Acta Scientific Otolaryngology (ISSN: 2582-5550)

Volume 3 Issue 8 August 2021

Research Article

Transoral and Extraoral Approaches for Benign Tumors of the Jaws. Which One to Use and When?

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Received: June 02, 2021

Published: July 05, 2021

Abstract

Purpose: To create an algorithm for the selection of the ideal approach for benign tumors of the jaws based on the authors' experience and a literature review.

Patients and Methods: A retrospective study was performed, including patients treated for the surgical resection of benign tumors of the jaws at the Oral and Maxillofacial Surgery Unit of the University Hospital of Maracaibo, Venezuela between January 2016 and March 2020. Approach selection criteria were divided into major and minor.

Results: A total of 28 patients were included in the study, from the studied tumors, ameloblastoma (53.57%) and ossifying fibroma (21.42%), were the most common pathologies; 21 cases were treated using a transoral approach (75%) and 7 cases were treated with an extraoral approach (25%). There were complications in 5 cases (17.85%), from these complications, 4 of them occurred in patients treated with a transoral approach (14.28%) and 1 occurred in patients treated with extraoral approaches (3.57%).

Conclusion: Selection of a proper approach for benign tumors of the jaws is very scarce, many factors should be taken into account in order to choose the proper approach that allows the total elimination of the lesion as well as the subsequent reconstruction of the defect, minimizing the aesthetic and functional consequences.

Keywords: Approach; Tumors; Jaws; Transoral; Extraoral

Introduction

Benign tumors of the jaws represent a wide group of entities that can be classified as odontogenic or non-odontogenic depending on their origin. The objectives of an adequate treatment should be focused on curing the patient, conserving or restoring form and function, minimizing sequels and preventing recurrences [1,2]. In order to select such proper treatment, several tumor-related factors must be taken into account such as location, size, infiltration to adjacent tissues, previous treatments and tumor biology. There are other factors inherent to the patient, such as age, systemic compromise, lifestyle and socioeconomic considerations that may influence on the treatment selection [3]. The surgical approach for the management of jaw tumors generally represents a challenge for the surgeon, due to the fact that, besides eliminating the lesion, it should allow for the subsequent reconstruction of the surgical defect.

Preoperative understanding of the tumor is mandatory for treatment planification, using proper imaging and tissue studies, in order to achieve successful functional and aesthetic results [4].

Objective of the Study

The objective of this study was to create an algorithm for the selection of the ideal approach for benign tumors of the jaws based on the authors' experience and a literature review.

Patients and Methods

A retrospective study was performed, including patients treated for the surgical resection of benign tumors of the jaws at the Oral and Maxillofacial Surgery Unit of the University Hospital of Maracaibo, Venezuela between January 2016 and March 2020. The tumors were assessed by clinical examination, computed tomography and histopathology report. This study was approved by the University Hospital of Maracaibo, Venezuela IRB and all participants signed an informed consent agreement.

Inclusion and exclusion criteria

All the patients treated for the surgical resection of benign tumor of the jaw and definitively confirmed by histopathology report of the excisional biopsy were included.

Data collection

The following patient data was extracted through the clinical patient record: age; gender; histopathological diagnosis, tumor location, tumor size, surgical approach and postoperative complications.

Approach selection criteria

Approach selection criteria were divided into major and minor.

Major criteria:

- Tumor biology
- Invasion to adjacent tissues.

Minor criteria:

- Tumor size
- Tumor location.

An algorithm for the selection of the surgical approach depending on the clinical and imagenological characteristics of the lesions was presented, based on the authors' experience and a literature review (Figure 1).

Statistical analysis

Once the data was collected, it was analyzed by using statistical software (version 20, SPSS Inc). According to the type of research and the established objectives, a descriptive analysis of each variable was performed, represented by absolute and relative frequency tables.

Figure 1: Algorithm for the selection of the surgical approach for benign tumors of the jaws.

Results

A total of 28 patients were included in the study, 14 males (50%) and 14 females (50%), with an average age of 28.35 ± 14.17 years (range between 3 and 54 years). From the studied tumors, 15 were ameloblastomas (53.57%), 6 ossifying fibromas (21.42%), 3 odontogenic fibromyxomas (10.71%), 2 giant cell central granulomas (7.14%), 1 adenomatoid odontogenic tumor (3.57%) and 1 hybrid odontogenic tumor (3.57%) (Figure 2 and 3). 21 cases were treated using a transoral approach (75%) and 7 cases were treated with an extraoral approach (25%): 1 cervicotomy with sublabial extension (Figure 4 and 5), 1 Webber-Ferguson approach and 5 Risdon approaches. Regarding the location of the tumors, 2 (7.14%) were in the anterior maxilla, 6 (21.42%) in the anterior mandible, 2 (7.14%) in the posterior maxilla and 18 (64.28%) in the posterior mandible. The average diameter of the tumors was 5.59 ± 1.75 cm and the average height was 3.42 ± 1.32 cm. Fenestration of the cortical plates was present in 15(53.57%) cases, and invasion to adjacent tissues in 9 (32,14%) cases. There were complications in 5 cases (17.85%): 3 cases presented postoperative infections (10.71%) and 2 patients presented exposure of the osteosynthesis material (7.14%). From these complications, 4 of them occurred in patients treated with a transoral approach (14.28%) and 1 occurred in a patient treated with an extraoral approach (3.57%) (Table 1).

Figure 2: CT scan showing the tumor's dimensions (Hybrid odontogenic tumor).

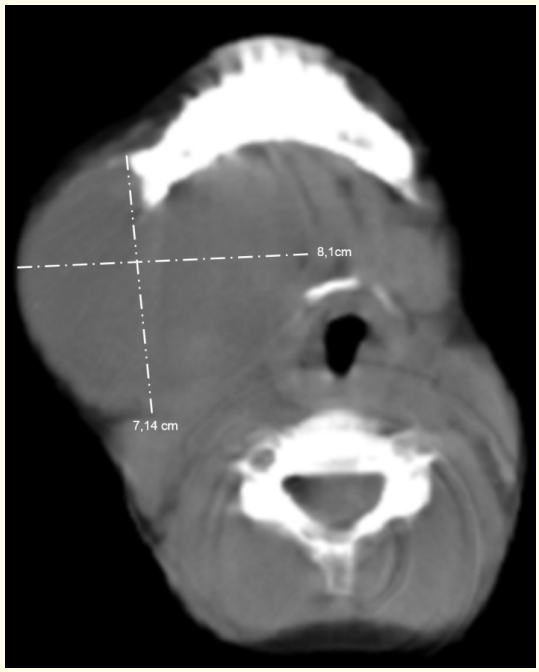

Figure 4: CT scan showing the tumor's dimensions (Odontogenic fibromyxoma).

Figure 3: Transoral approach for a hybrid odontogenic tumor.

Figure 5: Extraoral approach (cervicotomy with sublabial extension) for an odontogenic fibromyxoma.

Discussion and Conclusion

Considering the different tumor biologies and the specific clinical record, size, location and presentation of each tumor becomes a key point in order to select the proper approach [5]. Despite

Patient	Age	Gender	Histopathological diagnosis	Approach	Tumor Location	Size	Invasion to adjacent tissues	Fenestration to cortical plates	Complications
Patient nº 1	16	M	Unclassified hybrid tumor	Transoral	Anterior Mandible	6,52 x 4,5 cm	Yes	Yes	None
Patient nº 2	16	M	Ameloblastoma	Transoral	Anterior Mandible	5,12 x 2,66 cm	No	No	Postoperative infection
Patient nº 3	18	M	Juvenile Ossifying Fibroma	Transoral	Anterior Mandible	5,58 x 2,95 cm	No	Yes	Postoperative infection
Patient nº 4	3	M	Odontogenic Fybromixoma	Extraoral (cervicotomy with sublabial extension)	Posterior Mandible	8,73 x 7,42 cm	Yes	Yes	Postoperative infection
Patient nº 5	30	M	Ameloblastoma	Extraoral (Risdon Approach)	Posterior Mandible	6,33 x 4,8 cm	Yes	Yes	None
Patient nº 6	16	F	Ossifying Fibroma	Transoral	Anterior Mandible	4,39 x 2,88 cm	No	No	Exposure of the osteosynthesis material
Patient nº 7	24	F	Ameloblastoma	Transoral	Posterior Mandible	5,79 x 4,89 cm	No	No	None
Patient nº 8	54	F	Ameloblastoma	Extraoral (Risdon Approach)	Posterior Mandible	6,45 x 4,67 cm	Yes	Yes	None
Patient nº 9	33	F	Ameloblastoma	Transoral	Posterior Mandible	3,85 x 2,33 cm	No	No	None
Patient nº 10	49	M	Ameloblastoma	Extraoral (Risdon Approach)	Posterior Mandible	5,85 x 4,67 cm	Yes	Yes	None
Patient nº 11	25	M	Ameloblastoma	Transoral	Posterior Mandible	4,36 x 2,89 cm	No	Yes	Exposure of the osteosynthesis material
Patient nº 12	50	M	Ameloblastoma	Transoral	Posterior Maxilla	4,88 cm x 3,11 cm	No	No	None
Patient nº 13	15	F	Ameloblastoma	Transoral	Posterior Mandible	3,98 x 2,15 cm	No	No	None
Patient nº 14	48	F	Ameloblastoma	Transoral	Posterior Mandible	4,73 x 2,96 cm	No	Yes	None
Patient nº 15	23	M	Ameloblastoma	Transoral	Posterior Mandible	4,55 x 2,26 cm	No	No	None
Patient nº 16	23	M	Ameloblastoma	Extraoral (Risdon Approach)	Posterior Mandible	7,56 x 4,13 cm	Yes	Yes	None
Patient nº 17	48	M	Ameloblastoma	Extraoral (Risdon Approach)	Posterior Mandible	6,79 x 4,35 cm	Yes	Yes	None

Patient nº 18	48	M	Central Giant Cell Granuloma	Transoral	Posterior Mandible	3,25 x 1,99 cm	No	No	None
Patient nº 19	23	F	Ameloblastoma	Transoral	Posterior Mandible	4,99 x 2,85 cm	No	Yes	None
Patient nº 20	36	F	Odontogenic Fybromixoma	Transoral	Anterior Maxilla	2,87 x 1,98 cm	No	No	None
Patient nº 21	5	M	Juvenile Ossifying Fibroma	Transoral	Posterior Mandible	4,77 x 2,33 cm	No	No	None
Patient nº 22	15	M	Odontogenic Fybromixoma	Extraoral (Webber-Ferguson Approach)	Posterior Maxilla	7,88 x 4,65 cm	No	Yes	None
Patient nº 23	16	F	Adenomatoid Odontogenic Tumor	Transoral	Anterior Maxilla	2.46 x 1,85 cm	No	No	None
Patient nº 24	34	F	Ameloblastoma	Transoral	Anterior Mandible	5,97 x 3,74 cm	Yes	Yes	None
Patient nº 25	41	F	Ossifying Fibroma	Transoral	Posterior Mandible	5,55 x 3,53 cm	No	No	None
Patient nº 26	31	F	Ossifying Fibroma	Transoral	Anterior Mandible	6,73 x 4,25 cm	No	Yes	None
Patient nº 27	32	F	Central Giant Cell Granuloma	Transoral	Posterior Mandible	3,12 x 1,56 cm	Yes	Yes	None
Patient nº 28	22	F	Ossifying Fibroma	Transoral	Posterior Mandible	10,59 x 5.28 cm	No	No	None

Table 1: Characteristics and distribution of patients according to age, gender, histopathological diagnosis, tumor location, fenestration of cortical plates, invasion to adjacent tissues, surgical approach and postoperative complications.

their benign nature, some of these tumors tend to behave very aggressively and reach significant dimensions before even becoming symptomatic. They can cause root and/or bone resorption and have a very high recurrence rate, especially when the surgical treatment was not adequate. Tumors such as ameloblastomas and myxomas must be treated using a resection technique that involves the following anatomical layer (periosteum, muscle, or fascia) and a lineal osseous margin ranging from 0.5 to 1.5 cm [6,7].

Imagenological evaluation using CT scans, MRIs and/or PET-CTs is also fundamental for the selection of an adequate treatment plan. CT scans can be acquired easily and provide information regarding tumor extension and cortical bone erosion. MRIs is also an important method of evaluation and, although it is more expensive and requires more time, it also provides more detailed information about soft tissues and submucous tumor extension, allowing the surgeon to determine if a transoral approach is feasible. Understanding the imaging characteristics of these entities is essential. Generally, odontogenic tumors are related to a tooth or appear to be originated from the alveolar process and non-odontogenic tumors tend to affect the teeth or the alveolar process only after substantial growth [8].

Maxillary lesions are generally separated from the sinus floor by a cortical limit unless the lesion presents a secondary infection or shows aggressive characteristics [9,10]. Likewise, benign mandibular lesions generally present a well-defined cortical margin. Large lesions generally show an irregular contour, usually causing expansion of the cortical plates but preserving their margins; however, they can pierce them if they reach a considerable size [11,12].

Within the protocol of the authors, a CT scan is indicated in all cases because, since we are dealing with intraosseous tumors, it represents a tool of great diagnostic utility, providing information about the extent of the tumor and the presence or absence of bone cortical perforation, which in turn provides guidance about soft tissue involvement.

Balsaderini., *et al.* [13] reported that the site of predilection for the appearance of tumors was the posterior mandible, followed by anterior mandible. These findings are in concordance with our study. On the other hand, fenestration of the cortical plates and invasion of adjacent soft tissues was mainly evidenced in tumors located in the posterior mandible, contrasting with the study made by França., *et al.* [14], where they analyzed 40 patients diagnosed with Ameloblastoma, reporting a higher incidence of aggressive characteristics for tumors located in the maxilla.

Several transoral and extraoral approaches have been described in the literature which are widely applied for the treatment of jaw tumors. In general, the role of transoral resections is limited to small and easily accessible lesions. When the pathology requires a wider field of view, extraoral approaches are presented as a viable option, where there are different techniques available. In addition to these techniques, several modified surgical approaches have been proposed in recent years. Whichever approach is chosen, the goal is always the same: identification and exposure of the lesion, complete resection, prevention of recurrences, protection of blood vessels and vital nerves and minimization of functional and aesthetic damage caused by surgery [15].

Shirani., *et al.* [16] recommend the use of transoral approaches for the resection of locally invasive benign tumors, which diminishes the aesthetic and functional sequelae. The authors defend that even though extraoral approaches bring some advantages (mainly appropriate visibility) they also bring potential aesthetic compromise and potential damage to facial nerves and thus, they prefer this type of approach for the resection of malignant tumors.

Similarly, Omeje., *et al.* [17] recommend the use of transoral approaches for aggressive benign tumors when they are located in the mandibular anterior sector regardless of their size and in cases where aesthetic demands are high. Likewise, they recommend extraoral approaches when there is significant bone destruction.

Vargas., *et al*. [18] prefer an transoral approach for marginal resections of benign tumors with small dimensions that are limited to the mandibular body and/or lesions that do not compromise the basal border nor infiltrate the adjacent soft tissue, while they reserve extraoral approaches for cases where there is compromise of the condylar process, cortical perforation and/or destruction of the basal edge.

In our experience, satisfactory results can be achieved with the use of transoral approaches for benign tumors of the jaws, especially in tumors in the anterior sector or other anatomical locations in which a total visualization of the lesion for its adequate surgical resection is allowed. This type of approach turns out to be the first choice in most of the cases, since when it is used in an effective way it allows the total elimination of the pathology and, in some cases, the reconstruction of the underlying defect, without aesthetic compromise. Nevertheless, in cases in which the tumor shows characteristics of aggressiveness and transoral access to it results intricate, extraoral approaches are preferred in order to guarantee patient healing. Although the greatest concern falls on the aesthetic consequences that this kind of approach may bring, when they are executed in an adequate way respecting the aesthetic subunits, this inconvenience is minimized, bringing pleasant results.

Regarding the surgical treatment for the benign tumors of the jaws, it is known that there are multiple postoperative complications that can occur, surgical site infections are the more common [19-21]. In our study, postoperative infections and exposure of the osteosynthesis material were the complications presented, mostly associated with transoral approach, according to Yao., *et al.* [22], who in a retrospective study evaluated 365 patients who underwent surgical resection of jaws tumors and subsequent reconstruction with osteosynthesis material using transoral and extraoral approaches, founding a relationship between both complications, stating that infection of the surgical site predisposes to wound dehiscence and exposure of osteosynthesis material. These authors indicate that the highest prevalence of infections associated with transoral approaches is related to the large number of microorganisms present in the cavity and inadequate hygiene of the wound.

The literature regarding which considerations should be taken into account for the selection of a proper approach for benign tumors of the jaws is very scarce, and more studies related to this specific topic become necessary.

Conflicts of Interest

The authors declare that they have no conflicts of interest.

Bibliography

1. McHugh J. "Mandible and Maxilla". *Rosai and Ackerman's Surgical Pathology* 11 (2018): 212.
2. Santosh R and Ogle O. "Odontogenic Tumors". *Dental Clinics of North America* 64 (2020): 121.
3. Harris C and Laughlin R. "Bening tumors of the jaws". *Oral and Maxillofacial Surgeons* (2015): 415.
4. Dabholkar JP., *et al*. "Benign jaw tumors". *The Indian Journal of Otolaryngology and Head and Neck Surgery* 61 (2009): 240.
5. Marx R. "Oral and maxillofacial pathology: a rationale for diagnosis and treatment 2nd Edition (2014).
6. Ringer E and Kolokythas A. "Bone Margin Analysis for Benign Odontogenic Tumors". *Oral and Maxillofacial Surgery Clinics of North America* 29 (2017): 293.
7. Carlson E. "Surgical Management of Odontogenic Tumors". *Journal of Oral and Maxillofacial Surgery* (2005): 63.
8. Scarfe W., *et al*. "Imaging of Benign Odontogenic Lesions". *Radiologic Clinics of North America* 56 (2018): 45.
9. Koenig LJ. "Imaging of the jaws". *Seminars in Ultrasound, CT and MRI* 36 (2015): 407.
10. Mosier KM. "Lesions of the jaw". *Seminars in Ultrasound, CT and MRI* 36 (2015): 444.
11. Bharatha A., *et al*. "Pictorial essay: cysts and cyst-like lesions of the jaws". *The Canadian Association of Radiologists Journal* 61 (2010): 133.
12. Robinson RA. "Diagnosing the most common odontogenic cystic and osseous lesions of the jaws for the practicing pathologist". *Modern Pathology* 30 (2017): 96.
13. Baldasserini G., *et al*. "Epidemiological profile of ameloblastoma affected patients subjected to surgery at a tertiary hospital in the state of Sao Paulo". *Revista Odontológica Mexicana* 22 (2018): 82.
14. França LJ., *et al*. "Ameloblastoma demographic, clinical and treatment study: analysis of 40 cases". *Brazilian Journal of Otorhinolaryngology* 78 (2012): 38.
15. Ellis E and Zide M. "Surgical Approaches to the Facial Skeleton 2nd Edition (2008).
16. Shirani G., *et al*. "Immediate reconstruction of a large mandibular defect of locally invasive benign lesions (a new method)". *The Journal of Craniofacial Surgery* 18 (2007): 1422.
17. Omeje K., *et al*. "Management of Odontogenic Fibromyxoma in Pediatric Nigerian Patients: A Review of 8 Cases". *Annals of Medical and Health Science Research* (2015): 11.
18. Vargas G., *et al*. "Tratamiento de los ameloblastomas". *Revista Mexicana de Cirugía Bucal y Maxilofacial* 6 (2010): 66.
19. Ogihara H., *et al*. "Risk factors of postoperative infection in head and neck surgery". *Auris Nasus Larynx* 36 (2009): 457.
20. Horan TC., *et al*. "CDC definitions of nosocomial surgical site infections, 1992: a modification of CDC definitions of surgical wound infections". *American Journal of Infection Control* 20 (1992): 271.
21. Yang CH., *et al*. "Surgical site infections among high-risk patients in clean-contaminated head and neck reconstructive surgery". *Annals of Plastic Surgery* 71 (2013): 55.
22. Yao CM., *et al*. "Surgical site infections following oral cavity cancer resection and reconstruction is a risk factor for plate exposure". *Journal of Otolaryngology - Head and Neck Surgery* 46 (2017): 30.

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