

Management of maxillary molar undergoing buccal bone resorption due to orthodontic banding

Muhammad Khalid Shafiq¹, Asaad Javaid Mirza², Aftab A. Khan³

ABSTRACT

The consequences of injudicious use of orthodontic braces may vary from mild periodontal problems to severe loss of the attached periodontal tissues. In this case the patient had undergone orthodontic treatment. Though her appearance improved after the orthodontic treatment, but tooth # 16 which was banded and used for anchorage showed complete crestal and apical bone dehiscence in the buccal region. The patient came with the complaint of discomfort and inability to chew on the right side of maxilla. On intraoral examination, unusual calculus was seen deposited on the gums. X-ray showed resorption of buccal roots of tooth # 16. The patient was treated endodontically for the same tooth as it was grossly carious with exposed pulp chamber but incomplete root canal treatment. The buccal canals showing resorption were disinfected and overfilled to an extent that GP points became visible in the buccal sulcus. Raising the flap, the affected roots were cleaned and planed and the extruded GP cut and the roots resected and sealed with glass ionomer cement to encourage reattachment of periodontal apparatus. After 9-month of recall, patient is performing well with improved periodontal attachment and firmly standing tooth in the socket.

KEY WORDS: Apical root resorption, Bone dehiscence after orthodontic treatment, Periodontal attachment loss.

Pak J Med Sci July - September 2012 Vol. 28 No. 4 722-725

How to cite this article:

Khalid MS, Asaad JM, Aftab AK. Management of maxillary molar undergoing buccal bone resorption due to orthodontic banding. Pak J Med Sci 2012;28(4):722-725

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- * Received for Publication: March 17, 2012
- * 1st Revision Received: April 2, 2012
- * 2nd Revision Received: May 3, 2012
- * Final Revision Accepted: May 15, 2012

INTRODUCTION

A 22-year female medical student of Baqai Medical College came to endodontic Department of Baqai Dental College Hospital, Karachi. Her presenting complaint was discomfort on right side of her upper jaw and difficulty in chewing. Past dental history revealed that she had a cavity in tooth # 16, which was restored with amalgam in the Operative Dentistry Department of the same institution. The restoration did not work and patient had to undergo root canal treatment but the treatment remained incomplete due to unknown reason. The patient also gave the history of wearing fixed orthodontic appliances for prolong period of time. An orthodontic band was applied on the tooth # 16.

Her medical history was insignificant and no abnormality was detected extra orally. Examination



Fig.1: Unusual calculus seen deposited on the gums.

of oral cavity revealed presence of all except all first premolars in her mouth with immaculate periodontal health. They were extracted for the orthodontic reason. Tooth # 16 was grossly carious with opened pulp chamber. Buccal mucosa covering tooth # 16 was red due to inflammation. Unusual calculus deposit was seen on the soft tissues (Fig.1). Removing the calculus revealed that apices of the mesiobuccal and distobuccal roots of tooth # 16 were projecting out of the attached soft tissues of the gums.

Periapical X-ray showed that apices of both the buccal roots were resorbed. A No. 15 diagnostic 'K' file passed through these canals unobstructed which confirmed the apical resorption. Probing depth on palatal surface was within normal limits but on the buccal surface, it was not measureable as full length of the probe dipped in at each point. It was indicative of total bone loss on buccal surface. Despite this, the tooth was standing firmly in its socket.

Treatment: Two- visit treatment was planned for this patient including Orthograde root filling



Fig.2: Raised flap showing buccal bone loss.

followed by Surgical resection of effected roots. In the first visit, the pulp was debrided from its chamber and copiously irrigated with saline. Working length of each canal was established and the canals were prepared using rotary protapers upto # F₃. Calcium Hydroxide¹ was placed in the canals for 10 days. Provisional restoration material, Cavit (ESPE Dental, St. Paul, MN USA) was densely packed into the access cavity.

Subsequently, intracanal Calcium Hydroxide was removed under copious irrigation with mixture of saline and chlorhexidine. The canals were then dried using paper points. Each canal was dried with two or three paper points. This was a clear indication that they were bacteria free and ready to be obturated.² Appropriate sized GP points were used to hermetically seal the canals such that the GP points protruded out of the roots and became visible in the buccal sulcus projecting through the gums. Palatal root was filled as in a routine RCT procedure. Access cavity was packed with Cavit.

A full thickness flap was raised from mesial surface of the first molar to distal surface of the second molar under local anesthesia (Fig.2). The

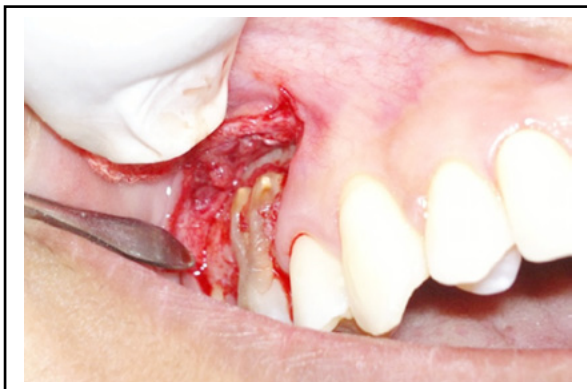


Fig.3: Roots resected and sealed with GIC.

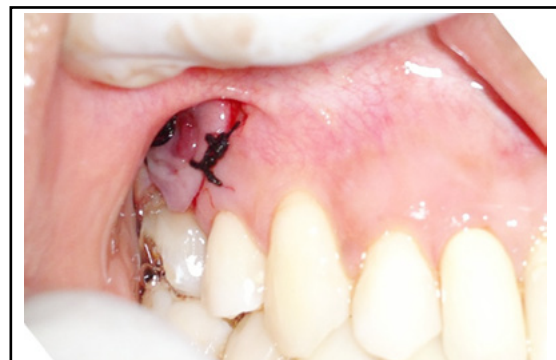


Fig.4: Wound sutured.

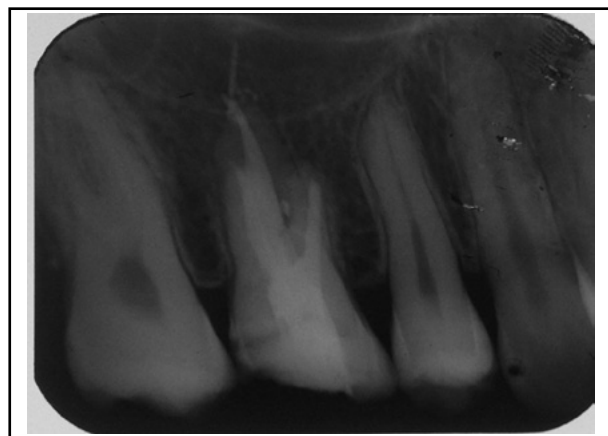


Fig.5: Post Operative X-ray.

area was debrided, scaled, and root planed using Gracy's curettes. The root ends were resected with a straight fissure stainless steel bur mounted on low speed hand piece under continuous distilled water spray (Fig.3). Resection of the projecting roots was performed such that they came in alignment with rest of the root. A heated small excavator was used to create space by removing apical GP. These apical spaces were sealed with glass ionomer restorative cement (Fuji II, GC Corporation, Tokyo, Japan).

Rationale behind using GIC was its high biocompatibility over other root end filling materials³ and ability to encourage attachment apparatus.⁴ The Flap was sutured with 3-0 silk sutures (Fig.4). Post operatively, the patient was prescribed with Doxycycline 100mg capsules OD and Flagyl 400mg tablets TDS for five days. Ibuprofen 400 mg BD was prescribed for 2 days with chlorhexidine mouth rinses thrice daily for a week.

After seven days, the patient was reevaluated clinically and radiographically. No pain or tenderness was found and the wound was healing normally. There was no redness of the buccal mucosa. Radiograph taken on this visit showed well filled root canals with normal surrounding tissues (Fig 5).

Sutures were removed and the patient was emphasized to maintain good oral hygiene. Patient was seen at three month interval for supportive periodontal care. The patient was asymptomatic on 9-month recall visit and was able to maintain the oral hygiene easily and satisfactorily (Fig 6).

DISCUSSION

The patient had history of previous orthodontic treatment with extractions of all first premolars. Patients with misaligned teeth have to wear orthodontic appliances for alignment of their teeth for varying period of time. These appliances if not



Fig.6: Periodontal reattachment after 9-month recall.

used judiciously, may pose problems. It is observed in the case under treatment that the patient had two problems; resorption of apices of roots and complete crestal and apical bone dehiscence in the buccal region of the maxillary first molar (Fig.2).

The ability to move teeth through bone during orthodontic treatment is dependent on bone being resorbed and roots remaining intact. It is highly probable that all teeth which have undergone orthodontic tooth movement exhibit some degree of microscopic root resorption.⁵ Longer treatment times seem to be associated with greater amounts of root resorption.^{6,7} In the majority of patients root loss is limited to 2 mm or less.⁸ Root resorption was quite evident in this case as well and was treated by using $\text{Ca}(\text{OH})_2$.

The likely reasons for buccal bone resorption can be improper band placement, gingival and periodontal problems following improper maintenance of gum tissue around banded molars during orthodontic treatment, expression of excessive buccal root torque causing the molar root to come in contact with buccal bone or expansive force on molar causing dehiscence.

The health of the bone and gums which support the teeth may be affected by orthodontic appliances due to tooth movement if any periodontal problem already exists. The surrounding bone may be affected in some rare cases where a periodontal condition does not exist.⁹

A cause of total buccal bone resorption may be plaque retention on the banded molars due to overhanging margins of orthodontic band. In a study gingival inflammation and greater interproximal loss of attachment was observed for maxillary banded molars than bonded maxillary molars.¹⁰

Teeth require very low continuous forces for their movements.¹¹ Ideal forces in orthodontic tooth movement are those which just overcome capillary blood pressure. In this situation bone resorption is seen on the pressure side and bone deposition on the tension side. Excessive Orthodontic forces hyalinize the periodontal ligament causing undue bone loss.¹² The present patient might be suffering due to excessive orthodontic forces.

One probable cause of buccal bone dehiscence could be the orthodontic effect of rapid maxillary expansion. It is represented by posterior tooth buccal movement which leads to a reduction in the buccal bone plate thickness. This thinning appears significant only for the first premolars and molars – i.e., the teeth that support the bands and show buccal translation movement.¹³

In this case, after complete canal disinfection, the canals were obturated hermetically and the protruding roots were resected. The spaces were created to seal the apical end of the resected roots with Glass Ionomer Cement. The potential advantage of using glass ionomer includes its: ease of placement, permanent bonding with hard tissues of the teeth¹⁴, ability to regenerate long epithelial attachment⁴, bacteriostatic property due to fluoride release¹⁵, biocompatibility¹⁶ and cost effectiveness.

During the last 9 months follow up, the patient has shown remarkable improvement and reattachment of periodontal apparatus has started (Fig.6). The tooth is functioning without any inconvenience and definite extra coronal restoration is due on next appointment.

REFERENCE

1. Carrotte P. Endodontics: Part 9 Calcium hydroxide, root resorption, endo-perio lesions Br Dent J 2004;197:735-743.
2. Messing JJ, Stock CJR. A color atlas of endodontics: Root Filling; 153-159 Wolfe Medical Publications Ltd, Torrington Palace, London UK. 1988.
3. Van Swol RL, Eslami A, Sadeghi EM, Ellinger RF. A new treatment of furcation defects involving strategic molars. Int J Periodont Restor Dent 1989;9:185-195.
4. Scherer W, Dragoo MR. New clinical applications for resin ionomer. Pract Periodont Aesthet Dent 1995;7:1-4.
5. McNab S. External Apical Root Resorption Following Orthodontic Treatment. Angle Orthod 2000;70:227-232.
6. Baumrind S, Korn EL, Boyd RL. Apical root resorption in orthodontically treated adults. Am J Orthod Dentofacial Orthop 1996;110:311-320.
7. Snelgrove RA. Generalized idiopathic apical root resorption as an incidental finding in an adolescent: a case history. Dent Update 1995;22:276-278.
8. Sameshima GT, Sinclair PM. Predicting and preventing root resorption: Part I. Diagnostic factors. Am J Orthod Dentofacial Orthop 2001;119:505-510.
9. Austrian Society of Orthodontics. <http://www.aso.org.au/docs/orthodontics/Risks.htm>. Accessed on Feb 26, 2012
10. Boyd RL, Baumrind S. Periodontal considerations in the use of bonds or bands in molars in adolescents and adults. The Angle Orthodontist 1992;62:117-126.
11. Laura RI, James EH, Jeffrey CN, John M. Human tooth movement in response to continuous stress of low magnitude. Am J Orthod Dentofacial Orthop 2000;117:175-183.
12. Roberts-Harry D, Sandy J. Orthodontics. Part 11: orthodontic tooth movement. British Dental J 2004;196:391-394.
13. Garib DG. Periodontal effects of rapid maxillary expansion with tooth-tissue-borne and tooth-borne expanders: A computed tomography evaluation. Am J Orthod Dentofacial Orthop 2006;129:749-758.
14. Lacefield WR, Reindl MC, Retief DH. Tensile bond strength of a glass-ionomer cement. J Prosthet Dent 1985;53:194-198.
15. Smith D. Glass Ionomer Cements. A prospective symposium on esthetic restorative material. Chicago: American Dental Association. ADA Council on Dental Materials. Instruments and equipments. 1993: 49-58.
16. Dragoo MR. Resin ionomer and hybrid ionomer cements: Part II. Human clinical and histology wound healing responses in specific periodontal lesions. Int J Periodont Restor Dent 1997;17:75-87.