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ARTIGO DE REVISÃO

ANALYSIS OF SURGICAL APPROACHES FOR THE TREATMENT OF AMELOBLASTOMA: AN INTEGRATIVE REVIEW

Análise das abordagens cirúrgicas para o tratamento de ameloblastoma: uma revisão integrativa

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ABSTRACT

Introduction: Ameloblastoma is a slow-growing and aggressive, often asymptomatic, benign odontogenic tumor capable of infiltrating peripheral tissues. It represents approximately 11% of odontogenic tumors. Its origin is still unknown, although it is believed to derive from epithelial cells remaining from the dental lamina and buccal mucosa. It is predominantly located in the mandible, occurring in about 85% of cases, mainly in the posterior region of the mandibular body. Radiographically, it is identified as a uni- or multilocular radiolucent lesion, with well-defined margins and opaque borders. The multicystic type is more common, exhibiting a more aggressive and expansive behavior, often associated with a higher rate of recurrence. On the other hand, single-tissue tends to present less tissue infiltration and aggressiveness. The primary treatment is surgical and can be performed radically or conservatively, depending on the stage and aggressiveness of the tumor. Objective: The objective of this study is to establish a relationship between the technique selected for the treatment of ameloblastoma, the histological type of the tumor, and the recurrence rate documented in the literature. Methodology: This is a literature review carried out using articles from the BVS, SciElo, and PubMed databases. For the literature review, the descriptors were combined by Boolean operators. From this, 13 original articles published between 2009 and 2023, in English, Portuguese, and Spanish, and available in full, were selected. As exclusion criteria, theses, monographs, and experience reports were excluded. Discussion: In the treatment of ameloblastoma, the selection of the surgical approach is influenced by the histological type of the lesion. For cases requiring conservative treatments, enucleation associated with curettage represents a viable option, especially in small to moderate unicystic ameloblastomas. On the other hand, for situations that require more aggressive approaches, en bloc resection is preferable, and is indicated for multicystic or unicystic ameloblastomas of large extension. Although it is not an inflexible norm, statistically, more radical surgical approaches tend to have lower rates of recurrence in all cases, while conservative treatments applied to multicystic ameloblastomas demonstrate significantly higher rates of recurrence. Therefore, there is a direct correlation between the histological type of ameloblastoma, the choice of treatment, and, consequently, the risk of recurrence. Conclusion: The selection between conservative and radical surgical approaches in the treatment of ameloblastoma is determined by the histological profile of the lesion. Enucleation and curettage are recommended for smaller single-cystic lesions, while en-bloc resection is preferred for larger multicystic lesions, associated with a lower recurrence rate.

Keywords: Ameloblastoma; Therapy; Surgery; Odontogenic Tumors.

RESUMO

Introdução: O ameloblastoma é um tumor odontogênico benigno de crescimento lento e agressivo, frequentemente assintomático, capaz de infiltrar tecidos periféricos. Representa aproximadamente 11% dos tumores odontogênicos. Sua origem é ainda desconhecida, embora se acredite que derive de células epiteliais remanescentes da lâmina dentária e da mucosa bucal. É predominantemente localizado na mandíbula, ocorrendo em cerca de 85% dos casos, principalmente na região posterior do corpo mandibular. Radiograficamente, é identificado como uma lesão radiolúcida uni ou multilocular, com margens bem definidas e bordas opacas. O tipo multicístico é mais comum, exibindo um comportamento mais agressivo e expansivo, frequentemente associado a uma maior taxa de recorrência. Por outro lado, o unicístico tende a apresentar menor infiltração tecidual e agressividade. O tratamento primordial é cirúrgico, podendo ser realizado de forma radical ou conservadora, dependendo do estágio e da agressividade do tumor. Objetivo: O objetivo deste trabalho é estabelecer uma relação entre a técnica selecionada para tratamento do ameloblastoma, o tipo histológico do tumor e a taxa de recidiva documentada na literatura. Metodologia: Trata-se de uma revisão da literatura realizada utilizando artigos das bases de dados BVS, SciElo e PubMed. Para o levantamento bibliográfico, os descritores foram combinados por operadores booleanos. A partir disso, foram selecionados 13 artigos originais publicados entre o período de 2009 a 2023, nos idiomas inglês, português e espanhol, e disponíveis na íntegra. Como critério de exclusão, foram excluídos teses, monografias e relatos de experiência. Discussão: No tratamento do ameloblastoma, a seleção da abordagem cirúrgica é influenciada pelo tipo histológico da lesão. Para os casos que demandam tratamentos conservadores, a enucleação associada à curetagem representa uma opção viável, especialmente em ameloblastomas unicísticos de dimensões reduzidas a moderadas. Por outro lado, para situações que exigem abordagens mais agressivas, a ressecção em bloco é preferível, sendo indicada para ameloblastomas multicísticos ou unicísticos de grande extensão. Embora não seja uma norma inflexível, estatisticamente, abordagens cirúrgicas mais radicais tendem a apresentar taxas menores de recidiva em todos os casos, enquanto tratamentos conservadores aplicados em ameloblastomas multicísticos demonstram taxas significativamente elevadas de recorrência. Portanto, há uma correlação direta entre o tipo histológico do ameloblastoma, a escolha do tratamento e, consequentemente, o risco de recidiva. Conclusão: A seleção entre abordagens cirúrgicas conservadoras e radicais no tratamento do ameloblastoma é determinada pelo perfil histológico da lesão. A enucleação e curetagem são recomendadas para lesões unicísticas menores, enquanto a ressecção em bloco é preferida para lesões multicísticas maiores, associada a menor taxa de recidiva

Palavras-chave: Ameloblastoma; Tratamento; Cirurgia; Tumores Odontogênicos.

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INTRODUCTION

Ameloblastoma is a benign tumor that affects the maxillofacial complex. Although the triggering factor is not yet fully understood, it is believed to derive from epithelial cells remaining from the dental lamina and buccal mucosa[20-23]. Clinically, it is characterized by slow and asymptomatic growth, although it demonstrates infiltrative and invasive behavior in local tissues [10, 13-14].

Compared to other maxillofacial pathologies, ameloblastoma has a prevalence of 1% among oral cysts and approximately 11% among odontogenic tumors[17]. As for the location, there is a preference for the mandible, observed in about 85% of cases. In addition, there is a higher incidence in the posterior region of both bony bases, often located below the roots of the molars[16].

In the early stages, the symptoms of ameloblastoma are non-existent or discrete, making early diagnosis and intervention difficult. An analysis of 40 cases by França8 revealed that the main complaint of patients before diagnosis was facial asymmetry, observed in 65% of cases. This data suggests that the perception of the pathology usually occurs when the tumor reaches large proportions, evidencing the importance of early diagnosis.

Initial lesions are commonly diagnosed accidentally through radiographic examinations during routine visits. Radiographically, ameloblastoma manifests as a uni- or multilocular radiolucent lesion, characterized by well-defined margins and an appearance resembling honeycombs or soap bubbles9. Due to these radiographic aspects, ameloblastoma can be differentiated from other conditions such as dentigerous cyst, odontogenic keratocyst, myxoma, ameloblastic fibroma, giant cell lesion, and calcifying odontogenic cyst, highlighting the importance of a thorough investigation[26].

This pathology was recently classified by the World Health Organization (WHO) into three distinct forms: ameloblastoma, unicystic ameloblastoma, and peripheral or extraosseous ameloblastoma3. Ameloblastoma is the most common form, characterized by the multicystic presentation of the lesion, diagnosed in 66.7% of cases. This variant is associated with severe and aggressive clinical conditions, with a high recurrence rate, in addition to demonstrating a greater capacity to invade the surrounding tissues, which may result in bone cortical expansion and tooth resorption[16].

On the other hand, unicystic and peripheral variants generally have a more favorable prognosis. From a histological point of view, the literature also describes variations of unicystic ameloblastoma: luminal, in which the lesion is restricted to the surface of the cyst; intraluminal, characterized by epithelial proliferation towards the cyst lumen; and mural, which exhibits extraluminal growth, enveloping the surrounding tissues[24]. However, the main difference from the multicystic variant is the

presence of a single lesion radiographically and the presence of a tumor capsule that limits its invasion into adjacent tissues.

On the other hand, the peripheral classification is considered the rarest, manifesting itself outside the bone tissue. In the literature, a higher prevalence is reported in men, occurring more frequently in the sixth decade of life and with a common diagnosis among mandibular premolars. This variant is found in the soft tissues, predominantly in the gingiva and alveolar ridge. Clinically, the lesion is identified as a non-ulcerated mass, which may be sessile or pediculate, presenting mucosa-like or slightly reddish coloration.

Treatment of ameloblastoma can be conducted through more conservative techniques, such as tumor marsupialization, or more invasive approaches, such as complete or partial resection. The conservative approach is preferred for less aggressive cases, although it is associated with high rates of recurrence. On the other hand, surgical therapy is indicated for more invasive and aggressive tumors, with a lower probability of recurrence, although it may result in aesthetic and functional impairment. New therapeutic modalities for the treatment of ameloblastoma are under investigation, including radiotherapy, chemotherapy, and lesion-directed therapies6.

Planning should consider the individuality of the tumor, its clinical and histological characteristics, the patient's age and systemic factors, as well as the possibility of recurrence associated with the selected technique. Therefore, it is essential to evaluate the different techniques available and their performance in relation to age, histology, location, and tumor size.

METHODOLOGY

The present study consists of an integrative literature review, a method whose objective is to systematically synthesize knowledge from previous scientific productions in an organized and comprehensive way. Called integrative due to the ability to integrate information and organize Topics for a broad and detailed analysis[7].

The project was developed in line with the steps proposed by Souza, Silva, and Carvalho[25] so that the methodological rigor could be verified. The study began with the following guiding question: what are the surgical and conservative treatments for ameloblastoma and what is the best option for each classification of the lesion? Then, we searched the literature for studies related to the researched theme in the period from June to October 2022, using the Biblioteca Virtual em Saúde Brasil (BVS) databases; SciElo (Scientific Electronic Library Online); PubMed (Public/Publish Medline); ScienceDirect.

The project was developed following the steps proposed by Souza, Silva and Carvalho[25], aiming to ensure methodological rigor. The study began with the following guiding question: "What are the treatments for ameloblastoma and their best options, considering different classifications

of the lesion?". Then, literature searches related to the theme were carried out from 2000 to 2024, using the Virtual Health Library (VHL), Scientific Electronic Library Online (SciELO) and Public/Publish Medline (PubMed) databases.

Therefore, the controlled and uncontrolled descriptors were combined in different ways through the Boolean AND operators, considering the language and search form present in each database. The descriptors chosen were: "Ameloblastoma", "Therapy", "Surgery" and "Odontogenic Tumors". The inclusion criterion was original articles, published in English, Portuguese, and Spanish, available online and in full. Publications such as theses, dissertations, monographs, term papers, experience reports, manuals, and reviews were excluded, and only literature reviews, meta-analyses, randomized clinical trials, and cross-sectional studies were selected, in addition, studies that addressed ameloblastoma but did not focus on treatment were excluded.

Subsequently, the controlled and uncontrolled descriptors were combined in different ways using the Boolean AND operators, considering the language and the specific search form of each database. The selected descriptors were: "Ameloblastoma", "Treatment", "Surgery" and "Odontogenic Tumors". As an inclusion criterion, original articles published in English, Portuguese, or Spanish, available online and in full, covering only literature reviews, meta-analyses, randomized clinical trials, and cross-sectional studies were considered. Publications such as theses, dissertations, monographs, term papers, experience reports, manuals, reviews, and studies that were not aligned with the objective of the theme were excluded.

During the search, 181 articles were identified. The first screening was performed by reading the titles, resulting in the selection of 53 articles. Then, the abstracts were analyzed, resulting in the selection of 28 articles. Finally, the articles were read in full, evaluating the methodology used and the results obtained. Thus, 13 articles were included in this review.

RESULTS AND DISCUSSION

EM ANEXO

Ameloblastoma is a benign lesion that affects the maxillofacial complex and tends to be asymptomatic until it reaches large proportions. The most common complaint reported before diagnosis is facial asymmetry, followed by pain, which usually occurs when the tumor affects important structures of the face[14]. In addition, this pathology presents a variety of histological and radiographic characteristics that can influence the choice of surgical treatment and prognosis.

The scientific literature presents several treatment options for ameloblastoma, which vary according to the specific characteristics of the lesion and the patient. Therefore, it is crucial for treatment planning and implementation to make

an accurate diagnosis of the histopathological and radiographic features of the lesion, as well as to assess its location and extent. In addition, it is important to take into account the patient's physical and systemic condition[3].

In this context, one of the first aspects considered is the incidence of the diagnosis in relation to gender, although this does not determine the choice of treatment, it is a relevant piece of data in the epidemiological analysis. The current scientific literature indicates a predominance of cases in males. A global study conducted by Hendra[14] revealed that male predominance is observed in the North American, Asian, African, and Australian continents. In the total sample, 53.3% (3,427 cases) occurred in men.

In line with this, the studies conducted by França8 revealed a total of 21 cases in males and 19 in females, while Laborde15 recorded 17 cases in men and 10 in women. However, the results of Giraddi12 and Edouma5 demonstrated a predominance of females, respectively, in the Asian and African continents. Thus, among the five studies with gender analysis, three showed a predominance of males. However, these results corroborate the notion that these statistics are variable and may change according to the sociodemographic factors of the region studied.

The age factor influences the systemic condition of the patient and his/her response to treatment. According to the scientific literature, most cases of ameloblastoma are diagnosed between the third and fourth decade of life, due to the absence of symptoms and the slow growth of the lesion. Among the studies analyzed in this review, five provided data on the mean age of the cases, which are in line with the information in the literature. The lowest mean age was reported by Edouma5, at 33 years, while the highest was recorded by Laborde[15], at 46 years.

In the sample studied by López Alvarenga16, it was observed that 81.2% of the patients were asymptomatic at the time of diagnosis. This finding is relevant because it suggests that many cases of ameloblastoma may go unnoticed for a prolonged period, contributing to a diagnosis at older ages. This is in line with the slow-growing characteristic of ameloblastoma, which can slow the perception of signs and symptoms. Usually, patients notice the presence of the lesion when there are evident visual changes in the face. This pattern of presentation is consistent with the findings of several studies on the subject.

Regarding the predominant location of the lesion, all the studies reviewed in this review showed a higher incidence of ameloblastoma in the mandibular bone, which is in agreement with the existing literature. The results provided by Hendra14 indicate that this predominance is observed in all geographic regions. In addition, in the study conducted by Giraddi12, it was found that 27 cases were diagnosed in the mandible, approximately 64.51% of which involved the body region and mandibular angle.

On the other hand, in the study conducted by França8, of the 19 cases of ameloblastoma identified in the mandible, 10 had simultaneous involvement of the body, angle, condyle, and mandibular ramus. It is essential to analyze the location and extent of the lesion, using radiographic images as an auxiliary tool. This evaluation is crucial to determine which areas of the bone structure have been compromised. Such factors can have a significant negative impact on the likelihood of tumor recurrence, as well as the patient's ultimate aesthetics and function.

In addition, the histological features of ameloblastoma play a crucial role in determining the appropriate treatment. This is because, depending on the histological variant, the lesion may present greater aggressiveness and local invasiveness. According to the World Health Organization (WHO) classification, ameloblastoma can be categorized into three main histological variants: solid or multicystic, unicystic, and peripheral. The multicystic variant is the most common, followed by the unicystic and peripheral variants, respectively[3].

Multicystic ameloblastoma is the most prevalent subtype, but it is associated with more aggressive cases. Of the five studies analyzed in this review, four of them reported a predominance of more than 60% of cases of the multicystic type, while only one study showed a predominance of the unicystic type. Although tumor characteristics can be identified through X-rays and biopsies, it is important to note that the exclusive analysis of radiographic images can lead to diagnostic errors.

In this context, the study conducted by Ajila and Hedge1 demonstrates that, initially, using only radiographic images, 33.6% of cases were classified as multicystic and 66.4% as unicystic. However, after histological analysis of the biopsied samples, it was found that 74.5% were multicystic and 23.3% unicystic. These results highlight the importance of using all available resources for the accurate diagnosis of ameloblastoma, to select the best therapeutic approach.

In addition, the histological type of ameloblastoma plays a crucial role in the selection of treatment and the likelihood of disease recurrence. In a case-control study conducted by Edouma5, it was observed that among patients who experienced recurrence, there was a predominance of histological diagnoses of the multicystic type. Consequently, it was found that among the cases of unicystic ameloblastoma, approximately 35% resulted in recurrence, while only 14% of the multicystic cases had such an incidence. These findings emphasize that tumor behavior varies according to different histological types, highlighting the importance of considering this factor in the formulation of the treatment plan.

In the literature, several treatment options for ameloblastoma have been described, the choice of which depends on the characteristics and size of the tumor. Conservative approaches

include enucleation combined with curettage, cryotherapy, or the use of Carnoy's solution, as well as surgical excision by osteotomy and marsupialization alone or combined with enucleation. On the other hand, for more radical surgical approaches, techniques such as marginal resection, segmental resection, and hemisection are included.

When analyzing conservative treatment, it is observed that this approach consists of less invasive methods, which tend to result in lower morbidity and better aesthetic results when compared to radical techniques. Studies such as the one by Neagu[18] recommend the application of conservative procedures for cases of unicystic and multicystic ameloblastoma to a lesser extent. Similarly, Barbieri[3-5] highlight the importance of adopting conservative techniques in young and elderly patients, especially when considering systemic factors that do not favor invasive surgical procedures.

On the other hand, some authors propose the combination of conservative techniques with more radical surgical procedures. For example, marsupialization or decompression may be used to reduce the size of the lesion and facilitate the removal of the tumor during the surgical procedure. After resection, vigorous curettage, cauterization, or the use of Carnoy's solution are employed to clean the surgical area and decrease the likelihood of recurrence[17]. Additionally, in cases of lesions that recur after radical techniques, marsupialization or decompression may be the initial treatment choice, allowing the control of tumor growth in a less invasive way.

In this context, the use of conservative techniques in an outpatient setting, in addition to providing a better functional aesthetic result, also contributes to a reduction in treatment costs and offers greater comfort to the patient. However, it is important to highlight that the scientific literature shows a high rate of recurrence after conservative interventions. This possibility should be carefully studied and considered during treatment planning.

In the study conducted by Almeida2, an analysis of 394 cases of multicystic ameloblastoma was performed, of which 245 were treated using conservative procedures. Of these, 98 cases had a recurrence of the lesion. In addition, in a study conducted by Edouma5, it was concluded that among cases of recurrence after conservative procedures, enucleation had a rate of 24.29%, being the lowest rate observed after remodeling, with a percentage of 14.29%.

When evaluating the radical surgical technique, it is observed that these are more extensive procedures, usually involving the removal of the lesion along with a portion of the adjacent bone base. Due to complete removal, the presence of residual tumor tissue in the bone is significantly reduced, thus decreasing the likelihood of disease recurrence. However, due to the more aggressive nature of these procedures, there is greater functional aesthetic impairment, higher performance costs, and less comfort for

the patient, especially during the perioperative and postoperative periods.

The authors Ghai[11], together with Maia and Sandrini[17], argue that the best radical approach to the treatment of ameloblastoma is en bloc resection, which consists of removing the entire length of the jaws that are in proximity to the lesion. On the other hand, Neagu18 state that radical surgery is the best treatment option for larger multicystic or unicystic ameloblastomas.

On the other hand, radical procedures for the treatment of ameloblastoma are not limited to en-bloc resection alone. Although they cause greater harm to the patient, currently, the morbidity associated with these procedures can be reduced with the use of digital planning techniques and reconstruction of the removed area. In addition, it is also possible to associate dental implants with rehabilitation of masticatory and aesthetic function after surgery.

The study conducted by Ajila and Hedge1 employed a total sample of 654 ameloblastoma cases, of which 233 underwent radical treatment. After a 6-year follow-up, 25 recurrences were documented in this group. On the other hand, in the cases treated conservatively, there were 148 recurrences. Both in the studies analyzed and in the literature in general, radical treatment of ameloblastoma is associated with a low recurrence rate, regardless of the site or histological type of the lesion.

As highlighted by Neagu18, radical surgical techniques are mainly indicated for cases of multicystic ameloblastoma or for single lesions that have reached large dimensions. When analyzing the results of the study conducted by Almeida[2], which investigated the difference between radical and surgical approaches only in cases of multicystic ameloblastoma, we observed that, of the 148 cases treated radically, only 18 patients were registered as having a recurrence of the disease.

Therefore, we can conclude that the treatment of ameloblastoma is predominantly surgical and may adopt conservative or radical approaches. However, the determination of the technique to be used requires a careful evaluation by the oral and maxillofacial surgeon. The patient's age is a relevant aspect, as it is related to their systemic condition and their ability to collaborate during the procedure, which can impact both the perioperative and postoperative periods. In addition, the location of the lesion is another crucial factor to be considered, especially in cases of extensive lesions, where performing radical procedures can lead to significant aesthetic and functional impairment.

In addition, the histological type of the lesion is a crucial factor in determining the appropriate surgical approach. Multicystic ameloblastoma is associated with more aggressive tumors, with faster growth and a greater propensity to recurrence, and is preferably treated by radical surgery, such as en bloc resection. On the other hand, unicystic ameloblastoma is a less aggressive lesion, usually found in smaller dimensions,

and conservative treatment is more indicated, through techniques such as decompression or marsupialization of the tumor. However, in cases of large single lesions, radical surgery should be the approach of choice.

It is still important to consider the advantages and disadvantages of each surgical technique for the patient. In this context, conservative treatment has the benefits of being able to perform in an outpatient setting, lower cost, and greater comfort for the patient, preserving aesthetics. However, this approach is not applicable in all cases and is associated with high rates of injury recurrence. On the other hand, radical treatment emerges as a more invasive option, which can compromise both aesthetically and functionally patient, and which, depending on their systemic condition, can pose a risk due to the complexity of the procedure. However, it is the approach that presents the lowest probability of disease recurrence, ensuring a favorable prognosis for the patient. In addition, virtual planning and prosthetic rehabilitation can significantly contribute to minimizing the damage caused by surgical intervention.

Thus, for the effective treatment of ameloblastoma, there are several techniques available, each with distinct impacts on the lesion. However, regardless of the approach chosen, it is essential to make an accurate diagnosis of the tumor, considering its location and histological variant. This allows for proper planning of the patient's treatment and, if necessary, rehabilitation. As a result, the probability of recurrence is reduced and the prognosis becomes more favorable.

CONCLUSION

Ameloblastoma is a benign tumor of odontogenic origin, characterized by a variety of clinical and histological manifestations, commonly classified into three distinct types. In this sense, the therapeutic approach to ameloblastoma should be individualized, considering the specific characteristics of each case. Aspects such as the histopathological characteristics of the lesion, its location, the patient's age, and functional considerations are taken into account in the choice of treatment. The goal is to achieve resolution of the neoplasm and promote patient well-being, ensuring an effective and personalized therapeutic approach.

The radical surgical approach is generally preferred for the treatment of multicystic, peripheral, or unicystic ameloblastomas in advanced stages of the disease. Although this treatment modality usually has a good prognosis, it is important to note that it is an invasive intervention and that it may not be suitable for all patients, taking into account their limitations. On the other hand, conservative treatment is often more accessible and less impactful in the postoperative period. However, studies show that this approach is associated with high recurrence rates, especially in cases of unicystic

ameloblastoma. Interestingly, when employed in specific cases of unicystic ameloblastoma, conservative treatment may have a more favorable prognosis.

The literature offers several treatment options for ameloblastoma, although there is a paucity of comprehensive review studies and meta-analyses, as well as case-control studies with robust methodology, conducted recently. Given this scenario, the objective of this article is to provide a comprehensive analysis of conservative and radical surgical techniques, in addition to contributing to the identification of gaps in knowledge and guiding the development of future studies in this area.

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Observação: os/(as) autores/(as) declaram não existir conflitos de interesses de qualquer natureza.

Table 1 - Studies on the management of ameloblastoma, histological tumor type, and recurrence rate.

Title of the work	Author(s) and date	Goals	Methodology	Findings
Ameloblastoma vs recurrent ameloblastomas: a systematic review	AJILA; HEGDE, 2022	Analyze the literature regarding clinical, radiographic, and histopathological characteristics; and recurrence rates of ameloblastoma, comparing them with the characteristics of recurrent ameloblastomas.	The literature search was conducted in the "PubMed" database using the search terms "recurrent ameloblastoma" and "ameloblastoma recurrence". The selected data covers the period from 2010 to 2020. The selection of articles for this review was performed by two independent reviewers. The data obtained were discussed in two distinct sections: the first addresses clinical, radiographic, and histopathological details, management, and recurrence rates of ameloblastomas in general; In the second section, the authors looked specifically at recurrent ameloblastomas.	Among the reported cases, there were 234 recurrences out of a total of 936 cases, resulting in a recurrence rate of 23.50%. The mean age of the patients was 43 years. The condition predominantly affected the mandible, with 89% of the cases (999), while the maxilla accounted for 11% (121) of the cases. In the histopathological analysis, 74.5% of the cases (898) were classified as solid or multicystic, while 23.3% (281) were classified as unicystic. Conservative treatment was performed in 64.4% of cases (421/654), while radical treatment was performed in 35.6% of cases (233/654). The mean follow-up time was 6 years. The recurrence rate after conservative treatment was 64.9% (148 cases), while after radical treatment it was 12% (25 cases).
Recurrence rate following treatment for primary multicystic ameloblastoma: systematic review and meta-analysis	ALMEIDA *et al*., 2016	Determining which treatment approach for multicystic ameloblastoma results in a lower recurrence rate.	The article selection process was conducted in two stages by two researchers, who were initially blind to each other's results. In cases of disagreement, a third researcher was consulted. Data extraction was performed using a graph designed specifically for this review. A meta-analysis was conducted for the quantitative evaluation of the extracted data, using the Review Manager software (version 5.3). A 95% confidence interval (CI) was calculated. Results with a p-value < 0.05 were considered indicative of statistical significance.	The seven articles selected for data extraction involved a total of 394 cases of multicystic ameloblastoma, of which 245 underwent conservative treatment and 149 were treated with radical surgery. A total of 116 recurrences were reported, 98 after conservative treatment (40%) and 18 after radical treatment (12%).

Ameloblastoma: un estudio retrospectivo de 48 casos.	LÓPEZ ALVARENGA *et al.,* 2013	To conduct a retrospective study of cases diagnosed as ameloblastoma, classifying them by sex, race, age, symptoms, radiographic appearance, histopathological diagnosis, and anatomical location.	Biopsy records from the Department of Oral Pathology of the Pontifical Catholic University of Minas Gerais, Brazil, were reviewed. The inclusion criteria were medical records of patients from January 1978 to February 2012, who had a definitive diagnosis of ameloblastoma, complete medical history, and availability of radiographic and histopathological tests.	Of the 48 patients diagnosed with ameloblastoma, there was an increase in the incidence in the mandible and angle, representing 45.8% of the cases. The condition affected both men and women, with a mean age of 36 years, with the majority being asymptomatic (81.2%). The most common histological type was multicystic (66.7%), followed by unicystic (31.2%) and peripheral (2.1%). On radiographic images, 60.4% of the cases had multilocular characteristics.
Ameloblastoma unicístico: qual a abordagem ideal? uma revisão de literatura	BARBIERI *et al.,* 2021	Determine the optimal approach to the treatment of unicystic ameloblastoma.	A literature review was conducted in the PubMed, BVS, LILACS, and SciELO databases. The health descriptors (DeCs and MeSH) "ameloblastoma", "odontogenic tumors" and "Maxillomandibular neoplasms" were used, combined with the controlled Boolean operators AND and OR. The guiding question was defined following the PICO strategy, resulting in the following structure: P - patients with unicystic ameloblastoma, I - conservative treatment, C - radical treatment, O - existence of an ideal treatment for unicystic ameloblastoma. Therefore, the research question posed was, "Is there an optimal approach to treating patients with unicystic ameloblastoma?".	There is no established consensus regarding the treatment of ameloblastomas. Options include conservative surgeries or radical interventions. Conservative interventions tend to reduce surgical morbidity, but have higher recurrence rates, while the opposite occurs with radical interventions. Ideally, a less aggressive approach should be considered in both young and elderly patients. Long-term follow-up is essential regardless of the surgical approach but b
Estudo demográfico, clínico e terapêutico do ameloblastoma: análise de 40 casos.	FRANÇA *et al.,* 2012	This is a descriptive review of ameloblastoma cases admitted to Hospital Heliópolis, São Paulo/SP, Brazil.	A retrospective analysis of 40 medical records of patients diagnosed with ameloblastoma from 1978 to 2011 was conducted. The clinical, demographic, and histopathological characteristics of these cases were evaluated, including age, gender, ethnicity, tumor location, type of treatment, complications, and recurrence. The study employed descriptive	Of the 40 cases analyzed, 21 (52.5%) were male and 19 (47.5%) were female. The mean age was 35.45 years. The mandible was the most frequently affected site, with 19 (47.5%) patients presenting tumors restricted to the mandibular body. Of these, five (12.5%) exceeded the midline. Eight

			statistical analysis.	(20%) cases had involvement of the body and mandibular angle or angle and bundles; in 10 (25%) cases, the lesion extended to the body, angle, branch, and condyle; and in three cases (7.5%) involved the maxilla. Facial asymmetry was the main complaint in 65% (26 cases) of the patients. Thirty-three (82.5%) patients underwent surgery. Tumor recurrence occurred in four cases (12.12%), three (9.09%) after curettage and one (3.03%) after maxillectomy.
Ameloblastoma: An Updated Narrative Review of an Enigmatic Tumor	GHAI, 2022	Describe the classification, histopathology, symptoms, diagnosis, and treatment of ameloblastoma.	The search was conducted in the PubMed, EMBASE, and Google Scholar databases, using the search terms 'ameloblastoma' and 'odontogenic tumor'. The inclusion criteria covered all types of articles published in PubMed and related exclusively to human beings. Exclusion criteria included articles with no full text available, not written in English, or belonging to gray literature. The focus of the literature was to define, classify, and study the epidemiology, clinical features, investigations, and treatment of ameloblastoma.	Ameloblastoma represents the most prevalent odontogenic tumor in the mandible and maxilla. Characterized by slow growth and local invasion, it often manifests as an asymptomatic swelling in these areas. The preferential treatment involves aggressive en bloc surgical resection with simultaneous reconstruction due to the high recurrence rate and the occurrence of large tissue defects. Recent advances in molecular research indicate the promising possibility of targeted therapies for ameloblastoma, potentially improving clinical outcomes.
Ameloblastoma: A retrospective analysis of 31 cases	GIRADDI; ARORA; SAFI, 2017	To evaluate the surgical treatment applied, perform regular follow-ups, and analyze the rate of recurrence and complications	This was a retrospective study conducted in patients undergoing treatment for ameloblastoma at the Department of Maxillofacial Surgery from January 2006 to December 2013. We evaluated the surgical outcomes, as well as the rate of recurrence and complications. Demographic data including age and gender, tumor	A total of 17 women (54.83%) and 14 men (45.16%) were diagnosed with ameloblastoma. Most cases (90.32%) occurred in the mandible, with only 9.67% in the maxilla. The posterior region, including the body and angle of the mandible, was the most

		of ameloblastoma in our institution.	location, preoperative diagnosis, histopathological subtype, and type of surgery were obtained from medical records. Patients underwent regular follow-up examinations, including radiological evaluations (panoramic radiographs, periapical radiographs, and CT scans, as necessary) and complete clinical examinations, covering aspects such as pain, swelling, sinus drainage, reconstruction plate integrity, and reconstruction plate exposure. Additional data were analyzed regarding the size and location of the tumor, surgical technique used, and occurrence of recurrence.	frequently affected, accounting for 64.51% of the cases. Regarding laterality, 48.38% of the cases involved the right side, while only 22.58% affected the left side. Regarding location, 29.03% of the cases crossed the midline. Histologically, the solid variant was the most common (61.29%), followed by the single variant (32.25%) and the desmoplastic variant (6.45%). The most common complaint of patients was swelling, followed by pain and sinus drainage. About 80.64% of the patients underwent radical treatment, while 19.35% received conservative treatment.
Global incidence and profile of ameloblastoma: a systematic review and meta ꞉analysis	HENDRA *et al., 2019*	To assess the global incidence of ameloblastoma through a systematic review and meta-analysis of articles published between 1969 and 2018, to provide a global profile of patients with ameloblastoma, considering gender, age distribution, tumor location, tumor types, and histopathologic al characteristics.	A search was conducted in the PubMed, EMBASE, SCOPUS, and Web of Science databases. The process was conducted by three reviewers, who acted independently and blindly about each other's activities. A meta-analysis was performed for the studies that provided incidence data. The incidence rate was stabilized using the Freeman-Tukey double arcsine transformation before pooling the data with the random-effects model in the meta-analysis. All combined estimates were presented with 95% confidence intervals. Chi-square tests were used for the relative frequencies of age distribution, tumor location, tumor types, and histological characteristics. MetaXL version 5.3 (Ersatz, EpiGear International, Sunrise Beach, Australia) was used for statistical analysis. A p-value lower than 0.05 was considered statistically significant.	Among all cases, 3,427 (53.2%) were male and 3,008 (46.7%) were female. Male predominance was observed in Africa, North America, Asia, and Australia. Most ameloblastomas were located in the mandible (n = 5,623, 87.2%), followed by the maxilla (n = 549, 8.5%) and the peripheral form (n = 72, 1.1%). On all continents, tumors in the jaw outnumbered tumors in the maxilla and other locations. The solid/multicystic type was the most common, with 2,462 (67.7%) cases. The unicystic, desmoplastic, and peripheral types accounted for 953 (26.2%), 130 (3.6%), and 38 (1.0%) cases, respectively.

Clinical, paraclinical and therapeutic factors implicated in the recurrence of benign jaw tumors in three tertiary hospitals in Yaounde	JACQUES *et al.,* 2021	Determine the clinical and paraclinical features that are implicated in or indicate the recurrence of benign tumors.	A case-control study was conducted from January 2010 to April 2020. The study population included patients diagnosed with benign tumors in the jaw. In total, 89 patients were selected, of whom 19 had at least one recurrence. Categorical data were compared using Pearson's chi-square test, while Student's t-test was used for numerical data. The significance limit adopted was 0.05, i.e., p-values lower than 0.05 were considered statistically significant.	In the study, 34 men and 55 women participated. There were recurrences in 7 men and 12 women. Control cases consisted of 27 males and 43 females. The mean age was 33.39 years for the cases and 28.09 years for the controls. Of the patients, 67.74% had a unilocular radiographic aspect, while 32.26% had a multilocular aspect. In addition, 14.28% of patients with unilocular tumors and 35.00% of patients with multilocular tumors had recurrence. Although conservative treatment (23.38%) was more associated with recurrence compared to radical treatment (10%), this difference was not statistically significant. It was also observed that enucleation (24.29%) was more associated with recurrence than with remodeling (14.29%).
Ameloblastoma of the jaws: Management and recurrence rate	LABORDE *et al.,* 2017	To compare the recurrence rate of ameloblastoma according to the type of treatment: radical or conservative, recording the clinical, radiological, and histological characteristics of these tumors.	All patients admitted to the Department of Oral and Maxillofacial Surgery of the Hospital de Lille for ameloblastoma of the jaws between 1991 and 2013 were included in the study. Data were analyzed using XLSTAT software. Initially, a descriptive analysis of the population was performed. Next, the patients were divided into two groups according to the type of treatment to compare recurrence rates. Fisher's exact test was used to compare recurrence rates between the group submitted to radical treatment and the group treated conservatively, with a significance limit of $P < 0.05$.	A total of 27 patients were included in the statistical analysis, 17 men (59.3%) and 10 women (40.7%). The mean age of the patients was 46.3 years. The main complaint was edema, observed in 18 patients (66.6%). The predominant tumor location was in the mandible, affecting 20 patients (74.1%). Of the patients, 22 underwent conservative treatment, while 14 received radical treatment. Eight patients required a second treatment, and two patients required a third due to relapses. The recurrence rate was significantly higher (90.9%) in the conservatively treated

				group than in the radically treated group (9.1%). Only one case of recurrence was observed in the group submitted to radical treatment.
Management techniques of ameloblastoma: a literature review	MAYAN; MAYAN; SANDRINI, 2017	Review the treatment options available in the literature for ameloblastoma.	This study consisted of a cross-sectional approach and literature review, focusing on "treatment techniques for ameloblastoma". Data were collected from scientific articles available in several databases, including MEDLINE, SciELO, BIREME, CAPES/MEC Journal Portal, and BBO. The selected articles cover the period from 2006 to 2014.	The treatment that offers the best prognosis for ameloblastoma continues to be total resection, due to the low associated recurrence rates. However, surgical interventions may result in irreversible sequelae, leading to the consideration of conservative treatment. The choice between conservative or radical treatments depends on several factors, including the patient's age, lesion location, histological type, extent, and involvement of neighboring structures. Radical treatments can be complemented with curettage, cauterization, or surgical site decontamination techniques to reduce the risk of recurrence. Radiotherapy is indicated only in exceptional and extensive cases, in which surgery would be mutilating or the lesions cannot be completely resected.
Surgical management of ameloblastoma. Review of literature	NEAGU *et al.,* 2018	Assess whether treatment for ameloblastoma should be conservative or radical.	Data were collected using the U.S. National Institutes of Health's National Library of Medicine database. Articles in English published between 2009 and 2014 were included.	Radical surgery seems to be the most recommended option for multicystic/solid ameloblastomas and advanced unicystic tumors. Currently, morbidity resulting from reconstruction can be reduced by techniques supported by digital models, which are a useful tool to restore the aesthetics and functionality of the area, especially when

				complemented by dental implants. Conservative surgery, combined with a supportive technique and long-term follow-up, is reserved for singleistic and multicystic/solid types to a small extent. However, despite being less invasive, the recurrence rate is significantly high.
Recurrence Rates of Intraosseous Ameloblastoma Cases With Conservative or Aggressive Treatment: a systematic review and meta-analysis	QIAO *et al.,* 2021	To systematically investigate and compare post-treatment recurrence of ameloblastoma in patients undergoing conservative or aggressive approaches.	PubMed, Medline, Cochrane Library, and Embase were used as databases, with no restriction of language and period. Recurrence rates, along with 95% confidence intervals, were calculated. A stratified analysis of the histological classification of the cases was conducted as described in the original included studies. The standard heterogeneity test, based on I2 statistics, was used to assess the consistency of effect sizes. Heterogeneity was classified as with and without significance, according to I2 values ≥50% and <50%, respectively. Publication bias was assessed using Begg's classification correlation and Egger's weighted regression methods. Statistical analyses and the Begg and Egger tests were performed using the Stata 15.0 software (Stata Co., TX, USA). A P value of <0.05 was considered statistically significant.	The aggregate results indicated that the recurrence rate for aggressive treatment was significantly lower than for conservative treatment. Similar results were also observed when stratifying participants by histological classification. Multicystic ameloblastoma has demonstrated a considerably higher recurrence rate than solid and unicystic ameloblastomas.

Source: Authors, 2024.