Abstract. Hypercementosis presents as painless, single or multiple non-neoplastic cementum formation beyond the physiological limits of the tooth. It often occurs in the apical area of the involved tooth following infection, chemical or mechanical trauma. We report on radiographic and histopathological findings in a single case of late intraosseous hypercementosis and odontogenic epithelial hyperplasia associated with a minute apical tooth root remnant years after its extraction, mimicking a tumour.

The extent of cementum hyperplasia is characterized as non-neoplastic hyperplasia of the cementum, usually occurring in the apical area of the involved tooth following infection, chemical or mechanical trauma (1). Besides local conditions such as periapical inflammatory processes (2), continuous dental eruption (3-4) and functional stress due to occlusion forces (5-6), its possible association with systemic endocrine [thyroid disease, acromegaly (7)] or skeletal disorders [Paget’s disease (8-9)] has been suggested. An excessive amount of cementum leading to abnormal thickness of the apex is easily detected both radiographically and macroscopically. Typical findings are the excessive cementum formations around all or part of the root with superficial radiopaque lamina dura and the radiolucent shadow of the periodontal membrane similar to normal cementum (9). Root hypercementosis is a frequent asymptomatic lesion in adults (10).

Case Report

Patient history. A 59-year-old woman was referred to the oral surgery clinic for treatment of the second right maxillary premolar. On oral examination, an unusual, tumour suspect mucosal irregularity mesial from the first mandibular molar was apparent. On the orthopantomographic radiograph a focal irregular osseous sclerotic lesion in the area of the extracted second mandibular premolar (Figure 1A) was apparent. Because of the thin radiolucent rim between the lesion and the adjacent molar tooth root, continuity with the latter was not suggested. The lesion was asymptomatic. Besides the anamnestic information about the extraction of the second left mandibular premolar 15 years previously, the medical history was not contributory. An odontogenic tumour was suspected and incisional biopsy of the lesion was performed in order to clarify its differentiation and dignity.

Biopsy. Immediately after the biopsy, the tissue was fixed in 4% buffered formalin. The superficial soft tissue was embedded in paraffin and stained with hematoxylin-eosin and periodic acid Schiff (PAS). The other very small osseous biopsy was embedded in methyl-methacrylate, ground and stained with toluidine blue and PAS. Microscopically, the soft tissue biopsy displayed severe inflammatory infiltrated subepithelial tissues similar to periapical granuloma (Figure 1B). Furthermore, the bone biopsy presented with dense fibrosis and scattered epithelial nests (Figure 1C) that were apparent between irregular mineralized areas. The epithelial cells appeared somewhat irregular and contained hyperchromatic nuclei; therefore, an osseous lesion with epithelial proliferation of uncertain dignity was reported. A positive histochemical PAS reaction within the epithelial structures suggested focal accumulation of mucinous materials. Despite the fact that no malignant tumour was detected during further clinical radiographic work up, both the clinical finding of unexplained ulcerative mucosal lesion...
and histological finding of sclerotic lesion with scattered epithelial nests mandated a surgical removal of the lesion in order to rule out possible osteosclerotic bone metastasis of the cancer of unknown origin.

**Sampling method.** Immediately after surgery, the tissue was fixed in 4% buffered formalin. Next, the specimen was vertically cut in 2-millimetre-thick parallel sections in a mesial-distal plane by means of a water-cooled diamond band saw (Cut-Grinder, patho-service GmbH, Hamburg, Germany). Each section was analyzed both macroscopically and contact radiographically. The sections were subsequently embedded in methyl-methacrylate, ground and stained with toluidine blue and Goldner trichrome.

**Gross findings.** Macroscopically, the sclerotic area had a central yellowish colour and a whiter periphery (Figure 2A). The distal part had a concave-shaped dense appearance (Figure 2C) similar to the neighbouring molar root apex. On the contact radiographs of the lamellated specimen, this area was highly mineralized, with a delicate cotton-like pattern (Figure 2B) and a smooth surface distally (Figure 2D). Here it was clearly separated from the neighbouring bone by a thin radiolucent membrane. However, this demarcation disappeared almost completely more superficially similar to cement-osseous dysplasia.

**Histology.** Microscopically, the lesion consisted of centrally located viable mineralized cementum and osteocementum material and a narrow periodontal fibrotic rim (Figure 3A). Epithelial nests were apparent both within the cementum (Figure 3B) and the fibrous membrane (Figure 3C). Similarly, several epithelial proliferations were found within the adjacent bone structures (Figure 3D). Even though hyperchromatic epithelial nuclei displayed some minimal irregularities, the cytoplasm was clear and no other atypia were apparent. The final diagnosis included late root tooth hypercementosis and hyperplasia of the odontogenic epithelium after extraction of the second mandibular premolar. The wound healed per primam intentionem and the subsequent follow-up at 12 months was inconspicuous. Informed consent was obtained from the patient in accordance with German legal requirements.

**Discussion**

Several developmental, reactive and neoplastic sclerotic odontogenic lesions such as enamel pearls (11-12), hypercementosis (13), cemento-osseous dysplasia (14-15), dentinoblastoma or odontoma (16-17) can develop in association with the tooth root of adult patients. The presence or absence of the continuity of the lesion with the root cementum and the finding of a radiolucent periodontal rim as well as the degree of its mineralization represent the most important radiographic criteria for considering periradicular sclerotic lesions. Currently, tooth root hypercementosis is considered a common finding in endodontic daily practice. Its macroscopic aspects comprise focal, circular and club-shaped lesions. Hypercementosis does not alter the biological width between the root surface, the periodontal ligament and the alveolar bone (18).
Figure 2. A: Macroscopically, an irregular mineralized osseous lesion was apparent. Its centre appeared yellowish with somewhat whitish peripheral areas. B: A dense sclerotic lesion with a delicate cotton-like and thin dark seam as well as perilesional trabecular sclerosis was found on the specimen contact radiograph. The root of the neighbouring first mandibular molar was separated from the lesion by the thin dark periodontal seam. The superficial cortical bone discontinuity represents the site of the initial biopsy. C: The other section through the specimen showed a small fragment from the root apex in continuity with more superficial whitish coloured sclerotic bone. D: Both its shape and density were identical to the roots of the first molar on contact radiograph. At the apex of the lesion, a thin radiolucent line similar to the neighbouring tooth roots was clearly recognized. A sclerotic trabecular bone structure was apparent more superficially.

Figure 3. A: The cementum (left) consisted of excessive depositions of dense mineralized material, separated from the adjacent compact bone (right) by the thin fibrous periodontal fibrous membrane tissue. More superficially, the cementum grew confluent into the adjacent bone similar to cementosseous dysplasia. Epithelial nests were found in the highly mineralized zone of (B) cementum, within the periodontal fibrous tissue membrane (C) as well as intraosseous (D) in the vicinity of the sclerotic lesion (A-D: undecalcified preparation, embedding in methyl-methacrylate, Stain: Goldner trichrome, original magnification: A ×50, B-D ×400).
In the present case, hypercementosis was found several years after the extraction of the second mandibular second premolar. As the orthopantomographic radiographs from previous pre-extraction oral examinations before the extraction were unavailable, it can only be speculated whether the lesion developed before the tooth extraction or if it developed on the root remnant secondary to trauma caused by the extraction. Interestingly, the cementum proliferations did not appear at the apex as in typical cases but predominantly within the empty dental root space following the extraction of the remaining tooth. Furthermore, the osteocementum material was intimately bound to the bone structures superficially. Thus, the characteristic radiolucent rim disappeared and the border of lesion became irregular similar to cemento-osseous dysplasia (14-15). Interestingly, the cementum and osteocementum material was associated with multifocal proliferation of activated odontogenic epithelium, thus mimicking a neoplasm in the initial biopsy.

Conclusion

To conclude, we have presented a single case with unusual hypercementosis within the empty distal root tooth space of the second mandibular premolar, as well as the proliferation of odontogenic epithelia associated with a fragmented retained apical root remnant years after extraction of the tooth, mimicking a neoplasm. Hypercementosis should be considered in unclear cases presenting with sclerotic lesions, even in the absence of an apparent tooth or tooth remnant.

Conflict of Interests

None declared.

References


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