Conservative Surgical Management of Conventional Ameloblastoma in Children and Young Adults: Clinical and Radiological Outcomes from a Case Series

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ABSTRACT

Background: Although radical resection of ameloblastoma minimizes recurrence, it often results in significant morbidity. Conservative surgery has gained attention, particularly in children, for preserving mandibular integrity and function.The objective of the study was to present the clinical and radiological outcomes of conservative surgical management of mandibular conventional ameloblastoma in children and young adults.

Case Series: Three patients aged 11–14 years with histologically confirmed conventional ameloblastoma of the mandible underwent conservative management via intraoral enucleation and curettage. Preoperative clinical and radiological assessments were performed, and follow-up was conducted for up to five years (mean: two years). Postoperative bone regeneration, functional recovery, and recurrence were evaluated. All cases involved the mandibular molar–ramus region and presented as painless swellings with multilocular radiolucencies. Conservative surgical treatment resulted in satisfactory healing and spontaneous bone regeneration, evident by the third postoperative month. Mandibular contour and function were fully restored, and no recurrence was observed during follow-up.

Conclusion: Conservative surgical management of conventional ameloblastoma can be effective in well-selected pediatric and young adult patients. It promotes bone regeneration, preserves mandibular structure, and minimizes the morbidity associated with radical resection.

Keywords: Ameloblastoma, Enucleation, Curettage, Mandible, Bone regeneration, Pediatric, Young adult

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INTRODUCTION

Ameloblastoma is a benign odontogenic tumour of epithelial origin, characterized by slow growth and locally aggressive behavior due to its infiltrative nature within surrounding bone.[1]Although histologically benign, its high recurrence rate particularly when not completely resected results in significant clinical challenges.[2] The tumor predominantly affects the mandible, especially the molar-ramus region, and typically presents during the third to fourth decades of life, with a slight male predilection.[3]The prevalence of ameloblastoma in children and adolescent was in range of 14.6-21.9%.[4,5]The World Health Organization in 2005 classifies ameloblastoma into four variants which include; conventional (multicystic), peripheral (extraosseous), unicystic, and desmoplastic .[6,7] Although unicystic ameloblastoma were seen more in children, solid multicystic lesion are commonly reported in Africa and Asia.[5,8]

The conventional and unicystic forms arise intraosseously, often leading to buccolingual expansion and variable bone resorption, while the peripheral variant originates within the gingiva. These differences in presentation influence both diagnosis and treatment planning. The clinical variants and the extent of the swelling have treatment implications and must be considered in the treatment choice for optimal management of patients. Surgical management remains the cornerstone of treatment, with approaches ranging from conservative to radical. Ameloblastoma can be selectively treated conservatively based on the clinical variant and certain factors that are age related. Conservative surgical techniques such as marsupialization, enucleation, and curettage aim to preserve mandibular integrity and function, particularly in younger patients where long-term quality of life is a priority.[9] The surgical technique employed determines overall recurrence of ameloblastoma. The recurrence rate following radical resection is 10% to 25% while conservative treatment may have recurrence rate of up to 55% to 90% rate.[9] The majority of recurrences are reported to happen within five years of first surgical procedure. Although radical procedures like segmental resection is associated with reduce recurrence, they are associated with significant morbidity, including facial deformity and functional impairment which negatively impact on the oral health related quality of life.[9] Despite growing interest in conservative management of conventional ameloblastoma, especially in pediatric and young adult populations, there is limited documentation on healing progression following such interventions particularly within African cohorts.

This case series aimed to present selected instances of conventional ameloblastoma in the mandible treated conservatively in children and young adults, with emphasis on clinical outcomes, and healing trajectory. By contributing to the existing body of knowledge, this study aimed to refine understanding of conservative surgical management of conventional ameloblastoma.

CASE PRESENTATION

Three patients presented to our facility with a chief complaint of painless, progressive swelling in the lower jaw. The swelling was noticed between 3 to 8 weeks prior to presentation in all the three cases. All cases involved the mandible and are barely noticed because of the size and none reported associated pain or systemic symptoms. Comprehensive clinical, radiological, and histopathological evaluations confirmed the diagnosis of conventional ameloblastoma in each case. The summary of the three cases is presented in table 1 below.

Case 1

ME, a 14-year-old male presented in January 2019 with a chief complaint of painless swelling on the left side of the lower jaw which was noticed 6 weeks prior to presentation. Examination revealed slight buccolingual expansion upon palpation of the buccal and lingual cortical plates of the mandible. There was no tooth mobility in the mandibular left quadrant. Radiographic evaluation (Figure 1A, 1C) revealed a multilocular radiolucency that extended from tooth 36 to the ramus sparing about 1cm of the condyle. An impacted third molar near the lower border of the mandible within a hypodense region of the mandible was noted. Aspiration of the lesion yielded a straw-colored fluid (Figure 1B), consistent with a cystic lesion.

A provisional diagnosis of conventional ameloblastoma was made through clinical, radiological, and histopathological assessment. The patient underwent conservative surgical management via intraoral access so as to eliminate the presence of unaesthetic scar following an extraoral access. The excised tissue was subjected to histopathologic examination to confirm the diagnosis. Follow-up Orthopanthomographs taken

at various intervals showed no evidence of recurrence and demonstrated spontaneous bone regeneration at the surgical site (Figure 1D and 1E). At the three-year postoperative review, clinical examination revealed complete resolution of the swelling and absence of buccal expansion (Figure 1F).

Case 2

SZ, a 13-year-old female presented January 2022 with a painless swelling of left angle and ramus region of the mandible of three and half year's duration. Clinical examination revealed an obvious facial asymmetry with buccolingual expansion, more on the buccal plate (Fig 2A). No tooth mobility was noted in the mandibular left quadrant, although tooth 37 was clinically absent. Radiographic evaluation (Figure 2B), revealed a well-defined multilocular radiolucency extending from the root of tooth 33, posteriorly expanding the ramus and extending to the coronoid process, sigmoid notch, and condylar base. Additional findings included truncation of the apical third of the mesial root of tooth 36, ectopic positioning of tooth 37 inferior to the distal root of tooth 36, and the developing tooth bud of tooth 38 located at the mid-ramus. The lower border was totally compromised.

Table 1: Summary of conventional ameloblastoma treated with conservative surgical approach

Case	Age	Gender	Duration	Site	Radiographic type	Surgery type	Follow up duration	Bone Regeneration	Recurrence
1	14	Male	6 weeks	Left molar ramus region	Multilocular radiolucency	Enucleation and peripheral ostectomy	36 months	Yes	No
2	13	Female	2.5 years	Left molar ramus region	Multilocular radiolucency	Enucleation and peripheral ostectomy	21 months	Yes	No
3	11	Female	4 weeks	Left molar ramus region	Multilocular radiolucency	Enucleation and peripheral ostectomy	36 months	Yes	No

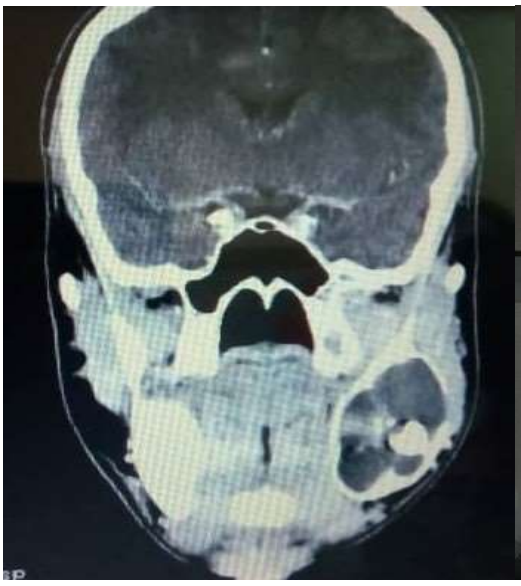


Figure 1A

Figure 1B

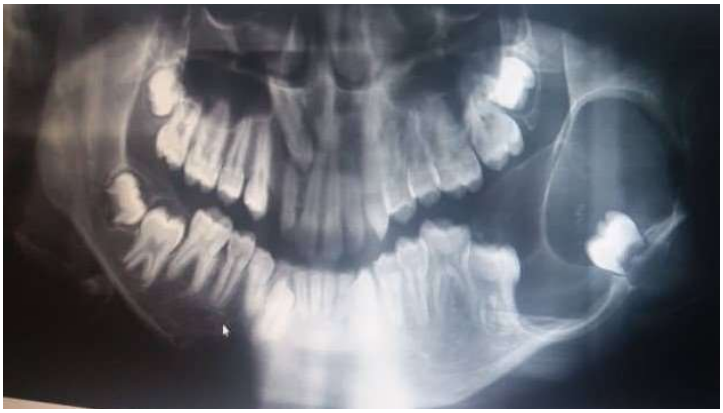


Fig 1C

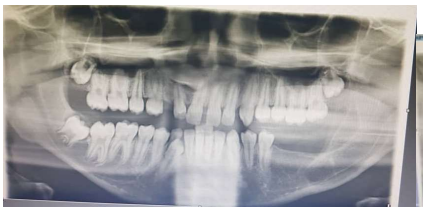


Figure 1D

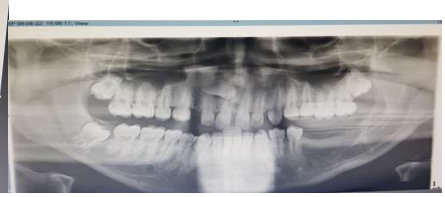


Figure 1E

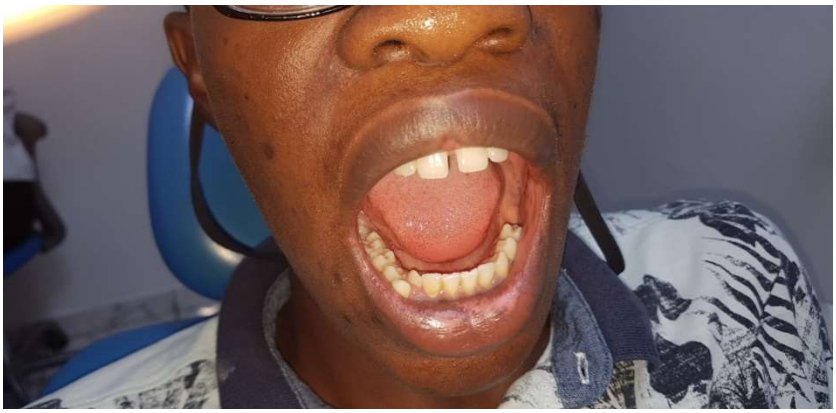


Figure 1F

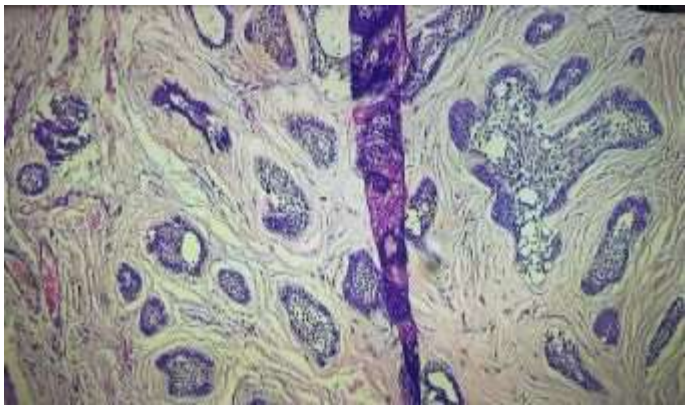


Figure 1G: Odontogenic nests with peripheral palisaded columnar cells with reversed polarity with central stellate reticulum-like cells disposed in follicular pattern

The patient underwent conservative surgical management via intraoral access. Follow-up orthopantomographs at two weeks and 21 months postoperatively (Figures 2C and 2D) demonstrated appreciable bone regeneration. At 21 months (Nov 2023) postoperatively, clinical examination revealed complete resolution of the swelling with restoration of normal buccal contour (Figure 2E).

Figures 2F and G show cystic epithelium with palisaded short columnar cells with reversed polarity and central stellate reticulum-like cells extending into the fibrous connective tissue

Case 3

HK, an 11-year-old female, presented January 2023, with a painless localized swelling of the left molar-ramus region of the mandible noticed one month before presentation to the hospital. Clinical examination revealed mild buccolingual expansion of the mandible, but no significant facial asymmetry. No tooth mobility was observed in the mandibular left quadrant, and tooth 37 was clinically absent. Radiographic examination (Figure 3A and 3B) demonstrated an expansile lesion, extending from mesial root of tooth 36, expanding the whole ramus in its entirety extending superiorly to the condylar region. The lower border was completely compromised.

Based on clinical, radiological, and histopathological findings, a provisional diagnosis of conventional ameloblastoma was made. The patient underwent conservative surgical management via intraoral access. Histopathological examination of the enucleated cystic linings confirmed the diagnosis of conventional ameloblastoma as shown in Figure 3C, 3D, and 3E. Radiographic evidence of bone regeneration was noted by the third postoperative month. At the three-year postoperative follow-up, clinical examination showed complete resolution of the swelling, with restoration of normal buccal contour (Figure 3C). Radiographic examination Jan 2025 revealed spontaneous bone regeneration in the operated region and no evidence of recurrence (Figure 3D).

Fig 2A

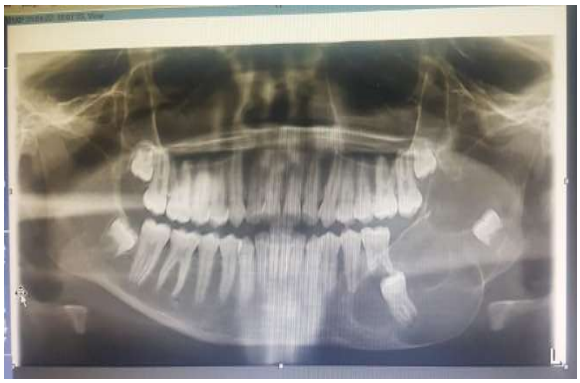


Figure 2B

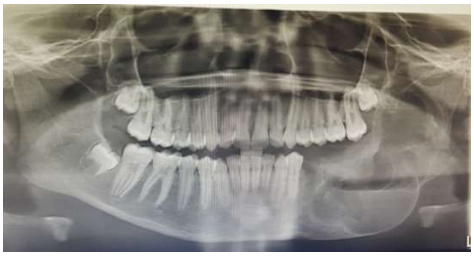


Figure 2C

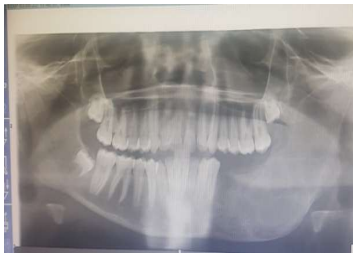


Figure 2D

Figure 2E

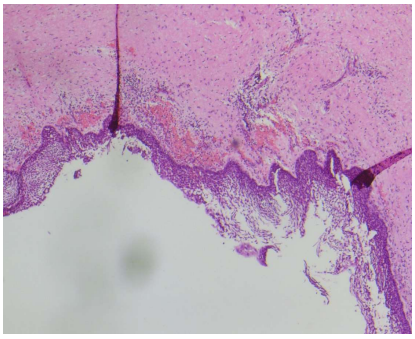


Figure 2F

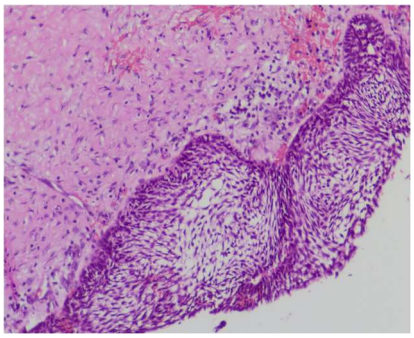


Figure 2G

a

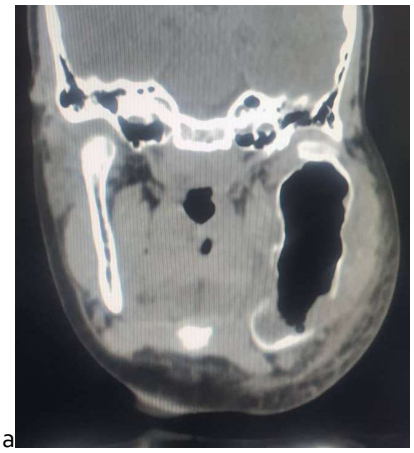


Figure 3A

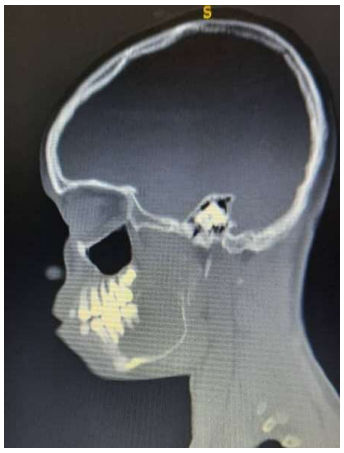


Figure 3B

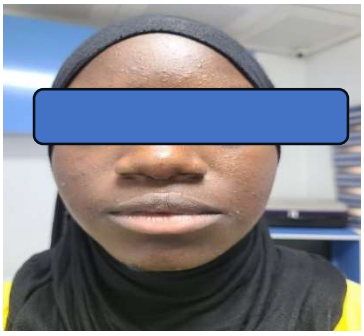


Figure 3C

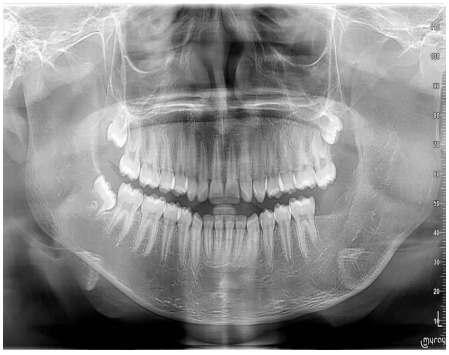
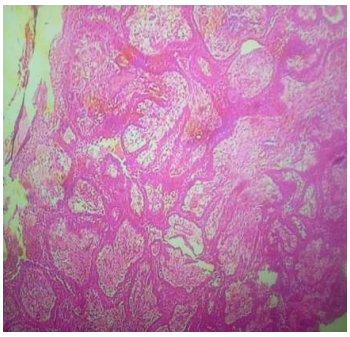


Figure 3D



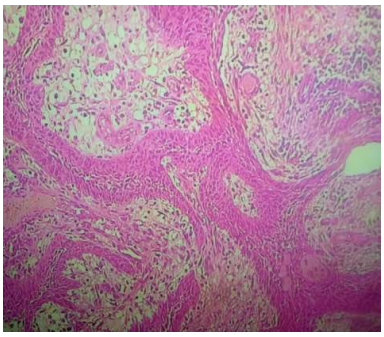


Figure 3: E X10 F X40

Histology (E and F) shows interconnecting islands of odontogenic nests with basal short columnar cells most of which are palisaded, exhibiting reversed polarity and central areas stellate reticulum-like areas with some undergoing cystic degeneration. Odontogenic nest with ameloblast like peripheral cells with basaloid central area. Lining epithelium and odontogenic nests within the fibrous connective tissue.

OPERATIVE TECHNIQUE

Routine preoperative assessments were conducted, and informed consent for surgery and anesthesia was obtained. All patients underwent conservative surgical management. Under general anesthesia via endotracheal intubation, intraoral incisions were made following standard surgical protocols. All the lesions were intrabony. A three-sided mucoperiosteal flap was raised, with a mesial relieving incision placed two teeth mesial to the radiographic extent of the lesion. The crevicular incision extended to the last tooth in the affected arch, followed by a crestal incision posteriorly to the end of the swelling. A distal relieving incision was added when necessary. Careful subperiosteal dissection exposed the lesion (Figure 4A and B).

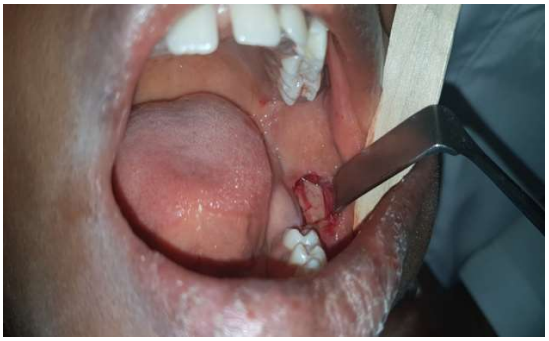


Figure 4A

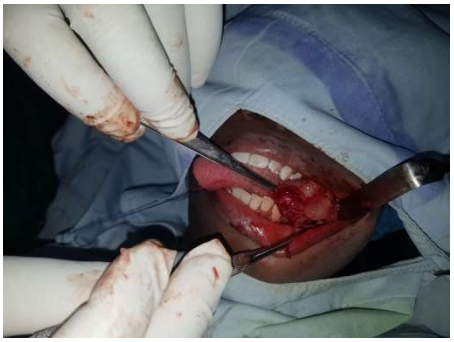


Figure 4B

The thin, expanded mandibular bone overlying the lesion was deroofed using a bone knibbler to create a bone window for easy access to the cystic lining which was enucleated completely. In some cases, the lesion lining was clearly visible; in others, it was inseparable from the bone (Figure 4C). Once identified, the thick cystic lining was removed in one piece when possible (Figure 4D). In cases with condylar extension, piecemeal removal was performed and surgical specimen sent for histopathologic examinations.

A round bur on a slow-speed handpiece was used to smoothened the bone surface under continuous saline irrigation. To prevent hematoma formation, the cavity was packed with gauze soaked in 0.2% chlorhexidine gluconate (Savlon) as shown in figure 4E. The sutures and gauze pack were removed 48hours after placement and flap was repositioned, then closed using 2.0 Vicryl absorbable sutures.

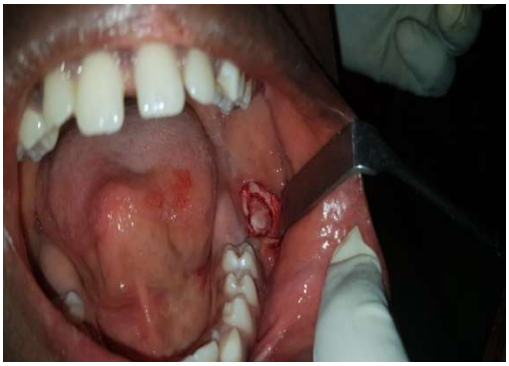


Figure 4C

Figure 4D

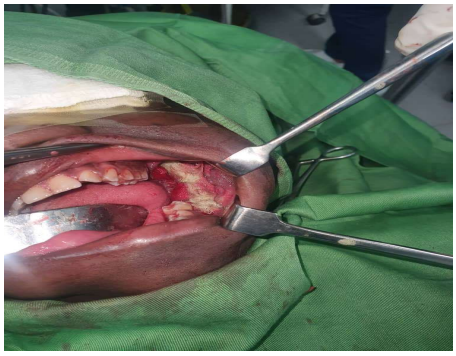


Figure 4E

Postoperative medications included age-adjusted doses of intravenous ceftriaxone, metronidazole, paracetamol, and diclofenac for 48 hours, followed by oral Augmentin, metronidazole, paracetamol, and

diclofenac for five days. Postoperative instructions were provided.

FOLLOW UP APPOINTMENTS

All patients were followed up at one month, three months, and six months, with continued surveillance for up to the last follow up of 3 years.

DISCUSSION

Ameloblastoma remains one of the most clinically significant odontogenic tumors due to its locally aggressive behavior and high recurrence potential when inadequately treated. In this case series, the age range was 11 to 14 years, with a mean age of 12.67 years, aligning with previous report on pediatric ameloblastoma incidence.[10]The upper limit of age reported in this study is lower than the most frequently reported age by Arotiba et al.[5] in the same country but different geographical zones. The reason for early presentation in our series could be due to the study location which is the Federal Capital Territory where majority of the population are in the upper social class which could have affected their health seeking behaviour.[11]Two of the three cases involved female patients. However, there is no consensus regarding gender predilection. While some studies reported a male predominance[12], others reported a female preference[10]. The mandible was affected in all cases. This is consistent with existing literature that highlights the higher susceptibility of the mandible to ameloblastoma and other odontogenic tumours when compared to the maxilla[13]. This may be attributed to the greater concentration of odontogenic epithelial remnants in the mandible.

All three lesions were located in the molar-ramus region of the mandible, a common site for ameloblastoma. The clinical presentation varied but was uniformly asymptomatic, with bony hard swellings that were not overtly visible on examination. This subtle presentation may represent an entity where a lesion that is barely visible, sometimes accidentally discovered, will show a significant bone destruction when subjected to radiological examination. Aspiration in all cases yielded straw-colored fluid, corroborating findings from previous studies[10].

Radiographically, the lesions appeared as well-defined multilocular radiolucencies. Case 2 extended from the parasymphyseal region to the coronoid process and sigmoid notch, while cases 1 and 3 involved the body of the mandible up to the condylar base. These patterns are consistent with documented cases in the literature Conversely, Arotiba et al.[5] reported symphyseal predilection. Notably, cases 1 and 2 exhibited impacted and ectopic tooth buds, a phenomenon also reported in previous study[14]. This could be due to disrupted eruption pathways caused by tumor growth.

Traditionally, conventional ameloblastoma is treated via marginal or segmental jaw resection because of the locally aggressive behaviour. However, this treatment is associated with significant morbidities such as interference with facial growth, aesthetics concerns, functional impairment, and impaired quality of life[15]. In this series, conservative management through enucleation and curettage was chosen based on lesion confinement within bone, absence of soft tissue invasion, and the imperative to preserve mandibular integrity and function in young children. These criteria are supported by literature advocating conservative approaches in well-selected cases, particularly in pediatric patients where facial growth and quality of life are paramount[14,16]

Clinically, all the three patients demonstrated complete restoration of buccal contour without signs of recurrence, echoing outcomes reported by other authors[16]. Early presentation likely contributed to minimal mandibular deformation and facilitated rapid recontouring. Radiographic follow-up over a minimum of three years revealed spontaneous bone regeneration by the third postoperative month, with no evidence of recurrence. The younger age group and periosteal preservation following a subperiosteal dissection could have contributed to the bone regeneration in our series. In a case series of six histopathology of (solid multicystic) plexiform and follicular ameloblastoma conservative treatment was an acceptable initial treatment.[8] Five of the six cases required addition intervention with follow up varying between 4 to 11 years. While recurrence remains a concern, particularly beyond five years, its typically delayed onset allows for extended monitoring and timely intervention. In children and young adults, where radical surgery may compromise growth and development, conservative management offers a balanced alternative that prioritizes oncologic safety alongside functional and aesthetic outcomes. In addition, the affectation of mandibular growth center in extensive lesions with involvement of the condyle justifies conservative treatment. The treatment also allows continuous growth of the mandible for a reasonable number of years.

These findings reinforce the viability of conservative treatment in achieving disease control and functional preservation. Importantly, this case series adds to the limited literature on conservative management of conventional ameloblastoma in African pediatric populations. Generally, and more importantly the observed bone regeneration and absence of recurrence during the follow up period highlight the potential of

conservative approaches in resource-limited settings, where access to reconstructive surgery and long-term rehabilitation may be constrained.

CONCLUSION

This case series demonstrates that conservative surgical management of conventional ameloblastoma, specifically enucleation and curettage, can be a safe and effective treatment option in carefully selected pediatric and young adult patients with spontaneous bone regeneration, restoration of mandibular contour, and absence of recurrence over a two-year follow-up period.

RECOMMENDATIONS

Conservative management should be reserved for cases where the lesion is well-contained within bone and shows no evidence of soft tissue invasion.

Source of Support
Nil.

Conflict of Interest
None declared

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