Section: Oral Medicine

Original Research Article

# CLINICORADIOGRAPHIC SPECTRUM OF AMELOBLASTOMA: A SINGLE-CENTER STUDY FROM PAKISTAN

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ABSTRACT

**Background:** Ameloblastoma is an odontogenic epithelial tumor, representing 1% of all oral epithelial and 9% of odontogenic tumors. It is a benign slow-growing, locally invasive tumor with a recurrence tendency. The aim of our study was to determine the clinical and radiographic findings of patients presenting with Ameloblastoma at Frontier Dental College Hospital Abbottabad.

**Materials and Methods:** It was a descriptive cross-sectional study conducted in the Oral Surgery department of Frontier Dental College Hospital Abbottabad over a period of six months. A descriptive audit of records of confirmed histopathological test reports of ameloblastoma, and clinical and radiographic findings of all patients during the six months' period were done. A consecutive non-probability sampling technique was used.

**Results:** Records of 170 patients (68.2% male, 31.8% females) were collected. Mandibular lesions (n=149, 87.6%) were more prevalent than maxillary lesions (n=21, 12.4%) with swelling at the affected site, being the most common finding (n=166, 97.6%), followed by mobility of teeth and pain. Radiographically, the multilocular appearance accounted for 118 (69.4%) while a unilocular was present in 52 (30.6%) of the lesions.

**Conclusion:** Majority of Ameloblastoma patients were male and the 3rd decade of life (26-35 yrs) was the most common age group affected. Patients below 40 years comprised 89.4% of cases. Painless swelling was the most common clinical feature reported in ameloblastoma attributing to late diagnosis reinforcing the need of early screening.

**Keywords:** Ameloblastoma; Odontogenic tumor; Mandible tumor; Maxilla tumor; Jaw radiography; Clinical feature.

## INTRODUCTION

Odontogenic tumors originate from the tooth-forming organ, and may be epithelial, connective tissue or mixed; they present with lesions having variable clinical, radiological and histopathological features.[1] Ameloblastoma is one of the most common, benign, slow growing, locally invasive, epithelial odontogenic tumors, representing 1% of oral epithelial tumors and 9% of odontogenic tumors with recurrence tendency due to its variable histological features.[2,3]

Ameloblastoma affects both genders equally with higher prevalence rate in mandible than maxilla and posterior region being dominant.[4,5] Mostly, it presents as asymptomatic, found by routine radiographic examination. It can cause swelling and expansion of the affected site leading to facial disfigurement.[6]

Swelling (98%), tooth mobility (57%) followed by pain (36%), as presenting symptoms and a tendency of maxillary anterior lesions and mandibular posterior region lesions has been described in a previous study.[7] Several studies have shown its

dominance in mandible and radiographic presentation as unilocular and multilocular appearance in ameloblastoma with root resorption has been seen of variable levels.[7]

Oral cavity is histologically lined by non-keratinized stratified squamous epithelium and is versatile due to its functional demands.[8] In 1937, Robinson defined ameloblastoma as a tumor that is usually nonfunctional, uni-centric with intermittent-growth, anatomically benign and clinically persistent.[9] World Health Organization (1991) defined ameloblastoma as "a benign, locally invasive tumor with a higher tendency to recur/relapse, composed of the proliferating odontogenic epithelium lying in a fibrous stroma.[9,10]

Ameloblastoma patients are mostly seen from 20-50 years of age, with peak occurrence in 4th and 5th decades in western population.[10] However, a younger age peak in 3rd decade has been seen in developing world. One study stated a median age of 35.9 years for ameloblastoma patients, with an average age of 39.1 years in developed and 27.7 years in developing countries.[10] Being commonly a central variety that grows within the jaw bone, it appears slow-growing and is asymptomatic at an early stage. Other symptoms may appear later, including pain due to superinfection, regional paresthesia in the exceptional cases, toothache, tooth mobility and oral ulceration. Intraoral bleeding, an unhealed tooth extraction site and swift growth of a lump in the jaw have been described.[11-13] In the rarer maxillary lesions, invasion of the upper jaw, epistaxis or cheek swelling have been reported as the presenting symptoms.[11] Recent studies have identified BRAF V600E and SMO mutations as key drivers in its pathogenesis, opening avenues for targeted therapies.[14,15] The objective of our study was to assess the clinical and radiographic features of Ameloblastoma in patients visiting the hospital.

## MATERIALS AND METHODS

This was a cross-sectional study conducted at Oral Surgery Department of FMDC Hospital, Abbottabad, Pakistan from Nov. 2025 to April 2026. Consecutive non-probability sampling technique was used. The WHO sample size calculator was used with 95% confidence level, a 19% proportion based on a previous study, and a margin of error 6.5%; the sample size calculated was 170. All male and female, histopathologically confirmed cases of ameloblastoma, aged 18 to 55 years, visiting the oral surgery department were included in the study; whereas recurrent cases of ameloblastoma were excluded, as recommended by recent reporting guidelines for odontogenic tumors.[16]

Study was preapproved by the college IRB (Ref No. FMDC/IRB/2025/51) and patients signed informed consent form. A detailed history was taken, followed by clinical and radiographic examination (PNS, OPG & CT scan). A biopsy (incisional/excisional) was performed under local or the general anesthesia and was evaluated by a single histopathologist to ensure consistency. Data were collected using a proforma to record each patient's details and features.

SPSS version-26 was used for statistical analysis. Frequency and percentages for the categorical variables of clinical features, gender, and radiological findings and mean + SD were calculated for the numerical variables like age. Common radiographic and clinical features were then stratified by gender and age for analysis. Post-stratification chi-square test was done, with a p-value $< 0.05$ considered statistically significant. The collected data were then presented in the form of the tables, bar charts and pictures.

## RESULTS

Records of 170 patients (68.2% male, 31.8% females), aged 18 to 55 years, with ameloblastoma, were included in this study [Figure 1]. The frequency of ameloblastoma by age group is shown in [Table 1]. The most common symptoms in ameloblastoma patients were swelling (n=166, 97.6%), followed by tooth mobility in 88 (51.8%), and pain in only 17(10%) of the cases (12 mild and 5 with moderate pain). Purulent discharge, paresthesia, bleeding on eating, superficial ulceration, and trismus were noted in a small subset of patients. These findings are shown in [Figure 2].

Lesions were more prevalent in the mandible (n=149, 87.6%) than the maxilla (n=21, 12.4%). Mandibular ameloblastoma was more common in the posterior part of mandible while maxilla showed more anterior lesions. No statistical significance was reported between symptoms of the ameloblastoma and age distribution [Table 2]. Similarly, no statistical significance was reported between symptoms of the ameloblastoma and gender [Table 3].

Radiographically, most of the ameloblastoma lesions showed multilocular appearance (118, 69.4%) than compared to unilocular lesions (52, 30.6%). There was no statistical significance between the radiological features and gender (P>0.05) (Table 4). The mean age of patients was 34.2 ± 8.7 years (range: 18-55 years).

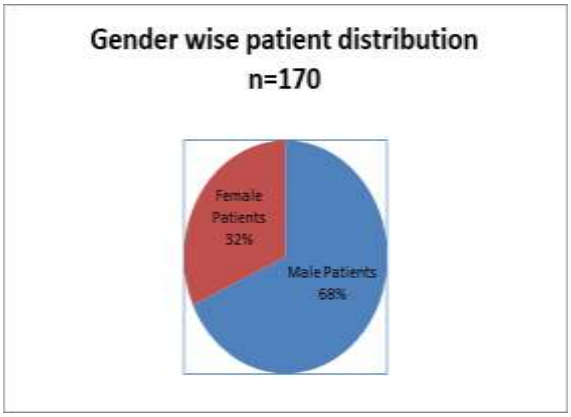


**Figure 1: Gender wise distribution of patients.**

**Table 1: Distribution of Ameloblastoma according to age group**

| Age in years | Frequency (n) | Percentage (%) |
|---|---|---|
| 18-25 | 16 | 9.4 |
| 26-35 | 78 | 45.9 |
| 36-45 | 58 | 34.1 |
| 46-55 | 18 | 10.6 |
| Total | 170 | 100.0 |

**Table 2: Cross Tabulation of Symptoms of the Ameloblastoma with Age.**

| Age (years) | Symptoms | | | | | |
|---|---|---|---|---|---|---|
| | Pain (%) | | Tooth mobility (%) | | Swelling (%) | |
| | Yes | No | Yes | No | Yes | No |
| 18-25 | 1 (6.3 %) | 15 (93.8%) | 6 (37.5%) | 10 (62.5%) | 16 (100%) | 0 (0%) |
| 26-35 | 7 (9.0%) | 71 (91.0%) | 43 (55.1%) | 35 (44.9%) | 78 (100%) | 0 (0%) |
| 36-45 | 5(8.6%) | 53 (91.4%) | 29 (50.0%) | 29 (50.0%) | 57 (98.3%) | 1(1.7%) |
| 46-55 | 4 (22.2%) | 14 (77.8%) | 10 (55.6%) | 8 (44.4%) | 18 (100%) | 0 (0%) |
| Total | 17 (10%) | 153 (90%) | 88 (51.8%) | 82 (48.2%) | 166 (97.6%) | 4 (2.4%) |
| P value | 0.352 | | 0.418 | | 0.284 | |

P-value calculated using Fisher's Exact Test due to small expected cell counts. No statistically significant association found ($p>0.05$)

**Table 3: Cross tabulation of symptoms of Ameloblastoma with gender**

| Gender | Symptoms | | | | | |
|---|---|---|---|---|---|---|
| | Pain | | Tooth mobility | | Swelling | |
| | Yes | No | Yes | No | Yes | No |
| Male (n=116) | 15 (12.9%) | 101(87.1%) | 57 (49%) | 59(51%) | 113(98%) | 3(2%) |
| Female (n=54) | 2 (4%) | 52 (96%) | 31 (57%) | 23(43%) | 53(98%) | 1(2%) |
| Total (N=170) | 17 (10%) | 153 (90%) | 88(51.8%) | 82(48.2%) | 166 (97.6%) | 4(2.4%) |
| P value | 0.089 | | 0.422 | | 0.420 | |

P-value calculated using Fisher's Exact Test.

**Table 4: Gender wise Radiographic Patterns of Ameloblastoma**

| Gender | Radiographic features | | Total | p-value |
|---|---|---|---|---|
| | Unilocular N=52 | Multilocular N=118 | | |
| Male (n=116) | 32(61.5%) | 84 (71.2%) | 116 | |
| Female (n=54) | 20 (38.5%) | 34 (28.8%) | 54 | |
| Total | 52 (100%) | 118 (100%) | 170 | 0.201 |

P-value calculated using Pearson's chi-square test (0.201, not statistically significant

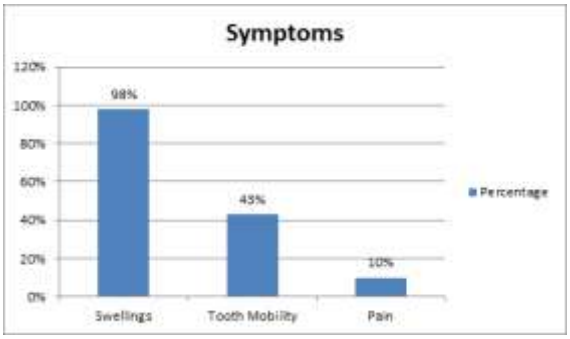


**Figure 2: Percentage of Common symptoms of Ameloblastoma.**

## DISCUSSION

Ameloblastoma is a benign odontogenic tumor of epithelial origin with a higher recurrence rate that shows locally aggressive behavior.[17] It presents 1% of epithelial odontogenic and 9% of oral odontogenic tumors affecting both genders almost equally and is more prevalent in mandible than maxilla.[18,19] It presents three different clinicoradiographic patterns, conventional or multicystic (86%), unicystic (13%) and peripheral (1%).[20] Histologically, it presents two main forms: plexiform and follicular, with other forms including granular, basal, clear cell and acanthomatous variants of ameloblastoma.[20,21] The 2022 WHO classification further refined these subtypes, emphasizing molecular markers for prognostication.[22]

Assessment of the clinical and radiographic features of ameloblastoma in patients was the objective of our study. Few reports have shown that ameloblastoma affects equally to women and men.[19,23] Our current study indicated a slight male predominance, which is similar to findings by Tatapudi et al,[18] while female preponderance is reported in studies from Chile and Mexico.[20,21] The 26 to 35 years' age-group was the most commonly affected, with 78 patients (45.9% of cases), which relates with the findings of Shoor et al,[21] whereas a study by Arotiba et al found the age-group of the patients with ameloblastoma to be between 18 and 19 years (44%).[23] A 2025 meta-analysis confirmed that the third decade is the peak incidence period in low and middle-income countries, while fourth to fifth decades predominate in high-income nations.[25] Our finding of a peak in the third decade aligns with studies from developing nations and contrasts with the fourth to fifth decade peak typically seen in Western cohorts, likely reflecting differences in healthcare access, diagnostic

delays, and potentially genetic or environmental factors.

The literature has shown that ameloblastoma mostly affects the mandible, mainly its posterior region [26]. Most common symptoms found in our study was swelling in 97.6% of cases along with purulent discharge, pain, paresthesia and mobility of tooth. Bleeding due to trauma on eating, superficial ulceration, trismus and an extracted tooth socket that failed to heal were among the less documented symptoms. These findings were similar to those of Kim et al.[27] A small number of patients also presented with a slow growing solitary swelling, which is also consistent with the studies of Simon et al and Adeline et al.[6,28]

Multilocular radiographic findings in 69.4% cases and unilocular lesions in 30.6% cases, with no statistical significance related to gender, were found in our study; most of other studies have also reported similar predominance of multilocular radiolucencies in ameloblastoma.[21] However, a study by kim et al. contradicts our findings; they found 59.2% of lesions to be unilocular with well-demarcated border.[27] Recent studies suggest that multilocularity correlates with higher recurrence risk, although long-term prospective studies are still limited.[16]

A large 2023 multicenter study by Wei et al. confirmed that ameloblastoma in Asian populations presents approximately a decade earlier than in western cohorts.[29] Additionally, advanced imaging guidelines published in 2024 recommend contrast-enhanced CT or MRI for preoperative assessment of maxillary ameloblastomas due to their higher propensity for skull base invasion.[30] Our findings are consistent with Jehan et al., who reported mandibular predominance (84.6%) and multilocular radiolucency (69.2%) in a Pakistani tertiary care hospital.[31] This distribution aligns with recent large cohort studies from South Asia.[24]

**Limitations of the study**

This was a single-center, cross-sectional study with a consecutive sampling technique, which may limit the generalizability of our findings to other populations. The absence of histopathological subtype correlation with radiographic features is another limitation. Additionally, the small sample size in certain age and gender subgroups may have affected the statistical power to detect significant differences. We also did not perform BRAF mutation analysis, which is increasingly recommended for targeted therapy planning.[14,15] Future multicenter studies with larger sample sizes and inclusion of histopathological subtypes are recommended using the 2022 WHO classification criteria.[22]

## CONCLUSION

This study has established that ameloblastoma in selected population was observed more in males compared to females and had a peak in 26-35 years of age group; the patients below 40 years of age comprised the vast majority of the cases (89.4%). Painless swelling being the commonly reported symptom, contributing to delayed diagnosis. Most of the ameloblastomas exhibited multilocular radiographic features. Given the recent advances in molecular profiling, future research should integrate BRAF V600E testing to optimize surgical and medical management.[14,25]

## REFERENCES


1. Oluk-Tekkeşin M, Wright JM. WHO Classification of Odontogenic Lesions. Turk Patoloji Derg. 2018;34(1).
2. Labib A, Adlard RE. Odontogenic Tumors of the Jaws. StatPearls. 2021.
3. Wright JM, Tekkesin MS. Odontogenic tumors. J Istanbul Univ Fac Dent. 2017;51(3 Suppl 1): S10-S30.
4. Black CC, et al. Ameloblastomas of the mandible and maxilla. Ear Nose Throat J. 2018;97(7): E26-32.
5. Liu L, et al. Clinical and pathological analysis of jaw ameloblastomas. Shanghai Kou Qiang Yi Xue. 2015;24(3):338-40.
6. Adeline VL, et al. Clinicopathologic features of ameloblastoma in Kenya. J Craniofac Surg. 2008;19(6):1589-93.
7. Ogunsalu C, et al. A new radiological classification for ameloblastoma. West Indian Med J. 2006;55(6):36-41.
8. Manikkam S, et al. Ameloblastoma. J Pharm Bioallied Sci. 2015;7(Suppl 1): S167-70.
9. Kramer IR, Pindborg JJ, Shear M. WHO Histological Typing of Odontogenic Tumours. 2nd ed. Berlin: Springer; 1992.
10. Vilembwa AL. A 10-year audit of ameloblastoma cases [dissertation]. Nairobi: University of Nairobi; 2006.
11. Tsaknis PJ, Nelson JF. Maxillary ameloblastoma: report of 10 cases. J Oral Surg. 1980;38(5):336-42.
12. Cadavid AM, et al. Ameloblastomas: current aspects. Surg Exp Pathol. 2019;2(1):1-6.
13. Palanisamy JC, Jenzer AC. Ameloblastoma. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2021.
14. Brown NA, Betz BL. BRAF V600E mutation in ameloblastoma: diagnostic and therapeutic implications. Mod Pathol. 2023;36(4):100086.
15. Kurppa KJ, Catón J, Morgan PR, et al. High-frequency SMO mutations in ameloblastoma: a systematic review. J Dent Res. 2024;103(2):123-131.
16. Ahmed S, Khan AA, Malik SA. Reporting standards for odontogenic tumors in low-resource settings: a 2025 consensus statement. Oral Surg Oral Med Oral Pathol Oral Radiol. 2025;139(1):55-62.
17. Avelar RL, et al. Odontogenic tumors: clinical and pathologic study of 238 cases. Braz J Otorhinolaryngol. 2008;74(5):668-73.
18. Tatapudi R, et al. Prevalence of ameloblastoma in a tertiary care hospital in South India. J Indian Acad Oral Med Radiol. 2014;26(2):145-6.
19. Santos JN, et al. Odontogenic tumors: analysis of 127 cases. Pesqui Odontol Bras. 2001;15(4):308-13.
20. Ochsenius G, et al. Odontogenic tumors in Chile: a study of 362 cases. J Oral Pathol Med. 2002;31(7):415-20.
21. Shoor H, et al. Clinical, radiographic and histopathologic features of ameloblastoma. Int J Sci Stud. 2011; 2:83-8.
22. Solomon LW, Vered M, Bilodeau EA, Wright JM. Odontogenic tumors: key changes in the 2022 WHO classification. Head Neck Pathol. 2022;16(1):46-58.
23. Arotiba GT, et al. Ameloblastoma in Nigerian children and adolescents: a review of 79 cases. J Oral Maxillofac Surg. 2005;63(6):747-51.
24. Hassan S, Riaz N, Awan S. Clinical patterns of ameloblastoma in South Asia: a pooled analysis of 11 institutional cohorts. J Oral Pathol Med. 2024;53(3):178-186.
25. Martins-Chaves RR, Gomes CC, Gomez RS. Immunohistochemical and molecular markers in ameloblastoma: a 2025 meta-analysis. Oral Dis. 2025;31(2):456-468.

26. Pereira FdAC, et al. Ameloblastomas in Bahia, Brazil: a clinicopathologic study of 81 cases. Rev Odonto Cienc. 2010;25(3):250-5.
27. Kim S-G, Jang H-S. Ameloblastoma: a clinical, radiographic, and histopathologic analysis of 71 cases. Oral Surg Oral Med Oral Pathol Oral Radiol Endod. 2001;91(6):649-53.
28. Simon EN, et al. Odontogenic tumors in Tanzania: a study of 87 cases. Oral Surg Oral Med Oral Pathol Oral Radiol Endod. 2005;99(5):598-602.
29. Wei S, Wang L, Zhang B, et al. Age distribution of ameloblastoma in Asian versus Western populations: a multicenter study of 1,204 cases. Int J Oral Maxillofac Surg. 2023;52(8):845-852.
30. Patel V, Clark S, Fernandez R. Advanced imaging guidelines for odontogenic tumors: AJR expert panel narrative review. AJR Am J Roentgenol. 2024;222(5): e2330578.
31. Jehan R, Asher T, Adeel M, Shoaib M, Rizwan M, Jabeen N, Noor A. Radiographical and Clinical Features of Ameloblastoma Among Patients Visiting the Tertiary Care Hospital. Pakistan Journal of Medical and Health Sciences. 2022;16(5):183. doi:10.53350/pjmhs22165183.