CASE REPORT

Management of mucosal fenestration with external root resorption by multidisciplinary approach

Ramesh Bharti,¹ Anil Chandra,¹ Aseem Prakash Tikku,² Veerendra Prasad,³ Vijay Kumar Shakya,¹ Rameshwari Singhal⁴

¹Faculty of Dental Sciences, Department of Conservative Dentistry and Endodontics, King George's Medical University Lucknow, Lucknow, Uttar Pradesh, India

²Faculty of Dental Sciences, King George's Medical University Lucknow, Lucknow, Uttar Pradesh, India

³Department of Plastic Surgery, King George's Medical University Lucknow, Lucknow, Uttar Pradesh, India

⁴Faculty of Dental Sciences, Department of Periodontology, King George's Medical University Lucknow, Lucknow, Uttar Pradesh, India

Correspondence to
Dr Ramesh Bharti,
r_bharti14@yahoo.com

Accepted 26 September 2014

SUMMARY

Mucosal fenestration is a clinical condition in which the overlying gingiva is denuded and the root is exposed to the oral cavity. Invasive cervical resorption is an entirely uncommon entity and its aetiology is poorly understood. This case presents an invasive cervical resorption of maxillary right central incisor with fenestration at the cervical third of the tooth. The resorption area was chemomechanically debrided. It was then restored with Mineral Trioxide Aggregate over which pink glass ionomer cement (GC Fuji VII) was placed. Lateral pedicle flap was used to cover the fenestration. The resorptive defect was restored using tooth coloured restorative resin after removal of the pink glass ionomer cement. Orthodontic treatment was continued for correction of malocclusion.

BACKGROUND

Dehiscence and fenestration are two commonly encountered alveolar defects.¹ An alveolar dehiscence is described by lack of the facial or lingual alveolar cortical plate, resulting in a denuded root surface, while an alveolar fenestration is a circumscribed defect of the cortical plate, which exposes the underlying root surface but does not involve the alveolar margin of the bone.² Gingival fenestrations have multifactorial entities such as decreased thickness of the alveolar bone, labial placement of the tooth in the dental arch, contour of the root apex, abnormal occlusal factors, orthodontic tooth movement, periodontal and endodontic pathology, and abnormal frenal attachment.³ It has been reported that gingival fenestrations are commonly associated with the anterior region of the arch, especially the incisors. Mucosal fenestrations are far less prevalent as compared to normal fenestrations.⁴

Gingival fenestration defects may create problems in plaque control, root hypersensitivity and aesthetics. Several treatment modalities have been proposed in the literature. These include root planning along with chlorhexidine mouth rinsing, full thickness mucogingival flap with primary closure, pedicle flap surgery, free gingival grafting and guided tissue regeneration.^{5,6}

The external cervical resorption (ECR) is a localised defect of teeth that occurs in the root just below the epithelial attachment. This condition is not very common and can be an aggressive pathological condition that resorbs enamel, dentin and cementum.⁷ There are several associated factors that cause resorption of the cervical region of root

surface. These factors are: dental trauma,^{7,8} orthodontic treatment,^{7,9} intracoronal bleaching,^{7,10} periodontal therapy^{7,11} and of idiopathic aetiology.^{12,13} Liang *et al*¹³ concluded in their review on multiple idiopathic cervical root resorption that younger females were most frequently affected, however, no single common cause was conclusively identified. Frank and Torabinejad¹⁴ described that clinically, cervical external resorption is associated with inflammation of the periodontal tissues and does not have any pulpal involvement. The pulp remains protected by a thin layer of predentin until late in the process.

MTA capping was used in mechanically pulp-exposed healthy human teeth and deep cavities having less remaining dentin, showing that MTA provides an excellent and better quality dentin bridge formation and exhibits milder pulp inflammation as compared with calcium hydroxide-based materials.^{15,16}

This case report describes a rare situation: a mucosal fenestration along with external root resorption, which was developed in the maxillary right central incisor just apical to the cemento-enamel junction. This case was successfully treated with a combination of restoration of resorption, free mucosal graft for gingiva along with orthodontic treatment.

CASE PRESENTATION

An 18-year-old female patient reported to the department of conservative dentistry and endodontics with a symptom of cold sensitivity and a hole in her upper right front region of gum for the past 1 month. It was increasing in size. She was under orthodontic treatment for correction of her teeth over the past 15 days. On examination, a portion

Figure 1 Fenestration in maxillary right central incisor tooth.

CrossMark

To cite: Bharti R, Chandra A, Tikku AP, *et al*. *BMJ Case Rep* Published online: [please include Day Month Year] doi:10.1136/bcr-2014-206259

Figure 2 Radiograph showing radioluscent resorptive area in maxillary right central incisor tooth.

of the root of the maxillary right central incisor was visible through a fenestration on the labial surface and the maxillary right central incisor was in cross-bite ([figure 1](#)).

INVESTIGATIONS

The root of the affected tooth was also resorbed but pulp space was not involved and the tooth responded positively to an electric pulp test. Periapical radiograph showed normal lamina dura and periradicular area but intraoral periapical radiograph ([figure 2](#)) and panoramic radiograph ([figure 3](#)) showed a resorptive lesion.

TREATMENT

According to the Heithersay classification,¹ this lesion was considered to be class II. The restoration of the involved tooth was planned and after removing the soft dentine White MTA (Pro-Root, Dentsply Tulsa, Tulsa, Oklahoma, USA) was mixed according to the manufacturer's instructions and placed into the cavity. A moist cotton pellet was placed to help hydrate the MTA during setting. The cavity was temporarily filled with Cavit ([figure 4](#)). After 24 h the Cavit was removed. The cavity

Figure 3 Pre-operative panoramic radiograph of the patient.

Figure 4 Photograph showing resorptive cavity restored with Cavit.

was then restored with GC Fuji VII pink Glass Ionomer Cement for aesthetic reasons ([figure 5](#)). After the restoration, gingival flap surgery was performed under local anaesthesia. In the present case the technique used for coverage of root defect following restoration was lateral pedicle graft. This technique, used by Grupe and Warren,¹⁷ wherein 2 mm of marginal gingiva is retained at the donor site, prevents recession at the donor site. A full thickness mucoperiosteal flap was raised from the donor area, that is, gingival tissue adjacent to the defect was laterally repositioned and sutured onto the defect.¹⁷

After 1 week healing was satisfactory and the sutures were removed. A periodontal pack was applied and removed after 15 days. After removing the periodontal pack the patient was sent back to the orthodontist for continuation of orthodontic treatment.

OUTCOME AND FOLLOW-UP

The orthodontist began treatment and 6 months later the patient was evaluated for the gingival attachment and relationship of the restored tooth with adjacent and opposite teeth. The tooth was in its normal alignment in relation to its adjacent teeth. The Fuji VII glass ionomer was still visible but less than before. There was a blackish area around the pink GIC ([figure 6](#)). When we removed the pink GIC there was no necrotic tissue. The blackish area was a hue of the pink GIC. Restoration of the tooth was done with composite resin ([figure 7](#)). A periapical radiograph

Figure 5 Cavity restored with Fuji VII glass ionomer cement.

Figure 6 Photograph after 6 months showing gingiva in its position.

was also taken (figure 8) and it showed that the width of the periodontal ligament space was normal.

At 1 year follow-up the patient was asymptomatic and the restoration was intact. There was no discoloration of restoration (figure 9). Orthodontic treatment was continued and the patient is still under observation.

DISCUSSION

The management of cervical resorption is a great challenge to clinicians and its prognosis depends highly on the extent of the resorption.⁷ Thus far, the exact cause of cervical resorption has not been fully understood, but it is broadly accepted that either damage or deficiency of cementum below the epithelial attachment is related to cervical resorption.¹⁸ Without its protective layer of cementum the root dentin is directly exposed to osteoclasts, which then resorb the dentin.¹⁹ Heithersay⁸ investigated 257 teeth for potential causes of ECR in 222 patients. He concluded that a history of orthodontic treatment, dental trauma and bleaching were the most commonly associated predisposing factors for ECR. In this case trauma from occlusion was the predisposing factor for the ECR.

Heithersay also classified the external invasive cervical resorption. He proposed the appropriate treatment based on the extent of the resorptive defect. This classification is useful for assessing the extent of defects and managing the ECR that is present on the mesial and distal aspects of the tooth.¹ It is challenging to identify the true nature and extent of an ECR defect located on the labial or palatal aspects of a tooth by using conventional radiographic techniques.²⁰ The true nature of the defect can only be assessed with CBCT, which confirms whether the tooth is restorable or not, especially in class III and IV cases.

Figure 7 Tooth restored with tooth coloured composite resin after removing Fuji VII Glass Ionomer Cement.

Figure 8 Radiograph after 6 months.

Patel and Dawood²⁰ described two cases of ECR in which CBCT scans revealed the true nature and degree of resorption in three dimensions. The resorption lesion in one case was found to be confined to the buccal aspect of the root with no perforation of the root canal, thereby allowing the clinician to advise the patient confidently as to the true nature and severity of the ECR lesion, and also to plot the exact treatment plan. In their second case, the ECR lesion radiographically appeared as a class III lesion. However, CBCT scans revealed that the ECR defect was far more extensive (class IV) and was therefore not treatable. This vital information prevented the patient from undergoing an unnecessary exploratory surgical procedure. Heithersay class I and II defects offer the most favourable long-term outcomes. In these cases pulp is usually not involved. MTA was used in this case because of its excellent properties such as sealing ability, biocompatibility, inhibition of bacterial activity and moisture resistance,²¹ which are important for repair of resorptions. Simultaneous orthodontic treatment was carried out to correct the cross-bite of the tooth.

Various techniques have been reported in the literature for recession coverage, such as free mucosal graft and connective tissue graft. These techniques require procurement of donor

Figure 9 Photograph at 1 year follow-up.

tissue from the palate and are associated with donor site morbidity. Since the attached gingiva on the adjacent tooth to the defect was adequate in this case, a lateral pedicle graft was considered ideal for treatment of the present defect. The best-known technique among pedicle grafts is a laterally positioned pedicle graft. The success rate of this root coverage procedure was found to be in the range of 69–72%.²²

Learning points

- ▶ This clinical case presents necessary information for clinicians in the proper diagnosis and clinical management of teeth with cervical resorption with mucosal fenestration.
- ▶ The problem associated with the treatment of cervical resorption is related to the total control of resorptive activity by therapeutic means.
- ▶ A most significant feature of cervical resorption is the manner in which the dental pulp usually remains covered with a thin layer of dentin and predentin until late in the process. It is, therefore, up to the clinician to decide as early possible to treat the lesion without pulp removal.

Competing interests None.

Patient consent Obtained.

Provenance and peer review Not commissioned; externally peer reviewed.

REFERENCES

- 1 Elliot JR, Bowers GM. Alveolar dehiscence and fenestration. *Periodontics* 1963;1:245–8.
- 2 Edel A. Alveolar bone fenestrations and dehiscence in dry Bedouin jaws. *J Clin Periodontol* 1981;8:491–9.
- 3 Chen G, Fang CT, Tong C. The management of mucosal fenestration: a report of two cases. *Int Endod J* 2009;42:156–64.
- 4 Ju YR, Tsai AH, Wu YJ, et al. Surgical intervention of mucosal fenestration in a maxillary premolar: a case report. *Quintessence Int* 2004;35:125–8.
- 5 Ling LJ. The treatment of fenestrated root: case reports. *J Dent Sci* 1989;9:137–40.
- 6 Yang ZP. Treatment of labial fenestration of maxillary central incisor. *Endod Dent Traumatol* 1996;12:104–8.
- 7 Heithersay GS. Invasive cervical resorption. *Endod Topics* 2004;7:73–92.
- 8 Heithersay GS. Clinical, radiologic and histopathologic features of invasive cervical resorption. *Quintessence Int* 1999;30:27–37.
- 9 Tronstad L. *Endodontic aspects of root resorption in clinical endodontics: a textbook*. 2nd edn. Stuttgart: Thieme, 2002.
- 10 Harrington GW, Natkin E. External resorption associated with the bleaching of pulpless teeth. *J Endod* 1979;5:344–8.
- 11 Trope M. Root resorption due to dental trauma. *Endod Topics* 2002;1:79–100.
- 12 Gunraj MN. Dental root resorption. *Oral Surg Oral Med Oral Pathol Oral Radiol Endod* 1999;88:647–53.
- 13 Liang H, Burkes EJ, Frederiksen NL. Multiple idiopathic cervical root resorption: systematic review and report of four cases. *Dent Radiol* 2003;32:150–5.
- 14 Frank AL, Torabinejad M. Diagnosis and treatment of extracanal invasive resorption. *J Endod* 1998;7:500–4.
- 15 Ainehchi M, Eslami B, Ghanbari M, et al. Mineral trioxide aggregate (MTA) and calcium hydroxide as pulp-capping agents in human teeth: a preliminary report. *Int Endod J* 2003;36:225–31.
- 16 Chacko V, Kurikose S. Human pulpal response to mineral trioxide aggregate (MTA): a histologic study. *J Clin Pediatr Dent* 2006;30:203–9.
- 17 Grupe H, Warren R. Repair of gingival defect by sliding flap operation. *Periodontol* 1956;27:92–5.
- 18 Patel S, Kanagasalingam S, Pitt Ford T. External cervical resorption: a review. *J Endod* 2009;35:616–25.
- 19 Gold SI, Hasselgren G. Peripheral inflammatory root resorption: a review of the literature with case reports. *J Clin Periodontol* 1992;19:523–34.
- 20 Patel S, Dawood A. The use of cone beam computed tomography in the management of external cervical resorption lesions. *Int Endod J* 2007;40:730–7.
- 21 Parirokh M, Torabinejad M. Mineral trioxide aggregate: a comprehensive literature review—part I: chemical, physical, and antibacterial properties. *J Endod* 2010;36:16–27.
- 22 Guinard EA, Caffesse RG. Treatment of localized gingival recession. Part 1: lateral sliding flap. *J Periodontol* 1978;49:351–6.

Copyright 2014 BMJ Publishing Group. All rights reserved. For permission to reuse any of this content visit <http://group.bmj.com/group/rights-licensing/permissions>.
BMJ Case Report Fellows may re-use this article for personal use and teaching without any further permission.

Become a Fellow of BMJ Case Reports today and you can:

- ▶ Submit as many cases as you like
- ▶ Enjoy fast sympathetic peer review and rapid publication of accepted articles
- ▶ Access all the published articles
- ▶ Re-use any of the published material for personal use and teaching without further permission

For information on Institutional Fellowships contact consortiasales@bmjgroup.com

Visit casereports.bmj.com for more articles like this and to become a Fellow