

# COMPARISON OF RADIOGRAPHIC PATTERN OF ODONTOGENIC PATHOLOGIES OF CHILDREN AND ADULT PATIENTS: A RETROSPECTIVE REVIEW OF HOSPITAL RECORD

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## ABSTRACT

**Objective:** To compare radiographic pattern of odontogenic Pathologies of patients up to 18 years and above 18 years.

**Materials and Methods:** This retrospective comparative study was conducted in the department of oral and maxillofacial surgery Khyber College of dentistry Peshawar. All patients below 18 years of age, operated in the department of oral and maxillofacial surgery for benign odontogenic pathologies (Ameloblastoma, Radicular cyst, Dentigerous cyst and keratocyst) from January 2016 to December 2019 were included in the study.

**Results:** Total 70 patients included in the study. Male female ratio was 1:1.05. Most common pathology in young age group was dentigerous cyst (71.4%) while in adult it was Ameloblastoma (51%). Cross tabulation of age group with nature of pathology, appearance on OPG, Cortical demarcation, root resorption and site of pathology was done. Unilocular appearance was showed by 60% of radicular cyst 88% dentigerous cyst and 50% Keratocyst in young patients 51% cases in children and 40% cases in adults showed not tooth relation. P value was non-significant for this relation.

**Conclusion:** Young and old age patients differ in nature of odontogenic pathologies and some of its characteristics. It is therefore recommended to conduct similar study with large sample size so that a clear relation of all variable can be established.

**Keywords:** Odontogenic Pathologies, Ameloblastoma, dentigerous cysts, radicular cyst, keratocyst

## INTRODUCTION

Tooth related jaw bone disease can be divided into odontogenic cyst and tumours. Odontogenic cyst are classified as inflammatory and developmental. Inflammatory cysts include radicular cyst while developmental cyst include dentigerous and keratocyst. Odontogenic tumours comprises a group of lesions that arises from odontogenic tissue.<sup>2</sup> They range from hamartomatous or nonneoplastic tissue proliferations to malignant neoplasms with metastatic

capacity.<sup>3</sup> A review of the literature revealed that odontogenic tumors accounted for between 1.0% and 30.0% of oral lesions.<sup>4</sup> Ameloblastoma is a benign but locally aggressive epithelial neoplasm that is one of the most common odontogenic tumors.<sup>5</sup>

For diagnosis of oral and maxillofacial diseases, clinical and radiological data play an important role. Good clinical and radiological examination can lead to successful diagnosis.

Orthopantomogram is useful for diagnosis of problems associated with maxilla and mandible.<sup>6</sup>

Cysts appear radiologically as well defined radiolucent areas within the bone. Although most cysts have a sclerotic rim, severe underlying inflammation

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may result in a decreased degree of sclerosis.<sup>7</sup>

The adult and the child/adolescent populations are different in many ways, not only because of their sizes. It is known, for example, that children and adolescents are more often target by certain lesions.<sup>8</sup>

Considering the unavailability of literature on the radiographic pattern comparison of children/adolescent (below 18 years) and adult this retrospective study is conducted on orthopantomograph.

The rationale of the study is to provide data for radiographic pattern of benign odontogenic cyst and tumour on the basis of patient’s age group. This will help the clinician for successful diagnosis and on time management of different pathologies.

**MATERIALS AND METHODS**

This retrospective comparative study was conducted in the department of oral and maxillofacial surgery Khyber college of dentistry Peshawar after approval of Ethetical Review Committee of hospital. All patients below 18years of age ,operated in the department of oral and maxillofacial surgery for benign odontogenic pathologies Ameloblastoma, Odontome, Radicular cyst, Dentigerous cyst and keratocyst) from Janurary 2016 to December 2019 were included in the study. Data was collected in specially designed performa. The patient biodata ,radiographic pattern of pathology e.g site, Jaw invove, Borders outline, involvement of teeth and its resoption and displacement and histopathological report of pathology were recorded. The data was analysed by SPSS version 20 by descriptive statistics. Chi square test was used to compare the results. For gender male and female ration was calculated. Stratification with respect to age group, type of pathology, radiographic pattern was done .P value ≤ 0.05 was taken as significant .The data was presented in the form of charts, graphs and tables.

**RESULTS**

Total 70 patients were included in study. 35 patients were up to 18years of age and 35 were above

18years. Male female ratio was 1:1.05. In patients up to 18years of age most common pathology was dentigerous cyst (71.4%) while in patients above 18 years most common pathologies was Ameloblastoma (51%). P value (0.000) was significant for type of pathology between two age groups. (Tab 1)

Cross tabulation of nature and borders of pathology and age was done and P value (0.57) was non-significant for two age groups. (Table 2)

Relation of Age, Nature of pathology and appearance of lesion on OPG. On OPG x-ray odontogenic pathologies of both age groups shows either unilocular (P value 1.4), Multilocular (P value 2.1) or mixed density radiolucency (P value 0.4) so P value was non significant. (Table 3)

Tooth relation with pathology and age cross tabulation was done. Impacted tooth was associated in both age groups (P value 0.85). 32% dentigerous cyst showed unerupted teeth while there was no other pathology associated with unerupted teeth in younger age. (Table 4)

Relation of root resoption with age and pathology done and rot resoption was present in all pathologies in both groups but with different percentages’ P value was 0.12 which was non -significant. (Table 5)

Relation of site of pathology and age was done. P value was non -significant (Table 6)

**DISCUSSION**

In our study total 70 patients data collected. Patients were divided in two age groups. One group was up to 18 years of age (children) and other was above 18 years. Male to female ratio was 1:1.18 in age group of up to 18years of age and in above 18 years age male female ratio was 1.3:1.

In our study in children age group most common benign pathology was dentigerous cyst, followed by radicular cyst, keratocyst and Ameloblastoma. Our study results are similar to the study done by Ha Wa, Kelloway in which dentigerous cyst was

**Table 1: Age Histopathology Cross tabulation**

		Histopathology				Total	P value
		Ameloblastoma	Radicular Cyst	Dentigerous Cyst	Keratocyst		
Age	up to 18years age	1 (2.85%)	5 (14.2%)	25 (71.4%)	4 (11.4%)	35	0.000
	above 18years age	18 (51%)	9 (25.7%)	3 (8.5%)	5 (14.2%)	35	

**Table 2: Cross Tabulation of Nature of pathology and borders of pathology**

Borders of pathology	Histopathology				P value
	Ameloblastoma	Radicular Cyst	Dentigerous Cyst	Keratocyst	
Well defined					0.22
i) Up to 18 years	0(0%)	5(100%)	19(76%)	4(100%)	
ii) Above 18years	10(55.56%)	8(88.9%)	3(100%)	5(100%)	
Ill defined					1.2
i) Up to 18years	1(100%)	0	6(24%)	0	
ii) Above 18years	8(44.4%)	1(11%)	0(0%)	0	

**Table 3: Cross tabulation of radiolucency**

Radiolucency	Age	Ameloblastoma	Radicular cyst	Dentigerous cyst	Keratocyst	P value
Unilocular	Up to 18years	0(0%)	3 (60%)	22 (88%)	2 (50%)	1.4
	Above 18years	1(5.6%)	6 (66.7%)	3 (100%)	4 (80%)	
Multilocular	Up to 18year	0 (0%)	0 (0%)	3 (12%)	0	2.1
	Above 18years	14 (77.78%)	3 (33.3%)	0 (0%)	1 (20%)	
Mixed density	Up to 18 years	1 (100%)	2 (40%)	0 (0%)	2 (50%)	0.4
	Above 18years	3(16.7%)	0 (0%)	0 (0%)	0 (0%)	

**Table 4: Tooth relation cross tabulation**

Tooth relation	Age	Ameloblastoma	Radicular cyst	Dentigerous cyst	Keratocyst	P value
No relation	Up to 18 years	1(100%)	5 (100%)	10 (40%)	2 (50%)	1.73
	Above 18years	15 (83.3%)	8 (89%)	2 (66.7%)	4 (80%)	
Impacted tooth	Up to 18years	0 (0%)	0 (0%)	7 (28%)	2 (50%)	0.85
	Above 18 years	3 (17%)	1 (11%)	1 (33.33%)	1 (20%)	
Un-erupted tooth/ Teeth	Up to 18 years	0 (0%)	0 (0%)	8 (32%)	0 (0%)	
	Above 18years	0 (0%)	0 (0%)	0 (0%)	0 (0%)	

**Table 5: Root resorption cross tabulation**

Root resorption	Age	Ameloblastoma	Radicular cyst	Dentigerous cyst	Keratocyst	P value
Yes	Up to 18 year	1 (100%)	3 (60%)	18(72%)	4 (100%)	0.12
	Above 18 years	5 (27.8%)	2 (22%)	2 (66.7%)	1(20%)	
No	Up to 18years	0(0%)	2(40%)	7(28%)	0(0%)	0.21
	Above 18years	13(72%)	7(77.8%)	1(33%)	4(80%)	

more common than radicular which and keratocyst.<sup>9</sup> In age group above 18 most common odontogenic pathology was Ameloblastoma (50%) followed by radicular cyst (25.7%), keratocyst (14.2%) and dentigerous cyst (8.5%). Common odontogenic pathology in adult is Ameloblastoma (odontogenic tumour) while in children it was dentigerous cyst (odontogenic cyst).

Borders of pathology were noted on OPG x-ray and keratocyst and radicular cyst shows well defined borders in 100% cases while 76% of dentigerous cyst shows well defined borders in children. No single study available to show all the variable which include in our study but different case report correlate with our study results such as study done by Priyesh Kes-harwani and colleagues that radicular cyst in children

Table 6: Site of pathology

Site of pathology	Age	Ameloblastoma	Radicular cyst	Dentigerous cyst	Keratocyst	P value
Maxilla	Up to 18years	0	2 (40%)	5 (20%)	2 (50%)	4.5
Anterior	Above 18years	0	4 (44.44%)	1 (33.3%)	0	
Posterior	Up to 18years	0	2 (40%)	4(16%)	0	5
	Above 18years	0	3 (33.33%)	0	1 (20%)	
Crossing mid-line	Up to 18years	0	0	1(4%)	0	2
	Above 18years	1(5.56%)	0	0	0	
Mandible	Up to 18years	0 (0%)	1 (20%)	6 (24%)	0	7.6
Anterior	Above 18years	1(5.56%)	1 (11.1%)	0	1 (20%)	
Posterior	Up to 18years	1 (100%)	0	8 (32%)	0	19
	Above 18years	14 (77.7%)	1 (11.11%)	1 (33.3%)	3 (60%)	
Crossing mid-line	Up to 18years	0	0	1 (4%)	2 (50%)	4
	Above 18years	2(11%)	0	1 (33.3%)	0	

shows well defined borders,<sup>10</sup> In adult above 18years of age group shows 88% cases of radicular cyst have well defined borders as compare to 100% cases well defined borders in population younger than 18years similar result shown by studies done by Fernanda Mafei<sup>11</sup>, and Y Ramkrishna<sup>12</sup> both studies showed well defined borders of radicular cyst in young patients. In Children group has 76% dentigerous cyst has well defined borders but above 18 years 88% cases shows well defined borders similar with the studies done by Scholl, Zhang and Teareuch that dentigerous cyst has well defined borders in most cases<sup>13-16</sup>. Keratocyst of children and above 18years both groups 100% cases shows well defined borders. In children well defined borders of Ameloblastoma were 0%, while in above 18years of age well defined borders of Ameloblastoma were 5%. This difference in borders of Ameloblastoma in different age group may be due to difference in sample size as in our study in children age group only one case of Ameloblastoma reported which shows ill -defined borders.

On OPG x-ray odontogenic cyst present as Unilocular radiolucency in children age group were 60% of radicular cyst , 88% of dentigerous and 50% of keratocyst were while in age group above 18years, 66.7% of radicular cysts, 100% of dentigerous cyst and 80% of keratocyst were Unilocular radiolucency also 5.6% of Ameloblastoma in above 18years were Unilocular radiolucent in presentation. Our results are similar to studies done by Scholl, Zhang and Teareuch<sup>13-16</sup> that most dentigerous cyst

present as unilocular radiolucency on OPG x-ray. Radio graphically , radicular cyst appears as a well-defined unilocular radiolucency.<sup>17</sup> According to the study done by Joen Iannuci Keratocyst mostly appear as unilocular radiolucency.<sup>18</sup>

Multilocular radiolucent presentation of cystic lesions in upto 18years of age were 12% of dentigerous cysts which is similar with finding of case report by Carla Patricia<sup>19</sup> and Scholl RJ<sup>14</sup> That although most dentigerous cyst present as Unilocular but rarely present as Multilocular radiolucency feature on the OPG x-ray. This is probably due to the cyst growth in areas of different bone densities . While in above 18 years 33% radicular cysts and 20% of keratocyst were Multilocular radiolucent 77.8% Ameloblastoma also Multilocular radiolucent. Our study results are similar with study done by Joen Innaci<sup>18</sup> for keratocyst and similar to that reported by Narsapur Sulabha A et al., and Lustmann J et al., that apart from the usual unilocular radiolucency, there has been very few cases reported of radicular cyst with multi-locular radiolucency.<sup>21-22</sup> Mixed density radiolucency in up to 18 years of patients were 100% in Ameloblastoma, 40% radicular cyst and 20% of keratocyst. In above 18years patients of 16% Ameloblastoma has mixed appearance. Tooth relation with pathology and age noted on OPG x-ray. There was no relation of any tooth in 100% of Ameloblastoma and radicular cyst while 40% of dentigerous and 50% of keratocyst were associated with teeth in patient age up to 18years. While in above

18years age group patients 83% of Ameloblastoma, 89% radicular cyst, 66.7% dentigerous cyst and 80% keratocyst found no relation with teeth.

Impacted tooth was associated in 28% dentigerous and 50% keratocyst in patient up to 18 years of age while relation of impacted tooth above 18 years of age were 17% Ameloblastoma, 11% radicular, 33% dentigerous and 20% keratocyst. In 32% Patients having dentigerous unerupted tooth while there was no other pathology associated with unerupted teeth in patients up to 18 years of age.

Root resorption with associated pathology determined and in up to 18years of age 100% of Ameloblastoma and keratocyst, 60% of radicular cyst and 72% of dentigerous cysts associated with root resorption while in above 18years of age 27.8% of Ameloblastoma, 22% radicular cyst, 66.7% dentigerous and 20% of keratocyst showed root resorption on OPG x-ray. Root resorption was more common in young age group as compared to old age Cross tabulation of tooth displacement with age and pathology done and results shows that in patients up to 18 years of age 100% of Ameloblastoma and keratocyst, 20% of radicular cyst and 72% of dentigerous cyst shows tooth displacement while in above 18years of age group 27.8% of Ameloblastoma, 100% of dentigerous cyst shows tooth displacement. A study done by P. Struthers and M. Shear results showed that Ameloblastoma showed more root resorption than cystic lesions.<sup>23</sup>

Site of pathology was determined for up to 18years age group Ameloblastoma was located in posterior mandibular study result are similar with result of study done by Marcela Guerrisi<sup>26</sup> that common location for Ameloblastoma is mandible PS region. Radicular cyst common location of maxilla 40% anterior maxilla and 40% posterior maxilla and 20% cases located in anterior mandible. 40% dentigerous cyst in maxilla (20% anterior maxilla, 16% posterior maxilla and 4% crossing mid line) while 60% cases located in mandible in which 24% located anterior mandible, 32% located posterior mandible and 4% crossing mid line. Our study results are similar with results of study done by Line et al<sup>24</sup> and Mourshed<sup>25</sup> according to these two studies dentigerous cyst most commonly located in mandible. Keratocyst equally distributed in maxilla and mandible, In maxilla common location was anterior maxilla and in mandible

in was crossing the midline.

Above 18years age group Ameloblastoma distribution was 5.56% located in maxilla crossing midline, 95% located in mandible in which 5.56% was in anterior mandible, 77.7% located in posterior mandible and 11% crossing midline of mandible. Radicular cyst distribution 78% in maxilla (44.4% anterior maxilla and 33.3% posterior and 22% in mandible. Dentigerous cyst and keratocyst predilection for mandible. Our study results are similar with study done by Adyen Acikgoz.<sup>26</sup>

## CONCLUSION

Young and old age patients differ in nature of odontogenic pathologies and some of its characteristics. It is therefore recommended to conduct similar study with large sample size so that a clear relation of all variable can be established.

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