Examples of Common Cystic Lesions in Pediatric Dental Practice

9

This chapter contains some examples of common cystic lesion examples and their radiographic appearance and their radiographic differential diagnoses. Obviously not all types of pathology were captured in this textbook chapter, but at least the reader will get a better feel about how the images turn out and what information can be retrieved from them.

Names of distinguished colleagues who supplied the images for this chapter are mentioned with the radiographs. If there is no name mentioned with the radiographs, the radiographs were taken by the author of this book or collected from the different university clinics he has worked in (Ghent University in Belgium, University of Washington in Seattle, USA, and University of Western Australia in Perth, Australia).

9.1 Dentigerous Cyst and Ameloblastic-Fibroma and Ameloblastic Fibro-Odontoma

The radiographic appearance of a *dentigerous cyst* is one of a uniform radiolucent, unilocular, well-defined, and corticated lesion that surrounds the crown of an erupted tooth. This developmental cyst appears to be attached to the cementoenamel junction and prevents normal eruption of the affected tooth and may displace the tooth considerably. It is more common in males, but not very common in children or adolescents. One should also keep in mind that some ameloblastomas and keratocystic odontogenic tumors can mimic a dentigerous cyst.

Ameloblastic fibro-odontoma is a mixed tumor with the same constituents as an *ameloblastic fibroma*, with the difference being the latter lacking collections of enamel and dentin (Figs. 9.1 and 9.2). There might be a tooth missing or a tooth might not have erupted. Differential diagnosis must include the following: ameloblastic fibroma, odontoma, adenomatoid odontogenic tumor, calcifying cystic odontogenic tumor, and calcifying epithelial odontogenic tumor.

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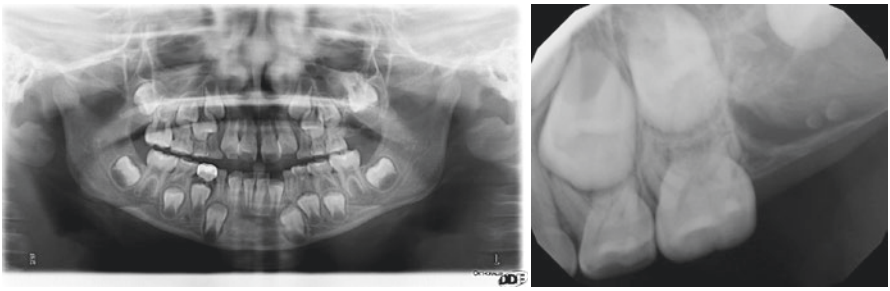

Fig. 9.1 The panoramic radiograph was taken because the maxillary left-hand-side first permanent molar had not yet erupted, while all other first permanent molars had and were in occlusion. The radiograph shows the presence of a well-defined, corticated, radiolucent lesion around the superiorly displaced left-hand-side maxillary first permanent molar and a congenitally missing second permanent molar. The periapical radiograph showed small round-shaped radiopaque entities within the radiolucent lesion

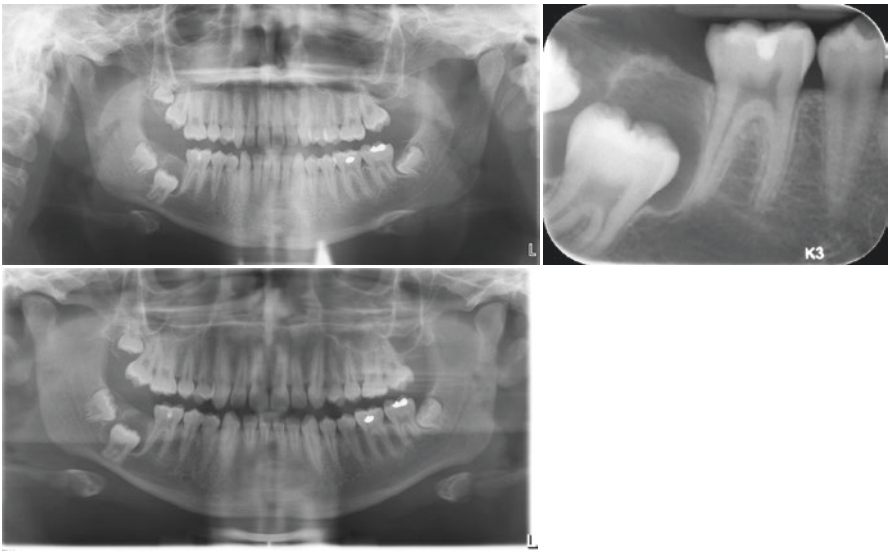

Fig. 9.2 The panoramic radiograph at the top was taken 1 year before the radiograph shown at the bottom. The periapical radiograph was taken when the second panoramic radiograph was taken. The reason for the right-hand-side second mandibular molar not erupting in this 14-year-old boy is because there is a dentigerous cyst, which has displaced the tooth inferiorly, with its roots impinging on the inferior cortical border of the mandible. Differential diagnosis should include ameloblastic fibroma and ameloblastoma. Unfortunately one was not able to follow up on this patient and hence the final diagnosis and treatment could not be included here

A dentigerous cyst is assumedly derived from cystic changes in the remains of the enamel organ after the enamel formation is completed. They seem to occur more in patients between 20 and 50 years of age. Progressive growth of the cyst leads to dilation of the dental follicle. They are most common around teeth which happen to have a great prevalence for failure to erupt: maxillary canines and mandibular third molars.

9.2 Cherubism

Cherubism is a giant cell lesion and is painless (Fig. 9.3). The typical radiographic appearance of cherubism is multilocular lesions (the result of fine bony septa extending between the soft-tissue masses) in the maxilla and mandible that start in childhood. They enlarge in the first place and then regress when the patient goes into adolescence. It is inherited as an autosomal dominant trait; however, there might be no previous report of cherubism in the family. It is also twice as common in males and the disorder seems to be rare in Japan. Teeth are frequently displaced and may be loosened and if the maxilla is affected the borders of the maxillary sinuses and even the orbits can be affected. Cervical lymphadenopathy can be present, despite the lack of inflammation, but due to reactive hyperplasia and fibrosis.

Cherubism is mapped to chromosome 4p16. The name refers to the children's facial appearance, which resembles that of plump-cheeked angels, angelic chubby cheeks of cherubs, which one can find in Catholic churches and in paintings from the Renaissance. Additionally, one can also recognize these patients, by their eyes being "upturned," due to a wide rim of exposed sclerae below the iris of the eye. The latter is caused by involvement of the inferior rim of the orbit and its floor, which pushed the eyeball upwards. Simultaneously the upper eyelids are pulled down, which accentuates the "eyes to heaven" appearance. Depending on the bony expansion and the areas involved, the patient's aesthetics will be impacted. Besides dental consequences such as unerupted and displaced teeth, and impaired mastication, also speech difficulties and loss of normal hearing and vision can be a problem. This adds all up to the psychological pressure in these patients. Erroneously, cherubism has also been called familial fibrous dysplasia, despite the condition not being related to fibrous dysplasia at all.

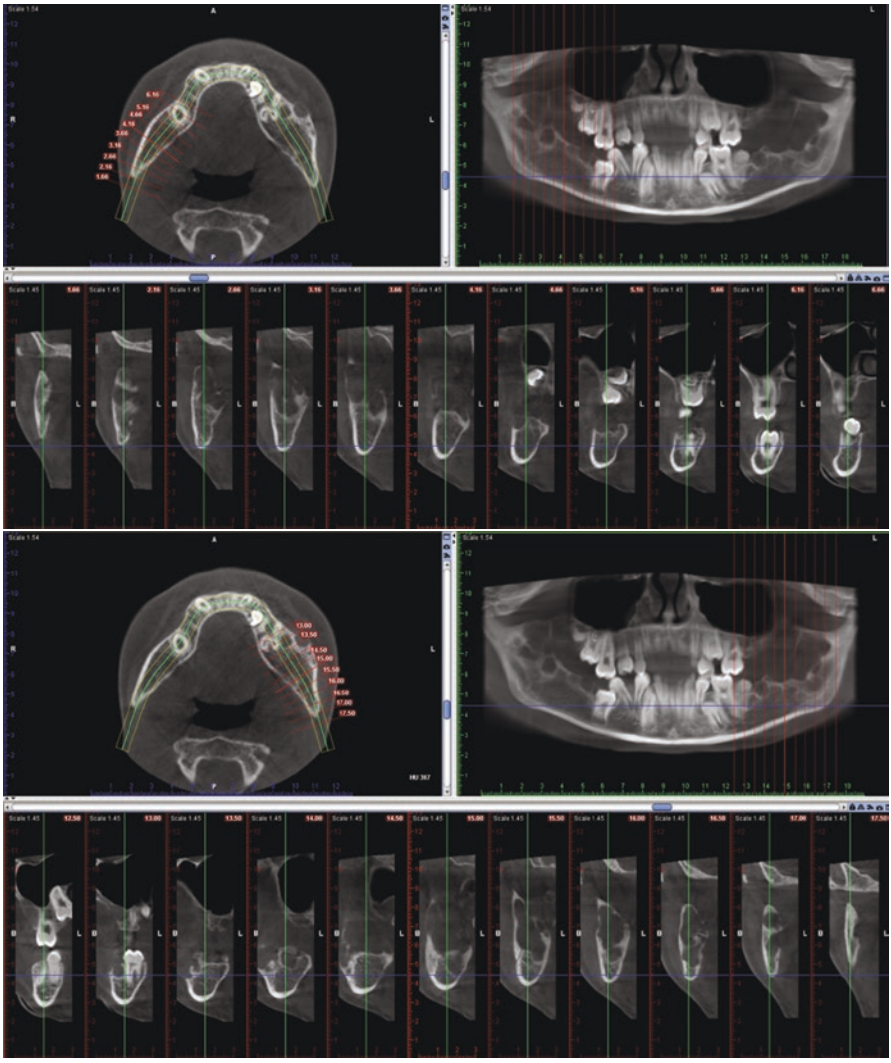

Fig. 9.3 This is a cone beam computed tomography of a boy with cherubism. The top image shows the slices through the right-hand side of the mandible and maxilla, while the bottom images are slices through the left-hand side of both jaws. One can appreciate the missing molars in both jaws, and the multilocular lesions in the mandible, which have caused substantial expansion of the buccal and lingual contours of the mandible, especially on the patient's left-hand side

9.3 Buccal Bifurcation Cyst

Synonyms for this cyst are *paradental cyst*, *infected buccal cyst*, and *inflammatory paradental cyst* (Figs. 9.4 and 9.5). The first permanent mandibular molar is affected most, compared to the second molar. A painless, hard buccal swelling is clinically

visible. It can occur bilaterally, but that is definitely not the rule of thumb. If secondary infection occurred, the patient can report pain. Radiographically a radiolucent area can be appreciated in the region of the furcation and distal to the root of the tooth. Buccal bifurcation cysts may be derived from epithelial cell rests of the periodontal membrane, located at the bifurcation of the molar tooth, and histologically they have the same characteristics of a radicular cyst. It is suggested that the paradental cyst on the third molar and the buccal bifurcation cyst, which is typically related to the first or second permanent mandibular molar, are the same cyst. However, this is food for discussion and falls outside of the scope of this book. Buccal bifurcation cysts cause delayed eruption of the affected tooth, which is in turn due to the position of the cyst, pushed with its roots against the lingual cortical plate of the mandible, causing the lingual cusps to be positioned higher than the buccal cusps. The tipping of the tooth is typical and distinguishes this lesion from any other lesion that can mimic this (e.g., periodontal cyst and Langerhans cell histiocytosis). In some cases the cyst involves an enamel spur or pearl. Not all buccal bifurcation cysts require surgical intervention.

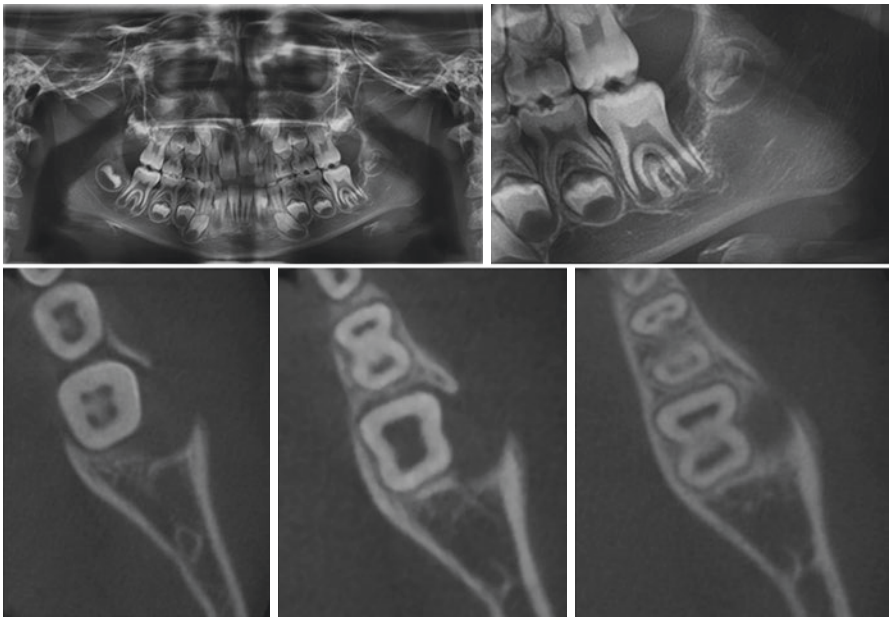

Fig. 9.4 The panoramic radiograph of this 6-year-old boy shows an unusual radiolucent area distal to the first left-hand-side mandibular molar. The cropped part of that radiograph shows a magnification of that area. The cropped cone beam computed tomography images below show the expansion and perforation of the buccal cortical plate of the mandible. This tooth did not have an enamel spur or pearl. The diagnosis was histologically supported as buccal bifurcation cyst. Noteworthy is to emphasize on the fact that the calcification of the second left-hand-side mandibular molar is delayed as well, compared to the other three second molars. The latter requires follow-up (courtesy of Dr. Annelore De Grauwe, Belgium)

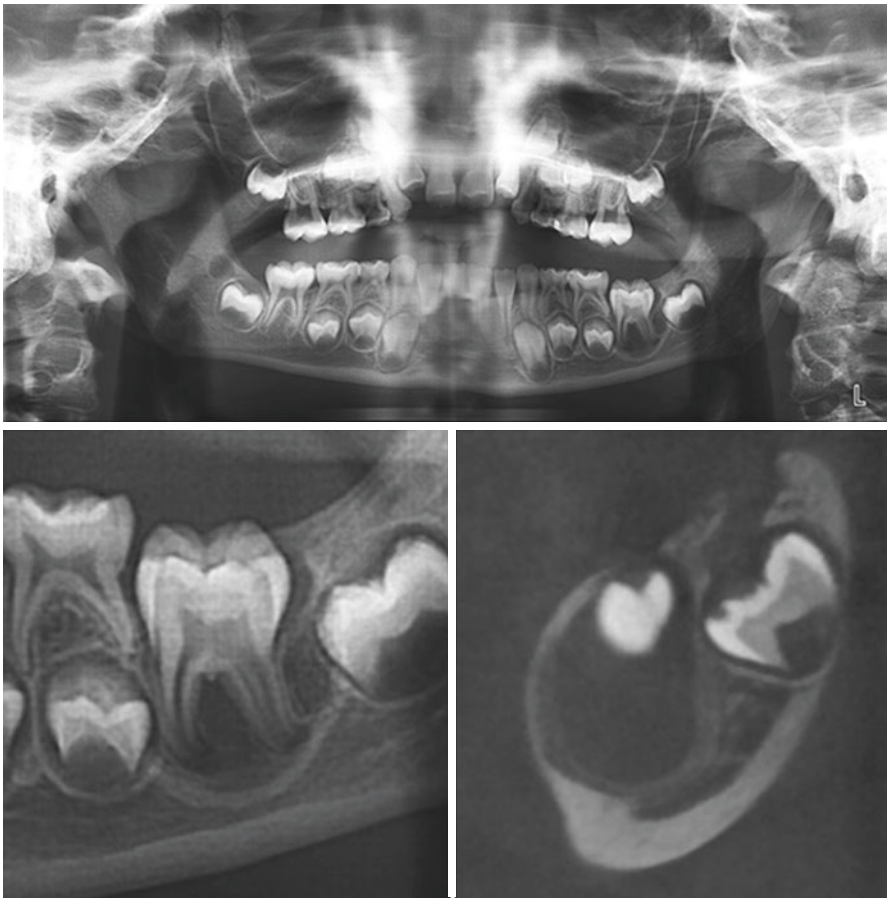

Fig. 9.5 This panoramic radiograph clearly shows delayed eruption of the left-hand-side first permanent molar and the adjacent radiolucent area, indicating a buccal furcation cyst. A closer inspection (cropped panoramic image) reveals an enamel spur in the furcation and one can appreciate the extension of the radiolucent area distal of the involved tooth. The cropped cone beam computed tomography image shows the borders of the lesion clearly and the proximity to the second permanent mandibular molar (courtesy of Dr. Annelore De Grauwe, Belgium)

9.4 Solitary Bone Cyst

There are a plethora of synonyms for solitary bone cyst: *simple bone cyst, traumatic bone cyst, hemorrhagic bone cyst, extravasation cyst, progressive bone cavity, and unicameral bone cyst* (Figs. 9.6 and 9.7). It is actually a pseudocyst, devoid of epithelial lining, but with connective tissue lining the walls and depending on the sources empty or filled with a sanguineous or serous fluid. Its etiology is unknown and it is usually an incidental radiographic finding in adolescent patients. Boys seem to be affected twice as much as girls. The most common site in the jaws is the mandible and more specific anterior and premolar region. Typical radiographic feature of this uniform radiolucent lesion is that the superior borders of the lesion usually scallop between the roots of the teeth and that with or without a clear corticated border. Whereas the teeth are not displaced, the cortical borders of the mandible might be slightly. It needs to be emphasized that these bony cavities occur often inside lesions of cemento-osseous dysplasia and fibrous dysplasia. Obviously the latter do not occur in the age group described in this book.

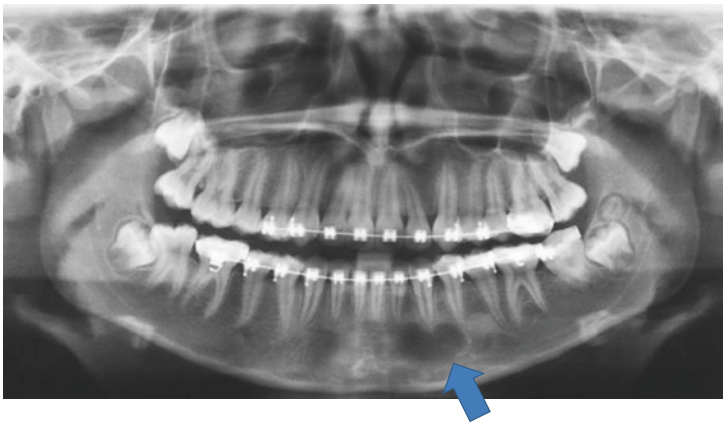

Fig. 9.6 This panoramic radiograph taken in a 16-year-old boy showed, besides two supernumerary molars in the second and third quadrants, also a uniform radiolucent lesion at the apex of the left-hand-side mandibular canine. This solitary bone cyst is partially well corticated and scallops between the roots of the adjacent teeth

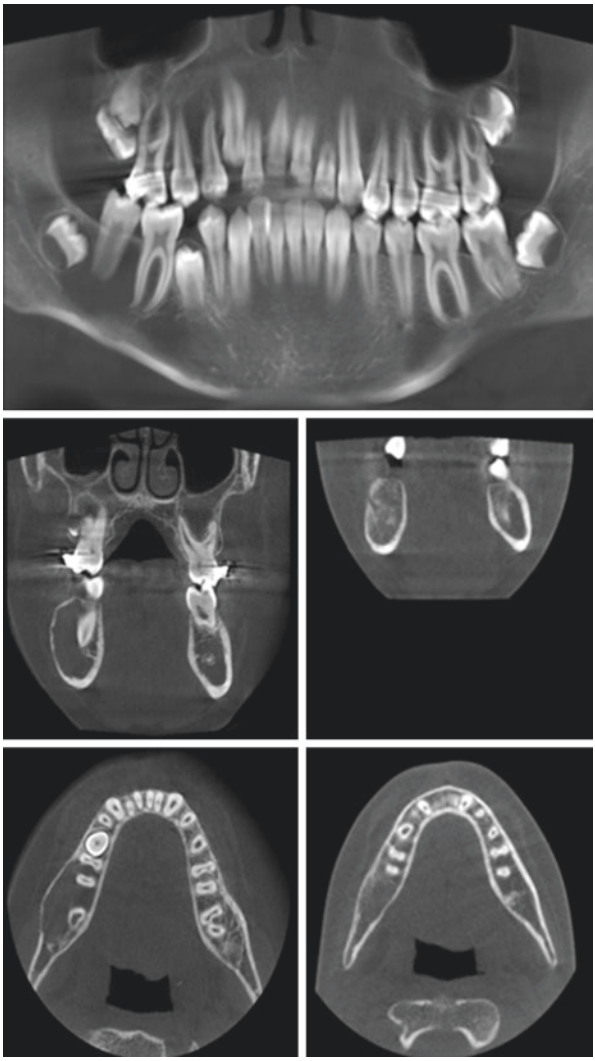

Fig. 9.7 This 14-year-old boy was followed up by a different orthodontist than the one who started the orthodontic treatment initially. Because the second orthodontist noticed a swelling in the right mandible, a panoramic radiograph was taken (not included here). The diagnosis was not conclusive, so the orthodontist ordered a cone beam computed tomography (top and bottom left-hand-side images). An ill-defined uniform radiolucent lesion, that scalloped between the roots of the right-hand-side mandibular molars, was observed. The teeth were not displaced but the buccal cortical wall of the mandible was clearly expanded. Surgery was performed and according to the oral surgeon's report the lesion was empty, which correlated with the diagnosis of solitary bone cyst. The image bottom right-hand side is the smaller field and lesser resolution cone beam computed tomography which was made 3 months post-surgery. It is clear from these coronal and axial slices that the lesion is healing and that the expansion of the mandible has decreased

9.5 Radicular or Periapical Cyst

Necrosis of the pulp can stimulate the apical epithelium to form a true epithelial lined cyst. The inflammatory response appears to trigger keratinocyte growth factor by periodontal stroma cells, which then subsequently start growing. The source of epithelium is usually cells rests of Malassez, but can also be from crevicular epithelium, sinus lining, or epithelial lining of fistulous tracts. Cysts will develop in 7–54% of necrotic teeth. The difference between a periapical granuloma and periapical cyst can only be made histologically. Radiographic appearance may be similar though. If exodontia is considered and the cyst is not enucleated, a residual cyst can develop. Some of the latter may heal spontaneously, but many may not. The radiographic appearance of a radicular cyst is usually a round lesion, centered around the root of the necrotic tooth. They can, however, expand and displace teeth and cause root resorption as well. Figure 9.8 is an illustration of a radicular cyst on a primary molar that mimicked a dentigerous cyst on the underlying premolar.

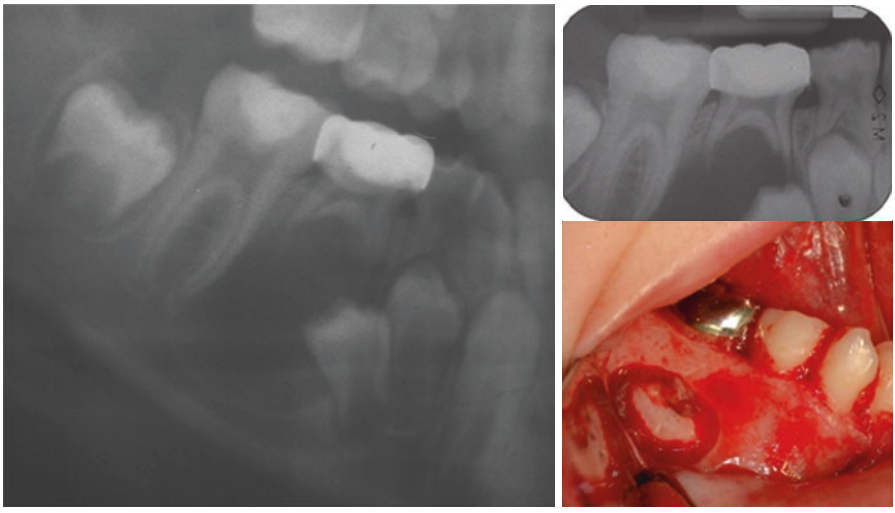

Fig. 9.8 This is a case of a 9-year-old patient who had a swelling buccal to the right-hand-side mandibular second primary molar. The cropped panoramic radiograph and the periapical radiograph at the top show a well-defined, uniform radiolucent, unilocular lesion apically to the deciduous molar. The permanent successor appears to be displaced inferiorly and the radiographs suggest a dentigerous cyst, as the cyst could be attached to the cementoenamel junction of the second premolar. When the surgeon explores the site, the lesion appears to be attached to the roots of the primary molar, which confirmed the diagnosis of radicular cyst. The primary tooth with the radicular cyst was removed and spontaneous eruption of the premolar followed soon (panoramic radiograph at the bottom of 9.5A)

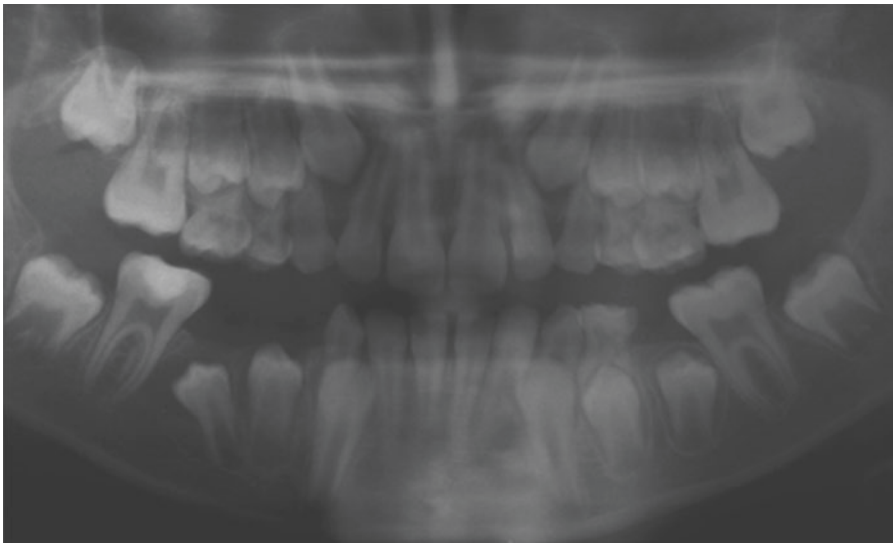

Fig. 9.8 (continued)

Further Reading

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