

International Journal of Research in Health and Allied Sciences

Journal home page: www.ijrhas.com

Official Publication of "Society for Scientific Research and Studies" [Regd.]

ISSN: 2455-7803

Original Article

Management of internal and external resorption

Dr. Nissy Sagar

Bachelors in Dental Surgery, Maharashtra, India(PGD HCA, Ontario, Canada)

ABSTRACT:

Tooth resorption can result in tooth loss. The etiology, pathophysiology, and therapy of the various kinds of tooth resorption vary. Confusion among educators, researchers, authors, clinicians, and students is caused by the fact that the same forms of resorption are classified and described using a variety of terminology. It may also cause misunderstandings that ultimately jeopardise the patient's care. The response of the dentoalveolar apparatus to infection is characterized by inflammation which may result in tooth resorption. Depending upon the type of resorption and etiology, different treatment regimens are used.

Key words: Resorption, Internal, external

Received: 25 January, 2022

Accepted: 27 February, 2022

Corresponding Author: Dr. Nissy Sagar, Bachelors in Dental Surgery, Maharashtra, India(PGD HCA, Ontario, Canada)

This article may be cited as: Sagar N. Management of internal and external resorption. Int J Res Health Allied Sci 2023; 9(2):95-98.

INTRODUCTION

Resorption is described as a physiological or pathological process that causes a tissue to lose material. When a tooth resorbs, dentin and/or cementum are lost as a result of the process. In addition to the loss of the periodontal ligament (PDL), some kinds of tooth resorption are also accompanied by the resorption of the nearby bone.¹ In the past, the earliest literary descriptions of tooth resorption evidence appeared at the start of the 20th century.² Miller first described what is now known as external cervical (invasive) resorption in his work from 1901. Miller hypothesised that this resorption was caused by an infection in the root canal system, but this hypothesis has not been verified. Based on clinical, radiological, and histologic observations in teeth following trauma, Andreasen and Hjrting-Hansen were the first to describe pathological tooth resorption in 1966.^{3, 4} In addition to a fourth response without resorption, they reported three separate pathological reactions of the tooth, PDL, and bone following trauma. Inflammatory resorption, replacement resorption, surface resorption, and healing without resorption were the names given to these reactions. On radiographs, replacement and inflammatory resorption were seen.³ Later, surface resorption was discovered histologically during a histological assessment of

avulsed teeth but not radiographically.⁴ Later, Andreasen introduced two further forms of pathologic resorption: the first in 1975 and the second in 1986. Transient replacement resorption and transient apical breakdown were the terms used to describe them.^{5, 6} In the latter, as the root goes through a remodelling process, both bone and tooth material are resorbed. It is no longer seen as a pathogenic process but rather as a sometimes-occurring component of a repair process.

CLASSIFICATION

Resorption is of various types. Physiologic resorption is associated with deciduous dentition resulting in their exfoliation, paving the pathway for the eruption of their succedaneous teeth. Unlike the deciduous teeth, the permanent teeth rarely undergo resorption unless stimulated by a pathological process. Pathologic resorption occurs following traumatic injuries, orthodontic tooth movement, or chronic infections of the pulp or periodontal structures. If the process is left untreated, it will result in the premature loss of the affected teeth. Internal resorption is noticed in the inner walls of root canal while external resorption is noticed on the root surface or cervical area. External root resorption exists concurrently with resorption of the alveolar bone and the resorptive process presents in a similar manner to that of bone.⁷

INTERNAL RESORPTION AND ITS MANAGEMENT

Internal resorption was first reported by Bell in 1830. Pink tooth of Mummery (1920), so called due to the presence of a pink discoloration on the crown, is named after the anatomist Mummery. Internal resorption can be categorized by the type/cause of resorption as inflammatory, transient, progressive, and replacement. Inflammatory resorption is more likely to commence following damage to the predentin subsequent to a bacterial infection or trauma. A transient internal resorption is another form of trauma induced non-infective, self-limiting root resorption and this will generally follow a luxation injury. Progressive type of internal resorption is stimulated by constant inflammation following infection. Root canal replacement/metaplastic resorption involves subsequent deposition of mineralised tissue resembling bone or cementum, but not dentin.⁷⁻¹⁰

The decision-making must take in to consideration several criteria: patient's age, tooth location, shape of the clinical crown, occlusion, resorption location, resorption wideness, presence or not of root perforations and their wideness, resistance/weakness of the remaining root hard tissue, periodontal status and ability to realize a restorative treatment on the concerned tooth.⁸⁻¹⁰

From the information collected by clinical examination and CBCT, several options may be considered: therapeutic abstention and monitoring, in absence of infectious signs and symptoms, orthograde root canal treatment, with three options depending on the absence or presence of perforation of the radicular wall: complete root canal filling with gutta percha on nonperforated lesions; combined gutta percha in the root canal and MTA fillings for the perforation area; complete filling with a bioactive material (MTA or Biodentine) on apical perforated lesions located in a short root length, retrograde apical treatment, and extraction and replacement by implants: the nonconservative treatment is indicated if the tooth is too weakened to be treated or restored.⁸⁻¹⁰

Delayed treatment can lead to progressive internal resorption. However, it can be arrested in its initial phase if detected earlier. The prognosis of treatment depends on the extent or the size of lesion. When internal resorption is clinically detected, pulpectomy is needed to arrest the resorption. Calcium hydroxide has been known to be a potent inhibitor of inflammation. When resorption has progressed to involve an external communication, the tooth cannot be retained in most cases. In some situations, complex surgical procedures need to be considered to gain access for repair. According to Culbreath et al., several materials such as gutta-percha, zinc oxide eugenol, and amalgam alloy can be used for the treatment for internal resorption. These materials do not provide sufficient strength to the tooth structure and may also cause substantial tooth discoloration. Endodontic treatment should be attempted within 7–10 days of the injury, in teeth with

closed apices, as the revascularization cannot occur, before the necrosed pulp becomes infected. Currently mineral trioxide aggregate is being increasingly used as a root canal filling material in these perforations. In teeth with a large resorption cavity in the coronal third of the root canal, use of composite materials should be considered in order to strengthen the tooth and to make it more resistant to tooth fracture.⁸⁻¹⁰

Surgical approach is needed when it is not possible to get access to the lesion through the canal. Surgical treatment should always be performed in a second intention, after orthograde treatment (or retreatment) has been performed, the coronal part of the canal being filled. In these cases, because of the shape of the lesion, surgical approach allows to get direct access to the lesion and to perform a mechanical cleaning of the resorbed defect. The general guidelines of the endodontic surgery procedure must be respected. Following local anesthesia, a mucoperiosteal flap is raised. The cortical bone plate is removed to provide access to the root area. The soft tissue lesion is curetted and the intra-radicular dentin cavity is prepared with the aid of an operative microscope, cleaned, and dried. The filling materials (like MTA or Biodentine) are placed and smoothed on its external surface. The surgical procedure is finished with meticulous cleaning of the wound area. The flap is repositioned and sutured.¹¹

EXTERNAL RESORPTION AND ITS MANAGEMENT

External resorption is initiated in the periodontium and affects the external or lateral surfaces of a tooth. It is a common sequelae following traumatic injuries, orthodontic tooth movement, or chronic infections of the periodontal structures. It can occur as a single entity or a combination of internal and external resorptions can occur simultaneously on the same tooth and they may appear as separate or joined defects. External resorption is often confused with internal resorption. The difference between internal and external resorption is described previously. External resorption is further classified into external surface resorption, external inflammatory resorption, external replacement resorption, external cervical resorption, and transient apical breakdown.¹²

The treatment varies according to the severity of the root resorption and in relation to the involvement with the root pulp, being basically endodontic, however, it depends on the location and extent of reabsorption. In the cervical region, endodontic treatment is usually associated with surgical complementation. In all cases, there is a need for clinical and radiographic monitoring to assess the success of the proposed therapy. In addition, the treatment of external resorption that affects the cervical third of the root can be only periodontal. However, it may present the disadvantage of being more time consuming for the patient and representing risks of aesthetic compromise when the area to be treated is in the anterior region, “considered

as an aesthetic facial area". In most cases of external resorption in an extensive or difficult access area, the treatment implemented is surgical; a flap of total thickness being exposed, exposing the defect, and then removing all inflamed tissue and cleaning the area, followed by a restoration of the resorption with materials such as glass ionomer, composite resin, amalgam or Mineral Trioxide Aggregate (MTA).^{13, 14}

MTA has been shown to provide bio inductive effects, helping with periodontal healing and allowing new cement growth on its surface. The use of intracanal medication containing calcium hydroxide in its composition increases the chances of scarring. In addition to maintaining high pH, it has antimicrobial activity and inhibitory action of inflammatory root resorption. External cervical resorption cases may be asymptomatic because the pulp tissue remains protected due to the surrounding dentin and pre-dentin layer. However, with the evolution of the lesion, communication with the root canal may occur and symptoms associated with irreversible pulpitis arise. When the lesion is clinically visible, it presents with a pinkish coloration in the cervical portion of the tooth, due to the presence of granulation tissue, which is highly vascularized. In the differential diagnosis of external cervical resorption, these cases usually respond positively to the thermal sensitivity test. Regarding the treatment of cervical inflammatory resorptions, the exposure of the lesion, removal of granulomatous tissue and restoration of the resorbed area is recommended. Endodontic treatment as a function of the amount of dentin that separates the floor of the pulp chamber from the area reabsorbed by the root canal may or may not be necessary. In the treatment of external cervical resorption there is no biological need to remove the pulp and perform the endodontic treatment; this is only justifiable in cases where the reabsorption may be very deep and extensive, being very close to the pulp and difficult to protect.¹⁵⁻¹⁷

Endodontic treatment is often necessary in advanced resorption situations, with contamination of the pulp chamber or root canal. In these cases, endodontic treatment is essential, not only because of the extent of external cervical resorption, but also because of the risk of intracanal bacterial contamination through resorption. In other cases resorption may occur only with surgical treatment, with removal of granulation tissue followed by restoration of the root defect and periodontal intervention. The Clark radiographic technique is a method of radiographic localization consisting of two periapical radiographic shots with variation of the angle of incidence of the radius (mesial and distal), and in fact this variation is provided in the radiographic image. The internal deformity accompanies the image in all angulations and the external resorption is removed from the canal when the angulation of incidence is modified. This difference exists because the defect of the internal resorption is the result of the deformation of the dentin

walls in a space that will be occupied by the root canal, while the external resorption is separated and is frequently superficial in relation to the root surface lateral to the canal. In addition, these radiographs may reveal the side of the affected root in cases of external resorption. There were no reports of recurrence of external cervical resorption in teeth with pulp vitality, with the prognosis being favourable in such cases. Regarding external tooth resorption by substitution, the prognosis is unfavourable and will inevitably lead to loss of the affected tooth. When treatment of resorptions is periodontal, curettage of reabsorbed tissue is indicated, followed by placement of calcium hydroxide or MTA to neutralize the microbial by-products that may be affecting the area, mainly to induce neoformation and scarring.¹⁷⁻¹⁹

REFERENCES

1. American Association of Endodontists . Glossary of endodontic terms. 10th ed. Chicago: American Association of Endodontists; 2020. Available from: <https://www.aae.org/specialty/clinical-resources/glossary-endodontic-terms/> Accessed 14 Sep 2021.
2. Miller WD. A study of some dental anomalies with reference to eburnitis. *Dent Cosmos*. 1901;43:845–56.
3. Andreasen JO, Hjorting-Hansen E. Replantation of teeth. I. Radiographic and clinical study of 110 human teeth replanted after accidental loss. *Acta Odontol Scand*. 1966;24:263–86.
4. Andreasen JO, Hjorting-Hansen E. Replantation of teeth. II. Histological study of 22 replanted anterior teeth in humans. *Acta Odontol Scand*. 1966;24:287–306.
5. Andreasen JO. Periodontal healing after replantation of traumatically avulsed human teeth: assessment by mobility testing and radiography. *Acta Odontol Scand*. 1975;33:325–35.
6. Andreasen FM. Transient apical breakdown and its relation to color and sensibility changes after luxation injuries to teeth. *Endod Dent Traumatol*. 1986;2:9–19.
7. Allen AL, Gutmann JL. Internal root resorption after vital root resection. *Journal of Endodontics*. 1977;3(11):438–440
8. Trope M, Chivian N. Root resorption. In: Cohen ST, Burns R, editors. *Pathways of the Pulp*. 6th edition. St. Louis, Mo, USA: C.V. Mosby; 1994. pp. 486–512.
9. Heithersay GS. Clinical endodontic and surgical management of tooth and associated bone resorption. *International Endodontic Journal*. 1985;18(2):72–92
10. Culbreath TE, Davis GM, West NM, Jackson A. Treating internal resorption using a syringeable composite resin. *Journal of the American Dental Association*. 2000;131(4):493–495
11. Nilsson E, Bonte E, Bayet F, Lasfargues JJ. Management of internal root resorption on permanent teeth. *Int J Dent*. 2013;2013:929486.
12. Fernandes M, de Ataíde I, Wagle R. Tooth resorption part II - external resorption: Case series. *J Conserv Dent*. 2013;16(2):180-185.
13. Baranwal AK. Management of external invasive cervical resorption of tooth with Biodentine: A case report. *J Conserv Dent*. 2012;19(3):296299.
14. Lima TF, Gamba TO, Zaia AA, Soares AJ. Evaluation of cone beam computed tomography and periapical

- radiography in the diagnosis of root resorption. Aust Dent J. 2016;61(4):425–431.
15. Hiremath H, Yakub SS, Metgud S, et al. Invasive cervical resorption: a case report. J Endod. 2007;33(8):999–1003.
16. Tessare P, Fonseca, B, Britto, M. Propriedades, características e aplicações clínicas do agregado trióxido mineral - mta. Uma nova perspectiva em endodontia. Revisão de literatura. Electronic J Endodontics Rosario. 2005;1(4):1–15.
17. Kqiku L, Ebeleseder K A, Glockner K. Treatment of invasive cervical resorption with sandwich technique using mineral trioxide aggregate: a case report. Oper Dent. 2012;37(1):98–106.
18. Maja BS, Rytta L, Matylda T, et al. Perforating internal rootresorption repaired with mineral trioxide aggregate caused complete resolution of odontogenicsinus mucositis: a case report. J Endod. 2015;41(2):274–278.
19. Smidt A, Nuni E, Keinan D. Invasive Cervical Root Resorption: Treatment Rationale with an Interdisciplinary Approach. J Endod. 2007;33(11):1383–1387.