

The incidence of cysts and tumors around impacted third molars

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Abstract. The objective of this retrospective analysis was to determine the incidence of the development of cysts and tumors around third molars and to discuss some relevant issues in relation to the removal of asymptomatic, impacted third molars. 9994 impacted third molars, removed in 7582 patients, formed the basis of this study. The analysis revealed 231 cysts (2.31%) and 79 tumors (0.79%), including 7 benign tumors (0.77%) and two malignant tumors (0.02%). The incidence of cysts and tumors around impacted third molars was 3.10%.

Key words: third molars; cysts; tumors; impaction.

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There are therapeutic and prophylactic indications for the removal of impacted third molars. There is, however, no general agreement about the need for surgical removal of all asymptomatic impacted third molars^{19,22,30}.

The National Institute of Health (NIH) Consensus Development Conference³² on the removal of impacted third molars reached agreement on 3 issues. (1) There are well-defined criteria for impacted third molar removal, i.e. infection, non-restorable carious lesion, cyst, tumor, destruction of adjacent tooth and bone. (2) It was agreed that reduced morbidity resulted from extraction in younger patients rather than in patients in advanced adulthood. (3) Current predictive growth studies were not sufficiently accurate to form a basis on which clinical action could be justified.

At that time, the need for future objective longitudinal studies was identified and since then many such studies have been performed^{1,3–5,12,14,20,40,44}. There is still debate, however, about the necessity of removal of asymptomatic impacted third molars.

It is argued by some authors that all impacted third molars should be removed regardless of the absence of symptoms^{14,20,25,28,40}. Other authors^{1,3,8,10,18,26,30,38} think that removing asymptomatic, impacted third molars is questionable in the light of the present lack of knowledge about the incidence of pathology associated with those third molars. Yet other authors^{4,5,12,23,24,42,44,47} consider that prophylactic surgical removal of impacted third molars is not necessary because the risk of development of pathological conditions in or around follicles of third molars is apparently low.

The objective of this investigation was to determine the incidence of the development of cysts and tumors around third molars using a retrospective analysis, and to discuss relevant issues in relation to the removal of asymptomatic impacted third molars.

Material and methods

9994 impacted third molars in 7582 patients were removed in the period 1986–1996 at the Department of Oral and Maxillofacial

Surgery, Faculty of Dentistry, University of Ankara. 41% of patients were referred by dental practitioners, 43% were referred by the Department of Oral Diagnosis and the remainder came on their own initiative because of complaints such as toothache, swelling and/or trismus. The ages of the patients ranged from 14 to 67 years, with a mean of 28.7 years. The ratio of maxillary to mandibular molars was 1:3. Radiographs were available on all patients.

179 patients had symptoms such as swelling or pain due to cystic or neoplastic lesions. 3782 patients had symptoms such as swelling, pain, trismus or fever due to pericoronitis. The remaining 3621 patients were asymptomatic and the impacted molars and/or associated pathology were diagnosed during routine examination, including radiography.

The data for these 9994 patients were analysed to determine the frequency of cysts and tumors around third molars.

Results

There were 231 cysts (2.31%) and 79 tumors (0.79%) found that were associated with 9994 impacted third molars, of which two were malignant (0.02%). 179 patients had symptoms such as swelling or pain due to cystic or neo-

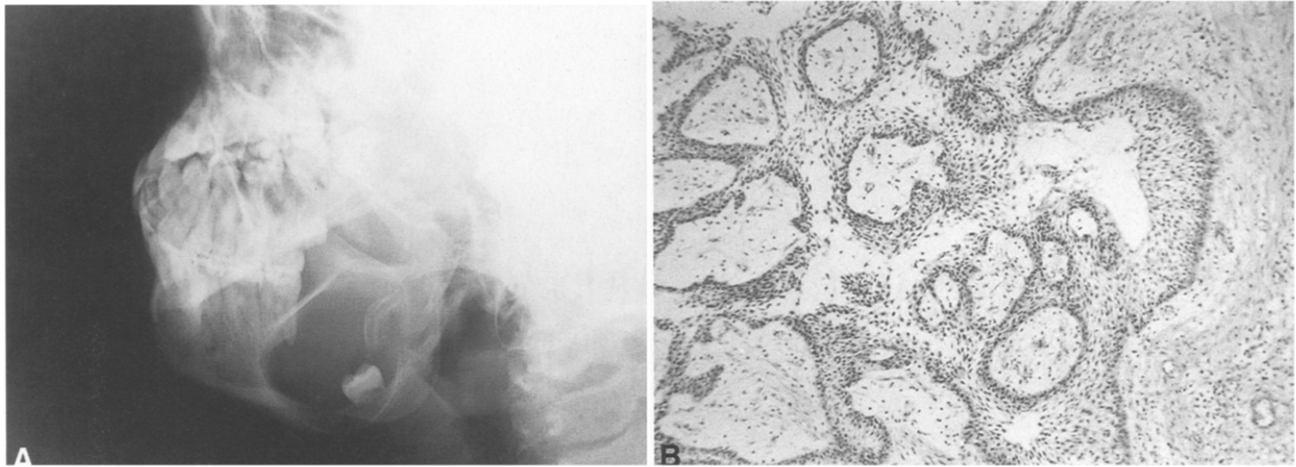


Fig. 1. A. Radiograph showing unilocular cystic lesion in right mandible which appeared to be a unicystic ameloblastoma. B. Histologic appearance of the same tumor. The ameloblastic epithelium forms sheets, islands and cords (H.E.×40).

plastic lesions. The remainder 131 patients had no symptoms suggestive of pathology.

Of the 231 patients who had cysts associated with an impacted third molar, 97 (42%) were women and 134 (58%) men. Their ages ranged from 19 to 67 years with a mean of 33.9 years. There were 75 cysts (32%) localised in the maxilla and 156 (68%) in the mandible. 215 cysts (93%) were found to be dentigerous and 16 (7%) were odontogenic keratocysts.

The 79 patients who had a tumor associated with an impacted third molar, consisted of 46 women (58%) and 33 men (42%), aged 14 to 52 years with a mean of

30.6 years. Six of these tumors (8%) were localised in the maxilla and 73 (92%) in the mandible. There were 41 ameloblastomas (52%), 15 odontogenic myxomas (19%), 11 odontogenic fibromas (14%), 10 odontomas (13%), one squamous cell carcinoma (S.C.C.) and one fibrosarcoma involved (Figs. 1-3).

In the same period, a total of 1080 cysts were treated and 985 of these cysts were odontogenic cysts (91.2%); 23.5% of these odontogenic cysts were associated with impacted third molars.

During this period, 630 tumors were treated and 212 of these tumors were odontogenic (33.7%); 37.3% of these odontogenic tumors were associated

with impacted third molars. The incidence of the development of ameloblastoma appeared to be 0.41%.

Overall, the incidence of cysts around impacted third molars was 2.31%, whereas the incidence of tumors around impacted third molars was 0.79%.

Discussion

There is no universally accepted treatment concept for asymptomatic, impacted third molars. Some authors^{14,20,25,28,40} argue that all impacted third molars should be removed regardless of the absence of symptoms, whereas

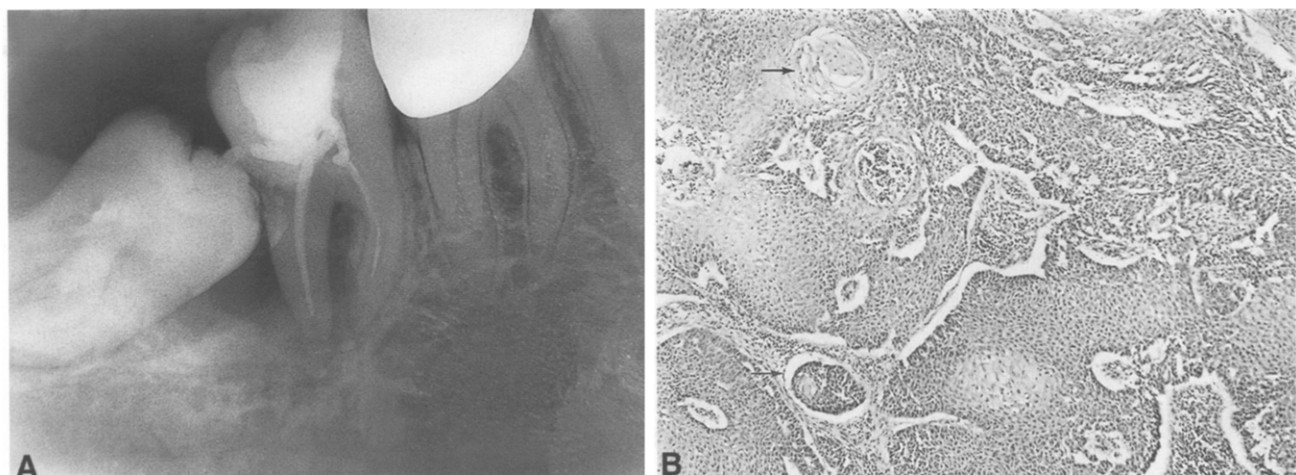


Fig. 2. A. Radiograph of 3rd molar associated with S.C.C. B. Histologic appearance of well-differentiated S.C.C. with some areas of keratinization (arrows)(H.E.×100).

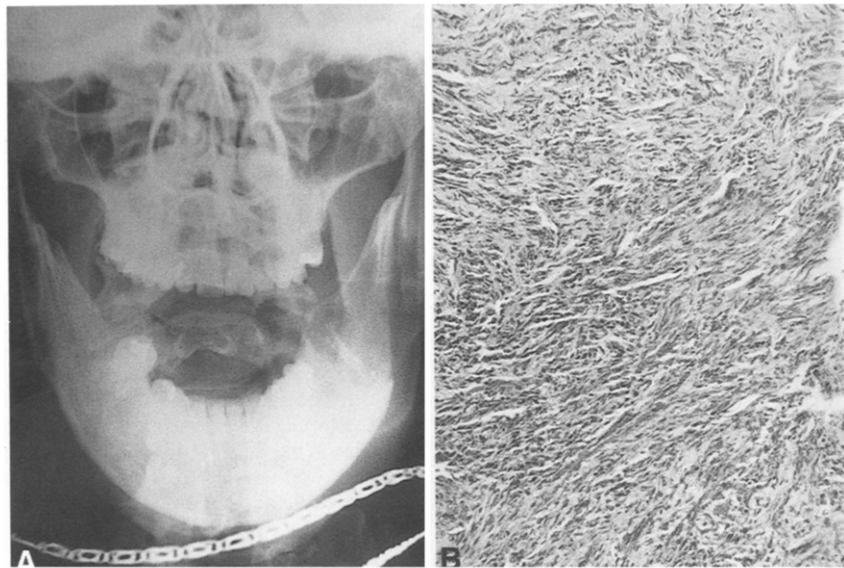


Fig. 3. A. Posteroanterior radiograph of patient with fibrosarcoma associated with impacted third molar. In the left mandible, a large radiolucency is observed, but the third molar had already been removed in another institution. B. Histology showed a sarcoma composed of atypical cells arranged as bundles (H.E. $\times 100$).

others^{1,3,8,10,18,26,30,38} think that removing asymptomatic impacted third molars is quite questionable. Yet other authors^{4,5,12,23,24,42,44,47} suggest that prophylactic removal of impacted third molars is not necessary because the risk of pathological conditions developing from these teeth is apparently low. BRICKLEY & SHEPHERD⁵ suggest that a computer-based neural network could play a useful role in supporting clinicians making third molar referral decisions.

MERCIER & PRECIOUS³⁰ put forward two questions in order to develop clear indications and contra-indications to both deliberate retention and surgical removal of an impacted third molar: (1) What are the risks to the patient of deliberately retaining the impacted third molar? (2) What is the risk-benefit ratio of surgical removal? According to the same authors, a strong indication for removal should be complemented by a strong contra-indication to its retention. The converse of this statement is also true.

The incidence of large cysts and tumors occurring around impacted third molars differs greatly in various studies. Figures on cysts have been reported by DACHI & HOWELL⁹ (11%), MOURSHED³¹ (1.44%), GOLDBERG et al.¹⁷ (2%), SHEAR & SINGH³⁹ (0.001%), NORDENRAM et al.³³ (4.5%), LYSELL &

ROHLIN²⁷ (3%) and SAMSUDIN & MASON³⁷ (3.3%). BRUCE et al.⁶ reported an incidence of 6.2% of cysts and tumors developing around impacted third molars. In their report, the incidence was notably highest (13.3%) in the oldest age group (mean age 46.5 years) and lowest (1.5%) in the youngest age group (mean age 20 years). The incidence of cysts and tumors associated with impacted third molars has been reported by OSBORN et al.³⁵ as 3% and by CHIAPASCO et al.⁷ as 1.5%. The present study showed an incidence of cyst formation associated with impacted third molars of 2.31%. GIROD et al.¹⁶ reported that the development of large cysts around impacted third molars took 2–13 years. It seems, therefore, that the longer an impaction exists, the greater the risk of development of cysts and tumors.

The incidence of ameloblastoma associated with impacted third molars has been reported by REGEZI et al.³⁶ (0.14%), SHEAR & SINGH³⁹ (2%) and WEIR et al.⁴⁶ (2%). The incidence of 0.41% in the present study is in line with these figures. The occurrence of unicystic ameloblastoma in a dentigerous cyst around an impacted third molar has been reported before^{11,15,41,45}. Figs. 1A & 1B reveal the radiographic and histopathologic appearance of a unicystic ameloblastoma.

The incidence of malignant tumors

around impacted third molars is very low. LYSELL & ROHLIN²⁷ reported that the incidence of the development of a tumor around impacted third molars was lower than 1%. The incidence of a tumor associated with an impacted third molar was 0.79% in the present study. There are cases reported of S.C.C. developing from a dentigerous cyst around an impacted third molar^{2,21,29,34,48}. YOSHIDA et al.⁴⁸ reported a case of S.C.C. developing from a keratocyst associated with an impacted third molar. EVERSOLE et al.¹³ reported that approximately 50% of central mucoepidermoid carcinomas are associated with a cyst or an impacted tooth. There are even cases reported of verrucous carcinoma developing in an odontogenic cyst. STOELINGA & BRONKHORST⁴³ reported the incidence, multiple presentation and recurrence of aggressive cysts of the jaws and discussed the malignant transformation of cysts. They reported that it seems justified to estimate the incidence of malignant change, including squamous cell carcinoma and mucoepidermoid tumor, as varying from 1–2% and recommended further epidemiological studies to substantiate or readjust this figure.

At present, there are about 60 well-documented cases reported in the literature of S.C.C. developing in an odontogenic cyst⁴³. Many authors suggest that S.C.C.'s arising in an odontogenic cyst are seen more often in the mandible than in the maxilla, with a predilection for the posterior region of the mandible^{2,21,29,34,48}. On radiographic examination, it may be very difficult to distinguish between a simple odontogenic cyst and a malignant lesion. The case in the present study resembled a simple dentigerous cyst (Fig. 2).

The study of STOELINGA & BRONKHORST⁴³ revealed that most keratocysts occurring in the third molar area are not really associated with the follicle of an impacted third molar. They are usually the result of pathological changes of either remnants or offshoots of the dental lamina or proliferations of the epithelium of the overlying mucosa.

The data presented and the reports from the literature indicate that cysts and tumors do develop in a relatively small but still significant minority of patients. There also seems to be a slight increase in the number of pathological conditions with increasing age. These facts need to be taken into account in

the decision process when discussing the pros and cons of treatment with the patient.

The policy to remove or not to remove third molars may also be influenced by local circumstances. When a wait and see policy is adopted, patient cooperation is clearly necessary to implement a regular follow-up. This may be jeopardized by geographical circumstances or lack of compliance. The data from the present study, even though the figures may be biased because of the referrals, still suggest that considerable pathology may occur in a relatively small proportion of patients. Other authors presented similar figures. The fact that almost half of the patients had no signs or symptoms indicating pathology, is certainly worth considering. This fact alone provides sufficient evidence that regular radiographic follow-up is necessary so as to be able to surgically intervene when pathology arises. The profession needs to consider all associated factors when formulating an evidence-based policy towards asymptomatic third molars.

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