

Root resorption

Assis. Prof. Dr Firas Albaaj

Root resorption presents a challenge to dentists because of its often undetected or asymptomatic activity. Diagnosis typically results from an incidental radiographic finding. Treatment of some types of resorptions can be fraught with frustration and failure.

In its glossary, the American Association of Endodontists defined root resorption as a condition associated with a physiologic or pathologic process that causes loss of cementum or dentin from a tooth root. Based on the site of origin, root resorption may be called internal or external. We can classified types of root resorption according to location, etiology, and resulting effects.

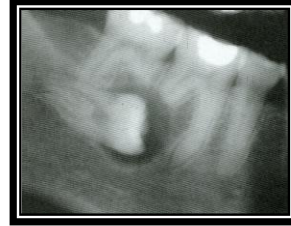
Classification	Type	Classification	Type
External Resorption	<u>A- Transient</u> 1- Surface 2- Pressure	Internal Resorption	* Pathologic # Inflammatory a-No perforation b- Supraosseous perforation c-Intraosseous perforation
	<u>B- Pathologic</u> 1-Replacement 2-Inflammatory 3-Extracanal invasive 4-Iatrogenic		

Transient resorption:

Transient surface (external) resorption, the least destructive type, is a self-limiting process that probably results from trauma affecting a small area periodontal ligament. Because of its confined nature, this type is not usually evident in a radiograph. Histologically, a periodontal ligament of normal thickness covers an area of irregular surface cementum. Responses to pulp vitality testing usually are normal. Because this resorptive process is self-limiting no treatment is necessary.

Pressure resorption:

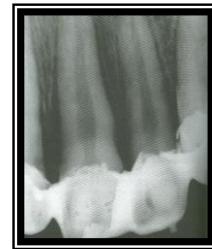
Another transient external type is pressure resorption which ceases when the source of pressure on the root surface is removed. The most common cases of such pressure are orthodontic tooth movement, tooth eruption, bone lesions, impacted teeth, and occlusal trauma.



Radiographically a blunted apical appearance with a normal periodontal ligament space may be noted in cases caused by orthodontic tooth movement. Root canal therapy is necessary when the resorption has caused pulpal pathosis or when crown root ratio has been compromised.

Replacement resorption:

Replacement resorption (ankylosis) is a pathologic external type that often follows luxation or (partial) tooth avulsion. In these cases, the periodontal ligament is partially torn or destroyed. A metaplastic process in the periodontal ligament causes cementoblasts to become cementoclasts, as a result of trauma to the ligament. As cementum or dentin is destroyed, it is replaced simultaneously by bone in direct apposition. An absent periodontal ligament is a typical radiographic finding at resorptive site. The defect margins are irregular. If resorption occurs during eruption, the involved tooth often appears shorter than adjacent teeth. With tooth avulsion, there is no physiologic tooth mobility. Despite attempted treatment, such as calcium hydroxide placed the canal(s), this type of resorption usually progresses until there is little or no root left, and tooth extraction is necessary.



the
in

Inflammatory resorption:

Inflammatory root resorption probably is the most common external type because of endodontic or periodontal infection. Pulp necrosis characterizes endodontic inflammatory resorption. The classic radiographic presentation is radiolucency adjacent to the region of root resorption, often at the root apex, or along the root at the origin of inflammation or infection (e.g. the lateral canal or periodontal disease). The defect outline may be smooth or



ragged. Endodontic or periodontal therapy to eliminate resorption-causing bacteria and inflammation usually arrests the process and allows periradicular osseous repair.

Extra canal invasive resorption:

Cervical resorption (also called extra canal invasive resorption) is a peculiar, lesser-known external type, which can start in the periodontal ligament as a result of injury from trauma, periodontal inflammation, or orthodontic treatment. A combination of osteoid and loosely organized vascular tissue replaces the resorbed root area. Progress usually is inward and lateral but leaves the canal intact as the process surrounds it. The process often appears to be superimposed on the canal, but scrutiny reveals that canal integrity is maintained.

The resorbed area may be excavated and restored if the pulp is not exposed. Otherwise, root canal therapy is required in conjunction with restoration. Extra canal invasive resorption usually occurs cervically, so gingival flap reflection may be necessary to expose the resorptive defect for excavation and restoration. The patient should be advised that a periodontal defect could result. Root extrusion is an alternative treatment to expose the resorptive lesion. A favorable crown root ratio must be maintained for this form of treatment. Clinical experience has shown that this type of resorption has a high risk of recurrence, even after extensive repair. This may be because the process begins in the periodontal ligament, and cells in adjacent positions may undergo metaplasia to become resorptive. The patient should always be advised of this.



Iatrogenic resorption:

Internal bleaching can cause iatrogenic external resorption. Many authors described a process in which bleaching solutions like 30 percent hydrogen peroxide leached through cervical dentinal tubules, then irritated gingival or periodontal tissues.

The result can be replacement (in subosseous cases) or inflammatory resorption (in supraosseous cases), which can be prevented by an excellent sealing base (polycarboxylate cement) over the gutta-percha



and sealer obturation at or apical to the cemento-enamel junction before bleaching.

INTERNAL RESORPTION:

Internal resorption is not as common as external and is typically asymptomatic. Therefore, internal resorption can be destructive if left undetected by routine radiography. It is widely accepted that chronic irreversible pulpitis causes internal resorption. The internal resorption process is not fully understood, but it is theorized that trauma renders a small portion of the pulp necrotic. This probably stimulates undifferentiated cells in the pulp, which become odontoclasts. Trauma-induced circulatory changes can affect cellular metabolism. Thus, odontoclastic activity at the predentin layer and granulation-tissue formation can occur.

The classic radiographic appearance of internal resorption is bulbous, uniform enlargement of the canal space, including discontinuity of the normal canal space. This is what differentiates its appearance from extra canal invasive resorption. Different horizontal angulations on films will show the process as remaining centered on the canal space contrary to the extra canal invasion resorptive process. The tooth may respond to thermal or to electric pulp vitality testing since this entails a vital process.



Treatment of internal resorption is always root canal therapy. To arrest the process, the pulp and granulation tissue with odontoclasts must be removed. If the resorption has not perforated the root surface, the canal should be obturated permanently with gutta-percha and sealer.

Subosseous perforation extension of the internal resorption often is associated with an adjacent osseous lesion. The defect must be repaired to form a matrix of hard tissue before final obturation. Calcium hydroxide is recommended to promote formation of this type of matrix to contain a gutta-percha and sealer filling. If this regimen fails to produce a matrix, surgery may be performed in some instances to repair the defect in conjunction with final obturation. This depends on the defect's accessibility. Obviously, palatal- or lingual- surface defects in the involved tooth are more difficult to treat.



Internal resorption with supra-osseous or coronal involvement may cause the involved tooth to appear pink. If the surface is perforated, the defect usually is restored in conjunction with endodontic treatment. As in some cases of extra canal invasive resorption, a periodontal procedure or root extrusion may be required to enhance accessibility for repair.