CASE REPORT

Management of internal resorption of central incisor using hybrid technique

Prabakaran Gayathri,¹ Ramesh Kumar Pandey,¹ Eesha Jain²¹Department of Pedodontics and Preventive Dentistry, King George's Medical University, Lucknow, Uttar Pradesh, India²Department of Paediatric and Preventive Dentistry, Uttaranchal Dental and Medical Research Institute, Dehradun, Uttarakhand, India**Correspondence to**
Dr Prabakaran Gayathri,
drpgayathri@gmail.com**SUMMARY**

Internal inflammatory root resorption is characterised by progressive destruction of intraradicular dentin and dentinal tubules along the root canal wall. A number of theories have been proposed as a possible cause for internal resorption. It is usually asymptomatic and detected during routine radiographic investigations. Prompt diagnosis and early management of such defects is essential to maintain the integrity of the tooth. Non-surgical and surgical methods are the two main strategies involved in the management of internal resorption. The non-surgical method is usually preferred, but in cases of extensive resorption with external root perforation, surgical intervention has been advocated. The present case illustrates repair of perforating internal resorption by hybrid method, using mineral trioxide aggregate and gutta-percha, following surgical exposure. After a 10-month follow-up, no clinical and radiographic abnormalities were observed. Additionally, there was also marked reduction in periodontal pocket depth.

BACKGROUND

The perforating resorptive defects carry a poor prognosis and it is difficult to salvage the tooth. The present case report highlights the importance of early and accurate diagnosis and strategic treatment planning which can also be conservative and surgical. This case report brings forth the hybrid technique of sealing such perforations. Utilising the strength of gutta-percha and biocompatibility of mineral trioxide aggregate (MTA), a hermetic seal can be attained, which in turn can prevent uneventful extractions.

CASE PRESENTATION

A 13-year-old girl reported to our Department of Pedodontics with symptoms of greyish discolouration and mobility in left upper front tooth. The medical history was unremarkable. Her dental history revealed an episode of trauma 7 years ago which was left untreated due to absence of any symptoms. Clinical examination revealed Ellis class 4 fracture of upper permanent left central incisor (21) with a sinus tract in the attached gingiva slightly mesial to it (figure 1). The tooth exhibited grade 2 mobility, tenderness on percussion and a probing depth of 5 mm on the facial aspect. Radiographic investigation revealed the presence of oval-shaped radiolucency extending beyond the confines of pulp canal space, perforating in the middle third of the root on the mesial aspect. All other anterior teeth tested normal to heat, cold, electric pulp tests except the affected tooth which

was non-responsive. To affirm that the sinus tract was connected to the external perforation of the tooth, a gutta-percha cone was inserted through the sinus opening which was later substantiated. The diagnosis of inflammatory perforating internal resorption was proposed, which usually has a poor prognosis. However, as the patient was reluctant to get the tooth extracted, it was decided to attempt endodontic treatment for the same. A standard access cavity was prepared after administration of local anaesthesia (2% lignocaine) and the canal was thoroughly irrigated with normal saline. The root canal was negotiated with a size 20K file and a radiograph was recorded to establish the working length (figure 2). It was found that the apical 4 mm of the canal was not negotiable as it was obliterated. During instrumentation severe bleeding was encountered when the file approached the middle third of the canal. The canal was filled with calcium hydroxide paste and closed. A recall visit was scheduled after 2 weeks and the dressing was removed. As the bleeding persisted, a surgical intervention was planned for the ease of removing granulation tissue and repairing the external perforation with MTA. A rectangular mucoperiosteal flap was raised under local anaesthesia. Loss of buccal cortical plate was observed on the mesiobuccal aspect of the tooth corresponding to the sinus opening. The external perforation was easily perceptible (figure 3). All the remnant granulation and pulpal tissue were debrided thoroughly and the canal was dried with paper points and obturated by both lateral and sectional condensation methods. During obturation, care was taken to keep the sealer material within the confines of the remaining portion of the root canal. The external perforation was sealed with ProRoot white MTA (figure 4). Synthetic bone graft was placed for periodontal regeneration procedure. Sutures were placed using black braided silk and the tooth was splinted. After 5 days, the sutures were removed and the coronal access was restored with composite resin restoration. The splint was removed after 2 weeks.

INVESTIGATIONS

Intraoral periapical radiograph to assess the working length and postoperative radiographs to reaffirm the success of the treatment for a period of 10 months.

DIFFERENTIAL DIAGNOSIS

A differential diagnosis of external root resorption and external cervical resorption should be included in such cases of root resorption. However, in the

CrossMark

To cite: Gayathri P, Pandey RK, Jain E. *BMJ Case Rep* Published online: [please include Day Month Year] doi:10.1136/bcr-2013-201570

Figure 1 Preoperative photograph showing traumatised 21.

Figure 3 Intraoperative photograph depicting internal resorption and perforation.

present case, the radiographic features were typical of internal root resorption, that is, the lesion was smooth, symmetrically distributed over the root and had a uniform density, as described by Gartner *et al.*¹

TREATMENT

Surgical exposure of the resorptive defect followed by repair of the defect by hybrid technique.

OUTCOME AND FOLLOW-UP

The patient was kept under radiographic review for the next 10 months (figure 5). The tooth was symptom free and there was reduction in the pocket depth up to 2 mm at the end of 10-month follow-up.

DISCUSSION

Prognosis of treatment in a traumatically injured tooth is adversely affected by root perforations.² Root perforations caused by internal and external root resorption should be

promptly diagnosed before any treatment is initiated. Patel *et al.*³ have suggested that conventional radiographs give satisfactory results for diagnosing such lesions, although cone beam CT (CBCT) is much more accurate. They recommended using CBCT for assessing root resorption lesion over conventional radiographs as CBCT resulted in a perfect diagnosis in their study. However, conventional radiographs are more cost-effective than CBCT. Another limiting factor for using CBCT is that it is not routinely available unlike conventional radiographs. In the present case, the lesion was adequately diagnosed with an intraoral periapical radiograph. However, authors of the present case also recommend the use of CBCT, wherever possible, as the three-dimensional scanned image obtained by CBCT can provide minute details which can be missed in a two-dimensional image obtained by conventional radiograph. Mostly perforating internal root resorption is treated through non-surgical conservative method.⁴ In the present case too, calcium hydroxide dressing was given as an intracanal medicament as it is a potent bactericidal and effectual in eradicating bacteria that are resistant to chemicomechanical instrumentation.^{5 6} The perforation was well confirmed from the radiograph, and considering the potential risk of periradicular leakage, normal saline was used for irrigation. However, there was consistent bleeding which could not be controlled with irrigation and calcium hydroxide dressing in mid appointments. Since the lesion was

Figure 2 Intraoral periapical radiograph recorded to estimate the working length.

Figure 4 Postoperative photograph showing the lesion filled using hybrid technique (using both mineral trioxide aggregate and gutta-percha).

Figure 5 Postoperative radiograph at a 10-month follow-up.

not amenable to conservative treatment, surgical intervention was resorted to. When the flap was raised there was destruction of the buccal cortical bone on the mesiobuccal aspect of the root which was not evident radiographically. Altundasar and Demir⁷ stated that the migration of the granulation tissue through the resorptive defect to the external root surface was the cause for destruction of adjacent bony structure. The bony devastation is frequently difficult to detect as it is superimposed by the intact bone. This might have been the possible cause why extent of bone loss remained undetected in the present case.

Obturation and sealing internal resorption defects to a permissible limit are an arduous task. Gutta-percha can be used as a filling material when such defect is restrained within the canal space. In circumstances where root canal wall has been perforated, the potential use of MTA should be considered. MTA is the material of choice for treating resorptive defects due to its excellent biocompatible properties.⁸ They are efficacious in repairing lateral root perforations and reinforcing the growth of the periodontium with superior sealing ability.⁹ Recent literature supporting the use of new hybrid technique might be advocated, which uses both MTA and gutta-percha together for managing resorption defects.⁸⁻⁹ Predominantly root perforation defects are treated initially followed by endodontic restoration of the tooth. Repair of root defect was preceded by endodontic

obturation in a case report by Yildirim and Dalci.¹⁰ In the present case we also opted for the same. Another possible threat was displacement of MTA during lateral condensation of the gutta-percha. The surgical access is helpful in avoiding this displacement as it paves a way for lateral and vertical condensation of the gutta-percha in orthograde and retrograde manner. In the present case, MTA was condensed over the gutta-percha and root dentin.

Effective use of MTA and gutta-percha in hybrid technique for treating such defects is of great boon in conserving the tooth and preventing uneventful extractions.

Learning points

- Surgical repair provides better accessibility and ease of direct repair of such perforating defects.
- Hybrid technique—gutta-percha serves as a matrix over which mineral trioxide aggregate (MTA) can be condensed, provides better adaptability and less chances of displacement of MTA.
- Cone beam CT is most accurate which enables three-dimensional viewing of resorptive defects caused by internal resorption. Though intraoral periapical radiographs are used frequently and proven to be satisfactory.

Competing interests None.

Patient consent Obtained.

Provenance and peer review Not commissioned; externally peer reviewed.

REFERENCES

- 1 Gartner AH, Mark T, Somerlott RG, *et al*. Differential diagnosis of internal and external cervical resorption. *J Endod* 1976;2:329–34.
- 2 Alhadainy HA. Root perforations. A review of literature. *Oral Surg Oral Med Oral Pathol* 1994;78:368–74.
- 3 Patel S, Dawood A, Wilson R, *et al*. The detection and management of root resorption lesions using intraoral radiography and cone beam computed tomography—an in vivo investigation. *Int Endod J* 2009;42:831–8.
- 4 Fuss Z, Trope M. Root perforations: classification and treatment choices based on prognostic factors. *Endod Dent Traumatol* 1996;12:255–64.
- 5 Bystrom A, Claesson R, Sundqvist G. The antibacterial effect of camphorated paramonochlorophenol, camphorated phenol and calcium hydroxide in the treatment of infected root canals. *Endod Dent Traumatol* 1985;1:170–5.
- 6 Sjogren U, Figdor D, Spangberg L, *et al*. The antimicrobial effect of calcium hydroxide as a short-term intracanal dressing. *Int Endod J* 1991;24:119–25.
- 7 Altundasar E, Demir B. Management of a perforating internal resorptive defect with mineral trioxide aggregate: a case report. *J Endod* 2009;35:1441–4.
- 8 Hsien H-C, Cheng Y-A, Lee Y-L, *et al*. Repair of perforating internal resorption with mineral trioxide aggregate: a case report. *J Endod* 2003;29:538–9.
- 9 Jacobowitz M, de Lima RK. Treatment of inflammatory internal root resorption with mineral trioxide aggregate: a case report. *Int Endod J* 2008;41:905–12.
- 10 Yildirim G, Dalci K. Treatment of lateral root perforation with mineral trioxide aggregate: a case report. *Oral Surg Oral Med Oral Pathol Oral Radiol Endod* 2006;102:e55–8.

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