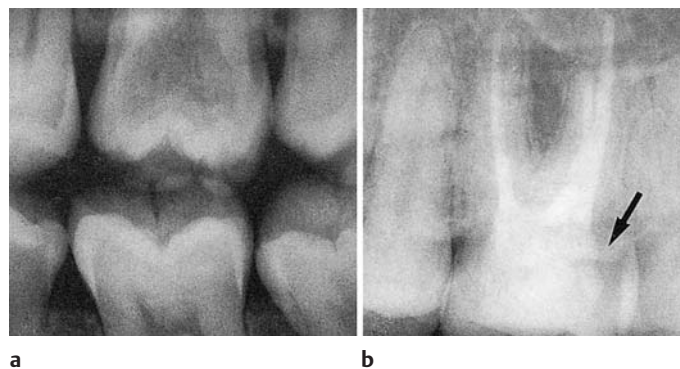
**Fig. 8.13**

- a Radiograph of a maxillary lateral incisor with cervical root resorption.** The patient presented with severe symptomatic pulpitis because of exposure and infection of the pulp through the undiagnosed resorption cavity.
- b** Pulpectomy with root canal filling is performed.
- c** The cervical resorption lacuna is exposed, cleaned, and restored with the acid-etch resin technique.
- d** Postoperative radiograph (radiolucent resin was used for cervical restoration).

**Fig. 8.14**

- a Radiograph of a maxillary first molar with a cervical resorption lacuna encompassing the greater part of the coronal dentin.**
- b** Following pulpectomy and root canal filling, the pulp chamber, including a minute distolingual opening to the periodontium (arrow), was restored with the acid-etch resin technique

External Inflammatory Root Resorption

The condition referred to as external inflammatory root resorption is a commonly occurring complication following displacement of the teeth, i.e., after luxation and avulsion injuries. The extrusion or intrusion of the tooth as well as subsequent repositioning or replantation procedures

will inevitably cause damage to the root, resulting in denuded areas on the root surface which will be chemotactic to phagocytes. Transient root resorption will then ensue.

In addition, displacement of the teeth leads to a disruption of the pulpal blood vessels at the api-

cal foramina and to ischemic pulp necrosis (see p.25). Microorganisms may then reach the root canal through enamel–dentin cracks and exposed dentinal tubules, and establish an infection, usually after a few days. The transient root resorption induced by the denuded areas of the root surface may now have exposed the tubular root dentin. Bacterial products from the infected root canal can then reach the resorptive areas on the root surface through the dentinal tubules and sustain the resorption of the root (**Fig. 8.15**).

Thus, external inflammatory root resorption is initiated by mechanical trauma, resulting in the removal of cementoblasts, precementum, and sometimes cementum in areas of the root surface. The resorptive process is then maintained by bacterial products from the infected root canal which provide the necessary continuous stimulation of the resorbing cells. *The condition can be recognized radiographically after a few weeks as periradicular radiolucent areas encompassing areas of the root and the adjacent alveolar bone* (**Fig. 8.16**). If allowed to progress, the resorptive process may destroy the tooth completely in a few months. However, by means of endodontic treatment, i.e., removal of the irritants from the root canal, the external inflammatory resorption can be arrested.

Any adequate endodontic treatment method will have an effect on the resorptive process. However, there is considerable clinical evidence that long-term treatment with calcium hydroxide provides

the most predictable results. When calcium hydroxide is placed in the root canal, it will effectively kill the bacteria and, in addition, it will influence the local environment at the resorption sites on the root surface through the dentinal tubules (**Fig. 8.17**). Because of its high pH, calcium hydroxide will neutralize the lactic acid from the osteoclasts, thus preventing a dissolution of the mineral component of the root. Moreover, an alkaline pH at the resorption site will be unfavorable for the collagenase and acid hydrolase activity of the resorbing cells, and may also stimulate alka-



Fig. 8.15 Section of the root end of a nonvital tooth. Microorganisms are seen in necrotic tissue in the root canal (to the left) and in the dentinal tubules leading to external resorption lacunae (Brown–Brenn stain).

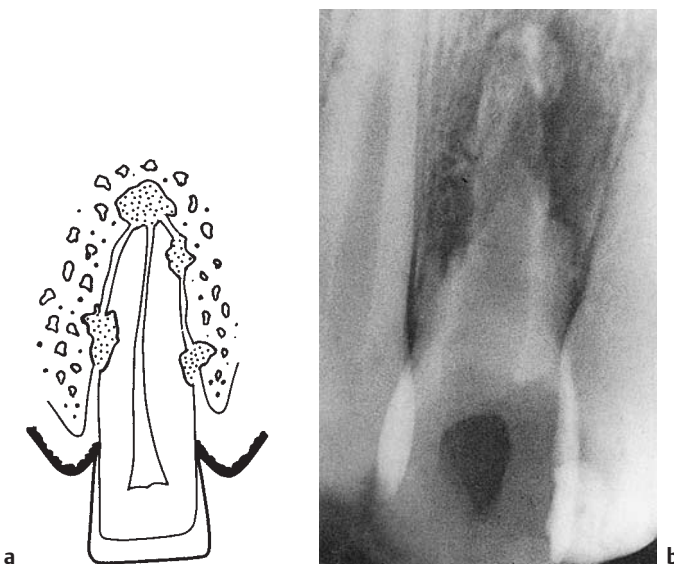


Fig. 8.16

- a** Diagram of a tooth with external inflammatory resorption. The resorption of the root is associated with resorption of the adjacent bone.
b Radiographically, radiolucent lesions are seen in the periodontium adjacent to external resorption lacunae.