерализирани телца - дендикли –  
јасно ограничени и препознатливи во однос на околните структури

може да се минимални до големи

заглавени во кавумот или коренот на забот

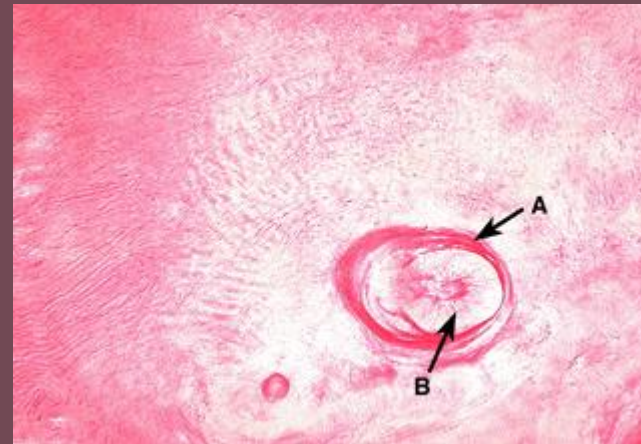
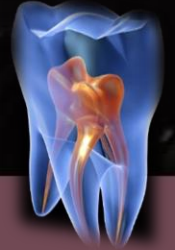


# ПУЛПОЛИТИ – ЛОКАЛНО ПРИСУСТВО ИЛИ СИМПТОМ ...

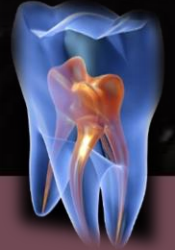
## ЛОКАЛИЗАЦИЈА:

*слободни или мобилни – најчесто се гледаат во пулпата коронарно или во коренот*

*фиксирани – прицврстени – за параканалниот денгин*

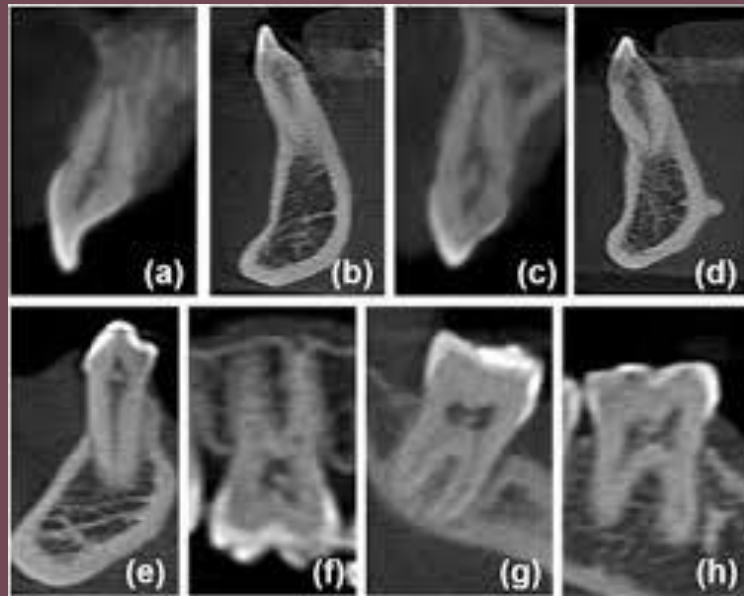
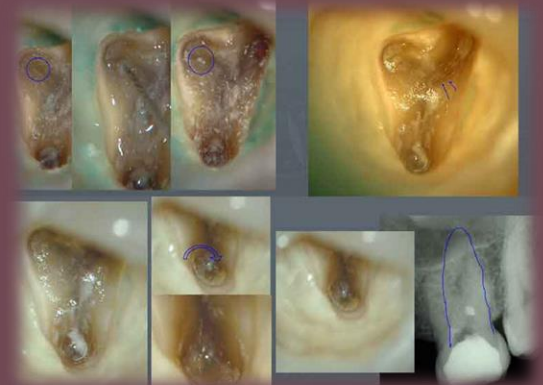


# ПУЛПОЛИТИ – ЛОКАЛНО ПРИСУСТВО ИЛИ СИМПТОМ ...

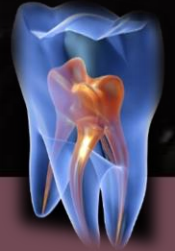


## ЛОКАЛИЗАЦИЈА:

*вградени – интерстициски – се формираат во пулпата но паралелно како тече дентиногенезата тие остануваат вградени во дентинокот – најприсутни во апикалната третина*



# ПУЛПОЛИТИ – ЛОКАЛНО ПРИСУСТВО ИЛИ СИМПТОМ ...

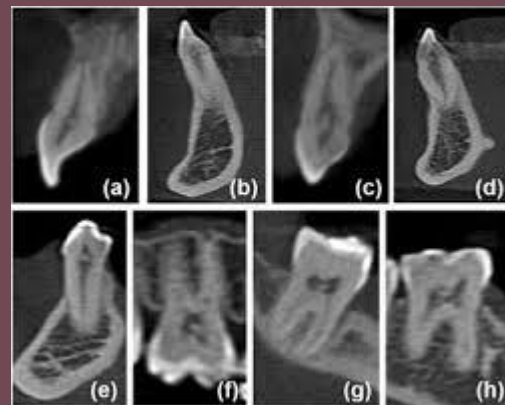


## ДИЈАГНОЗА :

сите радиографски методи  
ретроалвеоларна, ортопантомографија, профилна слика, дигитална  
rtg дијагностика...

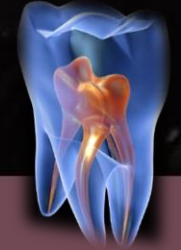
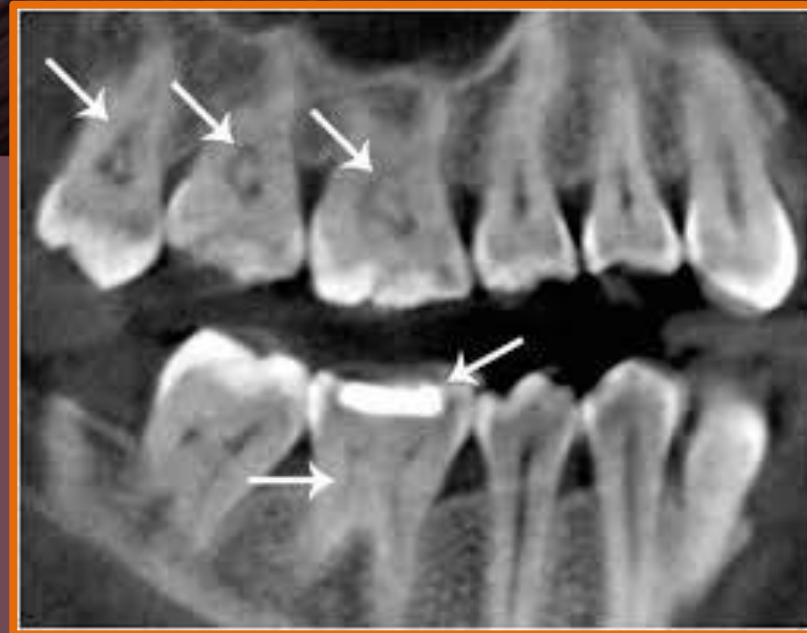
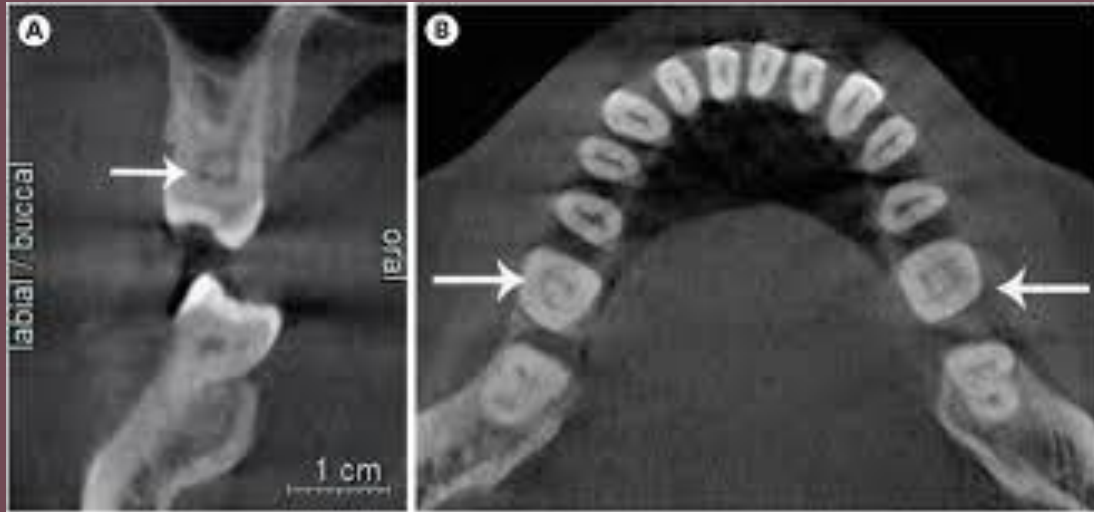


СВСТ – кон бин компјутерска томографија – последните години



**ПУЛПОЛИТИ – ЛОКАЛНО ПРИСУСТВО ИЛИ СИМПТОМ ...**

**ДИЈАГНОЗА :**



## ПУЛПОЛИТИ – ЛОКАЛНО ПРИСУСТВО ИЛИ СИМПТОМ ...

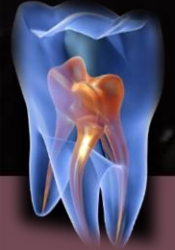
**КЛИНИЧКА МАНИФЕСТАЦИЈА :**

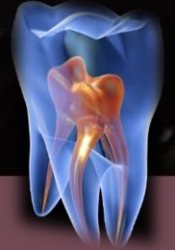
**обично асимптоматски**

**во случај на болка и неспецифична симптоматологија – ендодонтски третман**

**терапијата може да биде комплицирана – сложена**

**неопходно е да се отстрани дендиклот, па да се реализира ендодонтскиот третман**





## ЕНДОДОНТСКИ ТРЕТМАН :

- ✓ *отстранување на дентиклот*
- ✓ *со ултразвук, машински со дијамантски, челични, односно карбамидни борери*
- ✓ *или под ендодонтски микроскоп*
- ✓ *lege artis ендодонтски третман и реставрација*



## ДЕНТИКЛИ



Ibrahim Nasseh and Georges Aoun *Carotid Artery Calcification: A Digital Panoramic-Based Study*

O' Kansu at all. *Can dental pulp calcification serve as a diagnostic marker for carotid artery calcification in patients with renal diseases?*

Fatemeh Ezoddini-Ardakani at all. *Diagnostic Value of Dental Pulp Stones in the Early Diagnosis of Ischemic Heart Diseases*

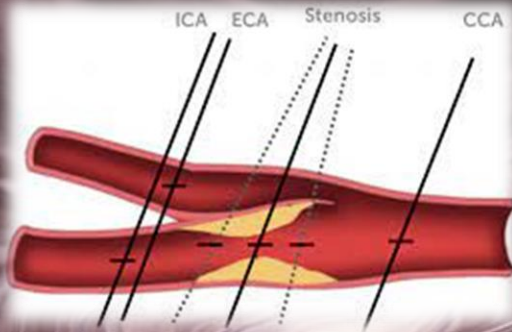
Kumar Chandan Srivastava at all. *Assessing the Prevalence and Association of Pulp Stones with Cardiovascular Diseases and Diabetes Mellitus in the Saudi Arabian Population—A CBCT Based Study*



ПУЛПОЛИТИ – ЛОКАЛНО ПРИСУСТВО ИЛИ СИМПТОМ ...



## ДЕНТИКЛИ

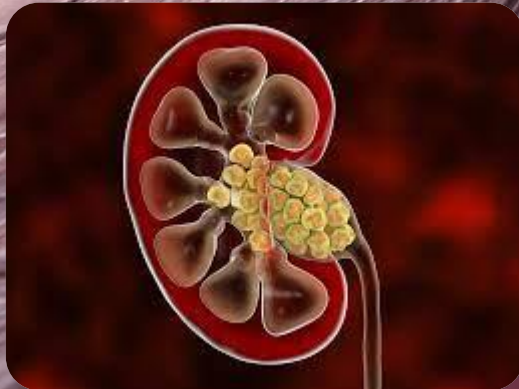


*Leila Khojastepour et al.* Can Dental Pulp Calcification Predict the Risk of Ischemic Cardiovascular Disease?

*Santosh Patil, Nidhi Sinha* Pulp Stone, Haemodialysis, End-stage Renal Disease, Carotid Atherosclerosis

*Shibu Thomas Mathew* PREVALENCE OF PULP STONES AND ITS RELATION WITH CARDIOVASCULAR DISEASES AND DIABETES MELLITUS USING DIGITAL RADIOGRAPHS: A RETROSPECTIVE STUDY

*Pratyaksha S. Panwar* Pulp Stones as Risk Predictors for Coronary Artery Disease: An Intriguing, Prevalence Study



# Deepak Narang at all... (2018)

Narang D et al. Pulp stones and hypertension.

**International Journal of Research in Health and Allied Sciences**

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ISSN 2455-7803 Index Copernicus value 2016 = 68.10

**Original Article**

**Pulp Stones and Hypertension- A Missing Link- A Clinical Study**

Deepak Narang<sup>1</sup>, Amit Jain<sup>2</sup>, Mohammad Amir<sup>3</sup>, Fatima Khan<sup>4</sup>

<sup>1</sup>PG teacher Oral Medicine, Prasad Medical College Saraishazadi, Banthara, Kanpur Road, Lucknow, U.P., India  
<sup>2</sup>Reader, Pedodontics and Preventive Dentistry, ACPM Dental College, Dhule, Maharashtra, India  
<sup>3</sup>M.D. Medicine, Clinical Specialist Medicine, Azamgarh city, Azamgarh , U.P., India  
<sup>4</sup>Reader OMDR, Rungta Dental College Kohka Kurud (Bhillai), Chhattisgarh, India

**ABSTRACT:**  
**Background:** Pulp stones are discrete calcified bodies in the dental pulp of healthy, diseased and unerupted teeth, frequently found on bitewing and periapical radiographs. The present study was conducted to assess the relation of hypertension with pulp stones in study population. **Materials & Methods:** The present study was conducted on 100 patients. Patients with systemic blood pressure above 170 mm of Hg and diastolic pressure above 110 mm of Hg were included in the study. All were subjected to radiograph (OPG) of maxillary and mandibular arches. Presence of calcification within teeth was considered. **Results:** Out of 100 patients, males were 60 and females were 40. The difference was non-significant ( $P > 0.05$ ). 44 males and 24 females had pulp stones. The difference was significant ( $P < 0.05$ ). Age group 30-50 years had 20 males and 8 females, age group 50-70 years had 24 males and 16 females. The difference was significant ( $P < 0.05$ ). **Conclusion:** It is suggested that the routine dental radiography could possibly be used as an available screening method for early detection of patients at risk of cardiovascular diseases.  
**Key words:** CVD, Pulp stone, Hypertension

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**Corresponding author:** Dr. Deepak Narang, PG teacher Oral Medicine, Prasad Medical College Saraishazadi, Banthara, Kanpur Road, Lucknow, U.P., India

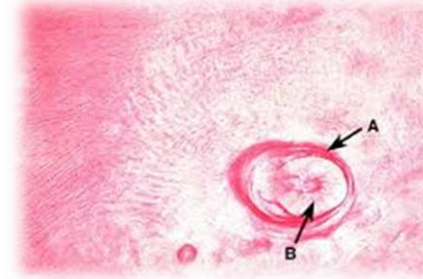
**This article may be cited as:** Narang D, Jain A, Amir M, Khan F. Pulp Stones and Hypertension- A Missing Link- A Clinical Study. Int J Res Health Allied Sci 2018; 4(2):61-63.

**INTRODUCTION**  
Pulp stones are discrete calcified bodies in the dental pulp of healthy, diseased and unerupted teeth, frequently found on bitewing and periapical radiographs. The present study was conducted to assess the relation of hypertension with pulp stones in study population. **Materials & Methods:** The present study was conducted on 100 patients. Patients with systemic blood pressure above 170 mm of Hg and diastolic pressure above 110 mm of Hg were included in the study. All were subjected to radiograph (OPG) of maxillary and mandibular arches. Presence of calcification within teeth was considered. **Results:** Out of 100 patients, males were 60 and females were 40. The difference was non-significant ( $P > 0.05$ ). 44 males and 24 females had pulp stones. The difference was significant ( $P < 0.05$ ). Age group 30-50 years had 20 males and 8 females, age group 50-70 years had 24 males and 16 females. The difference was significant ( $P < 0.05$ ). **Conclusion:** It is suggested that the routine dental radiography could possibly be used as an available screening method for early detection of patients at risk of cardiovascular diseases.  
**Key words:** CVD, Pulp stone, Hypertension

of dental pulp may have a similar pathogenesis so the routine dental radiography may be useful as a rapid screening method for early identification of the high risk subjects for cardiovascular disease. So, oral radiography may be helpful in screening for cardiovascular disease.  
The present study assessed the prevalence of pulp stones in patients with hypertension. The study confirmed that pulpal calcification was an increased rate in subjects with coronary atherosclerosis. Nayak et al reported that CVD patients had the maximum number of pulp stones. In a study conducted by Nayak et al, it was reported that 73% of the patients with a history of CVD had an evident pulp stone, whilst only 39% of patients with a record of CVD had pulp stones. The present study was conducted to assess the relation of hypertension with pulp stones in study population.

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**In our study, 44 males and 24 females had pulp stones. Thus the prevalence was 68%. The difference was significant ( $P < 0.05$ ). Age group 30-50 years had 20 males and 8 females, age group 50-70 years had 24 males and 16 females. The difference was significant ( $P < 0.05$ ).**

**Conclusion: It is suggested that the routine dental radiography could possibly be used as an available screening method for early detection of patients at risk of cardiovascular diseases.**

Original Article

DOI: 10.7860/JCDR/2013/5087.3042

## Pulp Stone, Haemodialysis, End-stage Renal Disease, Carotid Atherosclerosis

Dentistry Section

### Santosh Patil, Nidhi Sinha (2013)

SANTOSH PATIL, NIDHI SINHA

#### ABSTRACT

**Objectives:** The aim of this study was to determine the relationship between the presence of pulp calcification and carotid artery calcification on the dental panoramic radiographs in End Stage Renal Disease (ESRD) patients who were on haemodialysis.

**Methods:** A total of 112 End Stage Renal Disease (ESRD) patients on who were haemodialysis participated in this study. The periapical and the panoramic radiographs for all the patients were evaluated for the presence or absence of the narrowing of the dental pulps and for pulp stones in the pulp chambers and the pulp canals. The panoramic radiographs were also evaluated to determine the carotid calcification.

**Results:** Carotid calcifications were detected in none of the patients. 84 (74.99%) patients had dental pulp narrowing, and

38 (33.92%) patients had pulp stones. There was no statistical correlation between pulp narrowing and Carotid Artery Calcification (CAC) in the haemodialysis patient group. There was also no statistical correlation between pulp stones and CAC in the haemodialysis patients.

**Conclusion:** However, the incidental finding of CAC on a panoramic radiograph can provide life-saving information for the vascular disease patients, but in the present study, no significant relationship was found between the presence of the pulpal calcification and CAC in the ESRD patients who were on haemodialysis. Therefore, the presence of pulp calcification does not seem to serve as a diagnostic marker for carotid atherosclerosis.

**Key Words:** Pulp stone, Haemodialysis, End-stage renal disease, Carotid atherosclerosis

#### INTRODUCTION

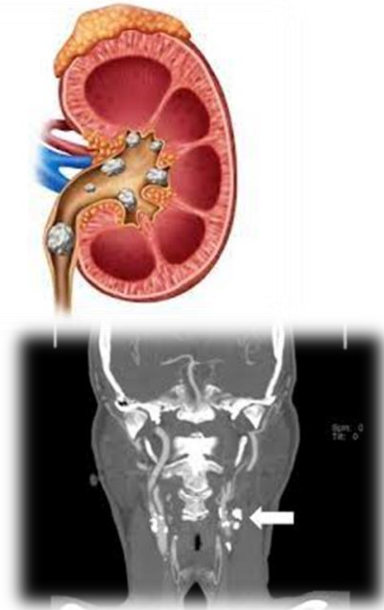
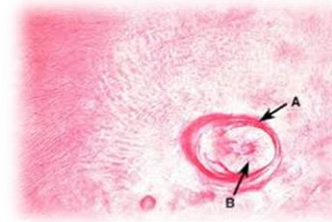
Dental pulp calcification can occur as diffuse forms or as discrete calcified stones. Pulp stones have been described as the symptoms of the changes in the pulp tissue rather than their cause. The exact mechanism and the aetiology of pulp calcification are not well understood, although, various factors which are implicated in the stone formation include pulp degeneration, epithelium rests in the pulp tissue, age, operative procedures, circulatory disturbances in the pulp, periodontal disease, orthodontic tooth movement, idiopathic factors, genetic predisposition and certain syndromes such as the Gardner's Syndrome [1,2]. A long-standing irritation which is secondary to pulp filling by the restorative material, can lead to the formation of pulp stones. It has also been noted that an irritated pulp, while it attempts to repair itself, may lead to the formation of pulp stones. The size of the pulp stones vary from a few microns to several centimeters. They may be seen as a microscopic mass or as a large mass which occludes the entire pulp space [3].

The pulp calcification is present in various dental diseases such as dentin dysplasia and dentinogenesis imperfecta usually occur throughout the dentition [4]. The conditions which are secondary to pulp calcification are pulp necrosis and pulpitis. The pulp calcification is also reported in the carious teeth of children and young adults was reported to be 5% and 20.4% respectively [5]. The histological examination have revealed high pulp calcification. But much higher prevalence of pulp stones (51.4%) was reported by Yamashita et al., in Jordanian adults [6].

the deposition of the secondary dentin and due to the deposition of calcified masses in the root [6]. Pulpal calcification is also found to occur due to the inflammatory changes in pulp because of caries, which is secondary to the deposition.

Based on the location, pulp stones can be classified as embedded, adherent and free. The embedded stones are formed in the pulp but they become enclosed within the canal walls because of the deposition of physiological dentin [7]. They are usually located at the apical portion of the root. The peripheral aspect of these stones may show the presence of odontoblasts and a calcified mass. While embedded in the dentine [8]. The adherent pulp stones are attached to the dentine. They are usually located in the pulp stones and they are never fully enclosed by the dentine. The adherent and the embedded pulp stones can cause significant obstruction of the pulp space. The location of pulp stones in the pulp chamber and the pulp canal is reported [9].

Based on the structure, there are true and false pulp stones; a true pulp stone is a mass of pulp tissue which is completely enclosed by dentine. The false pulp stones are more regular in shape as compared to the false pulp stones [1]. They are lined by odontoblasts and are composed of dentine, whereas the false pulp stones are not lined by odontoblasts; lead to the formation of pulp stones [10]. Based on the radiographic examination, the prevalence of pulp stones has been reported to be around 20-30% whereas the histological examination have revealed higher prevalence. But much higher prevalence of pulp stones (51.4%) was reported by Yamashita et al., in Jordanian adults [9].



**The aim of this study was to determine the relationship between the presence of pulp calcification and carotid artery calcification on the dental panoramic radiographs in End Stage Renal Disease (ESRD) patients who were on haemodialysis. 38 (33.92%) patients had pulp stones. There was no statistical correlation between pulp narrowing and Carotid Artery Calcification (CAC) in the haemodialysis patient group. There was also no statistical correlation between pulp stones and CAC in the haemodialysis patients.**

Original Article

DOI: 10.7860/JCDR/2013/5087.3042

## Pulp Stone, Haemodialysis, End-stage Renal Disease, Carotid Atherosclerosis

Dentistry Section

### Santosh Patil, Nidhi Sinha (2013)

SANTOSH PATIL, NIDHI SINHA

#### ABSTRACT

**Objectives:** The aim of this study was to determine the relationship between the presence of pulp calcification and carotid artery calcification on the dental panoramic radiographs in End Stage Renal Disease (ESRD) patients who were on haemodialysis.

**Methods:** A total of 112 End Stage Renal Disease (ESRD) patients on who were haemodialysis participated in this study. The periapical and the panoramic radiographs for all the patients were evaluated for the presence or absence of the narrowing of the dental pulps and for pulp stones in the pulp chambers and the pulp canals. The panoramic radiographs were also evaluated to determine the carotid calcification.

**Results:** Carotid calcifications were detected in none of the patients. 84 (74.99%) patients had dental pulp narrowing, and

38 (33.92%) patients had pulp stones. There was no statistical correlation between pulp narrowing and Carotid Artery Calcification (CAC) in the haemodialysis patient group. There was also no statistical correlation between pulp stones and CAC in the haemodialysis patients.

**Conclusion:** However, the incidental finding of CAC on a panoramic radiograph can provide life-saving information for the vascular disease patients, but in the present study, no significant relationship was found between the presence of the pulpal calcification and CAC in the ESRD patients who were on haemodialysis. Therefore, the presence of pulp calcification does not seem to serve as a diagnostic marker for carotid atherosclerosis.

**Key Words:** Pulp stone, Haemodialysis, End-stage renal disease, Carotid atherosclerosis

#### INTRODUCTION

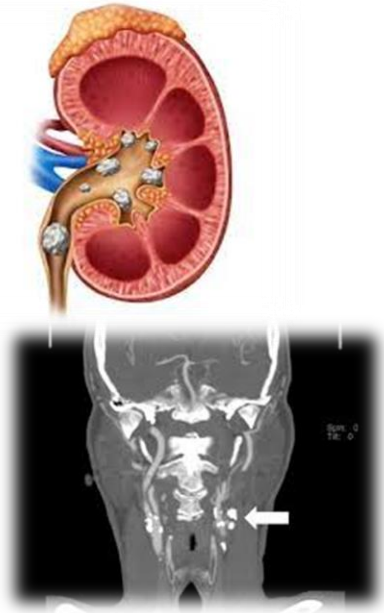
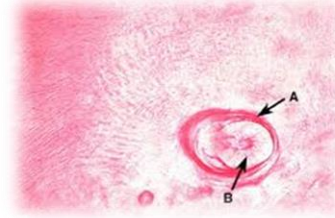
Dental pulp calcification can occur as diffuse forms or as discrete calcified stones. Pulp stones have been described as the symptoms of the changes in the pulp tissue rather than their cause. The exact mechanism and the aetiology of pulp calcification are not well understood, although, various factors which are implicated in the stone formation include pulp degeneration, epithelium rests in the pulp tissue, age, operative procedures, circulatory disturbances in the pulp, periodontal disease, orthodontic tooth movement, idiopathic factors, genetic predisposition and certain syndromes such as the van der Woude syndrome [1,2]. A long-standing irritation of the secondary dentin due to caries and pulp inflammation can lead to the formation of pulp stones. It has also been noted that an irritated pulp, while it attempts to repair itself, may lead to the formation of pulp stones. The sizes of pulp stones may be as small as 0.1 mm in diameter, which is just visible to the eye, or more and they may be seen as a microscopic mass or as a large mass which occludes the entire pulp space [3].

Other conditions such as renal osteodystrophy, systemic diseases such as dentin dysplasia and dentinogenesis imperfecta usually occur throughout the dentition [4]. The conditions which are associated with pulp stones are like hypercalcaemia, hypocalcaemia and renal osteodystrophy. The predisposing factors for the pulpal calcification. The incidence of the calcification in the carious teeth of children and young adults was reported to be 5% [5]. It is reported that the size of the pulp chamber and the pulp canal, the size of the pulp chamber and the decrease in the size of the secondary dentin deposition. Berrick and Nedelman found a decrease in the size of the pulp chamber which had occurred due to

the deposition of the secondary dentin and due to the deposition of calcified masses in the root [6]. Pulpal calcification is also found to occur due to the inflammatory changes in pulp because of caries, which is secondary to the deposition.

Based on the location, pulp stones can be classified as embedded, adherent and free. The embedded stones are formed in the pulp but they become enclosed within the canal walls because of the deposition of physiological dentin [7]. They are usually located at the apical portion of the root. The peripheral aspect of these stones may show the presence of odontoblasts and a calcified mass, which is similar to dentin [8]. The surface of pulp stones is irregular and uneven. The pulp stones are embedded in the pulp stones and they are never fully enclosed by the dentine. The adherent and the embedded pulp stones can cause significant pulp canal blockage, which may be the cause of pulpitis which may lead to the root canal treatment [9].

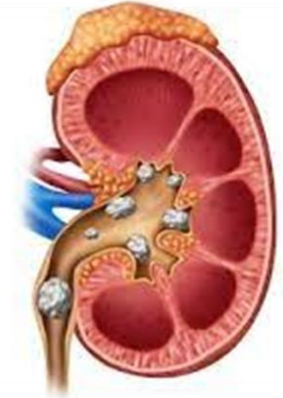
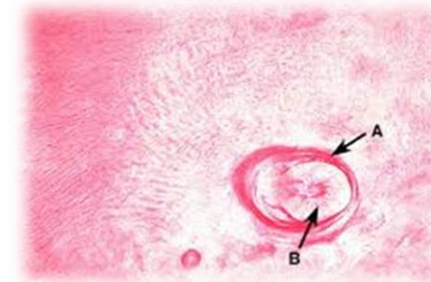
Based on the structure, there are true and false pulp stones; a true pulp stone is a mass of pulp tissue which is seen in the pulp chamber or pulp canal. The false pulp stones are more irregular in shape as compared to the false pulp stones [1]. They are lined by a dentin shell and are composed of dentine. The dentin shell is lined by pulp which is due to the inflammatory process, pulp stones [2]. Based on the radiographic examination, the prevalence of pulp stones has been reported to be around 20-30% whereas the histological examinations have reported 10-15% [10]. But the prevalence of pulp stones [11,4%] was reported by Hamasha et al., in Jordanian adults [9].



**Conclusion: However, the incidental finding of CAC on a panoramic radiograph can provide life-saving information for the vascular disease patients, but in the present study, no significant relationship was found between the presence of the pulpal calcification and CAC in the ESRD patients who were on haemodialysis. Therefore, the presence of pulp calcification does not seem to serve as a diagnostic marker for carotid atherosclerosis.**

***Prevalence of and relationship between pulp and renal stones: A radiographic study***

***Santosh R. Patil (2015)***



***Conclusion: However, there was no significant correlation between the presence of pulp stones and renal stones, and the incidental findings of pulp stones on periapical radiographs can provide useful information in the early diagnosis of the systemic calcifications.***

# Ashok Galav at all... (2018)

Galav A et al. Pulp stones and renal stones.

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## Original Article

### Association of Pulp Stones & Renal Stones- A Clinical Study

Ashok Galav<sup>1</sup>, Tarun Vyas<sup>2</sup>, Manpreet Kaur<sup>3</sup>, Manasi Chauhan<sup>4</sup>, Nupur Satija<sup>5</sup>

<sup>1</sup>Reader, Dept. Of Oral Medicine, Diagnosis and radiology, Tatya Saheb Kore Dental College & Research Center, Kolhapur (Maharashtra), <sup>2</sup>Senior Lecturer, Dept. of Oral Medicine, Diagnosis and Radiology, R.R. Dental college and hospital, Udaipur, (Rajasthan), <sup>3</sup>Reader, Dept. of Oral pathology, Pacific Dental College and Research Center, Udaipur, (Rajasthan), <sup>4</sup>Oral Physician and consultant, Happy teeth dental clinic, Deesa, Gujarat, <sup>5</sup>Oral Physician and consultant, Badr Al Samaa, Hospital, Ruwi, Muscat

#### ABSTRACT:

**Background:** Pulp stones are discrete calcified bodies in the dental pulp of healthy, diseased and unerupted teeth, frequently found on bitewing and periapical radiographs. The present study was conducted to assess the relation of pulp stones and renal stones in study population. **Materials & Methods:** The present study was conducted on 100 patients with diagnosed cases of renal stones of both genders. Patients with USG of kidney depicting renal stones were included in the study. All were subjected to radiograph (OPG) of maxillary and mandibular arches. Presence of calcification within teeth was considered. **Results:** Out of 100 patients, males were 55 and females were 45. The difference was non-significant (P> 0.05). 12 males and 8 females had pulp stones. The difference was non-significant (P< 0.05). Age group 20-40 years had 7 males and 4 females, age group 40-60 years had 5 males and 4 females. The difference was significant (P< 0.05). **Conclusion:** It is suggested that the routine dental radiography could possibly be used as an available screening method for early detection of patients at risk of renal stones. The prevalence found to be 20% in renal stones patients.

**Key words:** Pulp stone, Radicular, Renal stones

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Corresponding author: Dr. Ashok Galav, Reader, Dept. Of Oral Medicine, Diagnosis and radiology, Tatya Saheb Kore Dental College & Research Center, Kolhapur (Maharashtra).

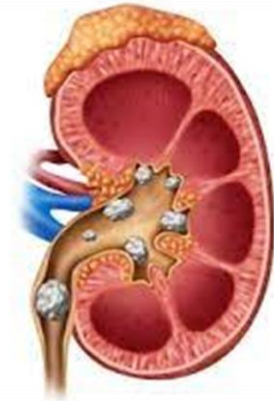
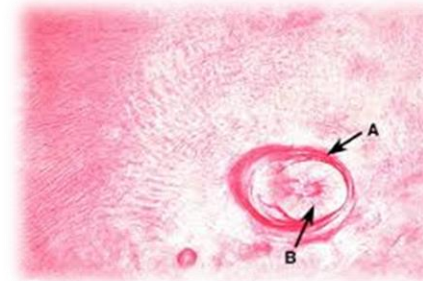
The article can be cited as: Galav A, Vyas T, Kaur M, Chauhan M, Satija N. Association of Pulp & Renal Stones- A Clinical Study. Int J Res Health Allied Sci 2018; 4(2):82-84.

#### INTRODUCTION

Pulp stones are discrete calcified bodies in the dental pulp of healthy, diseased and unerupted teeth, frequently found on bitewing and periapical radiographs. Stones may be free situated or attached to the pulp chamber or root canal. It is more common in the coronal than in the radicular portions of the pulp and they may exist freely within the dental pulp tissue or attached to, or embedded in dentin of healthy, diseased or unerupted teeth. Pulp stones vary in size from small microscopic particles to large masses that almost occlude the pulp chamber and a single tooth may have one to 12 stones or more with different sizes. Etiology of pulp stones, not completely understood, has been implicated in pulp stone formation like caries, deep restoration, chronic inflammation, interaction between

the pulp and pulp space, circumscribed distribution of pulp, gingivitis, periodontitis, Oral cavity tooth hygiene & calcifying nanoparticles. Pulp stones obliterate the pulp chamber making it difficult for access during root canal treatment. Pulp stones are more common in the coronal than in the radicular portions of the pulp and they may exist freely within the dental pulp tissue or attached to, or embedded in dentin of healthy, diseased or unerupted teeth. They can cause obstruction of the root canals which leads to endodontic failure.

Nephrolithiasis is a relatively common disease in Western countries. The lifetime prevalence is between 5% and 10% in the United States of America [USA] (16) and the prevalence is increasing worldwide (17). As a consequence of the genetic, environmental and multiple factors, a paradigm of the stone formation is complex process. A number of important advances have been made during the last decades in describing kidney stone formation, many questions

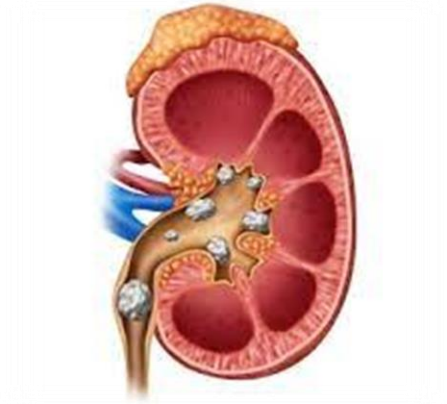
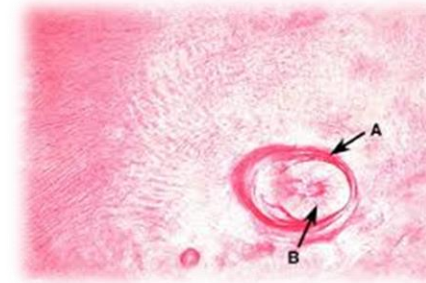


**In our study, 12 males and 8 females had pulp stones. Thus the prevalence was 20%. Amir et al. Pulp stones occurrence was higher in males than females, higher in mandible 51.4% than maxilla 48.6% higher on left side than right side, higher in molars than premolars, and higher in first molar than second molar.**

**Conclusion: It is suggested that the routine dental radiography could possibly be used as an available screening method for early detection of patients at risk of renal stones. The prevalence found to be 20% in renal stones patients.**

## ***Pulp stones associated with the renal calculi***

***Shaik Ali Hassan et al... (2019)***



***Conclusion: Pulp stones are mainly a sign of ageing of human pulp. Appear to be a part of normal physiological age changes in the body. Routine dental radiographs could deliver as a significant prognostic tool for early detection of potential renal stones.***

***This screening modality could easily be advocated as a tool in public health programs for early identification of possible renal calculi symptoms since it requires less radiation .***

Leila Khojastepour at all... (2013)

Original Article

Can Dental Pulp Calcification Predict the Risk of Ischemic Cardiovascular Disease?

Leila Khojastepour<sup>1</sup>, Pegah Bronoosh<sup>2\*</sup>, Shahdad Khosropanah<sup>3</sup>, Elham Rahimi<sup>4</sup>

<sup>1</sup>Associated Professor, Department of Oral Radiology, School of Dentistry, Shiraz University of Medical Sciences, Shiraz, Iran
<sup>2</sup>Assistant Professor, Department of Oral Radiology, School of Dentistry, Shiraz University of Medical Sciences, Shiraz, Iran
<sup>3</sup>Associated Professor, Department of Cardiology, School of Medicine, Shiraz University of Medical Sciences, Shiraz, Iran
<sup>4</sup>Student Research Committee, School of Medicine, Shiraz University of Medical Sciences, Shiraz, Iran

Abstract

Objective: To report the association of pulp calcification with that of cardiovascular disease (CVD) using digital panoramic dental radiographs.

Materials and Methods: Digital panoramic radiographs of patients referred from the angiography department were included if the patient was under 55 years old and had non-restored or minimally restored molars and canines. An oral and maxillofacial radiologist evaluated the images for pulpal calcifications in the selected teeth. The sensitivity, specificity, positive predictive value and negative predictive value of panoramic radiography in predicting CVD were calculated.

Results: Out of 122 patients who met the criteria, 68.2% of the patients with CVD had pulp chamber calcifications. Pulp calcification in panoramic radiography had a sensitivity of 83.9%.

Conclusion: This study demonstrates that patients with CVD show an increased incidence of pulp calcification compared with healthy patients. The findings suggest that pulp calcification on panoramic radiography may have possibilities for predicting CVD.

Key Words: Dental Pulp Calcification, Cardiovascular Disease, Panoramic Radiography

Corresponding author: P. Bronoosh, Department of Oral Radiology, School of Dentistry, Shiraz University of Medical Sciences, Shiraz, Iran. Email: pegah\_brx@yahoo.com

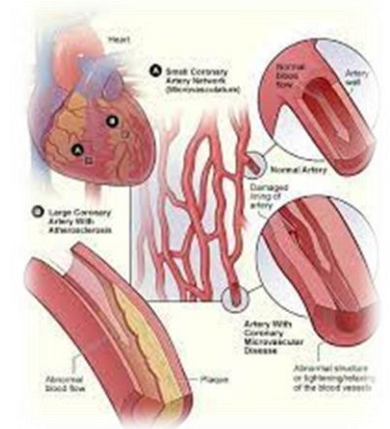
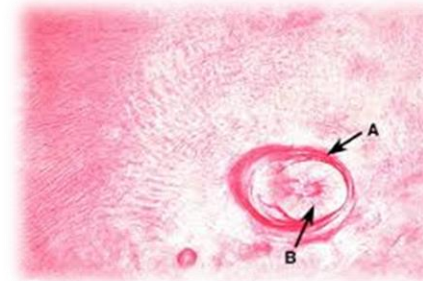
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Journal of Dentistry, Shiraz University of Medical Sciences, Shiraz, Iran, 2013; 10: 456

INTRODUCTION

Calcified particles of dental pulps known as pulp calcifications (PC) may be seen in healthy, diseased, and even unerupted pulp [1]. Their prevalence varies widely in different studies and the results may be affected by the number of teeth or patients as well as radiographic or microscopic reports [1-6]. Radiographic detection of pulp stones seems to be related to its diameter since only particles larger than 200 µm can be seen on radiographs [7].

So, radiological studies may tend to underestimate the prevalence of pulp calcifications. Radiographic features of pulp calcifications vary from discrete calcifications, named pulp



Results: Out of 122 patients who met the criteria, 68.2% of the patients with CVD had pulp chamber calcifications. Pulp calcification in panoramic radiography had a sensitivity of 83.9% to predict CVD.

It is also worth to note that in our study, molar pulp calcification in CVD patients was significantly higher than the normal group.

However, the rate of pulp calcification was higher for subjects older than 45 years compared to younger individuals. Statistically, age increase did not alter the chance of calcification significantly.



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On 28 AUG 2013

### Association of pulp stones with coronary artery stenosis

F. Ezoddini-Ardakani<sup>1</sup>, S.M. Namayandeh<sup>2</sup>, S.M. Sadr-Bafghi<sup>2</sup>, F. Fatehi<sup>3,4</sup>, Z. Mohammadi<sup>1</sup>, S. Shahrabadi-Farahani<sup>1</sup>, A.S. Hedayati<sup>1</sup> and M.J. Rahmani-Baghemalek<sup>1</sup>

<sup>1</sup>School of Dentistry, Shahid Sadoughi University of Medical Sciences, Yazd, Iran; <sup>2</sup>Yazd Cardiovascular Research Center, Shahid Sadoughi University of Medical Science, Yazd, Iran; <sup>3</sup>Department for Research Administration, Shahid Sadoughi University of Medical Sciences, Yazd, Iran; <sup>4</sup>Yazd Diabetes Research Center, Shahid Sadoughi University of Medical Sciences, Yazd, Iran

**Background:** Dental pulp stones are discrete calcifications in the pulp chamber which are often seen in deciduous and permanent teeth. It has been hypothesised that atherosclerosis can be associated with their development. **Objective:** To determine whether a higher prevalence of dental pulp stones is correlated with coronary artery stenosis. **Clinical setting:** Sixty-one patients aged 20–55 years referred to Afshar Heart Center for invasive coronary angiography were invited to undergo panoramic dental radiography. The panoramic radiographs were independently examined for the presence of pulp stones. **Results:** Pulp stones were present in 82% (31/38) of patients with at least one clinically significant coronary artery stenosis and in 48% (11/23) of patients with normal coronary angiography. They were present in 13% of the teeth in the former group and in 5% of the teeth in the latter. The findings show a statistically significant association between coronary artery stenosis and presence of pulp stones (odds ratio 4.83, 95% confidence interval 1.5–15.4). **Conclusion:** Coronary artery stenosis and dental pulp calcification are significantly associated. Dental radiography has the potential to be used as a rapid screening method for the early detection of coronary artery stenosis.

**Key words:** dental pulp calcification, coronary artery stenosis, panoramic radiography

## F. Ezoddini-Ardakani at all... (2010)

#### Introduction

Pulp stones are discrete calcifications in the pulp chamber that may develop in both deciduous and permanent teeth. They are usually found free within the dental pulp. The stones may be microscopic or macroscopic, and the latter form can be seen in dental radiographs. Their prevalence has been reported widely ranging from 8% to 95% by various studies in different locations and settings (Arya *et al.* 1993; Moss-Salentijn and Hendricks-Klyvert, 1988; Tamse *et al.*, 1982).

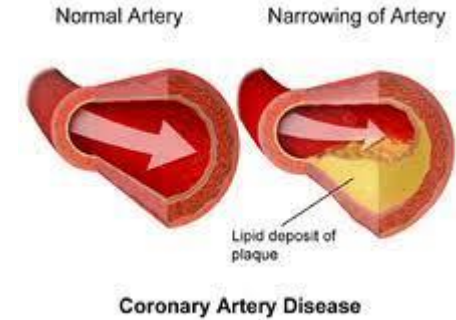
Various aetiologies have been suggested for pulp stones, including dental and systemic diseases, long-term irritation and bacteria (Zeng *et al.*, 2006). It has been suggested that hypercalcaemia is a predisposing factor to pulp stone (Sayegh and Reed, 1968). Although ageing has been shown to contribute to pulp stone development (Bernick and Nedelman 1975; Morse 1991), it has also been suggested that there is no association between ageing and pulp stone formation (Aksay *et al.*, 1996). There is an association between periodontal disease and cardiovascular events whereby periodontal infection can affect systemically vascular disease such as atherosclerosis (Mishra and Chandra 2006; Srinivasan *et al.*, 1999). It has been proposed that the pathogenesis of pulp stones is similar to that of calcified atheromas in cardiovascular diseases (Eggs *et al.*, 2005). A study of pulp stone calcification has been reported in radiographic studies of patients with coronary atherosclerosis (Maranhao de Moura and de Paiva 1987) although some normal control patients with pulp stones were also found (Kilicci *et al.*, 1994; Ogundiran *et al.*, 1992).

We hypothesised that the incidental finding of pulp stones on dental radiography might correlate with a higher rate of coronary artery stenosis and accordingly undertook this study.

#### Methods

During a 7-month period from March 2008, patients referred to Afshar Heart Center in Yazd, Iran for conventional catheter-based X-ray coronary angiography (CAG) were invited to participate in this study. All patients conformed to the American College of Cardiology criteria for suspected coronary artery stenosis and were aged 20–55 years with at least 8 permanent teeth present.

Catheterisation of coronary arteries was performed by the Seldinger (1953) approach. Coronary angiographic images were acquired using standard techniques by a GE Advantix Rad/Fluoro Suite (GE Healthcare, Milwaukee, WI, USA) and analysed independently by a single experienced cardiologist to evaluate the stenosis of three main arteries in the heart: the left anterior descending artery (LAD), the right coronary artery (RCA) and the circumflex artery (Cx). The degree of stenosis was defined as follows: narrowing of more than 50% in LAD or RCA, or 60% in Cx was recorded as a positive finding (Aksay *et al.*, 1996; Tamse *et al.*, 1982). The degree of stenosis was not recorded. Angiography results were divided into two groups: i, coronary artery stenosis (CAS group); and ii, normal coronary angiography (NCA group). All positive findings were divided into two groups: i, CAS group; and ii, NCA group. The prevalence of pulp stones was determined on the basis of the number of stenotic main arteries identified.



**Objective:** To determine whether a higher prevalence of dental pulp stones is correlated with coronary artery stenosis.

**Conclusion:** The findings show that coronary artery stenosis has a statistically significant association with presence of dental pulp stones. It suggests that dental radiography has the potential for use as a screening method for the early detection of coronary artery stenosis.

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<http://dx.doi.org/10.4236/health.2015.73038>



## Diagnostic Value of Dental Pulp Stones in the Early Diagnosis of Ischemic Heart Diseases

Fatemeh Ezoddini-Ardakani<sup>1</sup>, Seyedeh Mahdieh Nemayandeh<sup>2\*</sup>,  
Seyed Mahmood Sadrbafghi<sup>2</sup>, Sedigheh Hajhashemi<sup>2</sup>, Mahmood Emami<sup>2</sup>,  
Forouzan Ghasemi Kahtouei<sup>2</sup>, Leila Hadiani<sup>2</sup>, Mohammad Hossein Ahmadi<sup>2</sup>,  
Maliheh Moeini<sup>1</sup>, Seyed Hossein Razavi<sup>1</sup>, Sajad Besharati<sup>3</sup>

<sup>1</sup>Oral and Maxillofacial Radiology Department, Faculty of Dentistry, Shahid Sadoughi University of Medical Sciences, Yazd, Iran

<sup>2</sup>Yazd Cardiovascular Research Center, Shahid Sadoughi University of Medical Sciences, Yazd, Iran

<sup>3</sup>Shahid Beheshti University of Medical Sciences, Tehran, Iran

Email: [drnamayandeh@gmail.com](mailto:drnamayandeh@gmail.com)

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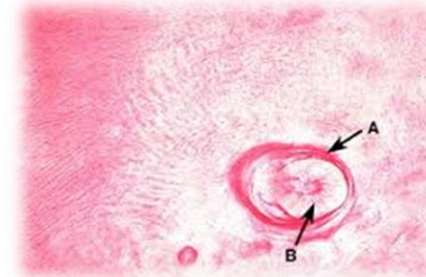
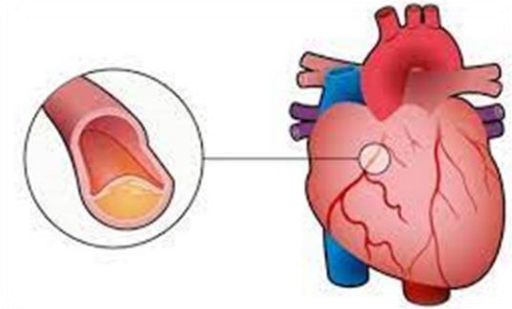


### Abstract

**Background:** Pulp stones are calcified masses formed in the primary and permanent dentitions. The ischemic cardiovascular disorders (CVD) can be the first health problem of the world. It seems that there is a relationship between pulp stones and cardiovascular diseases to determine the diagnostic value of panoramic dental radiographs as non-invasive test for the early detection of CVD. **Methods and Materials:** The subjects of the study came from patients presenting to Dental Clinic Department in Yazd who had 30 teeth and 60 natural teeth. They were referred to the Cardiovascular Center of Afshar Hospital in Yazd for cardiovascular evaluation. To set the cut-off point, the ratio of teeth with pulp stones to the total number of teeth with pulp stones was calculated and 1:1 ARI for diagnosing IHD. Absence was used for the ratio of pulp stones to total number of teeth to detect IHD. **Results:** The ratio of teeth with pulp stones to total number of teeth was 0.2 or more, was 138.7 times greater than the other. **Conclusion:** The dentists, who order panoramic radiographs for the treatment of patients, exactly study those teeth that preserve pulp stones. The ratio of teeth with pulp stone to total teeth equal 0.2 or more was a good test for early diagnosis of CVD.

\*Corresponding author.

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*Fatemeh Ezoddini-Ardakani at all... (2014)*

**Results: Only 3.8% of patients without pulp stone were affected by ischemic heart disease (IHD). About Sixty seven percent (67.3%) of individuals had at least one tooth with pulp stone. In individuals without IHD, 5% of the teeth showed pulp stone while this rate was 45% (9 times) in CVD patients. The number of patients for whom the ratio of teeth with pulp stone to total number of teeth was 0.2 or more, was 138.7 times greater than the other.**

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<sup>1</sup>Oral and Maxillofacial Radiology Department, Faculty of Dentistry, Shahid Sadoughi University of Medical Sciences, Yazd, Iran

<sup>2</sup>Yazd Cardiovascular Research Center, Shahid Sadoughi University of Medical Sciences, Yazd, Iran

<sup>3</sup>Shahid Beheshti University of Medical Sciences, Tehran, Iran

Email: [drnamayandeh@gmail.com](mailto:drnamayandeh@gmail.com)

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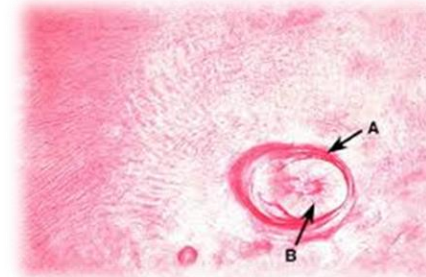
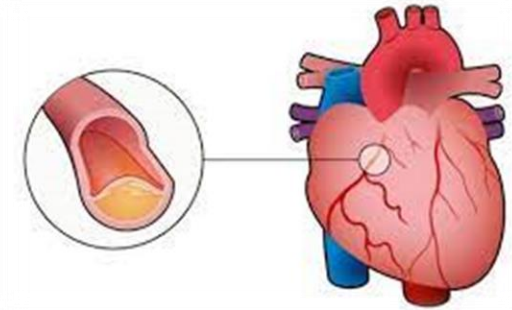


### Abstract

**Background:** Pulp stones are calcified masses formed in the primary and permanent dentitions. The ischemic cardiovascular disorders (CVD) can be the first health problem of the world. It seems that there is a relationship between dental pulp stones and cardiovascular diseases to determine the diagnostic value of panoramic dental radiographs as non-invasive test for the early detection of CVD. **Methods and Materials:** The subjects of the study came from 63 dentists present in the Dental Radiology Department, Faculty of Dentistry, Shahid Sadoughi University of Medical Sciences, Yazd, Iran. They were referred to the Cardiovascular Center of Afshar Hospital in Yazd for cardiovascular evaluation. To set the cut-off point, the ratio of teeth with pulp stones to the total number of teeth in each tooth was calculated. Also a chi-square test was used. **Results:** Only 10.0% of patients without pulp stone were affected by ischemic heart disease (IHD). About sixty seven percent (67.3%) of individuals had at least one tooth with pulp stone. In individuals without IHD, 5% of the teeth showed pulp stone while this rate was 45% (9 times) in CVD patients. The number of patients for whom the ratio of teeth with pulp stone to total number of teeth was 0.2 or more, was 138.7 times greater than the other. **Conclusion:** The dentists, who order panoramic radiographs for the treatment of patients, exactly study those teeth from the presence of pulp stones. The ratio of pulp stone to total teeth of 0.2 or more is a good tool for early detection of CVD.

\*Corresponding author.

to [drnamayandeh@gmail.com](mailto:drnamayandeh@gmail.com).  
Ezoddini-Ardakani, F., Nemayandeh, S., Sadrbafghi, M., Hajhashemi, S., Ahmadi, S., Hadiani, L., Ahmadi, M.H., Moeini, M., Razavi, S.H. and Besharati, S. (2015) Diagnostic Value of Dental Pulp Stones in the Early Diagnosis of Ischemic Heart Diseases. *Health*, 7, 336-345. <http://dx.doi.org/10.4236/health.2015.73038>



**Fatemeh Ezoddini-Ardakani at all... (2014)**

**Conclusion: It is recommendable that the dentists, who order panoramic radiographs for the treatment of patients, exactly evaluate teeth for the presence of pulp stones. In the case of the presence of several pulp stones, they should refer the patients to cardiologists for consultation. New research with larger samples is advisable. Specifically, a greater number of male subjects to obtain more accurate result are recommended**

Original Study

**PREVALENCE OF PULP STONES AND ITS RELATION WITH CARDIOVASCULAR DISEASES AND DIABETES MELLITUS USING DIGITAL RADIOGRAPHS: A RETROSPECTIVE STUDY**

Shibu Thomas Mathew<sup>1\*</sup>, Maha Ahmad Al-Mutlaq<sup>2</sup>, Rozan Fahad Al-Eidan<sup>3</sup>, Danah Mohammed Al-Khuraishi<sup>4</sup>, Hiba Adam<sup>4</sup>

<sup>1</sup>Assistant Professor, Riyadh Elm University, An Nammalhojyah, Riyadh 12734, Saudi Arabia

<sup>2</sup>General Dentist, Ministry of Health, Riyadh, Saudi Arabia

<sup>3</sup>General Dentist, Riyadh, Saudi Arabia

<sup>4</sup>Dental Intern, Riyadh Elm University, Riyadh, Saudi Arabia

**ABSTRACT**

**Objectives:** This study aimed to investigate the usefulness of digital radiographs in detecting the association between pulp stones and the symptoms of cardiovascular diseases (CVDs) and diabetes mellitus (DM). Additionally, this study aimed to determine the pervasiveness of pulp stones with independent variables, such as age, gender, and tooth type using digital radiographs.

**Methodology:** A total of 1030 patients from a university clinic participated in the study. The selection and recruitment of the case extended from 2016 to 2018. Patients were categorized into two groups: medically fit patients and medically compromised patients, who were subjected to intraoral X-ray examination. Radiographs were collected and examined for the presence and absence of pulp stones.

**Results:** The results showed that 86.25% of pulp stones were significantly associated with CVD and DM. By implication, 87.79% of participants aged 46-60 years were prone to developing pulp stone. There was a significant difference in pulp stone development between male and female patients.

**Conclusion:** The outcome showed a significant relationship between pulp stones and older age. The prevalence of pulp stones is significantly higher among patients with systemic diseases, especially in a cardiac and diabetic population.

**Key words:** cardiovascular diseases, dental pulp calcification, diabetes mellitus, prevalence, radiography.

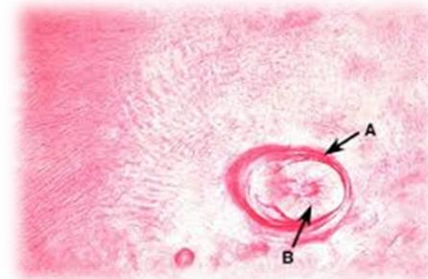
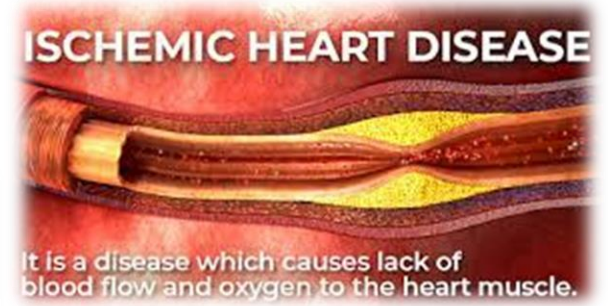
**Introduction**

Cardiovascular diseases (CVDs) are major public health problems, and they are defined as diseases of the heart and blood vessels. CVDs could be myocardial infarction, heart failure, stroke, heart failure, arrhythmia, heart valve issues, coronary illness, deep vein thrombosis, and pulmonary embolism. Moreover, previous studies have shown that CVDs are related to dental pulp stones. The prevalence of pulp stones in the dental pulp is 2.5% to 10%.

The etiological factors involved in the formation of pulp stones have been studied by many researchers, but the etiology is still indistinct in dentistry. Sound, erupting, and developed teeth can have pulp stones. Moreover, possible reasons for the formation of pulp stones could be age, orthodontic appliances, systemic diseases, trauma, and systemic diseases.<sup>3-4</sup> Additionally, the formation of pulp stones might be related to longstanding aggravations,

for example, caries, profound fillings, and interminable irritation. A few researchers stated that pulp stones are a component of an aggravated pulp trying to repair its tissues. Pulpal discomfort is one of the continuous side effects related to pulp stones. In a review, from 1970 to 1990, severe pulpitis cases could affect the pulp treatment, which prompts endodontic failure.<sup>5-7</sup>

Previous studies have related CVDs with the development of pulp stones. However, these studies did not address the pathological connection with CVDs and DM. Thus, this study aimed to investigate the usefulness of digital radiographs in detecting the association between pulp stones and the symptoms of cardiovascular diseases and diabetes mellitus (DM). Additionally, this study aimed to determine the pervasiveness of pulp stones with independent variables, such as age, gender, and tooth type using digital radiographs. Thus, detecting a CVD or DM through an intraoral radiograph might be a helpful method.<sup>8</sup>



Shibu Thomas Mathew at all... (2019)

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**The present study demonstrated a higher prevalence of pulp stones in patients with DM at 49.42% and CVDs at 39.95% when compared with the development of pulp stones in medically fit patients at 36.32%.**

Original Study

PREVALENCE OF PULP STONES AND ITS RELATION WITH CARDIOVASCULAR DISEASES AND DIABETES MELLITUS USING DIGITAL RADIOGRAPHS: A RETROSPECTIVE STUDY

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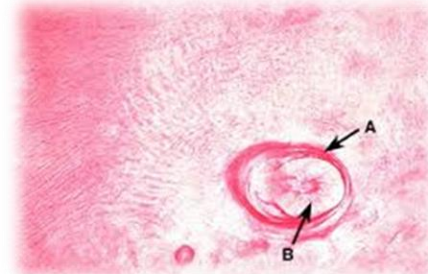
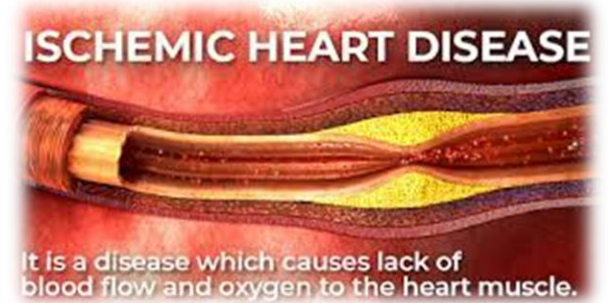
**Conclusion:** The outcome showed a significant relationship between pulp stones and older age. The prevalence of pulp stones is significantly higher among patients with systemic diseases, especially in a cardiac and diabetic population.

**Key words:** cardiovascular diseases, dental pulp calcification, diabetes mellitus, prevalence, radiography.

Introduction

Cardiovascular diseases (CVDs) are major public health problems. They are the leading cause of death, stroke, and heart failure. CVDs could be hypertension, heart illnesses, heart attack, stroke, heart failure, arrhythmia, heart valve issues, coronary artery disease, and heart failure. Additionally, dental pulp stones are found in either or both the coronal region and radicular pulp.<sup>2</sup> The prevalence of pulp stones has been studied by many researchers, but the etiology is still indistinct in dentistry. Sound, emerging, and long-standing pulp stones could be related to orthodontic forces, periodontal diseases, fluoride intake, and systemic diseases.<sup>3, 4</sup> Additionally, the formation of pulp stones might be related to longstanding aggravations,

for example, caries, profound fillings, and interminable irritation. A few researchers stated that pulp stones are a component of an aggravated pulp trying to repair its tissues. Pulp stones are continuous, irregular, and radiopaque masses of pulp stones. The pulp may vary from light to severe pain. They can obstruct the root trenches, which from pulp stones. Pulp stones may have related CVDs with the development of pulp stones. Nevertheless, these studies do not address the pathological connection with CVDs and DM. Thus, this study aims to investigate the relationship between digital radiographs and detecting the association between pulp stones and the symptoms of CVDs and diabetes mellitus (DM). Additionally, this study aimed to determine the prevalence of pulp stones with independent variables such as age, gender, and tooth type using digital radiographs. Thus, detecting a CVD or DM through an intraoral radiograph might be a helpful method.<sup>5</sup>



Shibu Thomas Mathew at all... (2019)

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Original Article

Pulp Stones as Risk Predictors for Coronary Artery Disease: An Intriguing, Prevalence Study

Pratyaksha S. Panwar<sup>1</sup>, Debkant J<sup>2</sup>, Nagarjuna G. Chowdary<sup>3</sup>, Dwijendra K.S<sup>4</sup>, Pradyumna Kumar S<sup>5</sup>, Manoj Kumar S<sup>6</sup>, Abhishek S. Nayyar<sup>7</sup>

<sup>1</sup>Department of Dentistry, Government Doon Medical College, Dehradun, Uttarakhand, Departments of <sup>2</sup>Conservative Dentistry and Endodontics,

<sup>3</sup>Prosthodontics and Crown and Bridge and Implantology, Institute of Dental Sciences, SOA University, Bhubaneswar, Odisha,

<sup>4</sup>Department of Pedodontics and Preventive Dentistry, MNR Dental College and Hospital, Sangareddy, Telangana, <sup>5</sup>Department of Oral Medicine and Radiology,

Saraswati-Dhanwantari Dental College and Hospital and Post-Graduate Research Institute, Parbhani, Maharashtra, India,

<sup>6</sup>Department of Oral Radiology, College of Dentistry, University of Ha'il, Ha'il, Kingdom of Saudi Arabia

Abstract

**Context and Aim:** Coronary artery disease (CAD) has been recorded as the leading cause of morbidity and mortality worldwide. Studies indicate that participants with CAD show higher degree of pulp calcifications. Localized pulp calcifications are microscopically apparent in more than half of the teeth in young adolescents. However, pulp stones extending to the entire dentition are infrequent and need further evaluation to predict the risk of other probabilities of associated diseases. The present study was planned to estimate the prevalence of pulp stones in participants diagnosed with or undergoing treatment for CAD. **Materials and Methods:** The present study consisted of 300 participants within an age range of 20-55 years who were divided into the study group consisting of 150 participants, including 108 males and 42 females and 150 age- and sex-matched controls. Pulp stones were imaged using bitewing radiographs using the paralleling technique under standard conditions. The radiographs were interpreted separately by two experienced radiologists. **Statistical Analysis Used:** The statistical analysis was performed using IBM SPSS statistics version 20 Core system software (SPSS Inc., Chicago, IL, USA), whereas statistical tests used were unpaired t-test and Z-test. The Chi-square test was used to check the prevalence of pulp stones in CAD participants in addition to their arch-wise and region-wise distribution while value of  $P < 0.05$  was considered statistically significant. **Results:** CAD participants exhibited the 100% prevalence of pulp stones while posterior teeth were predominantly affected ( $P < 0.05$ ). Furthermore, pulp stones were significantly higher in the maxilla than in the mandible in both the groups ( $P < 0.05$ ). No statistically significant difference was found in gender predilection in the study group, although the control group showed a definite preponderance for the males for the development of pulp stones ( $P < 0.05$ ).

**Conclusion:** CAD participants have a high chance of being afflicted with pulp stones. Higher prevalence of pulp stones in multiple teeth may be a sign of the disease in individuals. Further comprehensive studies are required to establish the role of pulp stones for CAD to be resolved.

**Keywords:** Coronary artery disease, pulp stones, risk predictors

INTRODUCTION

Coronary artery disease (CAD) is atherosclerosis of the coronary arteries leading to a reduction in blood flow to the heart. It is one of the leading causes of death worldwide.<sup>[1,2]</sup> The paucity of data and a wide range in the ethnicity of the residing populace in the country compounds the challenge of obtaining a wholesome data from India regarding the prevalence of CAD. Furthermore, ischemic heart diseases (IHDs) which ranked fifth in the leading causes of mortality in the world, is proposed to emerge as the leading cause of mortality by the

year 2020. This shows the significance this set of diseases carries demanding comprehensive studies of the preventive and treatment programs to be adopted to reduce the morbidity in future. Zachariah *et al.*<sup>[3]</sup> reported that 11% of the population in urban India and 7% in rural parts are afflicted by this disease. Pulp stones or denticles are nodular, calcified

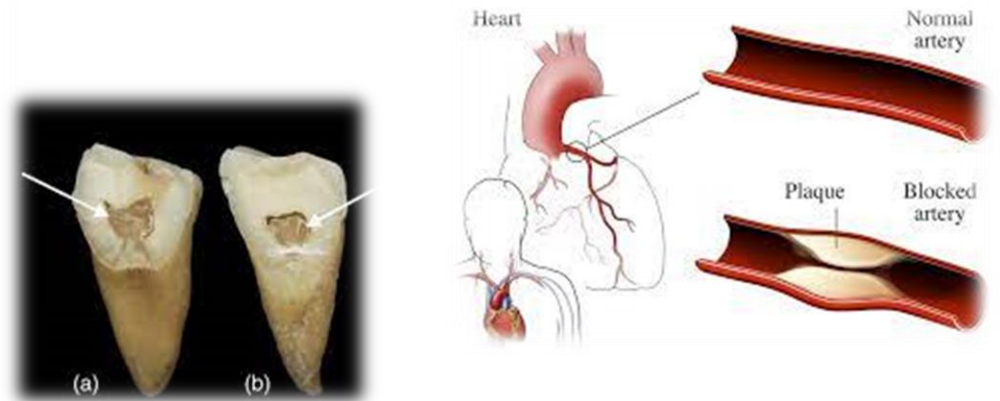
Address for correspondence: Dr. Pratyaksha S. Panwar, Department of Dentistry, Government Doon Medical College, Dehradun, Uttarakhand, India. E-mail: panwarpratyaksha@gmail.com

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Pratyaksha S. Panwar at all...  
(Saturday, February 26, 2022)

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Original Article

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**Keywords:** Coronary artery disease, pulp stones, risk predictors

INTRODUCTION

Coronary artery disease (CAD) is caused by atherosclerosis of the coronary arteries leading to a reduction in blood flow to the heart. It is one of the leading causes of death worldwide.<sup>[1,2]</sup> The paucity of data and a wide range in the ethnicity of the residing populace in the country compounds the challenge of obtaining a wholesome data from India regarding the prevalence of CAD. Furthermore, ischemic heart disease (IHD) ranked among the top causes of mortality in India in 1990, have been proposed to emerge as the leading cause of mortality by the

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Address for correspondence: Dr. Pratyaksha S. Panwar, Department of Dentistry, Government Doon Medical College, Dehradun, Uttarakhand, India. E-mail: panwarpratyaksha@gmail.com

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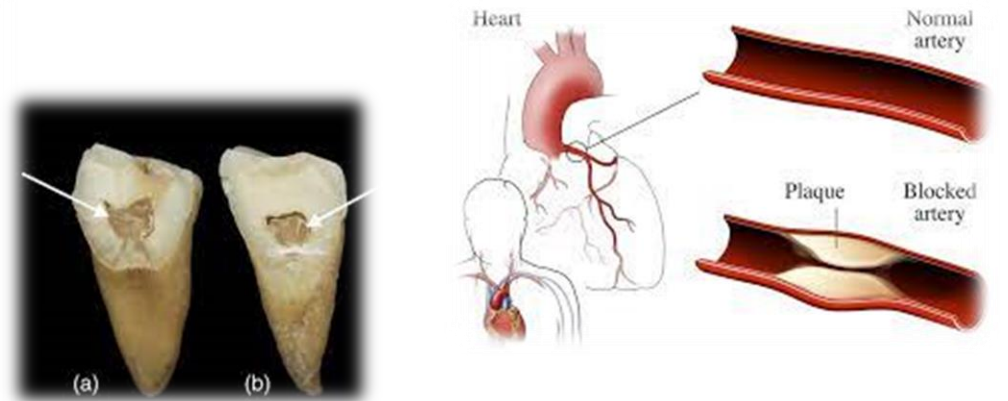
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Pratyaksha S. Panwar at all... (Saturday, February 26, 2022)

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Article

## Carotid Artery Calcification: A Digital Panoramic-Based Study

Ibrahim Nasseh and Georges Aoun \* 

Department of Oral Medicine and Maxillofacial Radiology, Faculty of Dental Medicine, Lebanese University, Beirut, Lebanon

\* Correspondence: aoungesorges@yahoo.com; Tel.: +961-3-666-166

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**Abstract:** Objective: The aim of this study was to estimate the incidence of carotid artery calcification (CAC) in a sample of Lebanese population using digital panoramic radiographs. Materials and Methods: Panoramic radiographs of 500 patients (281 females and 219 males), aged between 18 and 88 years (mean: 47.9 years), were assessed for CAC. Data collected were analyzed statistically using IBM® SPSS® for Windows version 20.0 (SPSS, Chicago, IL, USA). Results: CAC were found in 34 cases (6.8%), among them, 23 females (8.18%) and 11 males (5.02%). Six of all the calcifications were on the right side, against six on the left side, and 22 on both sides. The mean age of patients affected with CAC was 60.9 years (ranging from 18 to 88 years). Chi-square test showed no statistical significance between gender and CAC, while Spearman correlation analysis showed positive low correlation with age ( $r = 0.179$ ). Conclusion: CAC can be found on routine panoramic radiographs taken in dental clinics; dentists should automatically refer the patients in question for specialized medical evaluation.

**Keywords:** calcification; carotid artery; Lebanese; panoramic radiography; population

### 1. Introduction

The accumulation of atheromas, which are calcified plaques composed essentially of fatty substances, macrophage cells, lipids, calcium, fibrous connective tissue, etc., in the walls of the carotid arteries, may lead to a cerebrovascular accident [1–3].

According to many studies, cerebrovascular accidents represent the third cause of death worldwide; moreover, and about 60% of the surviving patients would suffer from mental and/or physical disabilities [4–9].

Therefore, knowing that atheromas are generally located in the bifurcation of the common carotid artery, and that the early detection of these calcifications may help decrease cerebrovascular accidents incidence considerably, there has been increased awareness in radiologic investigation as a noninvasive way to trace them [3,10–12].

Friedlander and Lande [13], followed by many other researchers, identify carotid artery calcification (CAC) by means of conventional imaging techniques used in dental practice, e.g., panoramic radiography.

Carotid artery calcification was described, radiographically, as irregular nodular radiopacity located posteroinferiorly to the mandibular angle and the hyoid bone, adjacent to the cervical vertebrae, close to the intervertebral space C3–C4 [10,11,14] (Figure 1). Nevertheless, because CAC looks like other calcifications, it is difficult to distinguish it from other calcifications, such as calcified lymph nodes, calcified thyroid nodules, etc.



Ibrahim Nasseh and Georges Aoun (2018)



# ПУЛПОЛИТИ – ЛОКАЛНО ПРИСУСТВО ИЛИ СИМПТОМ ...

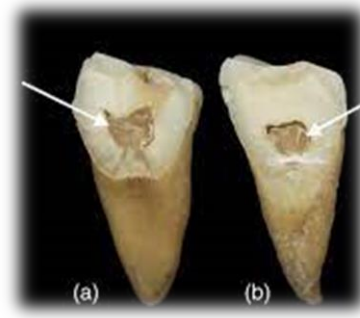


## A Retrospective Analysis of Pulp Stones in Patients following Orthodontic Treatment

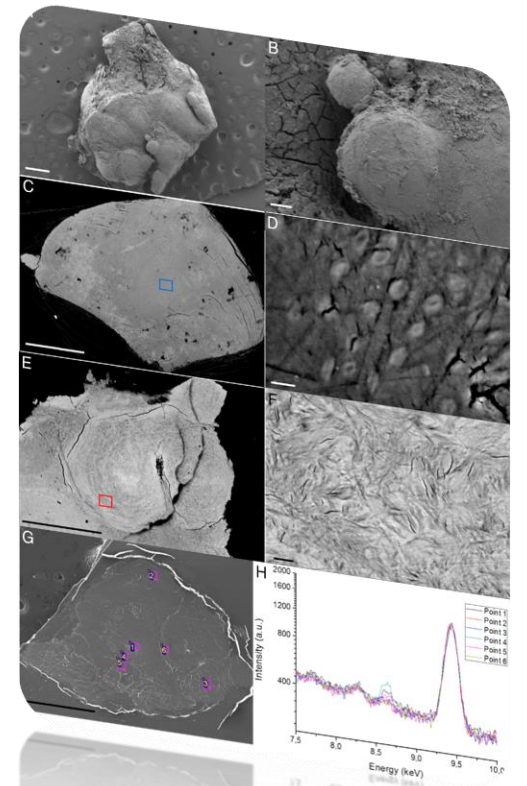
**ABSTRACT**

**AIM:** The present study was conducted to determine the prevalence of pulp stones in patients before and after orthodontic treatment. The study was conducted in a tertiary care dental hospital in India.

**RESULTS:** The present study reported the prevalence of pulp stones to be increased by 4% in the pre- and posttreatment radiographs, which was statistically significant. The study found the presence of pulp stones more in maxillary first molar and it was found to be teeth with maximum number of pulp stones before and after orthodontic treatment. However, further researches with larger samples are advisable.



**Debkant Jena at all... (2018)**

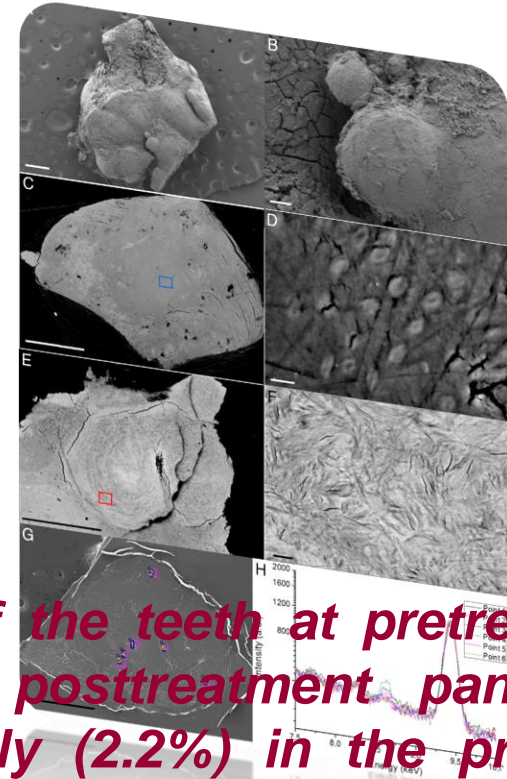


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## Dental pulp stone formation during orthodontic treatment: A retrospective clinical follow-up study

E Tarim Ertas at all... (2021)



**Results:** Dental pulp stones were detected in 3% of the teeth at pretreatment panoramic radiographs and 5.2% of the teeth at posttreatment panoramic radiographs. Pulp stone prevalence increased pointedly (2.2%) in the pre- and post-treatment radiographs ( $P < 0.001$ ). Also, there was a significant difference between the age groups ( $P < 0.001$ ). In the maxilla, dental pulp stones were found significantly more than that in the mandible at T1 and T2 panoramic radiographs. Maxillary first molars exhibited dental pulp stones the most frequently, followed by the maxillary second molars and mandibular first molars

The relationship between pulp calcifications and salivary gland calcifications

Sumita Kaswan<sup>1</sup>, Santosh Patil<sup>2</sup>, Sneha Maheshwari<sup>3</sup>, Farzan Ralwan<sup>4</sup>, Suneet Khandaewal<sup>5</sup>

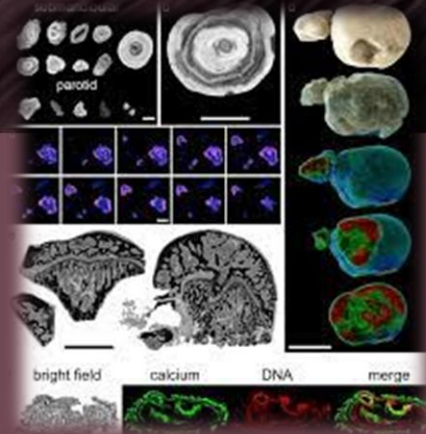
<sup>1</sup> Dept of Endodontics and Conservative Dentistry, Jodhpur Dental College General Hospital, Jodhpur (Rajasthan), India  
<sup>2</sup> Dept of Oral Medicine and Radiology, Jodhpur Dental College General Hospital, Jodhpur (Rajasthan), India  
<sup>3</sup> Dental Practitioner, Jodhpur (Rajasthan), India  
<sup>4</sup> Dept of Oral and Maxillofacial Pathology, Jodhpur Dental College, Jodhpur (Rajasthan), India  
<sup>5</sup> Dept of Oral and Maxillofacial Pathology, Desh Bhagat Dental College, Muktsar (Punjab), India

Correspondence:  
Dept of Oral Medicine and Radiology,  
Chhatrapati Dental College and Research Institute  
P.O. Box no 24, Siroda, NH no. 6  
Jodhpur, Rajasthan, India  
skaswan@gnoc.com

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**Results: Salivary gland calcifications were detected in 5 patients. 191 patients had pulp narrowing and 118 patients had pulp stones. There was no statistical correlation between pulp narrowing and salivary stones ( $p>0.001$ ) and also between pulp stones and salivary gland stones ( $p>0.001$ ).**

**Conclusions: However, the incidental findings of salivary gland stones on intra oral occlusal radiographs can provide useful information in the early diagnosis of the condition, but in the present study no significant relationship was found between the presence of pulp stones and salivary gland stones.**

Introduction

Pulp stones are calcifications of the pulp tissue, which are found in the pulp chamber and root canal. They are found in the teeth of deciduous and permanent dentition. The relationship between pulp stones and salivary gland stones has been described in the literature. The symptoms of the changes in the pulp tissue are not known, however, various factors such as pulp degeneration, age, genetic factors, and impaired blood supply have been described. The relationship between pulp stones and salivary gland stones is not known, however, various factors such as pulp degeneration, age, genetic factors, and impaired blood supply have been described in the literature.



Article

## Neutrophil Extracellular Traps Promote the Development and Growth of Human Salivary Stones

Mirco Schapher <sup>1,†</sup>, Michael Koch <sup>1,†</sup>, Daniela Weidner <sup>2,3</sup>, Michael Scholz <sup>4</sup>, Stefan Wirtz <sup>3,5</sup>, Aparna Mahajan <sup>2,3</sup>, Irmgard Herrmann <sup>2,3</sup>, Jeeshan Singh <sup>2,3</sup>, Jasmin Knopf <sup>2,3</sup>, Moritz Leppkes <sup>3,5</sup>, Christine Schauer <sup>2,3</sup>, Anika Grüneboom <sup>2,3</sup>, Christoph Alexiou <sup>1</sup>, Georg Schett <sup>2,3</sup>, Heinrich Iro <sup>1</sup>, Luis E. Muñoz <sup>2,3,†</sup> and Martin Herrmann <sup>2,3,\*,†</sup>

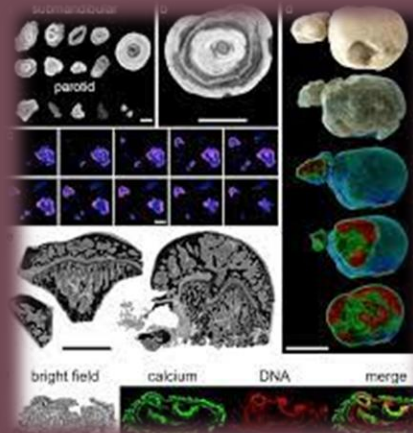
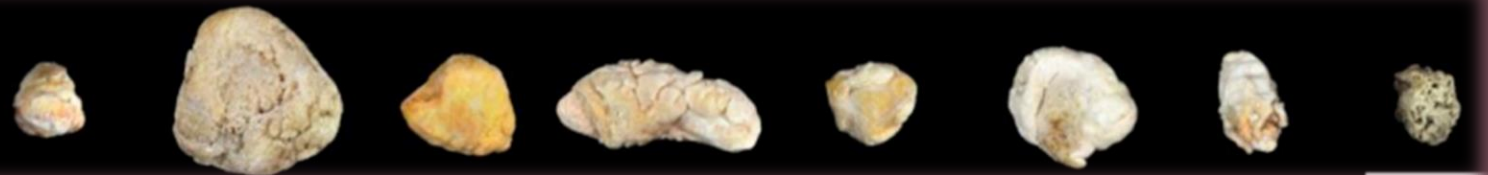
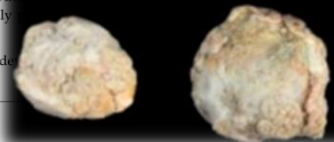
- <sup>1</sup> Friedrich-Alexander-University Erlangen-Nürnberg (FAU), Department of Otolaryngology, Head and Neck Surgery, Universitätsklinikum Erlangen, Waldstrasse 1, 91054 Erlangen, Germany; mirco.schapher@uk-erlangen.de (M.S.); Michael.Koch@uk-erlangen.de (M.K.); Christoph.Alexiou@uk-erlangen.de (C.A.); Heinrich.Iro@uk-erlangen.de (H.I.)
  - <sup>2</sup> Friedrich-Alexander-University Erlangen-Nürnberg (FAU), Department of Internal Medicine 3, Universitätsklinikum Erlangen, Ulmenweg 18, 91054 Erlangen, Germany; Daniela.Weidner@uk-erlangen.de (D.W.); Aparna.Mahajan@uk-erlangen.de (A.M.); Irmgard.Herrmann@uk-erlangen.de (I.H.); Jeeshan.Singh@uk-erlangen.de (J.S.); Jasmin.Knopf@uk-erlangen.de (J.K.); Christine.Schauer@uk-erlangen.de (C.S.); Anika.Grueneboom@uk-erlangen.de (A.G.); Georg.Schett@uk-erlangen.de (G.S.); Luis.Munoz@uk-erlangen.de (L.E.M.)
  - <sup>3</sup> Friedrich-Alexander-University Erlangen-Nürnberg (FAU), Deutsches Zentrum für Immuntherapie, Universitätsklinikum Erlangen, Ulmenweg 18, 91054 Erlangen, Germany; Stefan.Wirtz@uk-erlangen.de (S.W.); Moritz.Leppkes@uk-erlangen.de (M.L.)
  - <sup>4</sup> Friedrich-Alexander-University Erlangen-Nürnberg (FAU), Institute of Functional and Clinical Anatomy, Universitätsstrasse 19, 91054 Erlangen, Germany; michael.scholz@fau.de
  - <sup>5</sup> Friedrich-Alexander-University Erlangen-Nürnberg (FAU), Department of Internal Medicine 1, Universitätsklinikum Erlangen, Ulmenweg 18, 91054 Erlangen, Germany
- \* Correspondence: martin.herrmann@uk-erlangen.de  
 † These authors contributed equally to this work.  
 ‡ These authors contributed equally to this work.

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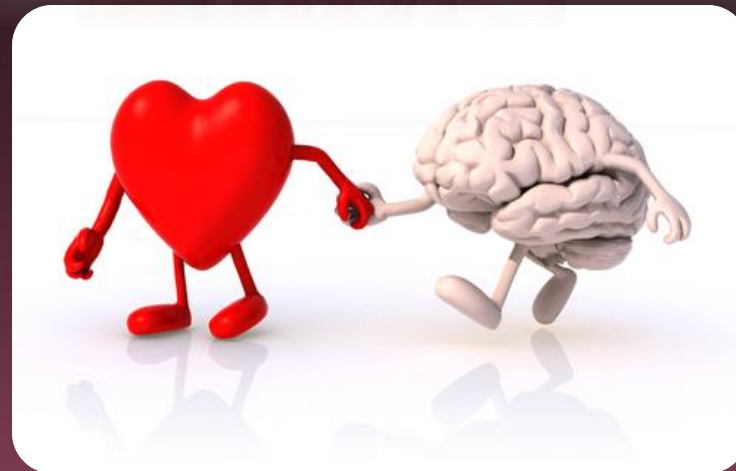
**Abstract:** Salivary gland stones, or sialoliths, are the most common cause of the obstruction of salivary glands. The mechanism behind the formation of sialoliths has been elusive. Symptomatic sialolithiasis has a prevalence of 0.45% in the general population, is characterized by recurrent painful periparotid swelling of the affected gland, and often results in sialadenitis with the need for surgical intervention. Here, we show by the use of immunohistochemistry, immunofluorescence, computed tomography (CT) scans and reconstructions, special dye techniques, bacterial genotyping, and enzyme activity analyses that neutrophil extracellular traps (NETs) initiate the formation and growth of sialoliths in humans. The deposition of neutrophil granulocyte extracellular DNA around small crystals results in the dense aggregation of the latter, and the subsequent mineralization creates alternating layers of dense mineral, which are predominantly calcium salt deposits and DNA. The further agglomeration and appositional growth of these structures promotes the development of macroscopic sialoliths that finally occlude the efferent ducts of the salivary glands, causing sialadenitis and gland dysfunction. These findings provide an entirely novel insight into the pathogenesis of sialolithiasis in which an immune system-mediated response essentially initiates the process of concretum formation and growth.

**Keywords:** sialolithiasis; salivary stones; lithogenesis; stone disease; salivary glands; neutrophils; neutrophil extracellular traps



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**БЛАГОДАРАМ НА ВНИМАНИЕТО**

