Odontomas and related lesions

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Key Words: Odontoma, fibro-odontoma, Odontoameloblastoma

Abstract
Odontomas are relatively common odontogenic hamartomatous malformations, generally asymptomatic, and are rarely diagnosed before the second decade of life. The most common symptom is an impacted permanent teeth or retained deciduous teeth. The etiology of the odontoma is yet not clear. During its development, enamel and dentin can be deposited in such a way that the resulting structures show an anatomic similarity to normal teeth, in which case the lesion is described as a compound odontoma. However, when the dental tissues form a simple irregular mass occurring in a disorderly pattern, it is described as a complex odontoma. Radiographic aspects of odontoma are characteristic. The complex odontoma appears as an irregular mass of calcified material surrounded by a thin radiolucent area with smooth periphery, and the compound type shows calcified structures resembling teeth in the center of a well-defined radiolucent lesion. The histological examination of odontomas often shows the presence of enamel matrix, dentin, pulp tissue, and cementum that can, but need not, exhibit a normal relationship. Odontomas are treated by conservative surgical removal and there no expectancy of recurrence. Ameloblastic fibro-odontomas and odontoameloblastomas show a great resemblance to common odontomas, especially in the radiographic examination. Therefore, it is suggested that all such specimens should be sent for histopathological examination for diagnostic confirmation.

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Odontomas
Odontomas are considered to be hamartomatous malformations resulting from the growth of completely differentiated epithelial and mesenchymal cells that give rise to ameloblasts and odontoblasts. These hamartomas are basically formed of enamel and dentin but they can also have variables amounts of cement and pulp tissue.1,2,3 During its development, enamel and dentin can be deposited in such a way that the resulting
structures show an anatomic similarity to normal teeth, in which case the lesion is described as a compound odontoma (Fig 1). However, when the dental tissues form a simple irregular mass occurring in a disorderly pattern, it is described as a complex odontoma (Fig 2). Compound odontomas appear more frequently than complex odontomas.\textsuperscript{3, 4}

The etiology of the odontoma is yet not clear.\textsuperscript{1-7} However, it has been suggested that trauma and infection at the place of the lesion can offer ideal conditions for its appearance.\textsuperscript{7, 8} Many authors are of opinion that odontomas are inherited or develop as a result of genetic mutation. This finding is backed by an increased number of odontomas found in heritable syndromes, such as Gardeners syndrome.\textsuperscript{1, 3}

Odontomas may be diagnosed at any age but they are usually detected during the first two decades of life.\textsuperscript{1, 3} One study analyzed 396 cases and showed that diagnosis usually happens between ages 11 and 15 years.\textsuperscript{6} Another study comprising 149 cases concluded that these lesions are detected most often during the second decade of life.\textsuperscript{8}

These malformations can be found anywhere in the dental arches. The majority of odontomas which are located in the anterior region of the maxilla are compound, while the great majority of odontomas located in the posterior areas, especially in the mandible, are complex odontomas.\textsuperscript{1, 7, 8}

In general they are asymptomatic, have slow growth,\textsuperscript{1} and seldom exceed the size of a tooth, but when large can cause expansion of the cortical bone.\textsuperscript{1, 2} The most common symptom is an impacted permanent teeth or retained deciduous teeth.\textsuperscript{1, 3, 6, 9, 10-15} Generally these malformations are intraosseous, but occasionally they may erupt into the oral cavity.\textsuperscript{9, 15}

Radiographic aspects of odontoma are characteristic. The complex odontoma appears as an irregular mass of calcified material surrounded by a thin radiolucent area with smooth periphery, and the compound type shows calcified structures resembling teeth in the center of a well-defined radiolucent lesion (Fig 3 & 4). A periodontal and pericoronary space characteristic of unerupted teeth is seen around each tooth.\textsuperscript{1-7} A developing odontoma can be discovered by routine radiography, but may cause difficulty in identification due to lack of calcification.\textsuperscript{2}

The histological examination of odontomas often shows the presence of enamel matrix, dentin, pulp tissue, and cementum that can, but need not, exhibit a normal relationship.\textsuperscript{1, 2, 3, 4} Compound odontomas are formed by tooth-like structures which resemble pulp tissue in the central portion surrounded by a dentin shell and partially covered by enamel. Complex odontomas are conglomerates without orientation of dentin, enamel, enamel matrix, cementum, and areas of pulp tissue. The capsule of connective tissue that surrounds an odontoma is similar to the follicle that covers a normal tooth.\textsuperscript{2}

Odontomas are treated by conservative surgical removal and there is no expectancy of recurrence.\textsuperscript{1, 9} Ameloblastic fibro-odontomas and odontoameloblastomas show a great resemblance to common odontomas, especially in the radio-graphic examination.
Therefore, it is suggested that all such specimens should be sent for histopathological examination for diagnostic confirmation.\(^2,9\)

**Ameloblastic fibro-odontoma (AFO)**

The WHO classification defines ameloblastic fibro-odontoma as a lesion similar to ameloblastic fibroma but showing inductive changes that lead to formation of enamel and dentin.\(^16\) It is usually encountered in children with an average age of 10 years.\(^1,2\) It has been suggested that ameloblastic fibro-odontomas should not be considered as true neoplastic odontogenic lesions, but rather as a stage preceding the complex odontoma which would be the final stage in this line of development of hamartomatous lesions.\(^17\)

Other authors consider that, despite the fact that some lesions diagnosed as ameloblastic fibro-odontomas can be developing odontomas, all cases of ameloblastic fibro-odontomas should not be considered as hamartomatous in nature since there are rare cases of ameloblastic fibro-odontomas showing true neoplastic behavior.\(^18\)

The majority of the ameloblastic fibro-odontomas are found in the posterior region of the mandible. These lesions seem to be exclusively central or intraosseous tumors. They are also characterized by being painless and slow-growing.\(^17\)

Radiographically, the tumor shows a well-defined unilocular or, rarely, multilocular radiolucent defect that contains a variable amount of calcified material with the radiodensity of dental hard tissues. The calcified material within the lesion may appear as multiple, small radiopacities or as a solid conglomerate mass.\(^1,17\) It can be differentiated from the odontoameloblastoma by the fact that it is well circumscribed and usually separates easily from its bony bed.\(^3\)

Histologically, AFO is composed of strands, cords and islands of odontogenic epithelium embedded in a cell-rich, primitive ectomesenchyme that resembles the dental papilla. The tumour mass is surrounded by a fibrous capsule. Dentin and enamel matrix are also seen (Fig. 4).\(^1,17\)

The treatment of choice is conservative surgical enucleation and prognosis is excellent.\(^1,17\)

However, development of an ameloblastic fibrosarcoma after curettage of an ameloblastic fibro-odontoma has been reported.\(^1\)

**Odontoameloblastoma (AO)**

The odontoameloblastoma is an extremely rare odontogenic tumor that contains an ameloblastomatous component together with odontoma-like elements. This lesion appears to occur more often in the mandible of young patients. Radiographically, this tumor shows a radiolucent, destructive process that contains calcified structures. These have the radiodensity of tooth structure and may resemble miniature teeth or occur as larger masses of calcified material similar to a complex odontoma. Multiple recurrences of odontoameloblastomas have been reported after local curettage and it appears that this tumor has the same biologic potential as the ameloblastoma. So, it is considered wise to treat a patient with an odontoameloblastoma in the same manner as one with an ameloblastoma. However, because of the rarity of odontoameloblastomas, there are no valid data on the long-term prognosis.\(^1,2,3,4\)

**Conclusion**

Odontomas are relatively common odontogenic lesions, generally asymptomatic, and are rarely diagnosed before the second decade of life. They are associated with impacted permanent teeth or retained deciduous teeth. During the development of the tumor, enamel and dentin can be deposited in such a way that the resulting structures show an anatomic similarity to normal teeth, in which case the lesion is described as a compound odontoma. The complex odontoma appears as an irregular mass of calcified material surrounded by a
thin radiolucent area with smooth periphery, and the compound type shows calcified structures resembling teeth in the center of a well-defined radiolucent lesion. Ameloblastic fibro-odontomas and odontoameloblastomas show a great resemblance to common odontomas, especially in the radiographic examination. Therefore, it is suggested that all such specimens should be sent for histopathological examination for diagnostic confirmation.

References

Figures

Figure 1. Compound odontoma. Photograph showing of recognizable structures anatomically similar to normal teeth.

Figure 2. Complex odontoma. Photograph showing dental tissues in a disorderly pattern.

Figure 3. Compound odontoma. IOPA shows calcified structures resembling teeth.
Figure 4. Complex odontoma. Radiograph showing irregular mass of calcified material of surrounded by a thin radiolucent area with smooth periphery.

Figure 5. Compound odontoma. Photomicrograph showing cross section of multiple small teeth like structure in a fibrous connective tissue.