

Odontogenic cysts: an update

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Abstract

The classification of odontogenic cysts has been widely debated and there has been much debate and controversy about the true nature of some of the lesions. Although cysts are common in the jaws, most are radicular cysts of inflammatory origin or simple dentigerous cysts. Others are less frequently encountered and may present diagnostic difficulties because of their varied features. The previous WHO classification, in 2005, redesignated a number of these lesions as true neoplasms, but this was controversial and was not based on sound evidence. For the latest WHO classification (2017), an international consensus group reappraised these lesions and agreed a terminology and new classification. This brief review presents this new classification, and explains the reasoning behind the agreed terminology.

Keywords calcifying odontogenic cyst; collateral cysts; dentigerous cyst; gingival cysts; glandular odontogenic cyst; odontogenic cysts; odontogenic keratocyst; orthokeratinised odontogenic cyst; radicular cyst

Introduction

Although the odontogenic cysts have been reviewed recently,¹ the publication of the new WHO Classification of Head and Neck Tumours² has further clarified terminology and has introduced new entities. The first two editions of the classification of odontogenic tumours^{3,4} were deliberately inclusive, and classified all neoplasms and cysts of the odontogenic apparatus so that pathologists would appreciate and understand the commonly shared features of these lesions and be able reach an informed diagnosis. Inexplicably, the 3rd edition⁵ excluded the odontogenic cysts leading to uncertainty regarding the nature of these lesions and making it difficult to reach a correct diagnosis or plan appropriate management. The authors also ignored the fact that there was still ongoing debate regarding the true nature of a number of lesions, which sat at the “cyst–tumour interface”. The most controversial change in the 3rd edition was to redefine a number of lesions, which had hitherto been regarded as developmental cysts, as neoplasms. Thus the odontogenic keratocyst

was removed from the classification of cysts and called “keratocystic odontogenic tumour” (KCOT) and the calcifying odontogenic cyst was reclassified “calcifying cystic odontogenic tumour”. The intention was to redefine these lesions as cystic neoplasms, but the evidence for doing so was not clear and was controversial. The most striking and welcome change in the new 4th edition of the WHO classification is the return of the odontogenic cysts, thus restoring the book’s status as the only complete classification of lesions of the odontogenic tissues.²

This review provides an update of our previous paper,¹ clarifies terminology and explains the reasoning behind the new classification. For a detailed description of the clinical and pathological features of these lesions, readers are referred to our original review article.¹

Update to the classification

The definition of jaw cysts remains the same⁶—‘a pathological cavity having fluid, semi-fluid or gaseous contents and which is not created by the accumulation of pus’. This definition does not require the presence of an epithelial lining as essential for a diagnosis, and recognises that a number of lesions, which are not of epithelial origin are cystic and are commonly included in the classification of cysts. In the jaws all the odontogenic cysts are epithelium lined, but a number of cystic lesions, which should be included in the differential diagnosis, are not. These include, for example, solitary bone cyst and aneurysmal bone cyst, which are included in the new classification as “bone cysts”.

The new classification of cysts of the jaws is very similar to that used in the 2nd edition⁴ (Table 1). It is based first on the origin of the epithelial lining and then according to their putative pathogenesis. Those that derive their lining from remnants of the tooth forming tissues are termed ‘odontogenic’ and are then further subdivided into inflammatory or developmental. Cysts whose epithelial lining is derived from sources other than tooth forming tissues are classified as ‘non-odontogenic’ and are included, since they have similar clinical presentations and must be considered in the differential diagnosis. In the 2nd edition⁴ two non-odontogenic cysts (nasopalatine duct cyst and nasolabial cyst) were included, but only the nasopalatine duct cyst is included in 2017² on the basis that the nasolabial cyst arises in soft tissues. The “bone cysts” are included and, ironically, given the exclusion of true cysts, were also included in the 5th edition.⁵

The classification of odontogenic cysts is shown in Table 1. It is intended to be simple and is based on the current best evidence. The classification and terminology was vigorously debated and agreed by an expert consensus group. The key elements to note are that it restores the odontogenic keratocyst and calcifying odontogenic cyst as benign developmental cysts (see below). The orthokeratinised odontogenic cyst is also recognised as an entity rather than being regarded as a variant of the odontogenic keratocyst. The lesions listed next to bullets are regarded as variants, or subsets of the main lesions.

Odontogenic cysts of inflammatory origin

This group of lesions result from the proliferation of epithelium due to inflammation. The most common is the radicular cyst in which the source of inflammation is apical periodontitis following the death of a tooth and necrosis of the pulp. The

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A classification of the odontogenic cysts

Odontogenic cysts of inflammatory origin

Radicular cyst

- Residual cyst

Inflammatory collateral cysts

- Paradental cyst
- Mandibular buccal bifurcation cyst

Odontogenic & non-odontogenic developmental cysts

Dentigerous cyst

- Eruption cyst

Odontogenic keratocyst

Lateral periodontal cyst

- Botryoid odontogenic cyst

Gingival cysts

- Gingival cysts of adults
- Gingival of infants (alveolar cyst)

Glandular odontogenic cyst

Calcifying odontogenic cyst

Orthokeratinised odontogenic cyst

Table 1

source of the epithelium in the collateral cysts remains a matter of some debate.

Radicular and residual cyst

Radicular cysts are the most common jaw cyst comprising about 60% of all odontogenic cysts.⁷ Chronic inflammation in the peri-radicular tissues results in a periapical granuloma and stimulates proliferation of the epithelial rests of Malassez. This is followed by central degeneration and necrosis to produce a cavity that becomes lined by epithelium. Cyst expansion then occurs due to hydrostatic pressure as debris accumulates centrally. Radicular cysts are always associated with a non-vital tooth, and this is an important diagnostic criterion for radiolucent lesions at the apex of the teeth (Figure 1).

Residual cysts are radicular cysts that remain in the jaws after extraction of the affected tooth. The histopathological features are similar in both lesions (Figure 2). However, as the source of inflammation has been removed, the wall of a residual cyst may mature and become relatively uninfamed and the epithelial lining becomes thin and regular (Figure 2b). In these cases they may be mistaken for developmental odontogenic cysts, but radiological examination and the clinical history can determine that they are located at a site of a previous tooth extraction. Treatment of radicular and residual cysts is by simple enucleation.

Inflammatory collateral cysts

Collateral cysts occur on the lateral, usually buccal, aspect of a partially erupted vital tooth and comprise about 5% of odontogenic cysts.^{1,7} The aetiopathogenesis of these lesions is uncertain and there is some controversy regarding their classification. They most frequently occur in the posterior mandible associated with partially erupted mandibular third molars (wisdom teeth) where they are usually called *paradental cysts*. The inflammatory

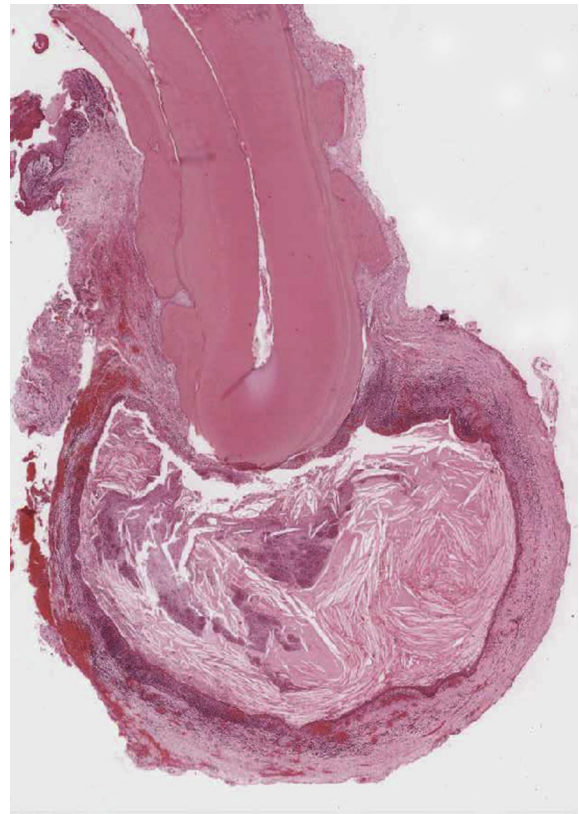


Figure 1 Radicular cyst at the apex of a dead tooth with necrotic pulp. The cyst is attached to the apex and is composed of an inflamed wall lined by epithelium. The lumen is filled with necrotic cell debris.

stimulus is therefore pericoronitis, but the source of epithelium is uncertain. Paradental cysts were first fully described by Craig in 1976⁸ who postulated that the lining derived from proliferation of the reduced enamel epithelium. Although this is the most likely source, it is possible that rest cells of Malassez may be involved and more recently an origin from sulcular or junctional epithelium has been demonstrated.⁹

Inflammatory collateral cysts are divided into two main types. About 60% are associated with partially erupted lower third molars and are called **paradental cysts**. Most of the remainder (over 35%) occur in children, usually at the buccal aspect of an erupting first molar, and are now called **mandibular buccal bifurcation cysts**.² Rarely, collateral cysts may arise in association with partially erupted teeth at other sites, including the upper canines and lower premolars.

Developmental odontogenic cysts

Odontogenic cysts with a developmental aetiology occur with no obvious clinical cause. Many of the developmental cysts show overlapping histopathological features, and a diagnosis may only be reached after careful consideration of clinical and radiographic evidence, particularly in the presence of secondary inflammation.

Dentigerous and eruption cyst

Dentigerous cysts embrace the crown of an unerupted tooth and are lined by epithelium that derives from the reduced enamel

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