

Histopathological Study of Pericoronal Tissue and Radiological Evaluation of Various Position of Impacted Mandibular Third Molar

¹Dr Grishma Doria, ²Dr Kinnari Rajpura, ³Dr Dhaval Niranjana Mehta, ⁴Dr Rina Mehta, ⁵Dr Albert Ashem

¹Reader, Oral and Maxillofacial Pathology, Faculty of Dental Science, Dharmsinh Desai University, Nadiad, Gujarat, India

²Professor and Head, Department of Oral Pathology, AMC Dental College and Hospital, Ahmedabad, Gujarat, India

³Professor and Head, Department of Oral Medicine and Radiology, Narshinbhai Patel Dental College and Hospital, Sankalchand Patel University, Visnagar, Gujarat, India.

⁴Senior Lecturer, Oral and Maxillofacial Pathology, Faculty of Dental Science, Dharmsinh Desai University, Nadiad, Gujarat, India

⁵Assistant professor, Department of Oral Medicine and Radiology, Dental College, RIMS, Imphal, Manipur, India

Corresponding Author:

Dr Grishma Doria

Reader, Oral and Maxillofacial Pathology, Faculty of Dental Science, Dharmsinh Desai University, Nadiad, Gujarat, India

Abstract:

Background: Removal of impacted mandibular third molar is a common procedure performed in oral surgery. Indications for removal of the third molar have generated much discussion in dentistry. The presence of pericoronal pathosis is generally accepted reason for the extraction of impacted mandibular third molars. Radiographic pathology is usually defined as a pericoronal radiolucency measuring about 2.5 mm or larger in any dimension.

Purpose: This study aims to evaluate the histopathologic changes in radiographically normal dental follicles associated with various types of impacted mandibular third molars.

Methods: After extraction of 50 impacted mandibular third molars, dental follicle associated with extracted teeth was placed in 10% formalin solution. Histopathologic examination was done. The type of pathological changes was recorded based on histopathological reports.

Results and conclusion: 46% patients with impacted third molar had vertical position and 58% patients with impacted teeth showed 0.5 to 1.5mm pericoronal radiolucency. Enamel organ epithelium (EOE) and squamous lining, epithelial rest in connective tissue and epithelial rest in connective tissue were higher in mesioangular tooth position. Maximum percentage of myxomatous change was recorded in mesioangular tooth followed by horizontal tooth position. Epithelial hyperplasia and severe inflammation were more common in distoangular teeth. Epithelial lining was absent maximum in vertical impacted teeth.

Keywords: Dental follicle, impacted lower third molar, pericoronal pathology, pericoronal radiolucency

Introduction

Most of the unerupted molars are covered by an pericoronal tissue composed of soft tissue. During extraction this pericoronal tissue is removed surgically and the location of this tissue into tooth bearing area of the jaw indicates probable with both ectodermal and mesodermal components.¹ Deliberate retention of the impacted third molar, however carries a risk of sequelae such as cyst formation, resorption of the root of second molar and tumour formation²

Unerupted and impacted third molar were found in young age groups. These impacted third molars were associated with dental follicles or dental sac which was normal developmental structures that characteristically appear as thin semicircular radiolucencies around the teeth in radiographs.³ A pericoronal space of greater than 2.5mm on an intraoral radiograph and greater than 3mm on a rotational panoramic radiograph should be regarded as suspicious.⁴ Pericoronal tissue of erupting third molar have propensity to undergo proliferation, neoplastic change or cause post-operative complications. Pericoronal tissue also showed pathological changes like dentigerous cysts,

odontogenic keratocyst and ameloblastoma which could be the health risks for the patients.⁵ Therefore present study was carried out to determine the need for the routine removal of unerupted and impacted third molar on basis of various histopathological changes associated with pericoronal tissue of impacted teeth.

Material and Methods

This study was carried out in 50 patients with impacted third molar attending Department of Oral Surgery and Oral Pathology Department Government Dental College and Hospital, Ahmedabad. In this study detailed clinical history was taken. Patients with signs of infection or enlarged tissue surrounding affected teeth were excluded from the study. Tobacco users, alcoholics, and those with systemic diseases that could affect the healing mechanisms were excluded. All the teeth included in the study were mandibular third molars.

The study was conducted after ethical clearance of institutional committee. Informed consent was taken from all the patients who were include in the study. Out of 50 patients, 25 patients were male and 25 patients were female with age range of 18 to 40 years. All these impacted third molar teeth were sent for radiographic examination with intraoral periapical radiographs. Width of the pericoronal space was determined to find out any correlation exists between histopathological changes of pericoronal tissue and radiographic width of the impacted teeth. According to radiographic width of pericoronal space patients were divided into three groups. Group 1 consists of impacted third molars with radiographic pericoronal width of 0.5mm to 1.5 mm. Group 2 consists of impacted third molars with radiographic pericoronal width of 1.5mm to 2.5mm. Group 3 consists of impacted third molars with radiographic pericoronal width of 2.5mm to 3.5mm.

Pericoronal tissues associated with impacted third molars were removed and sent for histopathological examination. These specimen were fixed in 10% solution of formaline for 24 hours. Processed routinely and embedded in paraffin. Blocks were prepared and section of 5 micron thickness were cut using a microtome and stained with routine Hematoxylin and Eosin stains for the purpose of histopathological study. The sections of myxomatous change, which were stained with Hematoxylin and Eosin (H&E) stain were also stained with Alcain blue stain. Two oral pathologists, who were not aware of the result of the previous pathology reports and clinical status of the patients, blindly re- assessed each slide for the following histopathological parameters:

- Follicular epithelial lining
- Severity of epithelial inflammation (mild, moderate, and severe)
- epithelial rest in connective tissue
- myxomatous change in connective tissue
- Epithelial hyperplasia
- Presence of salivary gland

Results: Fifty impacted teeth were radiographically analyzed for pericoronal radiolucency. They are surgically removed and histopathological examination of impacted teeth was carried out. Radiographic findings were correlated for each patient with the histologic findings, and the data were analyzed.

Table 1: Distribution of Patients with Impacted Third Molar according to age group and gender

Age(year)	Male		Female		Total	
	No	%	No	%	No	%
15-20	4	50	4	50	8	16
21-25	16	51.61	15	48.39	31	62
26-30	4	50	4	50	8	16
31-35	1	50	1	50	2	4
36-40	0	0	1	100	1	2
Total	25	50	25	50	50	100

All patients were from 15-40 years age range. 8(16%) [4 male and 4 female] patients were from age group of 15-20 years, 31(62%)[16 male and 15 female] patients were from age group of 21-25 years, 8(16%)[4 male and 4 female] patients were from age group of 26-30 years, 2(4%)[1 male and 1 female] patients were of 31- 35years of age group and 1(2%)[1 male] patients were of 36-40 years age group. (Table 1)

Table 2: Distribution of patients according to the age groups and tooth position of impacted mandibular third molar

Age (in Years)	Total		Tooth Position							
			Mesioangular		Distoangular		Horizontal		Vertical	
	No	%	No	%	No	%	No	%	No	%
15-20	8	16	0		2	25	1	12.5	5	67.5
21-25	31	62	9	29.03	3	9.68	5	16.12	14	45.17
26-30	8	16	2	25	2	25	1	12.5	3	37.5
31-35	2	4	1	50	0	0	1	50	0	0
36-40	1	2	0	0	0	0	0	0	1	100
Total	50	100	12	24	7	14	8	16	23	46

Out of 50 patients with impacted third molar, 23(46%) had vertical impacted teeth, 12 (24%) had mesioangular impacted teeth, 8(16%) had horizontal impacted teeth and 7(14%) had distoangular impacted teeth.(Table 2)In all age group except 31-35 years of age group vertical impacted teeth were more common than other impacted teeth.

Table 3: Distribution of various age groups and width of pericoronal radiographic width in patients with impacted third molar

Age (in Years)	Total		Radiographic width of pericoronal tissue					
			0.5mm- 1.5mm		1.5mm-2.5mm		2.5mm-3.5mm	
	No	%	No	%	No	%	No	%
15-20	8	16	5	62.5	0	22.58	3	37.5
21-25	31	62	18	58.06	7	25	6	19.36
26-30	8	16	4	50	2	50	2	25
31-35	2	4	1	50	1		0	0
36-40	1	2	1	100	0		0	0
Total	50	100	29	58	10	20	11	22

Out of 50 patients with impacted teeth, 29(58%) had pericoronal radiolucency of 0.5mm-1.5mm width of impacted teeth , 10(20%) had pericoronal radiolucency of 1.5mm-2.5mm width of impacted teeth and 11(22%) had pericoronal radiolucency of 2.5mm-3.5mm width of impacted teeth. (Table 3) In 15-20 years age group, 8 patients had pericoronal radiolucency of 0.5mm-1.5mm width of impacted teeth, 5 had pericoronal radiolucency of 1.5mm-2.5mm width of impacted teeth. In 21-25 years age group, 18 patients had pericoronal radiolucency of 0.5mm-1.5mm width of impacted teeth, 7 patients had pericoronal radiolucency of 1.5mm-2.5mm width of impacted teeth and 6 patients had pericoronal radiolucency of 2.5mm-3.5mm width of impacted teeth. In 26-30 years age group, 4 patients had pericoronal radiolucency of 0.5mm-1.5mm width of impacted teeth, 2 patients had pericoronal radiolucency of 1.5mm-2.5mm width of impacted teeth and 2 patients had pericoronal radiolucency of 2.5mm-3.5mm width of impacted teeth. In 31-35 years age group, 1 patients had pericoronal radiolucency of 0.5mm-1.5mm width of impacted tooth, 1 patients had pericoronal radiolucency of 1.5mm-2.5mm width of impacted tooth. In 36-40 years age group, 1 patient was included who had pericoronal radiolucency of 0.5mm-1.5mm width of impacted tooth. (Table 3)

Table 4: Histopathologic changes according to the position of impacted third molar

	Mesioangular (n=12)	Distoangular (n=7)	Vertical (n=23)	Horizontal (n=8)	Total (n=50)
Follicular epithelial lining					
Epithelium absent	3(25%)	1(14.28%)	8(34.78%)	1(12.5%)	14(28%)
EOE	1(8.33%)	1(14.28%)	3(13.04%)	2(25%)	7(14%)
Squamous	2(16.66%)	3(42.8%)	8(34.78%)	3(37.5%)	16(32%)
EOE+Squamous	6(50%)	2(28.57%)	3(13.04%)	2(25%)	13 (26%)
Epithelial hyperplasia					
Present	8(66.66%)	5 (71.42%)	11(47.82%)	5(62.5%)	29(58%)
Inflammation of Connective tissue					
Mild	8(66.66%)	0(0%)	8(34.78%)	2(25%)	18(36%)

Moderate	0(0%)	4(57.14%)	8(34.78%)	4(50%)	16(32%)
Severe	4(33.33%)	3(42.85%)	7(30.43%)	2(25%)	16(32%)
Epithelial Rest in Connective tissue					
Present	11(91.66%)	4(57.14%)	19(82.60%)	5(62.5%)	39(78%)
Absent	1(8.33%)	3(42.85%)	4(17.39%)	3(37.5%)	11(22%)
Myxomatous changes in connective tissue					
Present	10(83.3%)	2(28.57%)	10(43.4%)	5(62.50%)	27(54%)
Absent	2(16.6%)	5(71.43%)	13(56.52%)	3(37.50%)	23(46%)
Salivary Gland					
Ductal hyperplasia	1(8.33%)	1(14.28%)	2(8.69%)	0	4(8%)
Mucous acini	1(8.33%)	0	1(4.34%)	0	2(4%)

Out of 50 patients, 7(14%) patients had EOE, 16(32%) patients had squamous lining and 13(26%) had EOE and squamous lining while in 14(28%) patients follicular epithelial lining is absent. 27 out of 50(54%) patients with impacted teeth showed myxomatous changes in connective tissue. In 39(78%) patients out of 50 patients epithelial rests were present in connective tissue. In 29(58%) patients out of 50 patients epithelial hyperplasia were present in connective tissue. Out of 50 patients, 18(36%) patients showed mild inflammation in connective tissue and 16(32%) patients showed moderate and severe inflammation each. Salivary gland was found in 6 patients out of which 4 patients showed ductal hyperplasia and 1 patient showed mucous acini. (Table 4)

Out of 14(28%) patients with follicular epithelial lining absent, 8 patients had vertical impacted teeth, 3 patients had mesioangular impacted teeth. It was absent in both distoangular and vertical impacted teeth – 1 patient each. EOE maximum present 3 out of 7 patients in vertical impacted teeth. 8 patients with vertical impacted teeth, 3 patients with distoangular and horizontally impacted teeth and 2 patients with mesioangular impacted teeth showed squamous metaplasia. Epithelial hyperplasia is present in 71.42% distoangular (5 out of 7 teeth) impacted teeth followed by mesioangular impacted teeth (66.66%), horizontal impacted teeth (62.5%) and vertical impacted teeth (47.82%). Severe inflammation is present maximum in distoangular teeth (42.85%) followed by mesioangular impacted teeth (33.33%), vertical impacted teeth (30.43%) and horizontally impacted teeth (25%) respectively. Moderate inflammation is more commonly present in distoangular (57.14%) and horizontal (50%) impacted teeth. Mild inflammation was more commonly present in mesioangular impacted teeth. (Table 4)

Myxomatous changes in connective tissue is more commonly present in mesioangular impacted teeth (83.3%) followed by horizontally impacted teeth (62.50%), vertical impacted teeth (43.4%), and distoangular impacted teeth (28.57%) respectively. Epithelial rest in connective tissue is more commonly present in mesioangular impacted teeth (91.66%) followed by vertical impacted teeth (82.60%), horizontally impacted teeth (62.5%) and distoangular impacted teeth (57.14%) respectively. Ductal hyperplasia is present in 8.69% vertically impacted teeth, 14.28% distoangular impacted teeth and 8.3% mesioangular impacted teeth. Mucous acini is present in mesioangular and vertical impacted teeth- 1 tooth each. (Table 4)

Discussion:

The third molar region has the highest incidence of developmental anomalies and the odontogenic cysts and epithelial odontogenic tumours which illustrate the potential of the dental lamina in this location, therefore there is general agreement by dentists and dental specialist that the presence of disease associated with impacted 3rd molar teeth is an indication for their removal which are the most common teeth to be impacted in the oral cavity. Its prophylactic removal remains always controversial. There is currently very little scientific evidence to support routine removal of impacted 3rd molar teeth for prevention of disease. If there is disturbance during eruption of teeth, it is apparent that certain pathologic changes occur in the covering follicular tissue.⁶

Stanley et al (1988) reported that some type of pathological change can be expected eventually in approximately 12% of an impacted third molar population and 1.82% of the general population and because of this reappraisal of routine removal of symptomatic third molar might be indicated. In view of this the present study was carried out to determine the pathologic latency of pericoronal tissue of impacted third molar.³

The highest incidence of impacted third molar in the age groups 21-25 year which is 62% in present study which is in accordance of study done by Taiseer Hussain et al⁷ who also found largest number (39%) of impacted mandibular third molars were extracted from patients between 20 and 25 years of age. In contrast to that Rakprasitkaul (2001)⁸ reported highest incidence of impacted third molar in 11-20 years of age and was 42.3% which was not correlated with the present study. In the present study, vertical impaction was found in 46% patients, mesioangular impaction in 24% patients, horizontal impaction in 16% patients and distoangular impaction in 14% patients. Similar results also seen in study done by Morris and Jerman (1971)⁹ found vertical impaction in

54.5% patients, followed by mesioangular impaction in 27.7% patients. In contrast to present study, Eliasson et al (1989)¹⁰ noticed predominant horizontal position in 41% patients, Anand et al¹¹ noticed predominant mesioangular position in 57% patients and M Eshghpour¹² who reported 48.67% patients with mesioangular impacted teeth. Sutas Rakprasitkul⁸ found in his study that the incidence of pathologic conditions was higher than that of normal conditions in all third molar positions and in younger patients, normal tissue was more commonly found, but in patients older than 20 years, the incidence of pathologic tissue was higher than the incidence of normal tissue.

In the present study 58% patients are having impacted teeth with 0.5-1.5mm width of pericoronal radiolucency followed by 22% patients with impacted teeth with 2.5mm-3.5mm width and 20% patients with impacted teeth with 1.5mm-2.5mm width. Only 1 patient is present with 1.5-3.5mm width in age group of 31-40 years which suggests that as the age advances the pericoronal radiolucency does not increase with age. Eliasson et al found that the relative frequency age of such pericoronal changes remain constant.¹⁰

In the present study 14% patients have EOE, 32% patients have squamous lining and 26% patients have EOE and squamous lining, in contrast to study done by Conklin and Stafne (1949)¹³ reported squamous lining in 64% follicle which was double than the present finding. EOE with squamous lining is present 50% of mesioangular impacted teeth (6 impacted teeth out of 12 impacted teeth). Presence of epithelium was present in Forty-five (90%) specimen and only 5 (10%) specimens were devoid of epithelium, 31 (68.9%) showed REE and 14 (31.1%) showed SSE in study done by Naqoosh Haidry et al.¹⁴ Epithelial hyperplasia is also common in mesioangular and distoangular impacted teeth. Presence of epithelium was present in 87.8% patients, squamous epithelium was present in 51.2% patients, reduce enamel epithelium was present in 36.5% patients and epithelial hyperplasia was present in 14.6% patients in study done by Vijyalakshmi et al.¹⁵ Mild inflammation is found in 66.66% mesioangular impacted teeth, moderate inflammation is found in 57.14% distoangular impacted teeth and 50% of horizontally impacted teeth. Severe inflammation is found more common- 42.85% of distoangular impacted teeth. Inflammation was present in 34 (68%) cases and was absent in 16 (32%) cases in study done by Naqoosh Haidry et al.¹⁴ Inflammation was found in 24.3% patients and myxomatous tissue was present in study done by Vijyalakshmi et al.¹⁵ presence of lining epithelium was noted in 87.8% of the follicles. Of this, reduced enamel epithelium was present in 36.5% (out of 41 follicles) of the follicles and absence of epithelium was found in 12.19% in study done by Vijyalakshmi et al.¹⁵ Adav et al. found a significant relationship between increase in patients age and inflammation of dental follicle. It seems that the longer the follicular tissue remains in bone, larger the possibility of an inflammatory reaction within connective tissue.¹⁴ 85 cases (58%) showed fibrous or myxomatous connective tissue in study done by Anand et al.¹² Damante and Fleury noted that the loss of epithelium may have resulted from the ameloblast cell adherence to the enamel cuticle, which detaches from parts of the specimen during surgical treatment. A Esen et al noted that when asymptomatic impacted third molars become symptomatic, not only squamous metaplasia but also severity of inflammation significantly increase in their study.¹⁷ Cabbar et al.¹⁸ also reported that the mesenchymal cell inflammation upregulate the cell turnover of odontogenic epithelium and lead to proliferation, and they concluded that inflammation might be effective in squamous changes. Squamous metaplasia was present in 30 out of 83 patients; mesenchymal inflammation was present in 82% patients (68 out of 83 patients) with severe inflammation in 40% patients (33 out of 83 Patients) and mild inflammation in 42% patients (35 out of 83 Patients) in study done by A Ensen et al. John Adelsperger et al¹⁹ reported 34% specimen showed squamous metaplasia suggestive of cystic change equivalent to that found in dentigerous cysts. David Moraes et al²⁰ reported in their study that transformation of the reduced epithelium into squamous epithelium with maturation of the follicle and consequently with increasing age was statistically significant in study. Curran et al. concluded that any follicle with squamous epithelium should be regarded as a dentigerous cyst.²¹ Myxomatous changes were present in 78% patients (65 out of 83 patients) in study done by A Ensen et al.¹⁷

When the diameter of a pericoronal space is greater than 2.5 mm on an intraoral radiograph and greater than 3 mm on a panoramic radiograph, pathosis is suggested, and if the radiopaque border, representing the surrounding cortical plate, is not well-defined, this is also a sign of pathologic change. The differential diagnosis of pericoronal radiolucencies include enlarged follicular space, dentigerous cyst, odontogenic keratocyst, unicystic ameloblastoma, adenomatoid odontogenic tumour, calcifying cystic odontogenic tumour, and ameloblastic fibroma. Other rare lesions such as odontogenic fibroma, odontoma in premineralized stage, and odontogenic fibroma may also be encountered as pericoronal radiolucencies. Anand et al concluded in their study that unerupted third molars with pericoronal radiolucency of <2.5 mm should be retained since they do not exhibit cyst formation microscopically.¹¹

Conclusion:

Further clinical studies are required on large sample size to confirm these findings. It is suggested for clinical and radiographic follow-up of impacted third molars. It is also recommended that histopathological analysis of the follicle should be conducted on all surgically extracted third molar teeth.

References:

1. Cutright DE. Histopathologic findings in third molar opercula. *Oral Surg Oral Med Oral Pathol.* 1976 Feb; 41(2):215-24.
2. Eliasson S, Heimdahl A, Nordenram A. Pathological changes related to long-term impaction of third molars. A radiographic study. *Int J Oral Maxillofac Surg.* 1989 Aug; 18(4):210-2.
3. Stanley hr, Krogh h, Pannkuk e. Age changes in the epithelial components of follicles (dental sacs) associated with impacted third molars. *Oral Surg Oral Med Oral Pathol.* 1965 Jan;19:1 28-39.
4. Farah CS, Savage NW. Pericoronal radiolucencies and the significance of early detection. *Aust Dent J.* 2002 Sep; 47(3):262-5.
5. Vigneswaran AT, Shilpa S. The incidence of cysts and tumors associated with impacted third molars. *J Pharm Bioallied Sci.* 2015 Apr;7(Suppl 1):S251-4.
6. Glosser JW, Campbell JH. Pathologic change in soft tissues associated with radiographically 'normal' third molar impactions. *Br J Oral Maxillofac Surg.* 1999 Aug; 37(4):259-60.
7. Al-Khateeb TH, Bataineh AB. Pathology associated with impacted mandibular third molars in a group of Jordanians. *J Oral Maxillofac Surg.* 2006 Nov; 64(11):1598-602.
8. Rakprasitkul S. Pathologic changes in the pericoronal tissues of unerupted third molars. *Quintessence Int.* 2001 Sep;32(8):633-8.
9. Morris CR, Jerman AC. Panoramic radiographic survey: a study of embedded third molars. *J Oral Surg.* 1971 Feb; 29(2):122-5.
10. Eliasson S, Heimdahl A, Nordenram A. Pathological changes related to long-term impaction of third molars. A radiographic study. *Int J Oral Maxillofac Surg.* 1989 Aug; 18(4):210-2.
11. Teginamani AS, Prasad R. Histopathologic evaluation of follicular tissues associated with impacted lower third molars. *J Oral Maxillofac Pathol* 2013; 17:41-4.
12. Eshghpour M, Nezadi A, Moradi A, Shamsabadi, RM,aRezaei NM, Nejat A. Pattern of mandibular third molar impaction: A crosssectional study in northeast of Iran. *Niger J Clin Pract* 2014; 17:673-7.
13. Conklin Ww, Stafne Ec. A study of odontogenic epithelium in the dental follicle. *J Am Dent Assoc.* 1949 Aug;3 9(2):143-8.
14. Haidry N, Singh M, Mamatha NS, Shivhare P, Girish HC, Ranganatha N, *et al.* Histopathological evaluation of dental follicle associated with radiographically normal impacted mandibular third molars. *Ann Maxillofac Surg* 2018;8: 259-64.
15. Kotrashetti VS, Kale AD, Bhalaerao SS, Hallikeremath SR. Histopathologic changes in soft tissue associated with radiographically normal impacted third molars. *Indian J Dent Res* 2010; 21: 385-90.
16. Damante JH, Fleury RN. A contribution to the diagnosis of the small dentigerous cyst or the paradental cyst. *Pesqui Odontol Bras.* 2001 Jul-Sep; 15(3):238-46.
17. Esen A, Isik K, Findik S, Suren D. Histopathological evaluation of dental follicles of clinically symptomatic and asymptomatic impacted third molars. *Niger J Clin Pract* 2016;19:616-21
18. Cabbar F, Güler N, Comunoglu N, Sençift K, Cöloglu S. Determination of potential cellular proliferation in the odontogenic epithelia of the dental follicle of the symptomatic impacted third molars. *J Oral Maxillofac Surg* 2008; 66: 2004- 11.
19. Adelsperger J, Campbell JH, Coates DB, Summerlin DJ, Tomich CE. Early soft tissue pathosis associated with impacted third molars without pericoronal radiolucency. *Oral Surg Oral Med Oral Pathol Oral RadiolEndod* 2000; 8 9: 402- 6.
20. de Oliveira DM, de Souza Andrade ES, da Silveira MM, Camargo IB. Correlation of the radiographic and morphological features of the dental follicle of third molars with incomplete root formation. *Int J Med Sci.* 2008 Feb 8;5(1):36-40.
21. Curran AE, Damm DD, Drummond JF. Pathologically significant pericoronal lesions in adults: Histopathologic evaluation. *J OralMaxillofac Surg* 2002;60: 613-617.