



Cervical resorption

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Purpose

Cervical resorption is a clinical term used to describe a relatively uncommon and aggressive form of external tooth resorption which may occur in any tooth in the permanent dentition (1). Characterized by its cervical location and invasive nature, this resorptive process can lead to severe loss of tooth structure. Resorption of coronal dentin and enamel often creates a clinically obvious pinkish color in the tooth crown as highly vascular resorptive tissue becomes visible through thin residual enamel (2). Frequently, cervical resorption lesions are confused with and misdiagnosed as caries or internal resorption. As a result, inappropriate treatment is often initiated (3). The purpose of this Clinical Update is to review the etiology, diagnosis, treatment available, and referral guidelines for cervical resorption.

Etiology

Cervical resorption can occur following injury to the root surface at or just below the epithelial cervical attachment apparatus. Clastic cells colonize the damaged area and begin resorbing the tooth. The damage can be caused by physical or chemical means (4). Physical injury to non-endodontically and endodontically treated teeth typically includes all forms of tooth trauma, surgical procedures, orthodontic treatment, bruxism, and periodontal root planning and scaling. Chemical injury can occur from agents used within the root canal system, such as internal bleaching solutions. Research suggests that a combination of 30% H₂O₂ and heat can damage the cementum layer through the dentinal tubules (5).

Classification

A classification system has been developed to provide a clinical guide in the assessment of cases of invasive resorption (2).

- **Class 1**—a small invasive resorptive lesion near the cervical area with shallow penetration into dentin.
- **Class 2**—a well-defined invasive resorptive lesion that has penetrated close to the coronal pulp chamber but shows little or no extension into the radicular dentin.
- **Class 3**—a deeper invasion of dentin by resorbing tissue, not only involving the coronal dentin but also extending into the coronal third of the root.
- **Class 4**—a large, invasive resorptive process that has extended beyond the coronal third of the root.

Clinical tests

As in most cases of external resorption, cervical resorption is usually painless (6) and goes unnoticed by the patient unless pulpal or periodontal infection is present. In some cases, a deep resorptive cavity can result in sensitivity to temperature changes because of proximity to the pulp. Tests for pulpal

vitality are indicated to determine the pulpal status prior to initiating treatment. In most cases, cervical resorption is detected during routine radiographic or clinical examination, however there may also be a complete absence of clinical signs that would aid in diagnosis. If the lesion is located marginally, a pink coronal discoloration may be evident. The pink discoloration is caused by deep red, underlying granulomatous tissue showing through thin translucent enamel. This tissue bleeds freely on probing. By probing the resorption cavity walls with an explorer, hard, mineralized tissue will be felt accompanied by a sharp, scraping sound. This, and the appearance of knife-edge cavity borders are important in differentiating this resorption from root caries (3). A carious lesion presents with a yellowish or light brown color, and has a soft or leathery texture on probing with light pressure. The carious lesion may be covered by visible plaque, and cavitation may or may not be present (7). If the cervical resorptive lesion is more apically or proximally situated, it will not be visible, but may be detected by probing. When probing the area, copious bleeding and a spongy texture are commonly observed as the granulomatous tissue in the resorptive defect is disturbed (3).

Radiographic interpretation

To determine whether the resorption is internal or external, the radiograph is examined for continuity of the lesion with the outline of the root canal walls. If the pulp in the root canal is not involved in the resorption, it is usually possible to see the outline of the root canal though the radiolucency of the external resorptive defect. Most external resorptive lesions are asymmetrical, while internal resorptions are usually symmetrical (8). Another important radiographic aid to help distinguish these lesions is the buccal object rule. When two differently angled radiographs are made of a pair of objects, the image of the buccal object moves in the same direction the x-ray beam is cast relative to the image of the lingual object (9). Several radiographs need to be taken at different angles to distinguish internal resorption from external resorption. These radiographs will shift the image of the defect to different positions on the film, confirming its extracanal location.

Treatment

Non-surgical treatment

While the exact etiology of cervical resorption remains unknown, treatment is directed toward complete removal of the resorptive tissue. The use of a slow-speed handpiece is recommended to remove all resorptive tissue and to develop a sound dentinal margin. To prevent mechanical pulp exposure, bur contact with the pulpal wall must be avoided. The content of the defect, usually soft tissue with small hard tissue fragments, can easily be removed with spoon excavators (10). A determination must be made if endodontic treatment is necessary and the defect restored with an appropriate restorative material, like a glass-ionomer resin. Adjunctive orthodontic extrusion can also be used with

some advanced lesions. Some authors recommend the use of chemical agents to destroy the resorbing tissue by coagulation necrosis.

Surgical treatment

The surgical approach to treating cervical resorption has generally involved flap reflection, curettage, restoration of the defect with amalgam, composite resin, or glass-ionomer resin, and repositioning the flap to its original position. Periodontal reattachment cannot be expected with amalgam (11) or composite resin (12), and is unlikely with glass-ionomer resin. There is experimental evidence to suggest that reattachment may occur when ProRoot[®] MTA is used in this situation (13). A recent study showed that gray or white ProRoot[®] MTA can be useful even in the presence of human saliva (14). An alternative surgical option is to apically position the flap to the base of the resorptive defect. Should this surgical approach prove to be aesthetically unacceptable, orthodontic extrusion can be utilized to improve the gingival contour. An alternative treatment option is intentional replantation. This should be attempted only when no other treatment is feasible. When the resorptive portal of entry is within bone and not easily located, the affected tooth can be endodontically treated, extracted, the defect debrided and repaired, and the tooth replanted into its socket (6).

Treatment challenges

The problems associated with the treatment of cervical resorption relate to the total control of resorptive activity by therapeutic means and the satisfactory restoration of the defect by biologically acceptable and stable materials. Removal of the resorptive tissue during the early fibrovascular phase may not pose great clinical difficulties. However, in more advanced lesions where an interface between dentin and ectopic bone-like material has been established, it is essential that this tissue be either completely removed from its supporting blood supply or totally inactivated. The resorptive cavity and its margins must be rendered free of potentially active tissue. If all clastic cells are not removed, the chance of reoccurrence is high (15). Another significant feature of cervical resorption is the manner in which the dental pulp usually remains walled off by a thin layer of dentin and predentin until late in the process. The clinician needs to decide early if the lesion will respond to treatment without pulp removal. Where a perforation to the root canal has occurred, endodontic treatment is required (1).

Referral guidelines

The American Association of Endodontists (AAE) has designed an Endodontic Case Difficulty Assessment Form that may be used by general dentists when deciding whether to refer endodontic treatment. The conditions listed in the form are potential risk factors that may complicate treatment and adversely affect the outcome (16). Teeth with cervical resorption fall into the high difficulty category and achieving a predictable outcome will be challenging for even experienced practitioners. Referral to an endodontist is recommended.

Summary

Cervical resorption is a relatively uncommon condition but can cause great concern for patients affected by this

pathological process. This Clinical Update presents information necessary to aid practitioners in the proper diagnoses and clinical management of teeth with cervical resorption, including referral guidelines.

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