

Eruption Disturbance of Permanent Teeth Resulting from Periapical Lesions Associated with Primary Dentition

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ABSTRACT. This paper reviews briefly the histopathologies of common periapical lesions associated with grossly infected primary molars and presents three (3) cases depicting possible sequelae that could affect the succeeding permanent dentition. The need for early diagnosis and proper treatment of grossly carious and/or infected primary molars is stressed.

Keywords: Eruption Disturbance, Periapical Lesions, Primary Teeth.

Introduction

Some of the commonest sequelae of pulpitis appearing as periapical radiolucent lesions are periapical granuloma and inflammatory odontogenic cysts. Whatever the histological diagnosis of these lesions, some of the problems associated with periapical infection and its sequelae include malformation of the succedaneous tooth and eruption disturbance of the permanent dentition.

In this report, a brief review of the histopathologies of these lesions is discussed and three case reports depicting possible effects on the eruption of permanent dentition are presented.

Literature Review

The periapical granuloma is essentially a localized mass of chronic granulation tissue.

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The earliest change is a thickening of the periodontal ligament at the root apex. In some instances, it may appear as a well circumscribed radiolucent lesion, demarcated from the surrounding bone by a thin radiopaque line or zone of sclerotic bone. Histologically, this lesion arises as a chronic process beginning as hyperaemia and edema of the periodontal ligament with infiltration of chronic inflammatory cells such as lymphocytes and macrophages. There is also proliferation of both fibroblasts and endothelial cells leading to formation of new capillaries which are lined by swollen endothelial cells. Other notable histological findings include presence of epithelium in the lesion. Evidence suggests that this epithelium originates in most cases, from the epithelial rest of Malassez; but in some cases, from either respiratory epithelium of the maxillary sinus (when the sinus is perforated); oral epithelium (when a fistula has developed) or from oral sulcular epithelium related to furcation areas of the tooth. This epithelium may be stimulated to proliferate and lead to the formation of a cyst if the inflammatory reaction persists for a long period^[1].

The World Health Organization recently classified epithelial-lined cysts. They are either, developmental odontogenic or non-odontogenic cysts, or they may be inflammatory in origin^[2,3]. The cysts which have been shown to have possible inflammatory origin include the radicular cyst, the apical and lateral cyst, the residual cyst, the paradental cyst and the dentigenous cyst^[2].

The radicular cyst is almost invariably a sequelae of the apical granuloma and radiographically, is almost impossible to distinguish one from the other^[4]. This cyst is the commonest odontogenic cyst, but it is rare in children. The next most common cyst is the dentigerous cyst. Evidence in the literature also suggests that the dentigerous cyst may actually arise from unresolved radicular cyst^[3].

The occurrence of cysts in relation to primary dentition roots is very rare^[5]. However, it is quite common to find periapical radiolucent lesions associated with the primary dentition. Very few reports are available in the literature on the effect of periapical pathological lesions associated with primary teeth on the eruption of the permanent successors. Hill in 1978^[5] described 6 cases; Brook *et al* in 1971^[6] described 5 cases out of a total of 42 cysts found in patients aged 1-16 years, while only one case out of 289 cysts was reported by Main (1970)^[8] as occurring in association with deciduous dentition.

We present 3 cases which depict possible histopathogenesis of periapical infections of the dentition and their sequelae.

Case 1

A six-year-old female presented to the Emergency Clinic of the Faculty of Dentistry (FOD), King Abdulaziz University (KAU) complaining of pain in the upper primary central incisor. Routine panoramic radiograph was taken which revealed multiple caries involving 51, 52, 61, 62, 54, and 64 (the upper centrals and lateral incisors and upper left and right first primary molars). Also, 74, 75 and 85 (lower left first and second primary molars and lower right second primary molars) had been restored with amalgam

(Fig. 1). Emergency treatment was carried out by extracting the 51 and 61. The radiograph also revealed congenital absence of 45 (lower right second premolar). At this time however, the 34 (lower left first premolar) was evident and properly aligned. One year later, the patient returned to the clinic when a new panoramic radiograph (Fig. 2) revealed a well demarcated radiolucency apical to the 74 (lower left first primary molar) which had now replaced and rotated the 34 (lower left first premolar). Treatment included extraction of the 74 with curettage of the granulation tissue mass that became evident upon extraction. Healing has been uneventful. Patient was put on review every 3 months.

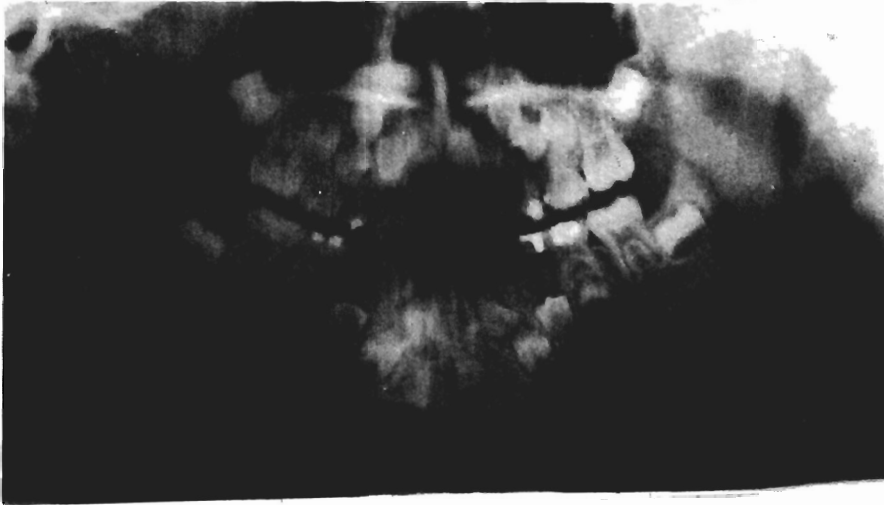


FIG. 1. Panoramic view of the jaws showing normal development of tooth number 34 (lower left premolar).

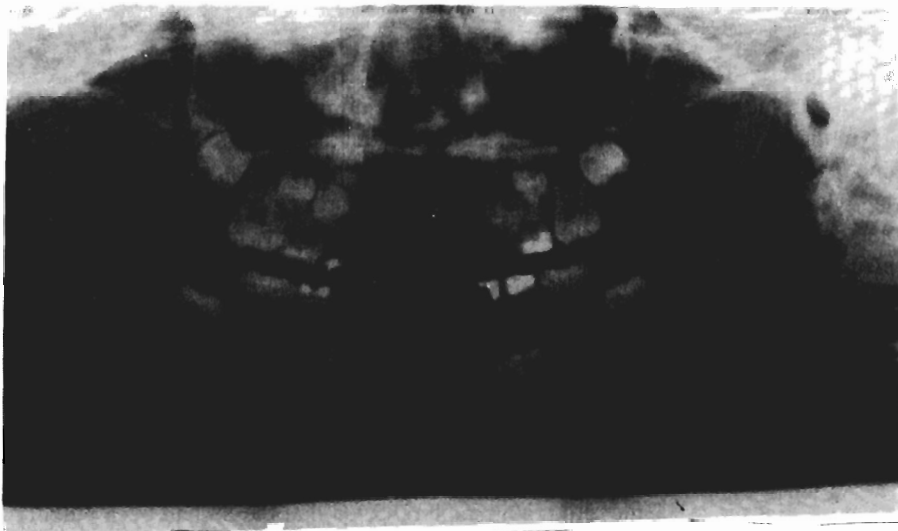


FIG. 2. Panoramic view of the jaws showing rotation of tooth number 34 and a periapical lesion on tooth number 74 (Lower left primary first molar).

Case 2

An eleven-year-old female (a sister of Case 1) reported to the Paediatric Dentistry Clinic of the FOD, KAU, Jeddah, complaining of many grossly carious teeth and requesting comprehensive dental care. Clinical examination revealed grossly carious 83, 84, 85, 73 and 75 (lower right primary canine, first and second primary molars, and lower left primary canine and second primary molar, respectively) with almost completely destroyed coronal structures. Radiological examination of this area revealed a periapical lesions of tooth 84 (lower right first primary molar) was in normal position while the 45 (lower right second premolar) was deviated almost horizontally in the bone (Fig. 3).



FIG. 3. Panoramic view of the jaws showing horizontal displacement of tooth number 45 (lower right second premolar) with circumscribed well-demarcated radiolucent area and remaining roots of 85 (lower right second primary molar).

Treatment of the patient included raising a mucoperiosteal envelope flap to allow for extraction of the roots of 83, 84 and 85 (lower right primary canine, first second and primary molars, respectively) and curettage of the periapical lesion. Clinically, the lesion, which resembled a granulation was curettaged and the flap was closed using 3/0 silk suture. At a subsequent visit, 73 and 75 (lower left primary canine and second primary molar) were extracted and a lingual holding arch was fitted to maintain the spaces. Patient was followed up regularly. Healing was uneventful and after 9 months, tooth 45 erupted into perfect alignment in the arch (Fig. 4).

Case 3

The third case was an eleven-year-old boy who present at the Clinic of FOD, KAU for Orthodontic Consultation. Intraoral examination revealed a swelling in the buccal area adjacent to 43, 85 and 46 (lower right permanent canine, second primary molar and first permanent molar). Panoramic radiograph revealed that the 85 had been pulpotomised. A large well-demarcated radiolucent lesion with unerupted 45 (lower right second premolar) *in site* was also evident (Fig. 5). Patient mentioned that there was an earlier

radiograph taken almost one year before. On the next visit, patient returned with the radiograph which showed the lesion at an earlier stage-obviously missed by the clinician (Fig. 6). Treatment involved total enucleation of the cyst and extraction of the unerupted premolar/erupted premolar (45). Healing has also been uneventful (Fig. 7).

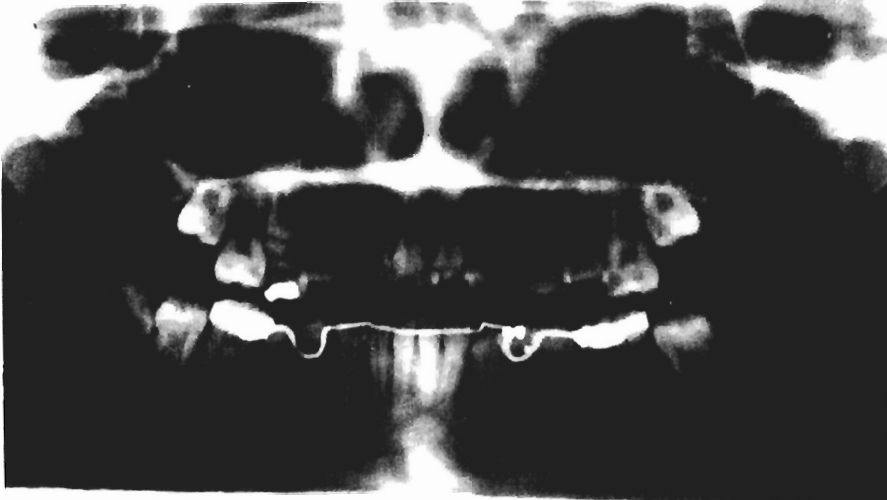


FIG. 4. Panoramic view of the jaws showing the lingual holding arch and the eruption of the tooth number 45 into perfect alignment.

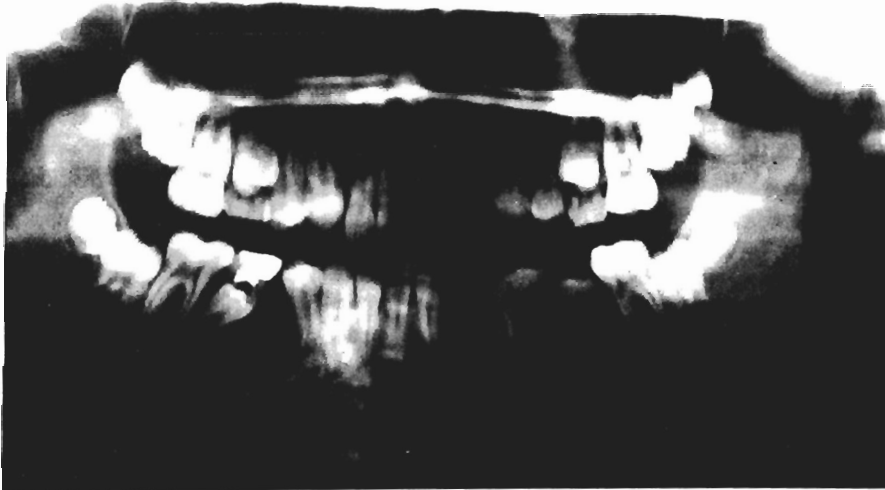


FIG. 5. Panoramic view of the jaws showing a large well circumscribed radiolucent lesion with unerupted 45 (lower right second premolar and pulp-tomized 85 (lower right second primary molar).

Discussion

The three cases presented here represent progressive clinical problems that could arise from a periapical lesion around the primary teeth on the developing permanent successor. Case 1 presented with an initial problem of rotation and the beginning of dis-

placement of the succeeding permanent tooth, while Case 2 depicts total displacement of the tooth. Case 3 however, shows the possibility of development of a dentigerous cyst, which, if left undisturbed, could lead to a pathological fracture of the jaw.

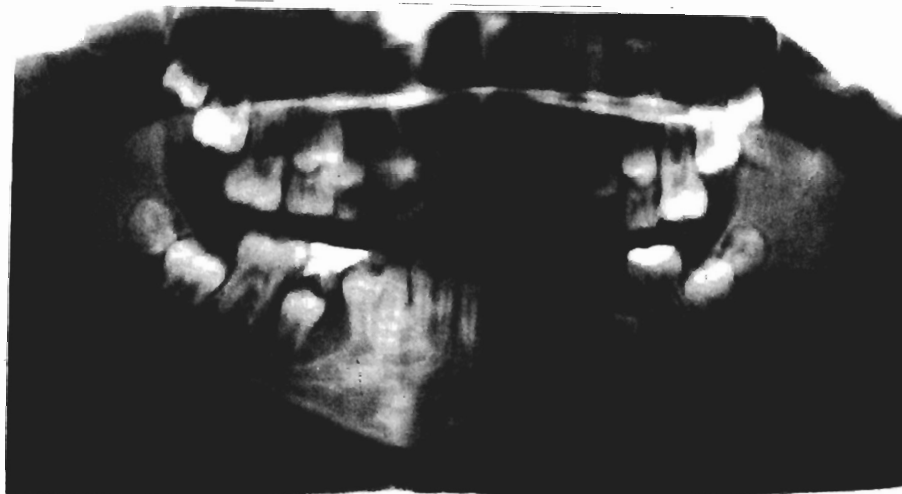


FIG. 6. Radiographic view of the lesion in figure 5 one year earlier.



FIG. 7. Panoramic view of the jaws showing the enucleated site 4 months after.

The pathogenesis of dentigerous cyst has received considerable attention in the literature. Three modes of origin have been described^[3]. The first suggests that the cyst develops between the reduced enamel epithelium and the crown of an unerupted tooth in the cyst-prone individuals and that genetic factors may be contributory. The second suggests that the crown of a permanent tooth may erupt into radicular cyst of its de-

ciduous predecessor. The third is a variation of the second concept, which suggests that inflammation at the apex of deciduous tooth can lead to the development of an inflammatory follicular cyst around the permanent successor^[3-8].

Evidence from the 3 presented cases here seem to support the latter two concepts. All the three cases have deciduous teeth that were either heavily restored or have undergone extensive pulpal therapy earlier. This may have left a focus of infection in the periapical region which could progress through stages of periapical granuloma, radicular cyst and, finally, as in the third case into a full blown dentigerous cyst. The works of Altini and Cohen^[9,10] also suggest that in some instances the erupting teeth may actually penetrate epithelial-lined cysts and therefore give rise to follicular keratocysts.

The literature also suggests the likelihood of these inflammatory cysts to be common in certain cyst-prone individuals and that a genetic factor may contribute to the process.^[3] In the present report, 2 of the cases are siblings and thus may support the latter hypothesis. The treatment of choice in many cases is extraction of the offending primary tooth and apical curettage^[11]. However, in cases where the cyst have attained considerable size as in the situation of the third case, enucleation or marsupialisation may be the treatment of choice with or without extraction of the associated premolar tooth^[5].

Apart from eruption disturbance, other abnormalities that may arise include enamel dysplasia, (e.g. Turner's hypoplasia); displacement and rotation of the tooth, and partial or complete stoppage of root growth of the succeeding permanent tooth.

While, wanton and unnecessary extraction of primary teeth, especially the molars, before their natural exfoliation period may create adverse occlusal problems in some instances, it is essential that cases that require endodontic treatment be carefully selected and followed up for a reasonable period to assess for failure. Such failures must be diagnosed and treated early to avoid the problems highlighted by these three cases.

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معوقات بزوغ الأسنان الدائمة متأثرة بالأسنان الأولية المصابة بالأضرار المرضية حول قمم جذور الأسنان

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المستخلص . هذه الدراسة الهستوباثولوجية تعرض باختصار حالات الاصابات المرضية الشائعة حول قمم جذور الأضراس الأولية (اللبنية) والمصاحب لها من الإلتهابات المتقيحة المتقدمة . وتعرض الدراسة لثلاث حالات من الأضراس الأولية المصابة والتسلسل المحتمل حدوثه نتيجة الإصابة بهذه الالتهابات المتقيحة ، ومدى تأثيرها على الأضراس الدائمة المقابلة لها في الإحلال . وقد وجد أن الحاجة إلى التشخيص المبكر ، وبالتالي تحديد طريقة العلاج المثلي للأضراس الأولية المصابة إما بالتنسوس العميق المتقدم أو التي وصل بها إلى حد الالتهابات المتقيحة حول قمم جذور هذه الأضراس هو ضرورة ملحة .