



ORTHODONTIC TOOTH MOVEMENT IN A PATIENT WITH CEMENTAL DYSPLASIA

Dr. Padma R^{1*}, Dr. S Chetan Kumar², Dr. I Venkata Giri³, Dr. Subhradip Biswas⁴

^{1*}Professor and Head, Department of Periodontics, Awadh Dental College and Hospital, Jamshedpur, Jharkhand.

²Professor, Department of Orthodontics, Malla Reddy Institute of Dental Sciences, Hyderabad, AP.

³Reader, Department of Orthodontics, St. Joseph Dental College, Eluru, AP.

⁴Post Graduate Student, Department Of Periodontics, Awadh Dental College And Hospital, Jamshedpur, Jharkhand

ABSTRACT

Hypercementosis refers to a prominent thickening of the cementum. It is most commonly an age related phenomenon and occurs in the adult teeth. The distribution of acellular and cellular cementum is affected by the physical conditions such as aging and pathological conditions like inflammation and hyperocclusal pressure causing hypercementosis. During orthodontic tooth movement pressure and tension are exerted on the periodontal ligament fiber bundles. The tension is on the periodontal fiber bundles and excessive cementum is deposited on the tension side. Spike like type of hypercementosis is generally observed in cases associated with orthodontic tooth movement. Movement of teeth with hypercementosis is not possible according to previous studies, Yet due to severity in both skeletal and dental condition of the patient the case was planned to be treated orthodontically for any changes.

Key words:- Cementum, Cemental Dysplasia, Hypercementosis, Tooth Movement, Alveolar Remodeling.

Access this article online

Home page:

<http://www.mcmed.us/journal/ajomr>

Quick Response code



Received: 25.10.22

Revised: 12.11.22

Accepted: 14.12.22

INTRODUCTION

Hypercementosis occurs as a generalized thickening of the cementum, with nodular enlargement of the apical third of the root. It also appears in the form of spikelike excrescences (cemental spikes) created by either the coalescence of cementicles that adhere to the root or the calcification of periodontal fibers at the sites of insertion into the cementum.¹

Cementum is more resistant to osteoclastic resorption than bone. Pathologically, cementum is thickened by chronic inflammation and hyperocclusal pressure^{2,3}. Hypercementosis of the entire dentition may occur in patients with Paget's disease.⁴

Corresponding Author

Dr. PADMA R.

Email: - Padmarajanna133@gmail.com

Other systemic diseases associated with hypercementosis include acromegaly, arthritis, calcinosis, rheumatic fever and thyroid goitre.⁵ [1].

Radiographically, the radiolucent shadow of the periodontal ligament and the radiopaque lamina dura are always seen on the outer border of an area of hypercementosis, enveloping it as it would in normal cementum. On the other hand, from a diagnostic standpoint, periapical cemental dysplasia, condensing osteitis, and focal periapical osteopetrosis may be differentiated from hypercementosis because all these entities are located outside the shadow of the periodontal ligament and lamina dura.⁶

As the literature review reveals that not many cases were reported with movement of teeth with hypercementosis, this case report gives the information

regarding the possibility of any orthodontic tooth movement in generalized hypercementosis patient.

CASE REPORT

Twenty years old male patient visited the department of orthodontics with a chief complaint of proclined upper front teeth and difficulty in chewing. Clinical and radiographic examination revealed prognathic mandible and retrognathic maxilla with tendency towards horizontal growth pattern. A case of severe skeletal class III with proclined upper & lower anteriors with increased reverse overjet (-10mm), reverse over bite (-8mm), increased freeway space (20mm) with severe crowding in relation to both arches was confirmed. Maxilla contained within the mandible with cross bite in relation to all teeth from 16 to 25 (Fig. 1) and narrow maxillary arch (Fig. 2) is possibly due to early closure of mid palatal suture. There is a decreased lower anterior facial height (by 58mm). Palatally placed 14 and 24 and infra erupted 33 and 43 were also observed (Fig. 1 to 3). Generalized periapically percementosis circumscribed in the lower arch and diffused in upper arch was observed.

Possible etiology of hypercementosis in this case is a functional adaptation and repair process of cementum due to excessive pressure exerted by surrounding musculature created by over closure of mandible.

Upon radiographic examination (Fig. 4 and 5), there was generalized multiple well defined radiopacities evident in the periapical region of all teeth.

Examination of the lesion in specific:

The radiopacities observed found to be well defined and associated with the periapical region of the tooth and in contact with the root. Surface of the cemental lesions are surrounded by well-defined uniform radiolucency, which in turn is surrounded by a sclerotic border of bone. This presentation is more prominent in the

anterior teeth involving 33, 35, 43, and 45. The roots of 46, 47, 48, 36, 37 and 38 appear bulbous and club shaped with a well-defined radiolucency surrounding the borders of the roots.

Differential diagnosis:

Included multiple periapical cement-osseous dysplasia, florid cementoosseous dysplasia, multiple cementoma.

HISTOPATHOLOGIC EXAMINATION:

Upper left 1st premolar (24) was extracted due to gross decay. Ground section of extracted tooth at root area was observed with Olympus trinocular research microscope under 10X magnification revealed that there is normal appearing dentin, thick tomes granular layer with cellular cementum extending through the whole length of the root (figure 6). The peripheral zone of the cementum exhibited large irregular lacunae. Based on the clinical, radiographic and histological features, it is suggestive of cemental dysplasia and generalized hypercementosis (clinical term).

DIAGNOSIS

The case was diagnosed with severe skeletal class III malocclusion attributed to narrow maxilla and prognathic mandible with horizontal growth pattern, constricted maxillary arch, prominent midpalatine raphe may be attributed to early fusion of mid palatine raphe, narrowed palatal vault, lingual placed upper canines, crowding in upper and lower anteriors, more palatally placed 14&24, partially erupted 17,18,27,28,38,48, infra-occlusion of 37, cross-bite in relation to 16to25, partially erupted 33,43, severe reverse overjet & over bite, severe(extreme)freeway space, caries, grossly decayed 24 and poor oral hygiene.

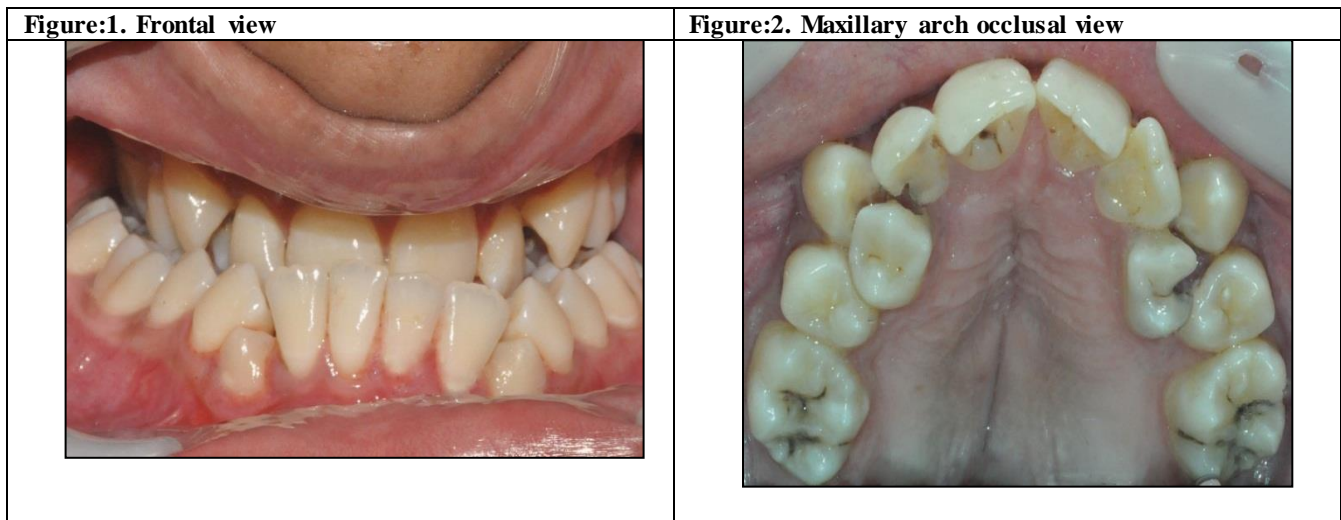


Figure:3. Mandibular arch occlusal view



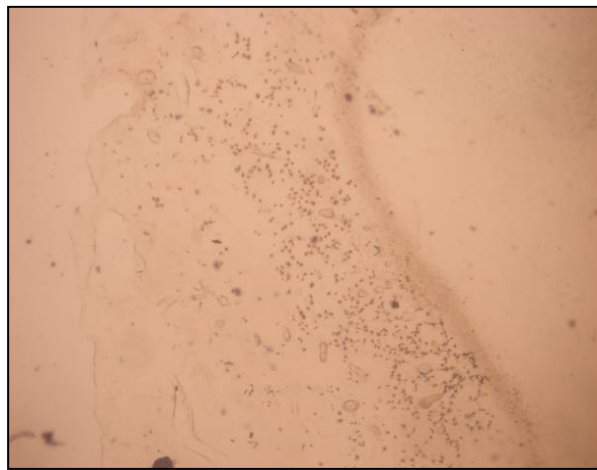
Figure:4. Orthopantomogram



Figure:5. Lateral cephalogram



Figure:6. Ground section of extracted tooth (24)



TREATMENT PLAN

As the patient was having difficulty in mastication, an attempt was made to achieve proper functional efficiency. Angle's class III malocclusion with severe retrusion of maxilla and mandibular prognathism is to be ideally treated by surgically assisted rapid palatal expansion (SARPE) and maxillary advancement for maxilla followed by bilateral sagittal split osteotomy for mandibular setback.

In this patient surgical approach (Le Fort I osteotomy) was contraindicated due to the following reasons:

- As it will involve hyper cemental lesions and might hinder the placement of bone plates and stabilizing screws.
- Surgical cut in the hypercemental area might lead to a comminuted fracture of the bone.
- Bilateral sagittal split osteotomy to set back the mandible was not feasible in this patient due to decreased amount of bone at the angle of the mandible and hypercemental lesions associated with all the teeth were large florid and extended to lower border of the mandible.

Orthodontic treatment as per contemporary literature is contraindicated due to poor prognosis of tooth

movement in hypercemental lesions. Extraction of 24 was done by trans- alveolar method. Brackets were bonded only in the upper arch to check if any positive prognosis occurred and planned for placing of brackets in lower arch if any positive response occurred. After bonding the upper arch with MBT 0.022 "slot 3M unitech brackets, treatment was started by placement of 0.014" cu NiTi wire followed by 0.016" NiTi wire. Mid line diastema was observed after initial appointments. Overall prognosis of the patient was poor.

DISCUSSION

Functions of normal cementum are to cover dentin and dentinal tubules, protect root dentin; reverses tooth movement (physiological eruption of tooth). Hypercementosis can be defined as an excessive formation of cementum above and beyond the extent necessary to fulfill its normal functions, resulting in abnormal thickening and changes in the macroscopic shape of the root. Hypercementosis changes the morphology of the root both internally and externally, especially in the apical third^{7,8,9}.

Advanced type of excessive cementum formation was observed in this patient. The prime interest of this case-report is to know the effect of hypercementosis on the mobility of teeth. As shown in earlier studies hypercementosis may be observed in individual teeth or it may occur in several teeth of the same person. The present investigation indicates that early hypercementosis cannot always be detected roentgenographically. In adults however, the more advanced type of excessive cementum deposits can be observed in the roentgenograms.

Several authors have considered the possibility that systemic and hereditary diseases might cause hypercementosis.⁵ Wolbach and Howe observed increased deposits of cementum as a result of vitamin-A deficiency in animals¹⁰. Hereditary factors may lead to hypercementosis and infraocclusion in several members of the same family.

Patient reported to department of orthodontics St. Joseph Dental College, Eluru, AP, INDIA with a chief complaint of proclined upper front teeth and difficulty in chewing. Possible etiology of hypercementosis in this case could be due to functional adaptation and repair process of cementum due to excessive pressure exerted by surrounding musculature created by over closure of mandible. According to many authors hypercementosis of first molars is fairly common, not infrequently premolars may become involved and even canines and anterior teeth. Observations of hypercementosis in several teeth must nevertheless be regarded as fairly uncommon.

As observed in the present study the hypercementosis may influence the movability of teeth during eruption and orthodontic treatment. Hypercementosis may cause disturbances in the rearrangement of the periodontal fibers. This may result in a delayed eruption. Shrinkage and atrophy of the periodontal ligament may also occur, subsequently leading to ankylosis. In addition, the roots of teeth which have been arrested in their eruption may frequently become curved and prevents further eruption. Orthodontic tooth movement in cases of early hypercementosis may lead to compression and atrophy of the periodontal ligament with ankylosis between root surface and bone. Such ankylosis was observed in the present study. The mild tooth movement observed in the left maxillary arch could be attributed to extraction of 24.

CONCLUSION

This following conclusions were made:

- It is difficult to achieve any tooth movement in a case of hypercementosis.
- The mild tooth movement observed in this case could be a representative of dentoalveolar changes which occurred due to extraction site of 24.
- Hypercementosis in teeth may cause ankylosis due to frequent curvatures of roots of involved teeth.
- Teeth with hypercementosis may possibly be moved orthodontically to certain extent in early stage of hypercementosis.

REFERENCES:

1. Lester KS: The incorporation of epithelial cells by cementum, *J Ultrastruct Res* 27:63,1969
2. Christgau M, Caffesse R G, Schmalz G and D' Souza RN. Extracellular matrix expression and periodontal wound-healing dynamics following guided tissue regeneration therapy in canine furcation defects. *J Clin Periodontol* 34: 691- 708, 2007.
3. Diekwisch TGH. Developmental biology of cementum. *Int Jour Dev Biol* 2001; 45:695-706.
4. Rushton MA: The dental tissues in osteitis deformans, *Guy's Hosp Rep* 1938; 88: 163,
5. Leider AS, Garbarino VE: Generalized hypercementosis, *Oral Surg Oral Med Oral Pathol* 1987; 63:375
6. Wood NK, Goaz PW: *Differential diagnosis of oral lesions*, ed 2, St Louis, 1984, Mosby.
7. Pinheiro BC, Pinheiro TN, Capelozza AL, Consolaro A. A scanning electron microscopic study of hypercementosis. *J Appl Oral Sci.* 2008 Nov-Dec;16(6):380-4
8. Barros LAP. Macro and microscopic studies of the morphology of the apical third in dental hypercementosis. Bauru (SP): University of Sao Paulo; 1999.
9. Consolaro A, Oliveira LU, Vasconcelos MHF. Determine the prevalence of hypercementosis and their etiopathogenic implications. *Odontol mod.* 1987;14(3):6-14.
10. Wolbach SB, Howe PR. The Incisor Teeth of Albino Rats and Guinea Pigs in Vitamin A Deficiency and Repair. *Am J Pathol.* 1933 May;9(3):275-294.25

Cite this article:

Dr. Padma R, DR. S Chetan Kumar, DR. I Venkata Giri, DR. Subhradip Biswas Orthodontic Tooth Movement In A Patient With Cemental Dysplasia. *American Journal of Oral Medicine and Radiology*, 2022, 9(2), 18-21.



Attribution-NonCommercial-NoDerivatives 4.0 International