

ORIGINAL ARTICLE

Histopathologic evaluation of follicular tissues associated with impacted lower third molars

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ABSTRACT

Context: Previous studies have reported that the dental follicular tissues associated with impacted lower third molars (ILTM) may undergo cystic degeneration and/or neoplastic transformation. This is especially likely when the pericoronal space is >2.5 mm on intraoral radiographs and >3 mm on panoramic radiographs and to examine dental follicular tissue for pathological changes in patients with ILTM and pericoronal radiolucencies of <2.5 mm.

Aim: Histopathological evaluation of follicular tissues associated with ILTM.

Materials and Methods: The morphology of the hematoxylin and eosin-stained follicular tissues of 146 such impactions were studied. **Results:** On microscopy, no cystic structures with fibrous walls were identified. 85 cases (58%) showed fibrous or myxomatous connective tissue and no epithelial elements. 61 cases (42%) showed epithelial elements in addition to fibrocollagenous tissue. Of these, 16 cases exhibited epithelium, of which 13 cases showed reduced enamel epithelium and three cases showed squamous metaplasia/non-keratinized stratified squamous epithelium. **Conclusions:** All asymptomatic unerupted third molars with pericoronal radiolucency of <2.5 mm should be retained since they do not exhibit cyst formation microscopically.

Key words: Dental follicle, impacted lower third molar, pathology

INTRODUCTION

Apart from its important role in eruption physiology, previous studies have reported that the dental follicle (DF) may undergo cystic degeneration and/or neoplastic transformation. The DF appears radiographically as a pericoronal radiolucency, the width of which is of the utmost importance in identifying DF pathology.^[1] Pericoronal radiolucencies are common radiographic findings observed in dental practice; they usually represent a normal or enlarged DF that requires no intervention. Alternatively, they may represent a pathological entity that requires appropriate management and histopathological interpretation. A pericoronal space >2.5 mm on an intraoral radiograph and >3 mm on a panoramic radiograph should be regarded as suspicious of pathosis.^[2]

One of the most hotly debated subjects in oral surgery is the

determination of the indications for extraction of asymptomatic impacted lower third molars (ILTM). Enlargement of the size of pericoronal radiolucency is an important finding for removal of an asymptomatic impacted tooth. A lot of histological variation may exist in the follicle tissue surrounding impacted teeth including changes in epithelial rests.^[3] Because most dental practitioners discard extracted unerupted third molars rather than send them for histopathological analysis, no accurate information is available regarding the prevalence of pathology at this site. Although there is a consensus that ILTM should be extracted when pathological changes and serious clinical symptoms are observed, there is no agreement regarding their prophylactic extraction. As a result, some clinicians espouse prophylactic extraction, while others favor observation and periodic monitoring.^[4] In an attempt to address the controversies surrounding the management of impacted teeth, this study was designed to microscopically evaluate the dental follicular tissues associated with pericoronal radiolucencies of <2.5 mm.

MATERIALS AND METHODS

Impacted third molars were removed for a variety of reasons and the clinical details for each patient including age, sex, and location of the lesion were recorded. Specimens of

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DFs associated with ILTMs were surgically removed in the Departments of Oral and Maxillofacial Surgery, A B Shetty Institute of Dental Sciences, Mangalore, and Coorg Institute of Dental Sciences, Virajpet, Karnataka.

The inclusion criteria were the presence of at least one asymptomatic unerupted third molar and a pericoronal radiolucency of <2.5 mm in greatest dimension. One hundred and forty six impactions met the study inclusion criteria after preliminary intra oral periapical radiography the follicles were submitted for histopathological examination; all specimens were fixed immediately in 10% buffered formalin and embedded in paraffin wax; 5- μ m-thick serial sections were then stained with the H and E stain.

RESULTS

Of the 146 cases that were included, there were 84 mesioangular, six horizontal, and 56 distoangular ILTMs. 85 were males and 61 were females, with an age range from 18 years to 32 years (median: 23.5 years). The amount of follicular tissue removed varied between 1.5 mm and 2.5 mm on gross examination. On microscopy, no cystic structures were identified. 85 cases (58%) showed fibrous or myxomatous connective tissue with (16/85) or without (69/85) inflammation and no epithelial elements. Two cases showed dystrophic calcification. 61 cases (42%) showed epithelial elements in addition to fibrocollagenous tissue. Of these, 16 cases exhibited epithelium, of which 13 cases showed reduced enamel epithelium and three cases showed squamous metaplasia/non-keratinized stratified squamous epithelium with underlying connective tissue [Figure 1]. 45 cases showed connective tissue with cords or islands of odontogenic epithelium [Figure 2] with/without inflammatory cells. When present, the inflammatory cells in all cases were predominately lymphocytes. Ameloblastoma-like islands were noted in 2 of the 45 cases which showed odontogenic epithelium [Figure 3].

DISCUSSION

In the presence of pathological changes and/or severe symptoms, such as infection, non-restorable carious lesions, cysts, tumors, and destruction of adjacent teeth and bone, there is no argument about the need for tooth extraction. However, the justification for prophylactic removal of ILTMs is less certain and has been debated for many years.^[5] Odontogenic cysts or odontogenic tumors may arise from the epithelial rests in the follicle tissue surrounding impacted tooth. The potential for this development is not known. Theoretically, a variety of tumors may arise from the epithelial remnants, particularly odontogenic tumors. The most frequent odontogenic tumor to arise from epithelial remnants is the ameloblastoma. Rarely, an untreated dentigerous cyst (DC) undergoes transformation into an ameloblastoma, squamous cell carcinoma, or intraosseous mucoepidermoid carcinoma, arising mainly from epithelial remnants.^[6-9] Therefore, changes occurring in

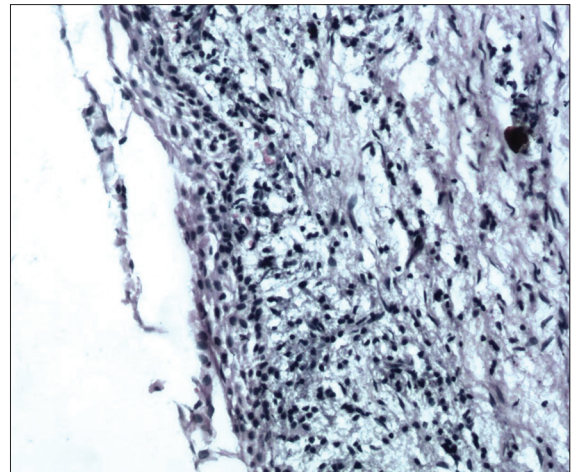


Figure 1: Hand E section showing non-keratinized stratified squamous epithelium with underlying connective tissue ($\times 40$)

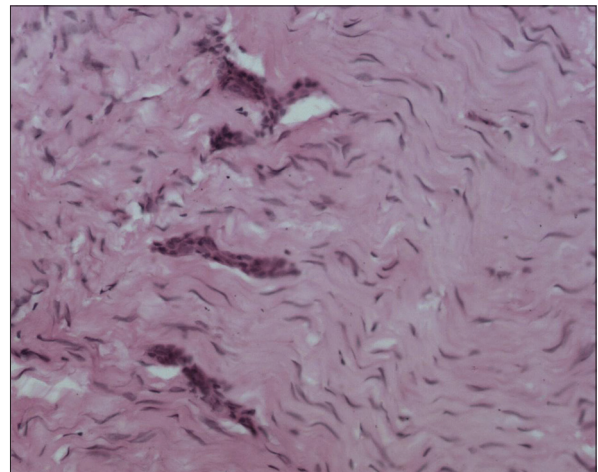


Figure 2: H and E section reveals connective tissue with cords or islands of odontogenic epithelium ($\times 100$)

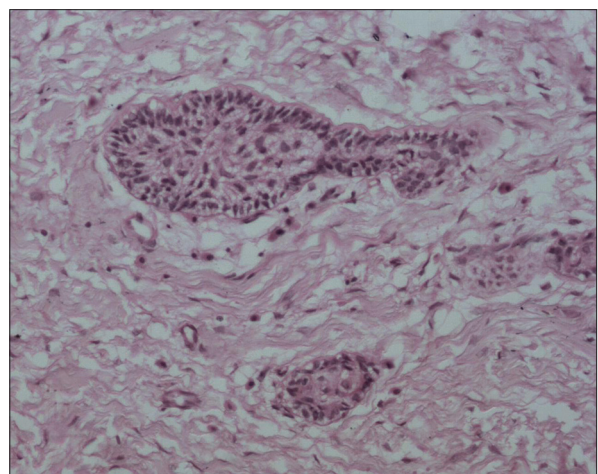


Figure 3: H and E section reveals connective tissue with ameloblastoma-like islands ($\times 100$)

epithelial rests and dormant remnants in the follicle tissue surrounding impacted teeth cannot be disregarded.

Primary intraosseous odontogenic carcinoma (PIOSCC), defined as a squamous cell carcinoma arising within the jawbones, has no initial connection with the oral mucosa and develops from remnants of odontogenic epithelium. The pathogenesis of PIOSCC is unclear although it has been suggested that longstanding chronic inflammation might be the main pre-disposing factor for malignant transformation in the cyst epithelium based on the presence of lymphocytes and plasma cells in the connective tissue of the cyst wall.^[10] There are reports of ameloblastoma, paradental cyst, and odontogenic keratocyst developing in the DFs of ILTMs that were asymptomatic both clinically and radiographically.^[11,12] These findings suggest that lack of radiographic appearance of disease is not a reliable indicator of the absence of disease and that the prevalence of soft tissue pathosis is higher than generally assumed from radiographic evaluation alone.

Widely accepted criteria for separating DFs and DCs do not exist; this remains an area of controversy.^[13,14] In this study, 16 cases exhibited epithelium, of which 13 were reduced enamel epithelium and three were non-keratinized stratified squamous epithelia; these findings corroborate those of Daley and Wysocki who state that the normal follicle may be lined by squamous epithelium. Similarly, Slater states that the presence of squamous epithelium cannot be used as the sole criterion to diagnose a DC, which should rather be labeled as follicular tissue with squamous differentiation.^[15,16] This is at variance with Glosser and Campbell,^[13] Curran *et al*,^[15] and Adelsperger *et al*,^[17] who argue that any follicle with squamous epithelium should be regarded as a DC. In most of the previous studies, any soft tissue specimen with presence of a dense fibrous connective tissue wall lined by a few layers of stratified squamous epithelium was defined as cystic. Various authors have described 23-50% of “cystic change” in ILTMs.^[18]

Varying criteria for the diagnosis of DCs have been described. Godoy *et al.*, applied the following histopathological criteria: Observation of a thin stratified squamous epithelial lining of the cystic cavity, exhibiting areas of continuity and arranged throughout a connective capsule of variable density; The criteria for DF included: observation of a thin and discontinuous simple cuboidal reduced enamel epithelium, along with loose fibrous connective tissue capsule.^[19] Da Silva T A espoused the following criteria for DCs: (a) A predominant lining by stratified squamous epithelium, (b) pericoronal spaces >5.6 mm, and (c) surgical exploration revealing bone cavitation and cystic content. DFs were predominantly lined by reduced enamel epithelium, the width of the pericoronal space was <5.6 mm, and no bone cavitations or cystic content was detected.^[20]

Some unerupted teeth have a slightly dilated follicle in the pre-eruptive phase which does not signify a cyst, nor even necessarily a potential cyst unless the pericoronal width is at least 3-4 mm. Attachment of the cyst wall to the neck

of the associated tooth is an essential feature of DCs, and microscopically, the cyst lining should demonstrate a readily identifiable component of reduced enamel epithelium before a diagnosis of DC is made. The following guidelines are recommended for the diagnosis of a DC: (i) A pericoronal radiolucency larger than 4 mm in greatest width as assessed on a panoramic radiograph, (ii) fibrous tissue lined by non-keratinized stratified squamous epithelium, and (iii) a surgically demonstrable cystic space between enamel and overlying tissue.^[14]

DFs can also be misinterpreted microscopically as central odontogenic fibromas. Oral and maxillofacial surgeons must be cognizant of the fact that myxomas histologically mimic an enlarged DF with myxoid change or the dental papilla of a developing tooth. A DF or odontogenic fibroma should be considered if myxomatous tissue contains islands or cords of odontogenic epithelium; however, the latter will be associated with larger pericoronal radiolucency. The highest rate of misdiagnosis was in the Armed Forces Institute of Pathology study of DFs and dental papillae which were interpreted as odontogenic myxomas.^[21] Central odontogenic fibroma-like changes have also been reported to be associated with crowns of impacted teeth.^[22]

Several authors have observed a high incidence of pathological changes in DFs associated with larger pericoronal radiolucencies. However, the discrepancy in the incidence rates of pathological changes in DFs is due to lack of standardization of the parameters used for radiographic and histological analysis of the cases.^[5] Most oral and maxillofacial surgeons and other dental practitioners make clinical judgments on an outpatient basis rather than submit pericoronal tissue for histological diagnosis when ILTMs are removed. Thus, data concerning pathological changes in follicles associated with ILTMs are very limited because pericoronal tissues are often discarded after third molar removal and the soft tissue is not submitted for histological examination.^[18]

CONCLUSIONS

In conclusion, the data from this study do not justify the removal of all asymptomatic ILTMs. The phrase “squamous metaplasia” of reduced enamel epithelium seems more appropriate than a diagnosis of DC when stratified squamous epithelium is present in follicular tissue in the absence of cystic change and pericoronal radiolucency of <2.5 mm. However, all asymptomatic ILTMs should be submitted to radiographic follow-up and in the event of extraction with increased pericoronal radiolucency, the follicular tissue obtained should be sent for histopathological examination.

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