CHAPTER 14

ODONTOGENIC BENIGN TUMORS OF THE JAWS

I. Epithelial Odontogenic Tumors

(With no inductive change in connective tissue)

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(With inductive change in connective tissue)

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AMELOBLASTOMA

Ameloblastoma is the most prevalent of all the odontogenic tumors combined; the only exception being the odontomas. It is a locally aggressive, slow-growing, epithelial odontogenic neoplasm which arises from remnants of the dental lamina, enamel organ, and cell rests of Malassez. It can also occur from the epithelial lining of a dentigerous cyst; in which case, it is called a mural ameloblastoma. The lesion occurs in patients between the ages of 30 to 60 years, predominantly in the fourth and fifth decades. The most favored sites are the mandibular molar region, angle of mandible, and ascending ramus. The tumor is painless and remains asymptomatic as it enlarges. The patient notices a gradual jaw expansion producing facial asymmetry. The cortex is often thinned but is seldom penetrated by the growth. The recurrence rate is high after surgical treatment.

The most common radiographic image is that of multilocular cyst-like radiolucencies. The septa in the radiolucency give it a soap bubble or honeycomb appearance. Some ameloblastomas are unilocular. Some are associated with unerupted teeth (usually mandibular third molars) and, therefore, cannot be differentiated radiographically from dentigerous cysts. The teeth in the vicinity of the lesion may be tilted or moved bodily because of the generally slow growth rate of the tumor. Sometimes root resorption may appear in association with the growth of an ameloblastoma, but this is an uncommon phenomenon. An ameloblastoma infiltrates the surrounding intact bone before the destruction is visible on a radiograph. Therefore, pathologically, the lesion is much larger than its radiographic appearance. The local infiltration of surrounding bone gives the lesion its high recurrence rate, especially if treated conservatively by curettage instead of by marginal or block resection.

Fig. 14-1 Ameloblastoma showing a large monolocular lesion with adjacent small multilocular spaces having a soap bubble appearance.

Fig. 14-2 Surgical specimen of an ameloblastoma that shows a buccal cortical plate expansion and has a multilocular soap bubble appearance.

Fig. 14-3 Unilocular ameloblastoma that shows an expansion into the oral cavity.

Fig. 14-4 Multilocular ameloblastoma in the mandibular molar region.

Fig. 14-5 Ameloblastoma that resembles an odontogenic cyst (dentigerous cyst). A careful clinical and radiographic examination showed an expansion of the cortical bone.

Fig. 14-6 Ameloblastoma producing root resorption. Notice the evidence of expansion at the inferior border of the mandible. The lesion resembles a dentigerous cyst surrounding the crown of the impacted mandibular third molar.

Fig. 14-7 Ameloblastoma producing resorption of the roots of the second mandibular molar. The radiopaque object posterior to the ramus is an ear-ring.

ODONTOGENIC ADENOMATOID TUMOR (Adenoameloblastoma)

Odontogenic adenomatoid tumor, also known as adenomatoid odontogenic tumor, is a benign, encapsulated, painless, epithelial odontogenic neoplasm which grows by expansion and is usually associated with an unerupted tooth. The tumor is asymptomatic, and small lesions are discovered incidentally on radiographic examination or when failure of tooth eruption is investigated. The swelling produced by a large lesion causes asymmetry. About 65% of the cases occur in the maxilla. The canine region is the most frequently involved area in both jaws. The mean age of patients is about 18 years. Females tend to be more commonly affected than males.

The radiographic appearance is that of a well-circumscribed unilocular lesion which may be completely radiolucent or may contain faint to dense radiopaque flecks of calcification. The radiolucency resembles a dentigerous cyst but envelopes most of the tooth rather than only the crown. Sometimes the radiolucency may occur without being associated with an unerupted tooth. As the tumor enlarges, it produces separation of roots or displacement of adjacent teeth.

Fig. 14-8 Odontogenic adenomatoid tumor resembles a dentigerous cyst and is associated with an impacted maxillary anterior tooth. The radiolucency must be differentiated from a normal follicular space and from other pericoronal lesions.

Fig. 14-9 Odontogenic adenomatoid tumor associated with an impacted first premolar. The pericoronal radiolucency must be differentiated from other pericoronal lesions. A careful examination shows faint radiopaque flecks of calcification in the radiolucency.

Fig. 14-10 Odontogenic adenomatoid tumor showing multiple radiopaque foci (calcifications) pericoronal to the impacted mandibular permanent canine. The radiopaque line near the superior border of the mandible suggests that the patient had undergone sialography for an unrelated symptom.

Fig. 14-11 An occlusal projection showing an odontogenic adenomatoid tumor in the maxillary anterior region. The lesion can occur without being associated with an unerupted tooth. There is presence of a swelling in the canine region and divergence of the roots of the anterior teeth.

CALCIFYING EPITHELIAL ODONTOGENIC TUMOR (Pindborg tumor)

Calcifying epithelial odontogenic tumor, also known as Pindborg tumor, is a rare lesion which behaves very much like an ameloblastoma. Jaw expansion or incidental observation on radiographs is the usual way in which this lesion is discovered. It is found in about the same age group as an ameloblastoma, with a mean around 40 years. The tumor has a definite predilection for the mandible. Any site in the jaw may be affected but the premolar - molar areas are more susceptible. About 50% of the cases are associated with unerupted teeth. This slow-growing lesion is mainly asymptomatic but may sometimes produce a painless swelling over the involved region. It is locally aggressive, infiltrates the surrounding tissues like an ameloblastoma and is, therefore, more likely to recur after surgical treatment.

Radiographic appearance reveals a cyst-like area which may or may not be well-delineated. In half the number of cases, the appearance mimics that of a dentigerous cyst or even an ameloblastoma. Large lesions tend to be multilocular and may exhibit honeycomb appearance. As the lesion matures, the radiograph reveals an unilocular or multilocular cystic lesion with numerous scattered radiopaque flecks. Sometimes the roots of the teeth may be resorbed.

Fig. 14-12 Calcifying epithelial odontogenic tumor involving the mandibular second and third molar region. Radiographically, the lesion shows a honeycomb appearance. (Courtesy, Dr. J. Weir.)

Fig. 14-13 Calcifying epithelial odontogenic tumor (Pindborg tumor) involving an unerupted tooth. The well-delineated pericoronal radiolucency around the

mandibular third molar contains numerous scattered radiopaque flecks of calcification.

AMELOBLASTIC FIBROMA

Ameloblastic fibroma is a mixed odontogenic tumor composed of odontogenic epithelium and mesenchyme. It occurs less frequently than an ameloblastoma. Its occurrence is during the period of tooth formation, that is, between the ages of 5 and 20 years whereas ameloblastomas generally occur in the fourth or fifth decade of life. Over 90 percent of the lesions are pericoronal and may be difficult to distinguish from dentigerous cysts. Unlike an ameloblastoma, this benign, painless lesion enlarges by slow expansion, bulging the cortical plates rather than eroding them. The lesion does not infiltrate the surrounding tissues, and therefore, does not recur when surgically treated. The site of occurrence is the same as that of an ameloblastoma: the mandibular premolar-molar area.

On a radiograph, the ameloblastic fibroma cannot be distinguished from a simple ameloblastoma. It is seen as an area of uniform radiolucency that has a smooth and well-defined border. The lesion may be either unilocular or multilocular. Frequently it is associated with an unerupted tooth which is often displaced to a significant distance, and adjacent roots may be pushed apart by the tumor. Very often the lesion is pericoronal to a mandibular molar.

Fig. 14-14 Ameloblastic fibroma associated with unerupted and displaced mandibular second and third molars. The lesion is pericoronal to the teeth which are in the formative stages.

Fig. 14-15 Ameloblastic fibroma showing a multilocular appearance and associated with an unerupted displaced incisor. There is expansion of the mandible. Although most ameloblastic fibromas occur in the mandibular premolar-molar areas, other sites may sometimes be affected as seen in this case. (Courtesy, Dr. J. Weir.)

Fig. 14-16 Ameloblastic fibroma associated with the mandibular molars.

Fig. 14-17 Ameloblastic fibroma growing superiorly and distally to the crown of the unerupted third molar. The lesion should be differentiated from other pericoronal lesions.

AMELOBLASTIC ODONTOMA

Ameloblastic odontoma is a rare clinical entity. It is characterized as an ameloblastoma with induction of mature dental tissues. It is essentially an ameloblastoma in which there is focal differentiation into an odontoma. An ameloblastic odontoma may be radiographically indistinguishable from a complex odontoma. There is a tendency for the radiopaque mass to occupy a relatively smaller proportion of the radiolucency than in the case of an odontoma. The lesion may displace the associated tooth.

AMELOBLASTIC FIBRO-ODONTOMA

Ameloblastic fibro-odontoma is a separate entity from ameloblastic odontoma. Ameloblastic fibro-odontoma is a lesion that consists of an ameloblastic fibroma and an odontoma. According to the maturation theory, this lesion represents an ameloblastic fibroma which matures into an ameloblastic fibro-odontoma. Some investigators state that if an ameloblastic fibroma is left undisturbed for a long time, it would ultimately mature completely into a complex composite odontoma. Most examples have been found in children, the average age being 12 years. The mandible has a slightly higher incidence of ameloblastic fibro-odontoma than the maxilla. The most common site affected is the premolar-molar region.

Radiographically, most ameloblastic fibro-odontomas are associated with crowns of impacted teeth. The lesions are well-demarcated. They may be unilocular or multilocular radiolucencies containing multiple radiopaque foci with irregular configurations. Recurrence is essentially non-existent because the lesion enucleates with relative ease from the bony defect.

Fig. 14-18 Ameloblastic fibro-odontoma is pericoronal to the impacted maxillary third molar and involves the maxillary sinus.

Fig. 14-19 Ameloblastic fibro-odontoma located superior to the crown of an erupting mandibular permanent first molar in a 6 year old child.

Fig. 14-20 Ameloblastic fibro-odontoma associated with the crown of an unerupted molar in a 4 year old child.

ODONTOMA (Hamartoma)

1) Compound composite odontoma. It is a collection of small radiopaque masses, some or all of which may be tooth-like. The numbers vary from two to several dozen. These unerupted tooth-like masses have a tendency to occur in the anterior segments of the jaws, with a somewhat greater incidence in the maxilla. A compound odontoma is formed by an exuberant growth of the dental lamina or by proliferation of an enamel organ into a number of small enamel organs. Microscopic sections show multiple tooth-like structures complete with enamel matrix, dentin and a central pulp chamber. The toothlets are so closely packed together that they appear to be one mass. The lesion is surrounded by a radiolucent line and bounded by a radiopaque border.

2) Complex composite odontoma. It is a mass of unorganized dental tissues. The enamel, dentin, cementum and pulp are arranged in a haphazard form. The conglomerate calcified mass has no resemblance to a normal tooth. It is a self-limiting lesion that tends to occur in the posterior segments of the jaws with a somewhat greater incidence in the mandible. Depending on whether the lesion arises from a normal tooth follicle or a supernumerary tooth follicle, there might or might not be a missing tooth. On a radiograph, the radiopaque mass may be of varying densities. Often, an unerupted tooth is associated with the mass. The lesion may be surrounded by a radiolucent line and bounded by a radiopaque border.

Fig. 14-21 Compound odontoma showing small radiopaque masses preventing eruption of the central incisor.

Fig. 14-22 Compound odontoma showing small toothlets. The lesion is surrounded by a radiolucent line.

Fig. 14-23 Compound odontoma exhibiting a prominent peripheral radiolucency bordered by a radiopaque line.

Fig. 14-24 Compound odontoma consisting of small toothlets.

Fig. 14-25 Compound odontoma consisting of small toothlets.

Fig. 14-26 Complex odontoma obstructing the permanent canine from erupting. The lesion is surrounded by a radiolucent periphery. There is retention of the deciduous canine.

Fig. 14-27 Complex odontoma in the mandibular third molar and ramus region. A radiolucent line surrounds the lesion.

Fig. 14-28 Complex odontoma developed from the mandibular second molar.

Fig. 14-29 Complex odontoma developed from the maxillary third molar.

Fig. 14-30 Complex odontoma in the maxillary tuberosity and associated with the crown of the unerupted maxillary third molar.

Fig. 14-31 Complex odontoma developing from the mandibular third molar.

ODONTOGENIC MYXOMA (Odontogenic fibromyxoma, Myxofibroma)

The odontogenic myxoma originates from the mesenchymal portions of the tooth bud, probably from the dental papilla. When relatively large amounts of collagen are evident, the term "myxofibroma" may be used to designate this entity. That the tumor is odontogenic seems quite plausible, since apparently it is not found in bones outside the facial skeleton. It occurs almost exclusively in the tooth-bearing regions of the jaws and the myxomatous tissue histologically resembles the stellate reticulum found in developing teeth. The tumor is asymptomatic although some patients complain of pain. It occurs in individuals between the ages of 10 and 30 years. It has been stated that it is unusual to find it in persons younger than 10 years or older than 50 years. When it grows to a large size, it causes cortical expansion rather than perforation of the cortical bone. The swelling may be large enough to produce facial asymmetry. Some cases are associated with impacted teeth. The body and posterior portion of the mandible are the favored sites. Maxillary myxomas may perforate and invade the antrum.

On a radiograph, the lesion appears as a radiolucency containing extremely delicate septa, giving it a multilocular or honeycomb appearance similar to an ameloblastoma, a giant cell granuloma, and a fibrous dysplasia. The multilocular compartments differ from other lesions in that they tend to be angular and may be separated by straight septa that form square, rectangular, or triangular spaces. The margins of the lesion are poorly defined. The roots of adjoining teeth may be displaced. In some instances, the lesion may be unilocular particularly if it arises from the part of the follicle that persists in the pericoronal region of an unerupted tooth. Although myxomas are benign, they are locally invasive and, therefore, have a high recurrence rate following attempts at curettage. The overall prognosis for this lesion, however, is good.

Fig. 14-32 Odontogenic fibromyxoma of the left mandible showing a honeycomb expansible lesion associated with an impacted tooth.

Fig. 14-33 Odontogenic myxoma exhibiting the characteristic multilocular appearnce with straight septa forming squares, rectangles and triangles.

ODONTOGENIC FIBROMA

Central odontogenic fibroma is an infrequent lesion and, therefore, very little is known. This rare lesion is regarded as the bony counterpart to the peripheral odontogenic fibroma. It arises from the mesenchymal components of a tooth germ, either the dental follicle, dental papilla, or the periodontal ligament. The mandible may be the most common location for this tumor. This benign, painless, slow-growing, asymptomatic tumor produces cortical expansion of the jawbone. On a radiograph, the lesion exhibits either an unilocular or a multilocular radiolucency similar to that of an ameloblastoma. The lesion shows little tendency to recur after curettage.

Fig. 14-34 Odontogenic fibroma involving the premolar-molar region.

CEMENTIFYING FIBROMA (Ossifying fibroma, Cemento-ossifying fibroma)

Cementifying fibroma or ossifying fibroma is a benign fibro-osseous lesion of periodontal ligament origin. Clinically, this mesenchymal odontogenic neoplasm manifests as a painless enlargement with cortical expansion, resulting in displacement of teeth or divergence of roots. The most common sites are the tooth-bearing areas of the mandible. Most cases are seen in young to middle-aged adults.

On a radiograph, the morphology of the lesion depends on the stage of tumor development. In the first stage, the lesion is an unilocular well-circumscribed radiolucency and may be mistaken for a cyst. In the second stage, the radiolucency shows multiple small radiopaque foci of calcified masses. In the final stage, the calcified masses coalesce to form a solid radiopacity with a peripheral radiolucent rim. The teeth adjacent to the tumor are vital and may be displaced or their roots may be diverged. The prognosis is good since most cementifying fibromas respond well to enucleation or curettage.

Fig. 14-35 Cementifying fibroma (ossifying fibroma) exhibiting foci of calcified masses and producing expansion of the left maxillary sinus. A similar appearance may sometimes be seen in fibrous dysplasia.

Fig. 14-36 Cementifying fibroma (ossifying fibroma) showing calcification in the radiolucency located between the mandibular left second premolar and third molar.

Fig. 14-37 Ossifying fibroma in the radiolucent stage showing expansion of the cortical bone of the mandible.

Fig. 14-38 Ossifying fibroma exhibiting radiopaque foci of calcified material. The lesion shows buccal and lingual expansion of cortical bone.

BENIGN CEMENTOBLASTOMA

Benign cementoblastoma is a benign mesenchymal odontogenic neoplasm that forms a large bulbous mass of cementum on the roots of a tooth. Also known as a true cementoma. It occurs predominantly in the second and third decades, typically before 25 years of age. It arises in association with the apex or apices of a mandibular molar or premolar tooth, usually the first mandibular molar. The tooth remains vital and its position is not affected. Usually there are no symptoms but when the lesion is large, there may be slight expansion of the cortical plates.

On a radiograph, the morphology of the lesion depends on the stage of development, similar to the three stages of cementifying fibroma. The lesion, when discovered, is usually in the third stage consisting of a discrete radiopaque mass with a thin radiolucent border and attached to the root of the affected tooth. This prognosis is good after extraction of the involved tooth and excision of the mass.

Fig. 14-39 Cementoblastoma in the third stage consisting of a radiopaque mass with a radiolucent border and attached to the apices of the mandibular second premolar and first molar. The teeth are vital.

Fig. 14-40 Cementoblastoma consisting of a radiopaque mass with a radiolucent border and attached to the apices of the mandibular second molar. The involved tooth is vital.

Fig. 14-41 Cementoblastoma at the root apices of the mandibular first molar. The involved tooth is vital.