Case Report

# Giant Dental Calculus: A Rare Case Report and Review

**Abstract**

Inadequate oral hygiene is the root cause of the initiation and establishment of the periodontal disease. Dental calculus serves as plaque retentive area, thereby contributing to gingivitis and periodontitis. The present unusual case is of a 55-year-old female patient reported to the department of periodontology with a chief complaint of hard deposit at the right maxillary and mandibular posterior region. The patient was found to have very heavy calculus deposition with respect to right maxillary and mandibular posterior teeth, and the patient was using the left side for mastication and avoiding chewing from the right side mainly due to some periodontal problem. The extraction of the hopeless teeth along with dental calculus was done. Dimensions of dental calculi at maxillary and mandibular teeth was 4 cm × 3 cm each.

**Keywords:** *Dental calculus, oral hygiene, plaque*

**Yashodeep Chauhan, Sandhya Jain[1], Madhu Singh Ratre, Shaleen Khetarpal, Manish Varma**

*Departments of Periodontology and [1]Orthodontics and Dentofacial Orthopaedics, Government College of Dentistry, Indore, Madhya Pradesh, India*

## Introduction

Dental calculus was considered as the primary etiological factors from the period of Sumerians about 5000 years ago.[1] Pathogenic microorganisms present in dental plaque release toxins and produce enzymatic effect, thereby inducing gingivitis. Untreated gingivitis eventually leads to attachment loss causing periodontitis. Dental calculus serves as loci for retention of plaque and is only a secondary phenomenon for infectious periodontal disease and not the primary etiological factor. Mineralization of dental plaque leads to the formation of dental calculus. The formation of calculus occurs when fluid phase of plaque becomes supersaturated with calculus components.[2] Usually, morphological analysis of calculus shows spongy appearance of calcified masses with empty spaces and tubular holes. Empty space of dental calculus consists of nonmineralized bacteria surrounded by calcified matrix. Calcified biofilms usually consist of brushite, octacalcium phosphate, hydroxyapatite, and whitlockite. Supragingival calculus contains an average of 37% of mineral, with octacalcium phosphate forms outer layer and hydroxiapetite forms inner layer. Subgingival calculus consists of around 58% of minerals, whitlockite being primary mineral. The composition of saliva also determines the calculus formation in different individuals. Alkaline saliva and high urea concentration are associated with increased dental calculus formation. Furthermore, increased salivary phosphates and oxalates are found to be associated with increased dental calculus formation.[3,4]

Visible and tactile sense of operator serves as a primary and important means of detection for calculus. The smooth and clean root surface is often considered as the endpoint of scaling and root planing. Recent technology for the detection of calculus includes miniature endoscopic system, ultrasound technology, and laser technology.[5]

Oral hygiene habits, dental professional visits, diet, prescribed medication, genetic variation in salivary content, age, gender, and masticatory habits contribute to extent and location of calculus formation.[6,7]

## Case Report

A 55-year-old female visited the department of periodontology with a chief complaint of heavy mass at the right maxillary and mandibular posterior teeth region for 10 years. Bleeding from gums and bad breath was also reported by her for 6 years. She also had a complaint of loosening of her remaining teeth for 3–4 years.

**How to cite this article:** Chauhan Y, Jain S, Ratre MS, Khetarpal S, Varma M. Giant dental calculus: A rare case report and review. Int J App Basic Med Res 2020;10:134-6.



**Submitted:** 07-Mar-2019
**Revised:** 03-Sep-2019
**Accepted:** 09-Jan-2020
**Published Online:** 02-Apr-2020

***Address for correspondence:***
*Dr. Yashodeep Chauhan, Government College of Dentistry, Indore, Madhya Pradesh, India.*
*E-mail: chanchalcc@rediffmail.com*

**Access this article online**

**Website:** www.ijabmr.org

**DOI:** 10.4103/ijabmr.IJABMR_84_19

**Quick Response Code:**

She has a habit of tobacco chewing for 30 years. She used to clean her teeth with toothpowder. She used to take toothpowder on her index finger and rub the index finger in horizontal direction on teeth. There was no contributory past medical history.

Extraoral examination showed a loss of bilateral symmetry with swelling at the lower right side of the face. On intraoral examination, partially edentulous maxillary and mandibular arch with a total of 15 teeth were present including 11, 12, 13, 14, 15, 16, 17, 21, 22, 23, 24, 25, 27, 37, and 47. Teeth with Grade III mobility include 47 and Grade II mobility include 14 and 15. Two yellowish-brown color, hard, nontender masses were present: one at maxillary and one at mandibular posterior teeth region [Figures 1-3]. Based on clinical examination, these hard masses were diagnosed as calculi. Huge calculus mass extending from 14 to 17 was seen, which had extended up to the mucogingival junction buccally, below the marginal gingiva palatally, and hamular notch distally. Calculus of approximately the same size was present at 47 with mucogingival junction, alveolingual sulcus, and retromolar pad as its buccal, lingual, and distal extensions, respectively. Both the masses of calculi had approximately same dimensions of 4 cm × 3 cm. Routine hematological investigations were performed which is in normal range. Ortopantomograph [Figure 4] was also done.

Based on history and clinical findings, the diagnosis of chronic generalized periodontitis was made. Teeth having hopeless prognosis were extracted. The extraction of teeth 14, 15, 16, 17, and 47 was done under local anesthesia. The calculus was also removed along with extracted teeth [Figure 5]. Scaling and root planing was done, and the patient was motivated for oral hygiene measures.

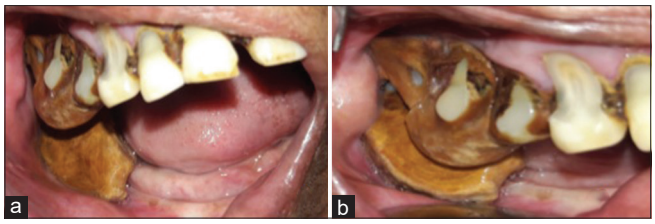

**Figure 1: (a) Anterior view of calculi. (b) Buccal view of Calculi**

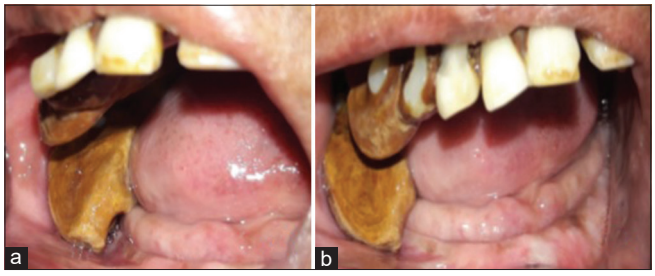

**Figure 3: (a) Anterior view of mandibular calculus. (b) Buccal view of mandibular calculus**

## Discussion

Dental calculus is a plaque retentive factor and deposition of calculus for a long period, which alters the anatomy of crown, making it difficult to perform plaque control measure. This, in turns, causes mineralization of plaque retained over calculus. The site of calculus mainly depends on the location of the opening of salivary duct and composition of saliva from glands. Moreover, prolonged nonfunctional teeth (usually during mastication) tend to accumulate more calculus.[2]

Various concepts were proposed to understand the formation of calculus. The $CO_2$ tension within salivary duct is higher than surrounding atmosphere; as a result, when saliva comes out of ducts, $CO_2$ gets dissociate from saliva making pH of saliva alkaline. Salivary gland secretion also consists of urea which further breaks into ammonia. Ammonia also results in increase in pH of saliva. As a consequence of increase alkalinity of saliva, phosphoric acid dissociation increases, thereby increasing the concentration of phosphate ions in saliva and eventually results in precipitation of calcium phosphate crystals. Epitactic concept suggests the formation of hydroxyapatite crystals by seeding agents such as intercellular matrix of plaque. Moreover, pyrophosphates (inhibitor of calculus formation) at the calcification site are decreased. Another mechanism is the transformation of amorphous noncrystalline deposits and brushite to octacalcium and finally into hydroxyapatite.[8]

Fauchard in his classic treatise "Le Chirurgien Dentiste (1728),"[9] describes a calculus. Only the roots of the tooth protrude from the gross specimen which shows a

**Figure 2: (a) Occlusal view of maxillary calculus. (b) Palatal view of maxillary calculus**

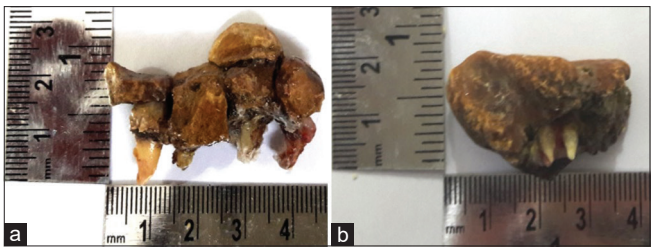

**Figure 4: (a) Maxillary calculus with extracted teeth. (b) Mandibular calculus with extracted tooth**

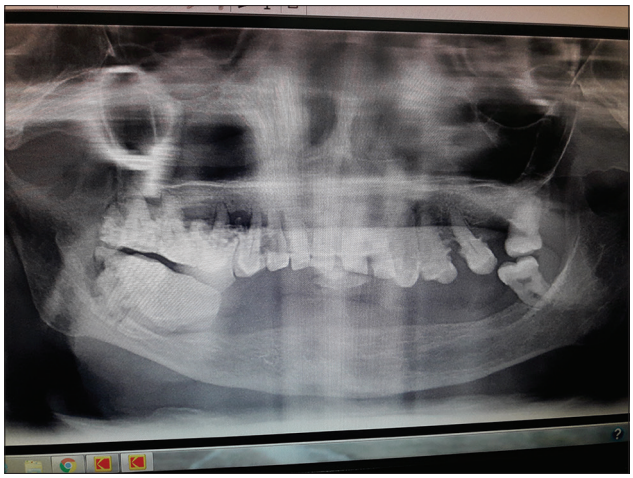

**Figure 5: Orthopantomograph**

rocklike mass of calculus approximately twenty times the size of the tooth itself.

In the present case, maxillary right premolars and molars were fully covered by calculus with distal extension up to hamular notch, buccal extension up to mucogingival junction, and palatally extension beyond marginal gingival. Similarly, mandibular calculus submerged right second molar with distal extension covering retromolar pad, buccal extension up to mucogingival junction, and lingual extension up to alveolingual sulcus. These findings are similar as reported by Moskow, 1960.[10]

Wilson[11] in 1967 reported calculus of size 3 cm × 2 cm, whereas in our present case, two huge calculus chunks present: one at maxillary and mandibular of size 4 cm × 3 cm each.

Diabetes mellitus patients have altered secretion of the salivary glands with more concentration of salivary calcium and protein and are more prone to calculus deposits. Ortega *et al*.[12] reported calculus of about 4 cm diameter in diabetic patients. Similar to our case, majority of cases reported in literature were partially edentulous and had poor oral hygiene practice. However, Bridgman[13] and Midwood,[14] reported cases of calculus attached over maxillary and mandibular dentures too.

## Conclusion

The case presented was of deposition of massive calculus at maxilla and mandibular right posterior region. The huge size of the calculus and smooth occlusal surface representing the occlusal table of teeth made this case a unique one. Negligence toward oral hygiene was the primary reason for such deposition of massive calculus. The treatment of such case is the removal of calculus, followed by motivation and counseling of the patient to achieve a good oral hygiene.

### Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

### Acknowledgment

We would like to acknowledge the support of Dr. Subhash Garg, Former Professor and Head, Department of Periodontology, Government College of Dentistry, Indore, Madhya Pradesh.

### Financial support and sponsorship

Nil.

### Conflicts of interest

There are no conflicts of interest.

## References

1. Mandel ID, Gaffar A. Calculus revisited. A review. J Clin Periodontol 1986;13:249-57.
2. Gupta S, Jain PK, Kumra M, Rehani S, Mathias Y, Gupta R, *et al*. Bacterial viability within dental calculus: An untrodden, inquisitive clinico-patho- microbiological research. J Clin Diagn Res 2016;10:ZC71-5.
3. Akcalı A, Lang NP. Dental calculus: The calcified biofilm and its role in disease development. Periodontol 2000 2018;76:109-15.
4. Pateel DG, Gunjal S, Math SY, Murugeshappa DG, Nair SM. Correlation of salivary statherin and calcium levels with dental calculus formation: A preliminary study. Int J Dent 2017;2017:2857629.
5. Kamath DG, Umesh Nayak S. Detection, removal and prevention of calculus: Literature review. Saudi Dent J 2014;26:7-13.
6. Hernández-Castañeda A, Aranzazu-Moya1 G, Mora G, Queluz D. Chemical salivary composition and its relationship with periodontal disease and dental calculus. Braz J Oral Sci 2015;14:159-65.
7. Doğan GE, Demir T, Laloğlu E, Sağlam E, Aksoy H, Yildirim A, *et al*. Patients with dental calculus have increased saliva and gingival crevicular fluid fetuin-A levels but no association with fetuin-A polymorphisms. Braz Oral Res 2016;30:e129.
8. Newman MG, Takei HH, Carranza FA, Klokkevold PR. Carranza's Clinical Periodontology. 10th ed. St. Louis, MO: Saunders Elsevier; 2012.
9. Fauchard P. Le Chirurgien Dentiste on Traite des Dents. Tome I, Paris: Pierre-Jean Mariette, 1726.
10. Moskow BS. Unusual deposition of calculus. J Periodontol 1960;31:246.
11. Wilson RO. Calculus resembling odontoma. Oral Surg Oral Med Oral Pathol 1967;23:44.
12. Ortega KL, Luiz AC, Martins FM. Calculus or tumour? Br Dent J 2008;205:582.
13. Bridgman JB. Case report: A patient who had not removed her lower denture for 54 years. N Z Dent J 2016;112:16-7.
14. Midwood I. Prosthodontics: Tenacious lump of calculus. Br Dent J 2016;220:45.