APICAL PERIODONTITIS

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Periodontitis

- **Painful pulpoperiapical pathoses**
- (acute apical periodontitis)
- Inflammatory response - to pulpal irritants
- exogenous forces become hyperactive
- great increase in intraperiapical pressure
- algogenic mediators released by the injured cells

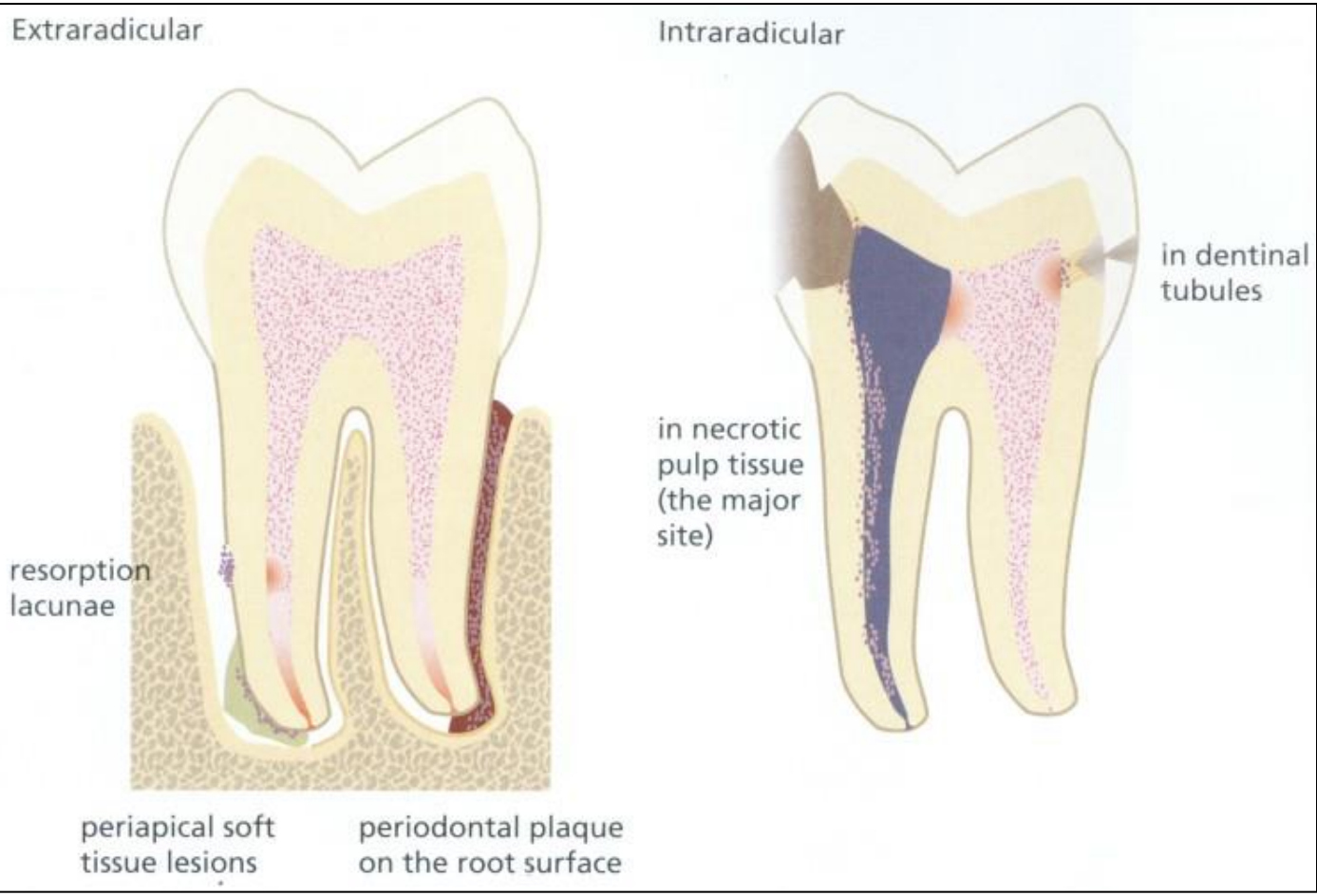
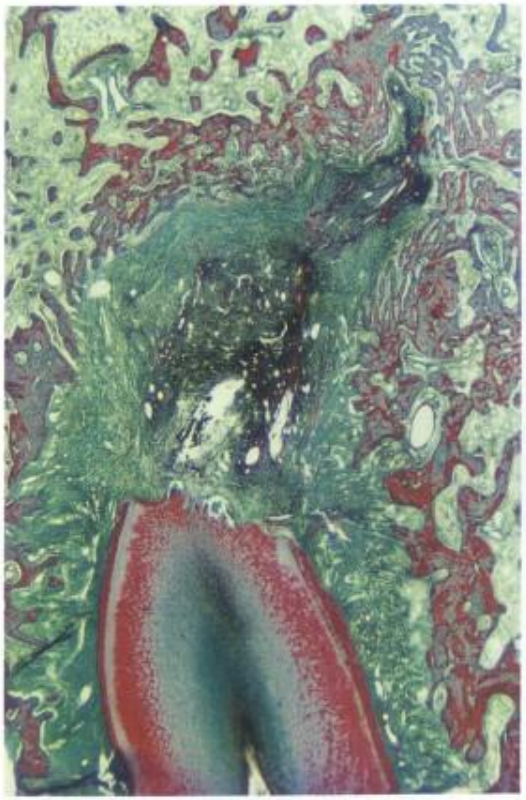
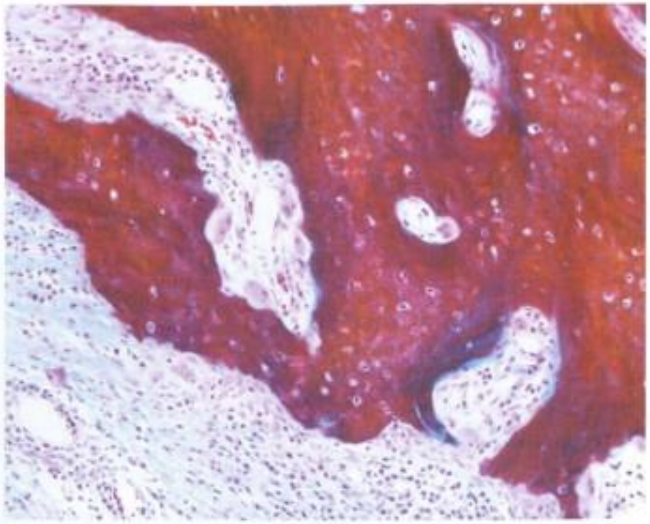


Fig. 8.3 Drawing illustrating the locations of endodontic micro-organisms. The major locations are intraradicular: in the necrotic pulp tissue, adhering to the root canal walls and in the inner part of dentinal tubules. Extraradicular micro-organisms may be present in periodontal plaque on the root surface, in resorption lacunae and in periapical soft tissue. (See Advanced concept 8.1 and the text.)

Fig. 9.1 Potential locations of endodontic lesions in the periodontium.



(a)



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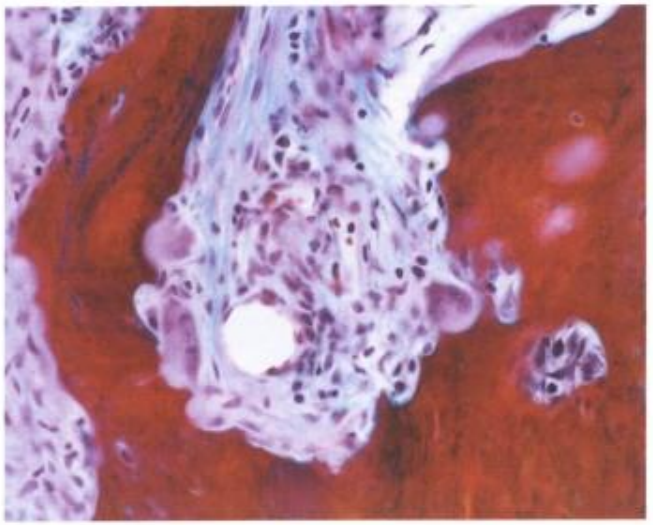


(c)

Fig. 9.6 Bone resorption is an important feature of the early inflammatory response in apical periodontitis. In the case shown in (a), bone is resorbed within a fairly large area outside the root tip where the inflammatory lesion appears to be spreading. This case also displays foreshortening of the root tip due to resorption. Osteoclastic activities are seen within a bone marrow spaces in (b) and (c) near the root tip of a tooth with progressing apical periodontitis. Microphotographs are from unpublished experimental material in non-human primates.

Acute apical periodontitis

- mild symptomatic (exudative) response
- contaminants from the pulp, vasodilatation, fluid exudation,
- white cells infiltration
- periodontal phase - abscess in the periodontal space
- enosseal phase - localized ostitis
- periosteal phase - severely symptomatic
- pain - throbbing character, radiating
- submucous phase - periosteal inflammation - relief

Acute periapical abscess

- Advanced exudative, severely symptomatic
- steadily increasing amount of inflammatory exudate, leucocytic infiltration
- suppuration
- Etiology
- infection
- injury (acute, chronic)
- chemical irritation (dressings)

Recrudescent abscess (phoenix abscess)

- previously - chronic (granulomatous lesions)
- contaminated (infected)
- decrease in immunity
- Symptoms: acute symptoms + periapical radiolucency
- Subacute periapical abscess
- chronic periapical abscess cycle
- drainage through the stoma = the sinus tract (fistula)
- parulis (gumboil) on the mucosa = swelling (gingiva, oral mucosa)

Acute periodontitis - symptoms

1. Phase (periodont)	hyperemia in the apical periodontium increase in pressure - elevates slightly the tooth nerve endings are stimulated slight pressure - mild pain
2. phase (enosseal)	as the process advances - the tooth becomes increasingly tender, lymph nodes sensitive, alteration of the patient, starts pus formation, pain more intense and steady soft vestibular tissue - painful to palpation, patient may be febrile

Acute periodontitis - symptoms

3. phase (periost)	the most intense pain - throbbing, steady radiating - pus penetrates the outer plate of the bone - raises the periosteum swelling in the apical region great mobility face asymmetry, swelling the symptoms greater in horizontal position patient - febrile
4. phase (submucous)	periosteum and mucosa - ruptured RELIEF pain subsides - but swelling fluctuation great asymmetry

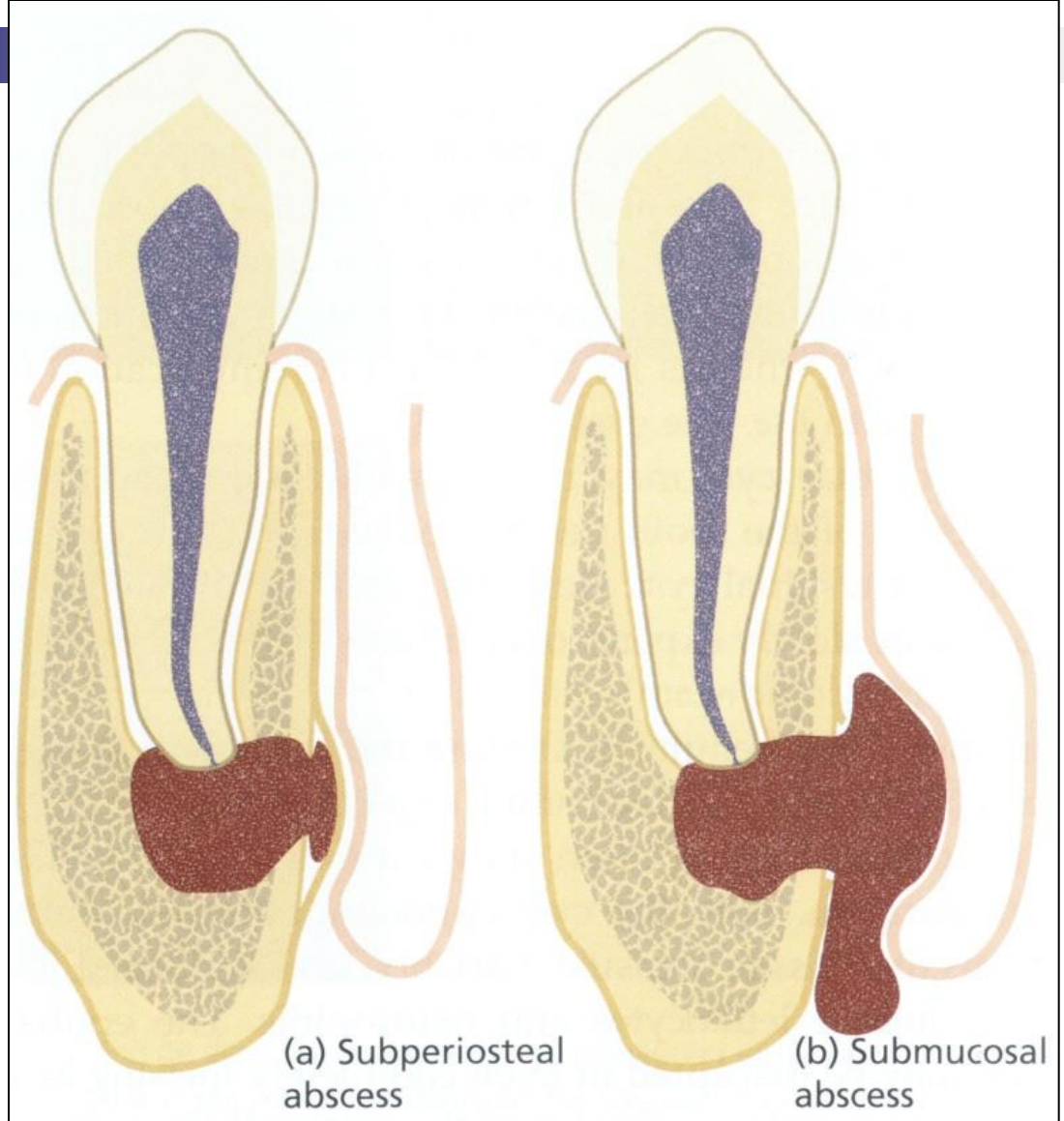


Fig. 9.13 Potential developments of a periapical abscess. In a subperiostea abscess, pus has assembled underneath the periosteum (a). In a submucosa abscess (b), pus has broken through the periosteum and accumulated in the mucosal tissue. The latter is often associated with a distinct extra-oral tissue swelling.

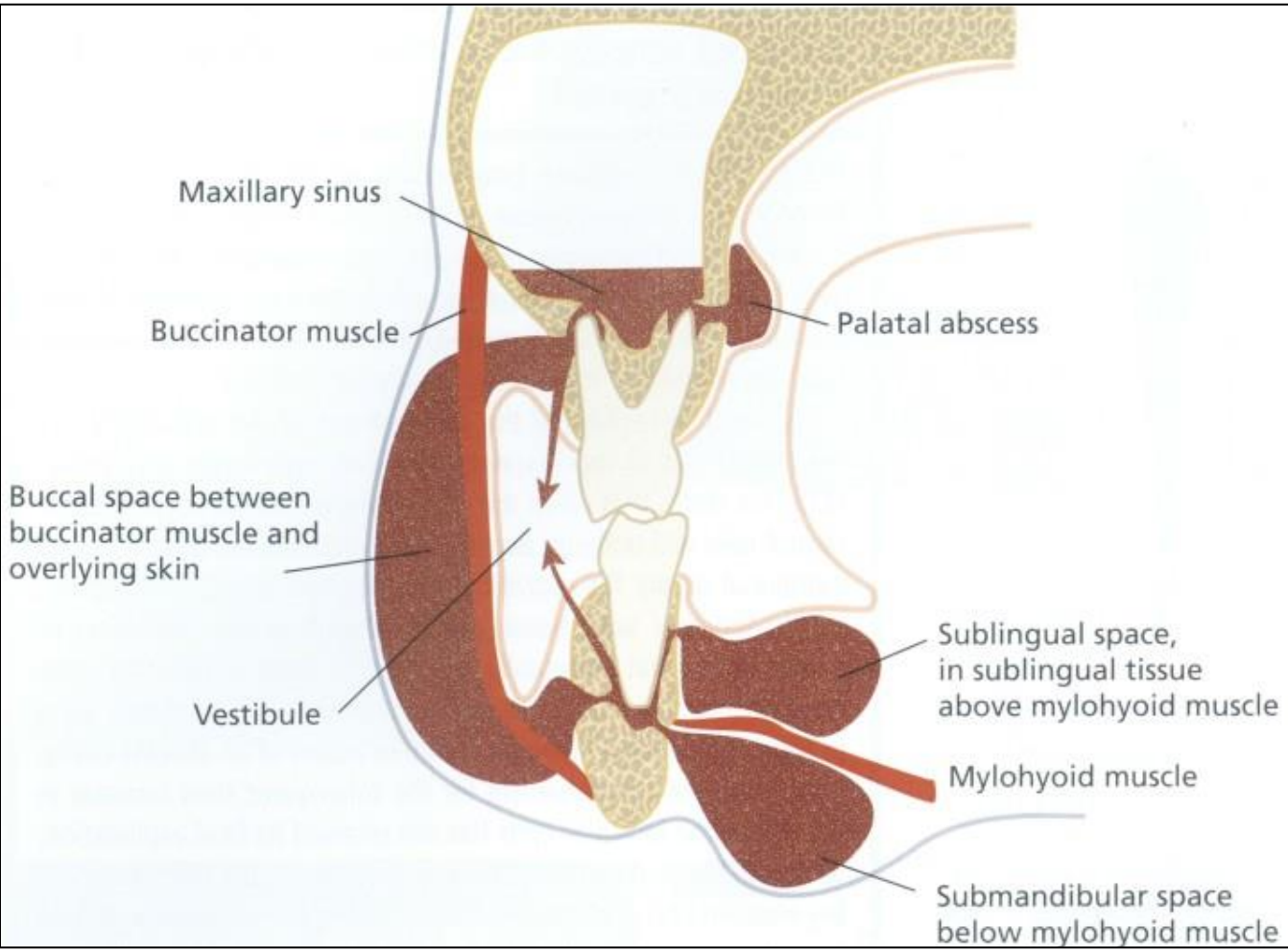


Fig. 9.12 Common pathways of a periapical abscess. The route depends on the location of the roots in relation to the surrounding anatomical structures: (1) sublingual space, in the sublingual tissue above the mylohyoid muscle; (2) submandibular space below the mylohyoid muscle; (3) palatal abscess; (4) buccal space between buccinator muscle and overlying skin; (5) maxillary sinus; (6) vestibule.

Non painful pulpoperiodontal pathoses

- inflammatory response to pulpal irritant - proliferative components
- (granulomatous)
- Pain is absent

Pulpoperiapical osteosclerosis

- (condensing osteitis, sclerosing osteitis)
- increase in the density of the periapical bone
- osteoblastic hyperactivity - bony trabeculae thicker
- in young persons - mandibular teeth
- (carious lesion, chronically inflammed pulp)
- After root canal therapy - return to normal

Incipient chronic apical periodontitis

- slightly widened apical periodontal space
- dilated blood vessels, mild inflammatory response
- -chronic inflammatory cells (plasma cells, lymphocyte)

Periapical granuloma

- more advanced form
- granulation tissue + chronic inflammatory cells
- (granulomatous tissue)
- peripheral collagenous fiber capsule

Chronic periapical abscess

- (suppurative apical periodontitis)
- formation of parulis - sinus tract
- mild painful symptoms - when stoma is blocked

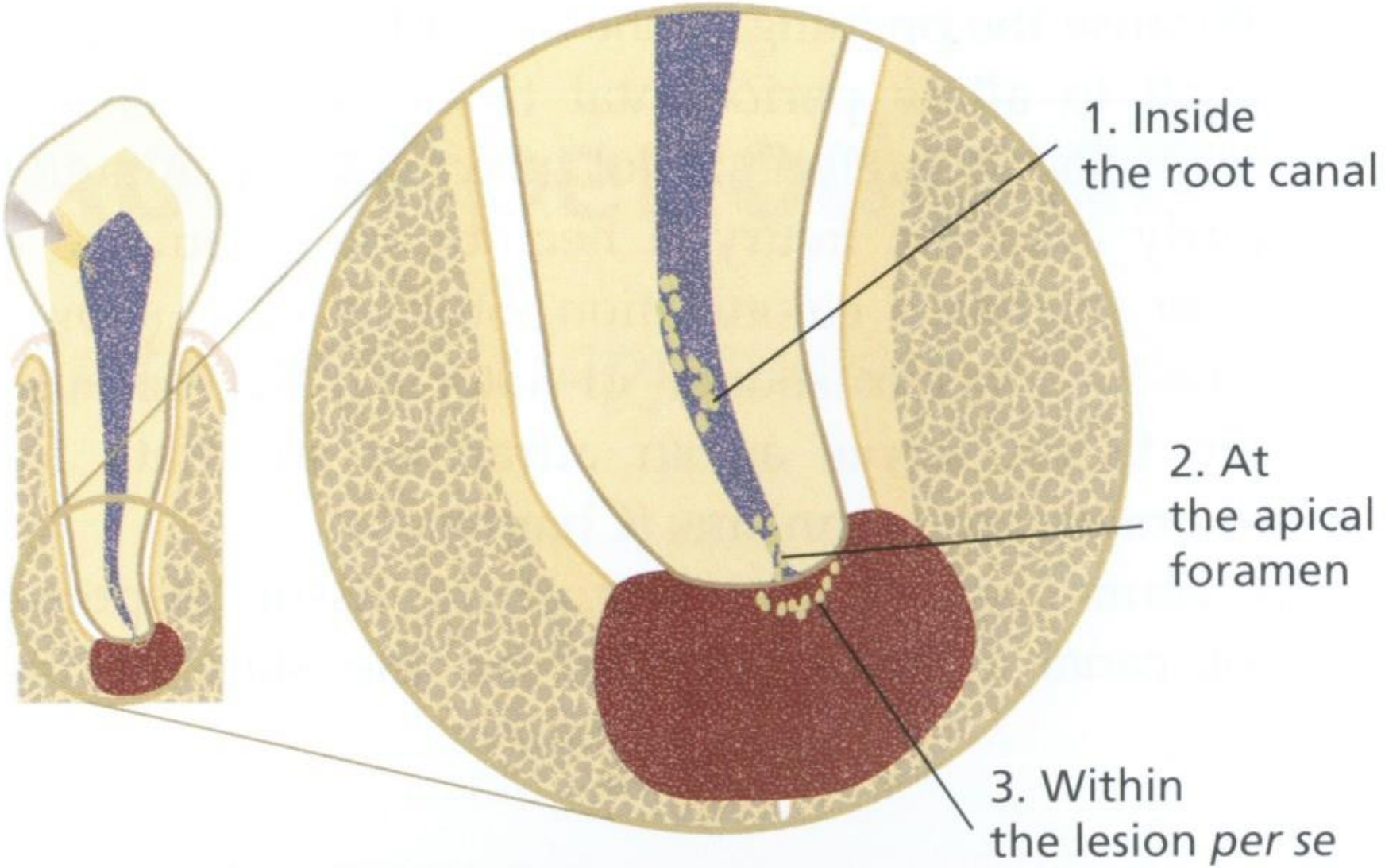


Fig. 9.3 Potential positions of the bacterial front in a necrotic pulp: (1) inside the root canal at a small distance from the apical foramen; (2) at the apical foramen; (3) within the lesion *per se*.

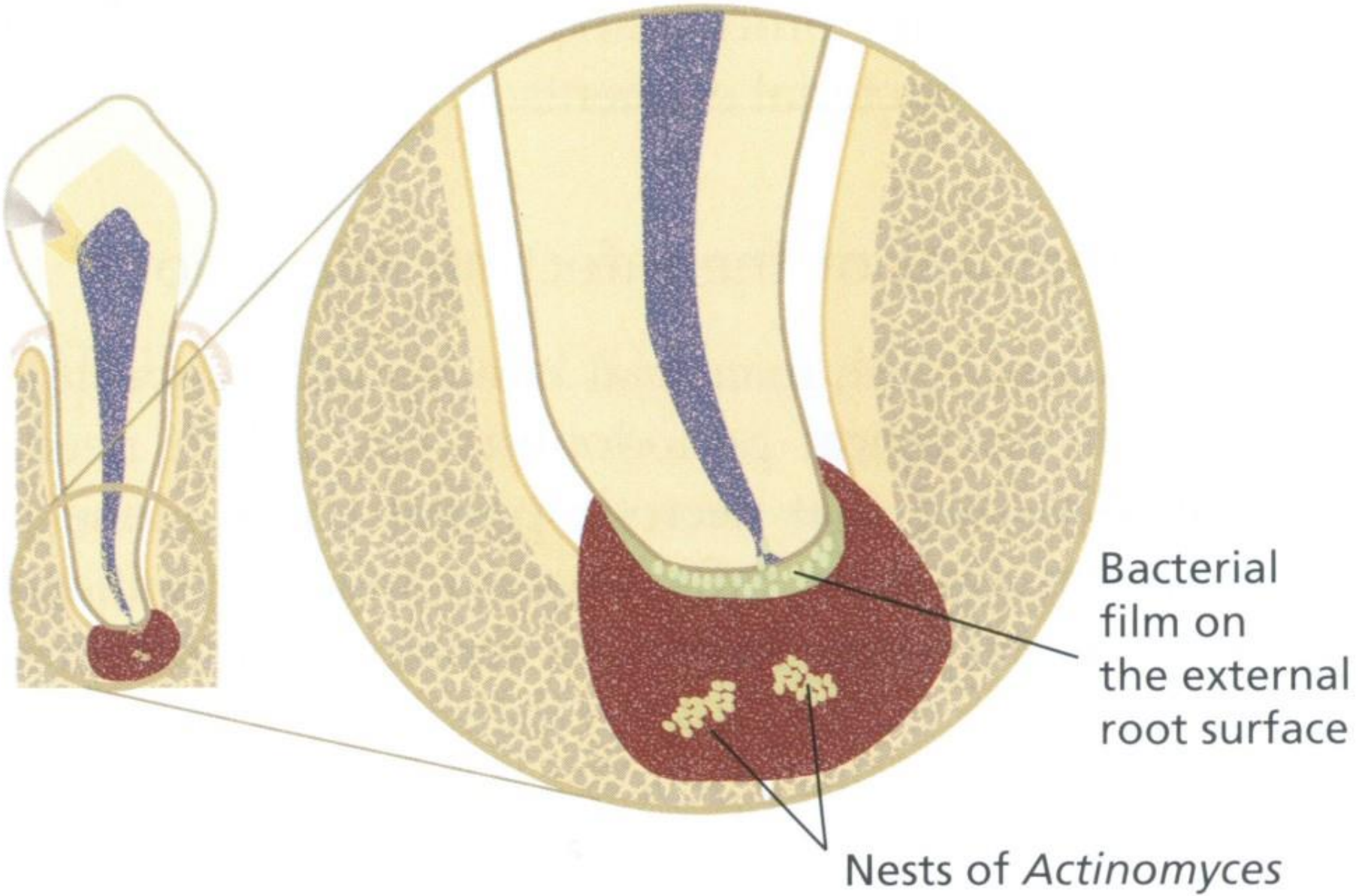
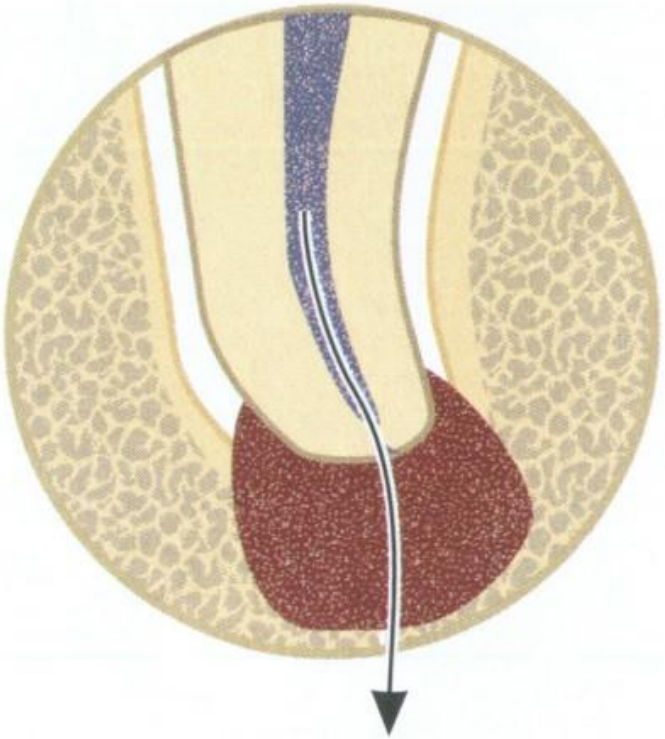


Fig. 9.4 Bacterial may occur in the lesion as either a film on the external root surface or as nests, as in this example.



- periapical abscess
- periapical granuloma
- radicular cyst
- osteomyelitis

Fig. 9.5 Overview of periapical tissue responses to root canal infection.

Periapical cyst

- chronic inflammatory response - from the chronic lesion
- -central cavity filled with fluid + crystals of cholesterol
- (cellular fatty degeneration)
- lined with epithelium (rest of Malassez)
- surrounded by granulomatous tissue
- peripheral fibrous encapsulation

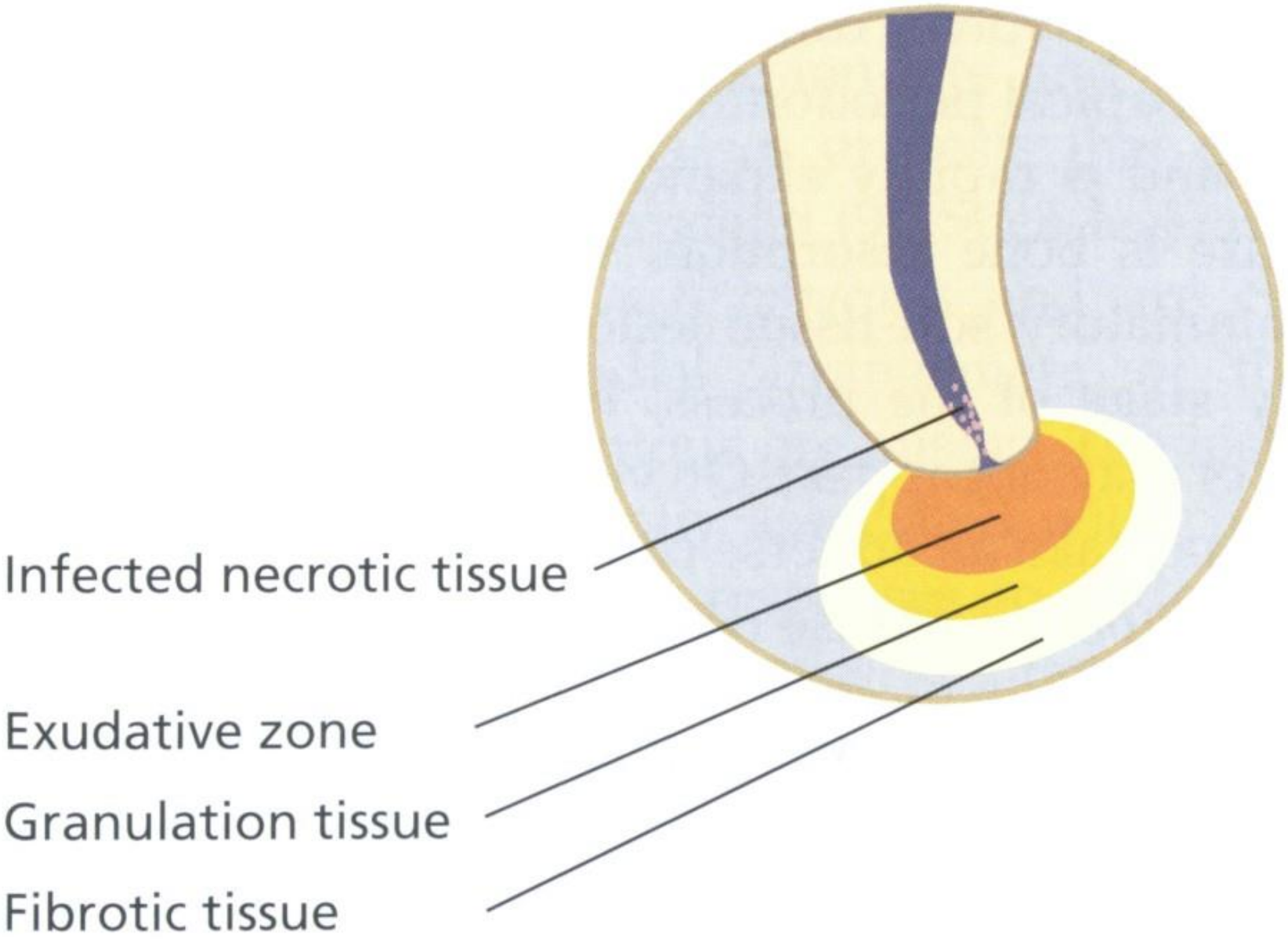


Fig. 9.7 In response to root canal infection, the tissue lesion presents different features at various distances from the root tip.

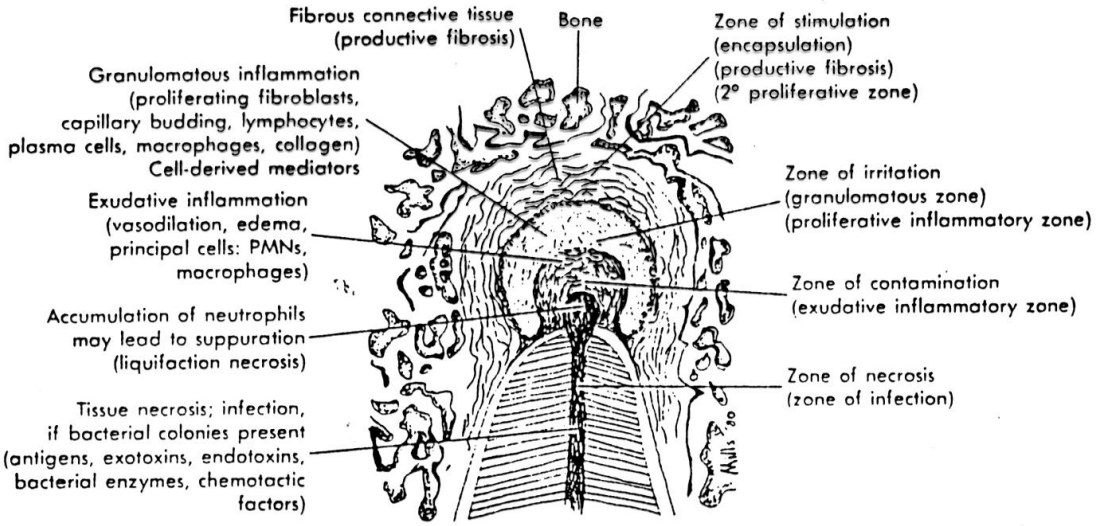


Fig. 4-8. Mesiodistal section through apex of a maxillary first premolar with a periapical granuloma (Type I pulpoperiapical lesion; see Hirsch classification, p. 171). The radiograph shows large area of bone resorption. Necrotic tissue at apical foramen *(AF)* feeds zone of contamination *(C)*, which results in an exudative (acute) response. Toxicity and leukocyte infiltration diminish as distance from the canal foramen increases *(I)*. Granulomatous tissue *(GT)* and peripheral encapsulation *(S)* are evident. *AB*, Alveolar bone.

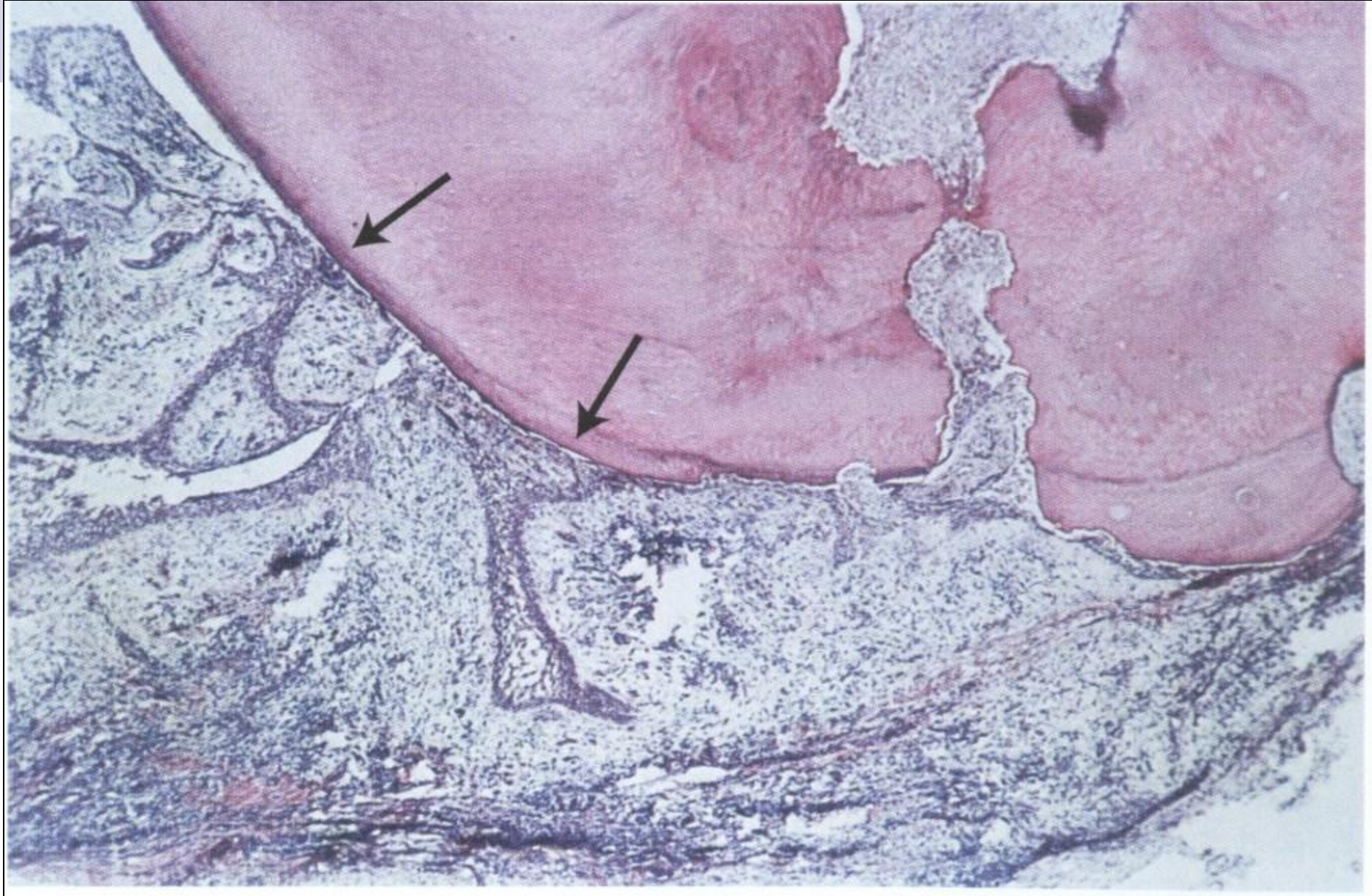
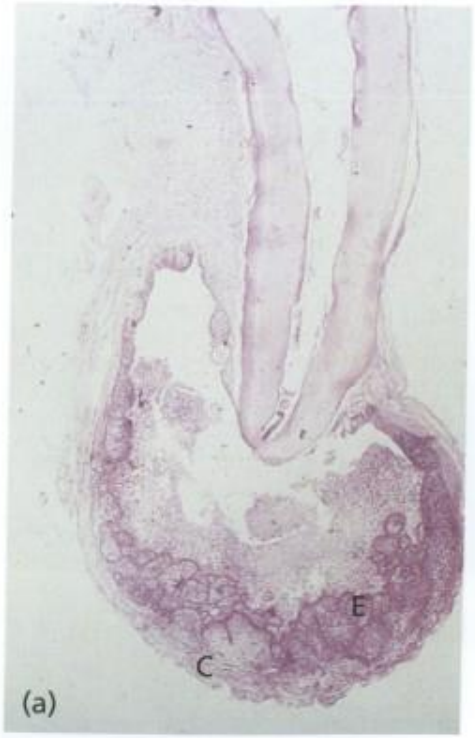


Fig. 9.8 Epithelial strands in a periapical granuloma that seem to attach to the root tip (arrows).



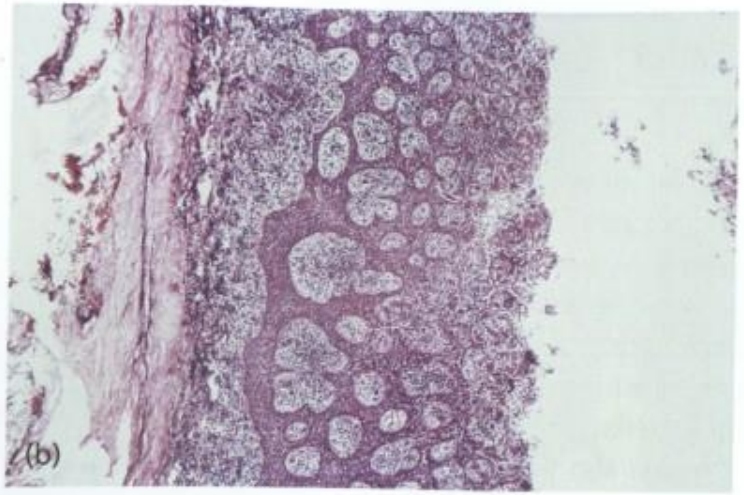


Fig. 9.9 (a) A radicular cyst attached to the apical end of an extracted root is seen. Epithelium (E) and a connective tissue capsule (C) surround the cyst lumen. (b) Proliferating cyst epithelium in a typical arcade-like configuration accompanied by intense inflammatory cell infiltrates.

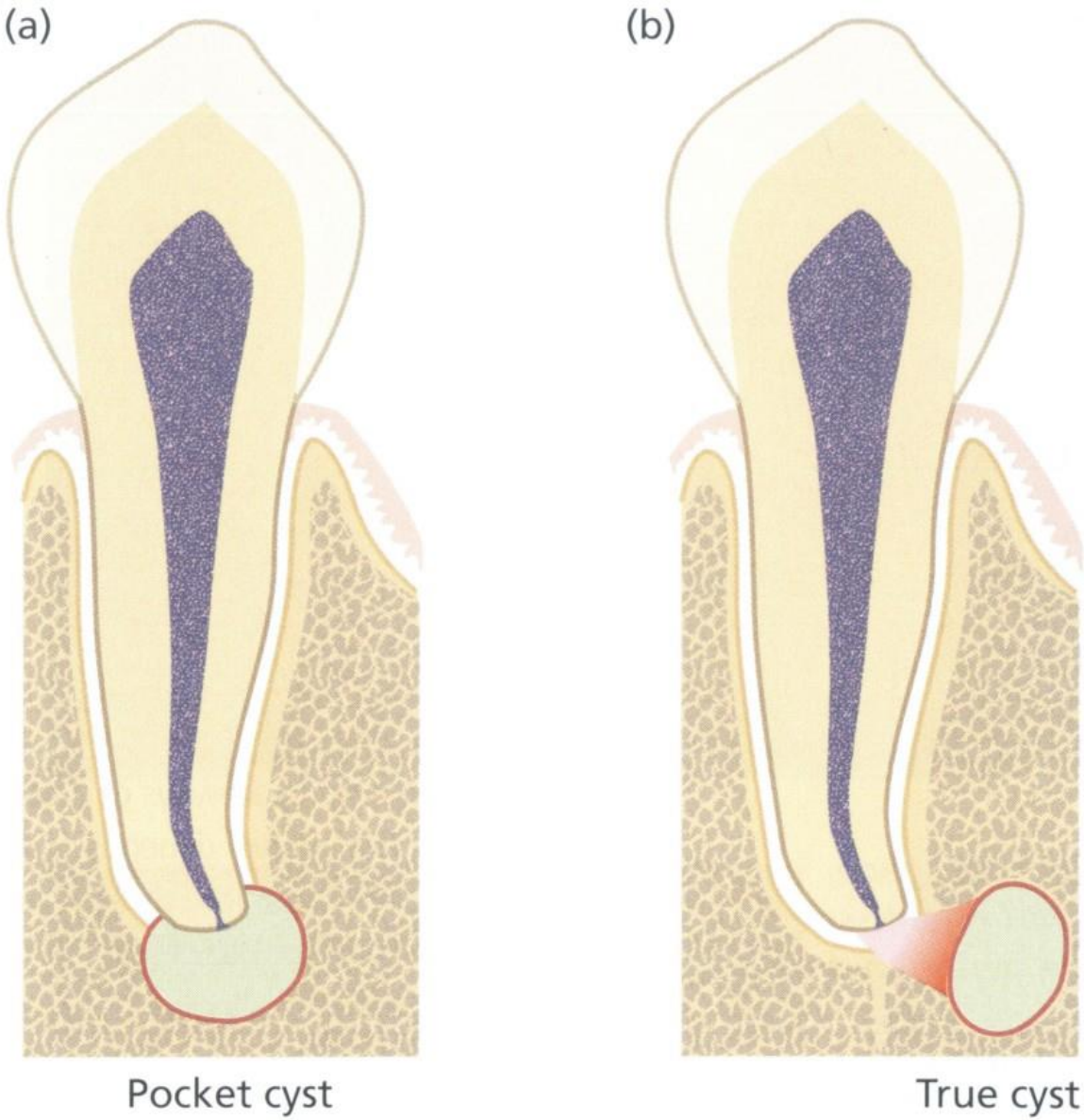
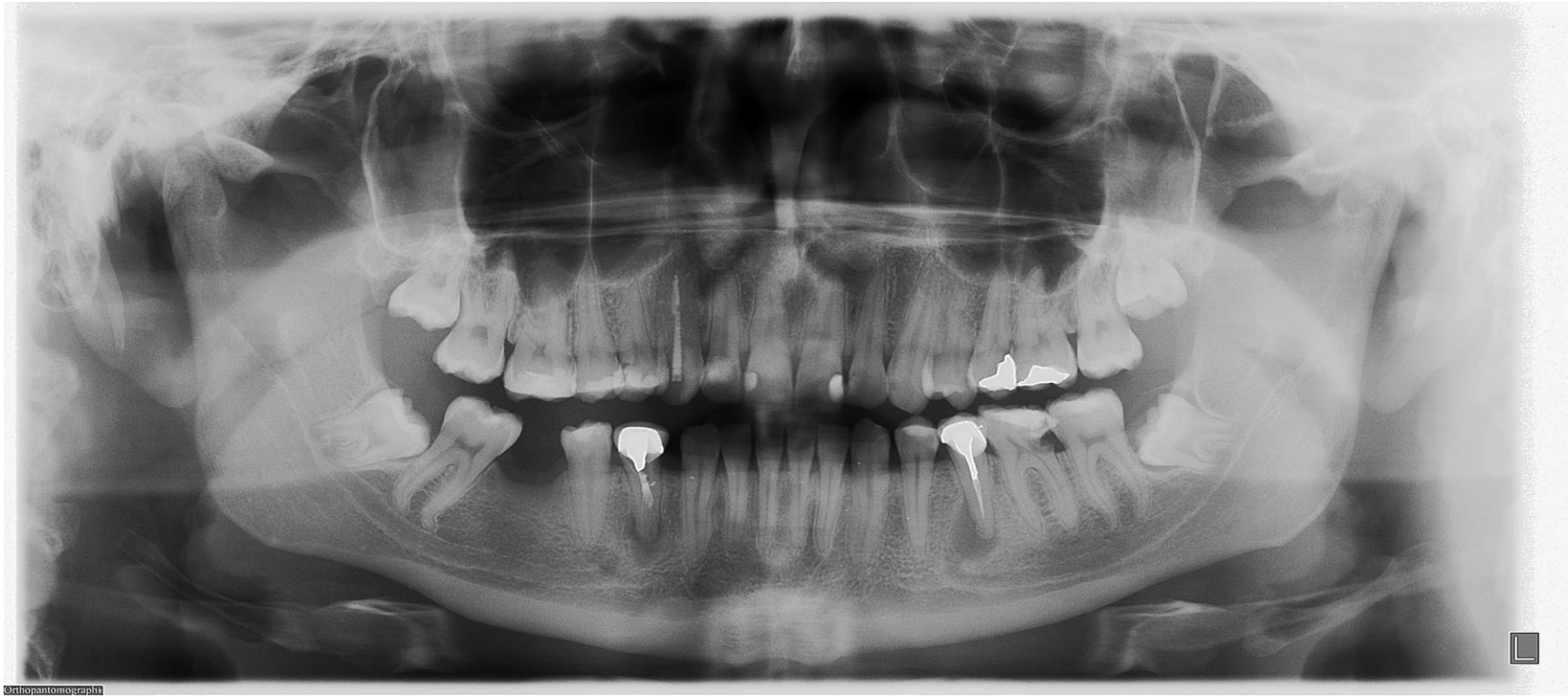
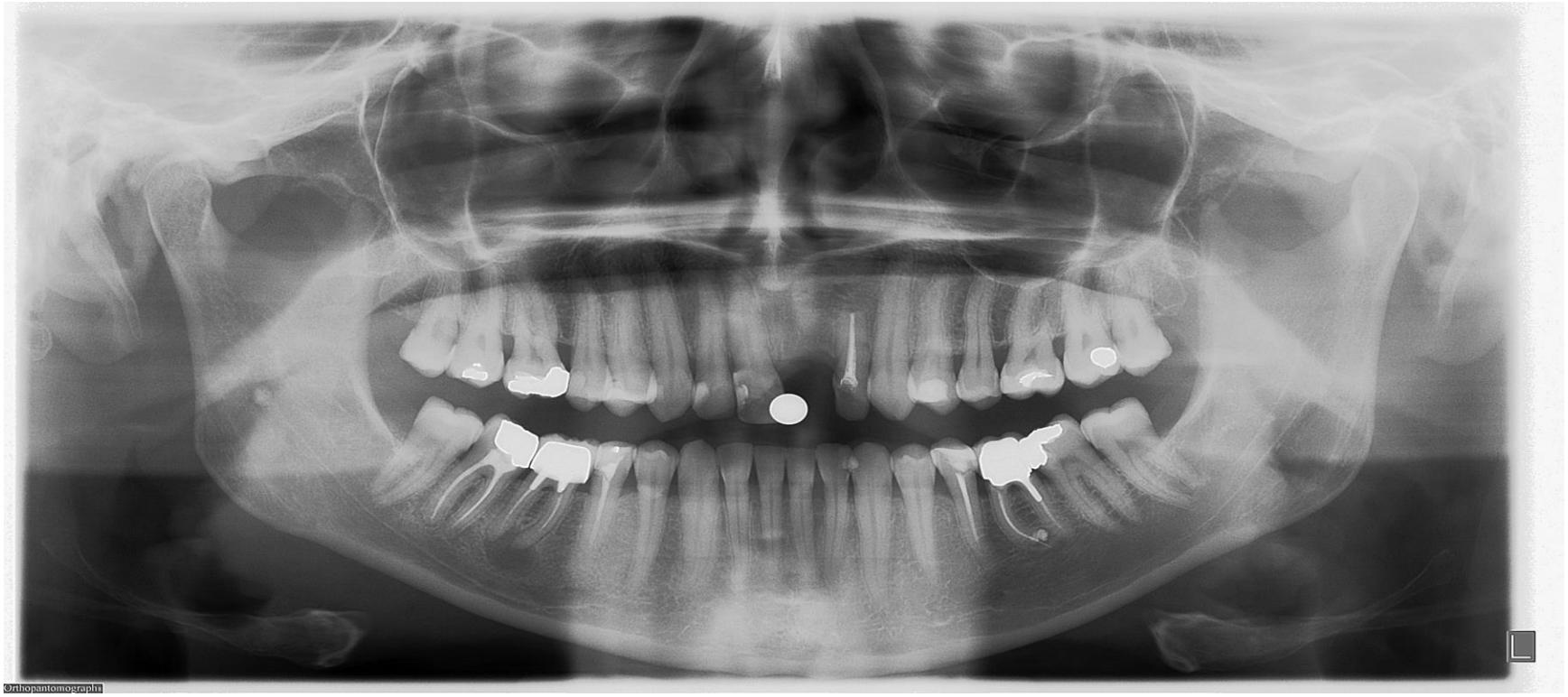


Fig. 9.11 Radicular cysts may appear in two configurations: a *pocket cyst* (a) where there is direct communication between the cyst cavity and the root canal space; and a *true cyst* (b) where no such communication exists.

X-ray examination

radiolucency
chronic diffuse area of bone rarefaction
granuloma, cyst - opaque hyperostotic
border


Orthopantomograph


Orthopantomograph

Classifications

- diffusa
- circumscripta
- granulomatosa progressive

According to Hirsch

periapical granuloma

- granulomatous tissue, endothelial cells swollen
- macrophages, cholesterol may be present
- epithelial granuloma
- the same pattern + solid strands of epithelium

radicular cyst

- without inflammation
- strong inflammation (abscess)
- cavity surrounded by epithelim, mostly stratified
- peripheral fibrous capsule

Recrudescent chronic periodontitis (phoenix abscess, periodontitis chronica acutae exacerbans)