

# Magnitude of Oral Health Negligence – A Case Report

Shaila Kothiwale\* Dwiti Thanawala\*\* Anil  
Malleshappa\*\*\*

\*M.D.S, Professor, \*\*Post Graduate Student, Department of  
Periodontics, \*\*\*M.D, Department of Biochemistry, KLE  
V.K. Institute of Dental Sciences, Belgaum, Karnataka, India.  
Contact: shailakothiwale@yahoo.co.in

## Abstract

The epidemiology of periodontal disease is one of the most important challenges before the dental profession at the moment. Plaque is considered the etiology involved in the destruction of the periodontal tissues. Calculus, on the other hand is considered merely as a contributing factor by some and as an etiological agent by others.

The following case report describes the presentation of a huge mass of calculus in the maxillary left molar region. This was thought to be correlated to the salivary calcium and phosphorus levels. However, the biochemical analysis revealed normal salivary calcium and phosphorus levels. Hence, the increase in mass was attributed to absolute negligence of oral hygiene.

Developing countries show low awareness and poor oral hygiene habits among large sections of the population, which is resulting in increased incidence of the dental problems. Health education and promotion should thus be given utmost importance to combat the various oral health related problems.

**Keywords:** Calculus, Saliva, Calcium, Phosphorus, Oral health attitude

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## Introduction:

Oral health is an integral part of general health (1, 2). Dental caries and periodontal diseases are the main causes of tooth loss and the most prevalent health problems in the world. Dental health cannot be separated from general health, since oral disease may be a manifestation of or an aggravating factor in some widespread systemic disorder (3). The link between oral infections and other diseases in the body is becoming well documented and accepted within the health care community. This underscores the importance of good oral hygiene. Despite this, oral health is not given sufficient importance in the developing countries. Various studies have been conducted globally to appraise the importance of knowledge and oral health attitude but the population in the rural areas of the developing countries is still unexposed to the awareness of maintenance of oral hygiene (3).

## Case report:

A 60 year old female patient reported with the chief complaint of an asymptomatic extra-oral swelling on the left side of her face which was present since 3-4 months. She also complained of a feeling of an erupting tooth in the same region for the past 6 months. She was unable to eat from the same side. The patient gave a positive history of usage of tobacco powder for cleaning her teeth since childhood. On extra-oral examination, the swelling was well defined, around 3 x 3 centimeters (cm) in size, hard, and non-tender on palpation (Figure 1). On intra-oral examination, a huge mass of calculus was seen in the molar region of the second quadrant (Figure 2). The calculus extended from the palatal portion of the maxillary left second molar tooth (27), embedding the tooth completely, over to the facial aspect upto the buccal vestibule (Figure 3). This mass prohibited her from closing her mouth in occlusion. A similar smaller mass of calculus was seen surrounding the adjacent teeth (26 and 28). Clinically, 26 had Class IV recession and Grade III mobility and thus had poor prognosis, whereas 28 presented with Grade I

mobility. She had missing mandibular anteriors and molars in the third quadrant. The remaining teeth showed moderate amount of calculus.

The radiographic examination revealed a radiopaque mass in the left maxillary molar region (Figure 4).

### *Treatment:*

As an emergency treatment, the calculus mass was removed along with the embedded 27 and 26 within it (Figure 5, 6). The mass covering 27 measured 3.5 x 3 cm in size (Figure 7). The socket was completely debrided and sutures were placed (Figure 8).

The patient was recalled after 7 days. On examination, the surgical site showed signs of healing and the sutures were removed. She underwent full mouth scaling and root planing and was given oral hygiene instructions (Figure 9). She was motivated to abstain from the habit of tobacco powder usage.

### *Laboratory analysis:*

Saliva is the mineral source for supragingival calculus, and the gingival fluid or exudate furnishes the minerals for subgingival calculus (4, 5, 6, 7). The rate of calcification and accumulation of calculus vary from person to person, in different teeth, and at different times in the same person (8, 9). Based on these differences, persons may be classified as heavy, moderate and slight calculus formers or as non-calculus formers. Plaque has the ability to concentrate calcium at 2 to 20 times its level in saliva (10). Early plaque of heavy calculus formers contains more calcium, three times more phosphorus, and less potassium than that of non-calculus formers, suggesting that phosphorus may be more critical than calcium in plaque mineralization (11, 12).

Since the patient presented with a colossal mass of calculus, the saliva and calculus samples were collected to analyze the concentration of calcium and phosphorus in these samples. The samples were stored in 10 % formalin and were sent to the



**Figure 1 – Extraoral view.**



**Figure 2 – Intraoral view**



**Figure 3 – Intraoral view showing the mass of calculus.**



**Figure 4 – Panoramic radiograph showing a radiopaque mass on the left side (white arrows).**



**Figure 5 – Specimens removed from left maxillary molar region.**



**Figure 6 – Mass of calculus removed along with the embedded tooth**





Figure 7 – Dimension of the calculus mass.



Figure 8 – Site after removal of the specimen and the tooth followed by placement of sutures.



Figure 9 – Post-therapy intraoral view after 2 weeks.

Table 1- Table showing patient's salivary calcium and phosphorus levels

	Result	Reference range
Salivary calcium	9.3 mg/dL	2-11 mg/dL
Salivary phosphorus	15.9 mg/dL	6-71 mg/dL

Department Of Biochemistry, KLE's Prabhakar Kore Hospital, Belgaum for biochemical analysis.

*Salivary analysis:*

The saliva sample was analyzed in Dimension® RxL Max® Integrated Chemistry system. It was first centrifuged at 3000 rpm for 15 minutes, following which the clear supernatant was diluted with saline. This was then loaded in the machine where the samples underwent ultrasonic mixing along with the reagent.

*For calcium analysis:*

Principle of the procedure:

The calcium in the saliva reacts with O-cresolphthalein complexone (OCPC) to form a purple complex. The amount of complex thus formed is proportional to the calcium concentration and is measured using a bichromatic (577,540) endpoint technique.

$\text{Ca}^{++} + \text{OCPC} \rightarrow \text{Ca- OCPC complex (absorbs at 577 nm) pH 9.7}$

*For phosphorus analysis:*

Principle of the procedure:

The inorganic phosphate combines with molybdate ( $\text{MoO}_4$ ) in an acid solution to form a complex which is reduced by p-methylaminophenol sulfate (PMAPS) and bisulfate. The 340 nm absorbance of the reduced phosphomolybdate solution is proportional to the inorganic phosphorus concentration and it measures using a bichromatic endpoint technique.

$\text{NaMoO}_4 + \text{PO}_4^{3-} \longrightarrow \text{phosphomolybdate}$   
pH 1.6

phosphomolybdate + PMAPS +  $\text{NaHSO}_3$   
reduced phosphomolybdate complex (absorbs at 340nm)

*Calculus analysis:*

The following tests were carried out for the qualitative analysis of the various components

1) For calcium oxalate:

Heat the above solution. Cool. Filter through Whatman No 1+ 0.5 ml saturated  $\text{CH}_3\text{COONa}$  + 10% Acetic acid till pH=5  
- A white precipitate confirms the presence of calcium oxalate

2) For uric acid: 10 mg of sample + 2 ml 5% HCl + 2 ml 10 % NaOH +1 ml phosphotungstic acid

- A blue colour confirms the presence of uric acid

3) For carbonate: 10 mg of sample + 3 ml 5% HCl - Effervescence confirms the presence of carbonate

4) For phosphate: 10 mg of sample + 2 ml 50%  $\text{HNO}_3$  + Boil and centrifuged+ ammonium molybdate (1M)- A canary yellow precipitate confirms presence of phosphate

7) For magnesium:

10 mg of sample + 3 N HCl 1 ml. Heat to boil. Supernatant + 0.2 ml 10 % ammonium phosphate + 0.5 ml conc  $\text{NH}_4\text{OH}$ . Wait for 10 minutes.

- A crystalline precipitate confirms presence of magnesium

**Results:**

*Salivary analysis results*

The results showed that the amount of calcium and phosphorus levels in the saliva were within normal limits (Table 1).

*Calculus analysis results*

The calculus samples which were analyzed showed the presence of calcium oxalate (60%), carbonates (20%) and uric acid (20%) but the absence of magnesium and phosphates.

**Discussion:**

The average daily increment in calculus formers is from 0.10% to 0.15% of dry weight (9, 13). The time required to reach the maximal level has been reported as 10 weeks (14), 18 weeks and 6 months (15). Calculus formation continues until it reaches a maximum, from which it may be reduced in amount.

In the present case, it was noticed that the patient presented with a huge mass of calculus inspite of normal salivary calcium and phosphorus levels. This may be attributed to decreased self cleansing mechanism induced by the cheeks, lips and the tongue (15, 16), slight atrophy of the buccal musculature due to aging (17), no visit to the dentist because of the belief of an erupting tooth, and reduction in the masticatory efficiency as a

result of the unreplaced missing teeth in the opposite quadrant.

A few risk factors involved in the susceptibility to periodontal disease are age (18), sex, race, illiteracy, diet, malnutrition, low socio-economic status (19), and faulty oral hygiene practices.

In children in the age group of 9 to 15 years, supragingival calculus has been reported in 37% (20), in the 16-21 year age group, it ranges from 44-88 % (21) and those over 40 years of age, it is between 86-100% (22).

Illiteracy and faulty beliefs have lead to innumerable oral diseases. Failure to treat these diseases with the right treatment modality, results in the increase in its severity and a shift to an irreversible state. Periodontal disease is inversely proportional to increasing levels of education (23). Studies have shown that prevalence and severity of periodontal diseases are lower in office personnel than in factory workers (23).

In a study on Sri Lankan tea plantation laborers who had virtually no oral hygiene or dental care, researchers found that all of the study participants had calculus on almost all tooth surfaces by the age of 40 years (24).

Tobacco in the form of *Mishri* is used in a lot of rural places in India for the purpose of cleaning teeth (23). These agents are detrimental to the periodontium as against the myth of a certain section of population.

Oral physiotherapy plays an important role in the oral health maintenance. Studies have shown that less than 1/3 rd of the Indian population use a tooth brush and tooth paste to clean their teeth. More than 50% of those who use a tooth brush, are not aware of the proper brushing techniques (23).

A survey found that people do not associate dental health with adequate oral care, with over 60 per cent people in India having never visited a dentist in their life (25). This has expressed concern over

the low awareness and poor oral hygiene habits among people, which is resulting in a sharp rise in the dental problems.

Periodontal diseases can best be prevented through early detection and primary prevention (26, 27). Preventive dental care is almost nonexistent in the rural areas and very limited in urban areas of developing countries. This can be reinforced by health education and motivation. (1)

### **Conclusion:**

It is essential to combat oral diseases through a preventive approach, to deal with the negligence widespread in society. Early diagnosis and treatment are essential such that the disease should be intercepted in the earliest possible stage to prevent irreversible damage. An association has been shown between oral diseases and general health especially cardiovascular diseases, pre-term low birth weight, etc. Some results even suggest that aggressive forms of periodontitis associated with *Aggregatibacter actinomycetemcomitans* and *Porphyromonas gingivalis* are associated with the incidence of stroke (28).

Hence, the focus on health education and promotion should be given prime importance especially in the rural areas. Oral health education would help mould people's behavior and their oral health attitude for attaining good oral hygiene (29). Effective, committed and well coordinated National Oral Health Programs could provide oral health care, both in the rural as well as in urban areas, to combat the deteriorating oral health conditions in the developing countries.

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