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Case report

Odontogenic fibromyxoma: A case report in myasthenia gravis patient and review of the literature

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ABSTRACT

Introduction and importance: Odontogenic fibromyxoma is generally slow-growing, benign, asymptomatic, present with painless swelling in the jaw. Pain is mostly seen in the case of infection, adjacent anatomical structures or neural involvement. When the English-language literature is searched, only 62 cases are found about odontogenic fibromxoma which means it is really rare pathology.
Case presentation: We describe a case of odontogenic fibromyxoma in a 29-year-old female with Myasthenia Gravis (MG) who referred to oral and maxillofacial surgeon with increased swelling in the anterior region of the mandible.
Clinical discussion: Clinically, there was swelling in the mouth that caused bone expansion. On the radiological examination, a well-circumscribed, radiolucent area causing displacement of the tooth roots was observed. After clinical and radiological examinations, the operation was done under local anesthesia. The excised lesion was sent for histopathological investigation and the patient was followed up clinically and radiologically for 3 years.
Conclusion: The clinical and radiological properties, differential diagnosis, treatment options and prognosis of odontogenic fibromyxomas are also discussed after the case presentation along with literature review.

1. Introduction

Odontogenic fibromyxoma is a benign, rare, odontogenic disease and before were classified as a simple type of odontogenic fibroma. According to the 1992 World Health Organization's histological classification of odontogenic tumors, fibromyxomas are a subgroup of myxoma. When the literature was searched for the incidence of odontogenic fibromyxoma, no single incidence rate was found. Myxomas constitutes approximately 1–17.7 % of all odontogenic tumors and odontogenic fibromyxomas represent a very small part of all myxomas and their prevalence varies from 0.04 % to 3.7 % [1–20].

The World Health Organization (WHO) defines myxoma as around and locally invasive neoplasm with angular cells located within the abundant mucoid stroma. The tumor is usually poorly connected to the surrounding tissues. It either mixes freely with the tissue from which it comes out or is separated by a pseudocapsule. Myxomas contain little collagen and unlike myxomas, fibromyxomas may show calcification or ossification and contain higher amounts of thick collagen fibers and vessels [7,9,10,12,13,17–19]. There is no difference in the biological behavior of myxomas and fibromyxomas [21].

Odontogenic myxomas and fibromyxomas are classified as mesenchymal odontogenic tumors (with limited or without odontogenic epithelium) under the WHO classification of odontogenic neoplasms [11–13]. Previous theories show that the lesion derives from the neural sheath or is the result of degeneration of fibromas, lipomas, and; chronic irritation and the degenerative processes following tissue anoxemia [22]. Recent studies are considered to originate from primitive mesenchymal structures and are thought to arise from bone, tooth germ, or odontogenic tissues such as dental papilla, dental follicle or periodontal ligament. For this reason, we can say that all myxomas seen in the jaws are of odontogenic origin [7–11,13–17,20,23–29].

Odontogenic fibromyxomas affect all age groups but most of the cases reported in the literature were diagnosed between the second and fourth decades of life. It was observed that it peaked in the third decade. [2,7–14,16,17,20–27]. It is rarely seen in adults over 50 and children under 10 years of age [1,8–11,14,20,21,23,25].

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In recent publications, it has been reported that odontogenic fibromyxomas are more common in the mandible and females [10–12,24]. The tumor occurs both in the maxilla and mandible with a slight predilection for the posterior mandible. A few cases are described in the ramus, condyle and non-tooth bearing areas [25].

Radiographic presentation of odontogenic fibromyxoma is not typical, and this can lead to an incorrect clinical diagnosis. It is vary from small unilocular radiolucent lesions to large multilocular radiolucent lesions which have mostly well-defined borders. Multilocular radiolucent images; honeycomb, soap bubble, tennis racket, wispy and spider web in appearance [9–17,20,21,23,25]. Most of them are multilocular and the most characteristic radiographic feature is the "tennis racquet" appearance [11–13].

Odontogenic fibromyxoma causes enlargement of the jaws, usually bicortical bony expansion and often completely perforation of the cortices and extension into the surrounding structures but it rarely crosses the midline of the jaw [4,8,10,13,17,21,25,27]. Smaller lesions are usually asymptomatic, while larger lesions are often aggressive with the possible destruction of the cortical bone. The main symptom is slow swelling of the affected area and displacement of the dentition. Especially large lesions usually show displacement of teeth or root resorption [7,9,10,13,14,17]. Other findings were a mobile tooth, toothache (preceding jaw swelling), mucosal ulceration, displacement of teeth, or root resorption [9,21].

Table 1
Clinical review data on 63 patients with odontogenic fibromyxoma.

Patient No	Authors	Year	Gender	Age	Location	Treatment	Anesthesia	Follow up	Recurrence
1	Wawro	1950	F	32	Mandibula posterior (right)	Segmental resection	NS	NS	NS
2	Wawro	1950	M	22	Maxilla posterior (right)	Segmental resection	NS	NS	NS
3	Bruce	1952	M	14	Maxilla anterior (left)	Enucleation and curettage	GA	NS	NS
4	Schultz	1957	M	32	Mandibula posterior (right)	Excision	GA	NS	No
5	Westwood	1974	F	42	Maxilla anterior (alveolar ridge)	Excision	GA	3 years	No
6	Schneider	1975	F	26	Maxilla anterior (right)	Excision 2 times	NS	4 years	Yes
7	Yura	1982	F	54	Mandibula posterior	Resection and reconstruction	GA	2 year	No
8	Abiose	1987	F	40	Mandibula posterior (right)	Enucleation and curettage	NS	6 month	No
9	Abiose	1987	F	40	Maxilla anterior (left)	Excisional biopsy	NS	NS	No
10	Abiose	1987	F	20	Mandibula posterior (left)	Enucleation and curettage	NS	3 years	Yes
11	Abiose	1987	M	10	Mandibula anterior	Enucleation and curettage	NS	6 month	No
12	Abiose	1987	F	30	Mandibula anterior	Enucleation and curettage	NS	6 month	No
13	Abiose	1987	F	25	Maxilla posterior (left)	Enucleation and curettage maxillectomy	NS	3 years	Yes
14	Abiose	1987	F	22	Maxilla posterior (left)	Exicisional biopsy	NS	NS	No
15	Abiose	1987	M	18	Mandibula posterior (right)	Mandibulectomy	NS	6 month	No
16	Abiose	1987	F	20	Mandibula posterior (left)	Mandibulectomy	NS	6 month	No
17	Abiose	1987	F	25	Maxilla posterior (left)	Maxillectomy	NS	1 year	No
18	Keszler	1995	NS	5–16	Maxilla and Mandibula posterior (mostly right side)	Resection and currettage	NS	1 year	Yes:2 No:8
19	Keszler	1995	NS	5–16					
20	Keszler	1995	NS	5–16					
21	Okada	1997	M	52	Maxilla posterior	Excision	LA	NS	NS
22	Tsukinoki	1999	M	71	Mandibula anterior	Enucleation and curettage	NS	2 year	No
23	Schmidt	2004	NS	13–75	Mandibula posterior	Liquid nitrogen cryotherapy	NS	NS	NS
24	Mehrotra	2008	M	12	Mandibula posterior	Resection and reconstruction	GA	3 year	No
25	Shahoon	2009	M	8	Mandibula (right)	Excision	LA	3 year	No
26	Hadidy	2010	M	15	Mandibula posterior (right TMJ)	Chemotherapy and radiotherapy	NS	5 month after	Died
27	Sato	2010	F	40	Mandibula (right)	Curettage	NS	1 year	No
28	Infante-Cossio	2011	F	32	Maxilla anterior	Radical surgical excision	GA	3 year	No
29	Dietrich	2011	M	46	Maxilla canine to first molar (right)	Total resection	GA	2 year	No
30	Reddy	2013	F	12	Maxilla canin premolar (left)	Curettage and enucleation	GA	NS	No
31	Zayet	2014	F	13	Maxilla and Mandibula posterior	Total enucleation	GA	NS	NS
32	Omeje	2015	M	8	Maxilla anterior (central)	7: Peripheral ostectomy 1: Bone resection	NS	2 year	No
33	Omeje	2015	F	2	Mandibula posterior (right)			2 year	No
34	Omeje	2015	M	7	Mandibula anterior (left)			2 year	No
35	Omeje	2015	M	9	Maxilla anterior (left)			2 year	No
36	Omeje	2015	F	11	Mandibula anterior (left)			2 year	No
37	Omeje	2015	M	13	Maxilla anterior (right)			2 year	No
38	Omeje	2015	M	8	Mandibula posterior (left)			2 year	No
39	Omeje	2015	F	10	Mandibula anterior (left)			2 year	No
40	Bhoyar	2016	F	8	Gingiva	NS	NS	NS	NS
41	Khare	2016	M	11	Maxillary anterior(right)	Excisional biopsy	NS	NS	NS
42–57	Haser	2016	M	6	Mandibula	Hemi-mandibulectomy and reconstruction	GA	3 months	No
58	Bahl	2016	M	15	Mandibula posterior (right)	Segmental resection and reconstruction	GA	1 year	No
59	Rowland	2017	F = 10, M = 6	5–70	Madibula 9 case - Maxilla 6 case - Maxilla+Zigoma 1case	Resection	GA	1–14 month	No
60	Alhousami	2018	F	22	Mandibula (right)	Mandibular resection	GA	6 month	No
61	Salti	2018	M	14	Mandibula posterior (left)	Resection and reconstruction	GA	NS	NS
62	Rowe	2019	F	33	Mandibula (left)	Hemi-mandibulectomy and reconstruction	NS	NS	NS
63	Genc	2021	F	32	Mandibula anterior (left)	Total enucleation	LA	3 years	No

NS: Not Specified.

Lesions to be considered in the differential diagnosis unicystic ameloblastoma, conventional ameloblastoma, ameloblastic fibroma, adenomatoid odontogenic tumor, Pindborg tumor, central giant cell granuloma, central hemangioma, odontogenic keratocyst, calcifying epithelial odontogenic tumor, dentigerous cyst, aneurysmal cyst, fibro-osseous lesions, and central odontogenic fibroma. One-third of fibromyxomas have poorly defined borders, because of that malignancy also be included in the differential diagnosis [7,9,10,13,16,20–22].

Histologic differential diagnosis should be made with myxoma, pleomorphic adenoma, nodular fasciitis, myxoid lipoma, fibrous dysplasia, chondromyxoid fibroma, odontogenic fibroma, desmoplastic fibroma, myxoid neurofibroma, myxofibrosarcoma, rhabdomyosarcoma, aggressive angiomyxoma, fibrosarcomas, chondrosarcomas and liposarcoma [9,16,18,21].

Surgery is the only treatment choice. Surgeon make the right therapeutic decisions by evaluating the clinical, radiological, and pathological findings together. Radiotherapy is not effective in treatment of fibromyxoma [7,9,11,13,16,17,22,24,27]. The treatment decision is made with radiographic and clinical findings depending on how much the lesion includes soft tissue and intraosseous structures [16]. Conventional treatment method is complete removing the lesion by enucleation or resection [10,15,16,21,27,29]. Due to the aggressive nature of the tumor, some studies suggest segmental mandibulectomy or maxillectomy followed by reconstruction if possible [13,20,23,24,27]. In other studies, it is stated that radical resection should be preferred in the treatment of lesions larger than 3 cm, if the diameter of the lesion is smaller it is better to treat conservatively with enucleation or curettage [9–11,13,16,22–24].

After curettage, some publications say cleaning the cavity with an agent can be applied to kill epithelial remnants of satellite cysts [29]. In some studies, liquid nitrogen therapy was used after curettage. In this way, it devitalizes the bone and eliminates neoplastic cells, and it has therefore been argued that it can be a good alternative to radical resections [16].

Myasthenia gravis (MG) is an autoimmune disease in skeletal muscle characterized by fatigue and weakness increasing on exertion. Routine dental treatments of MG patients, due to the myasthenic crisis, can be unsafe or even life-threatening. For this reason, it is necessary to plan well before and during the operation [30,31].

Since 1950, in the jaw, only 63 cases of odontogenic fibromyxoma (including the present case) have been published in the English-language literature (Table 1) [1–29]. This study aimed to describe a case of fibromyxoma in a patient with myasthenia gravis and to review previously reported cases.

2. Clinical report

A 29-year-old female patient noticed the increasing and painless swelling in her mouth and applied to oral and maxillofacial surgen. The patient was extremely worried because of this mass in her mouth. She feared that the lesion would be malignant. In the anamnesis, it was learned that the patient had Myasthenia Gravis and her condition was stable. In the intraoral examination, a raised, painless lesion with the same color as the mucosa was seen in the anterior region of the lower jaw on the left side (Figs. 1, 2). In the intraoral examination, no caries was found in the relevant region. Due to orthodontic treatment, it was observed that there was a retainer behind the lower teeth in both maxilla and mandible.

In the radiological examination, a radiolucent, well-circumscribed lesion that extended to the right and left canines of the lower jaw and causing displacement of the tooth roots was observed in the panoramic radiograph (Fig. 3).

The procedures to be performed were explained to the patient and ethical approval and participation approval were obtained. In order to understand the contents of the swelling, the oral and maxillofacial surgeon first performed a fine needle aspiration. However, nothing came from the aspiration result. Consultation from the patient's neurologist was requested and the operation was planned under local anesthesia. The SCARE 2020 Guideline was used for operation [32]. After local anesthesia, a gingival incision was made and the periosteum was elevated. Expansion in the bone was seen in more detail and no perforation was found in the bone. (Fig. 4). The lesion was reached after the bone tissue was removed with the aid of a bur. The entire lesion was enucleated and the lower left lateral tooth in the lesion was extracted (Fig. 5). The excised lesion contained a solid structure and was sent to

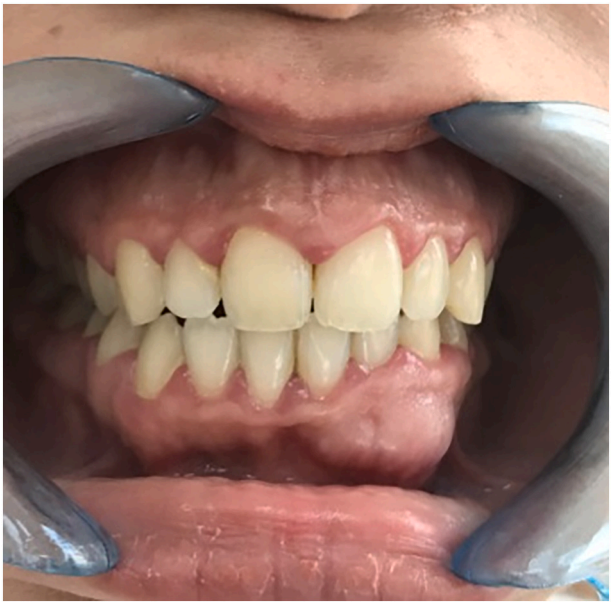

Fig. 1. Front view of the mouth.

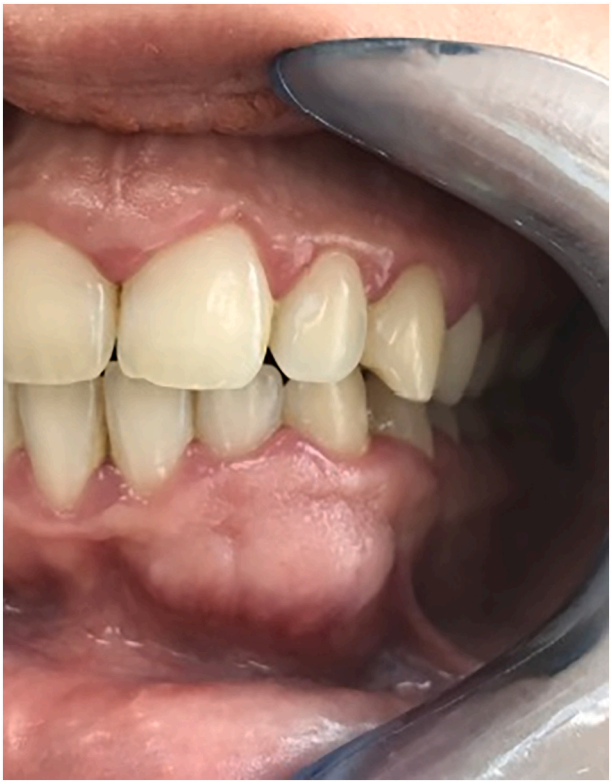

Fig. 2. Lateral view of the mouth.

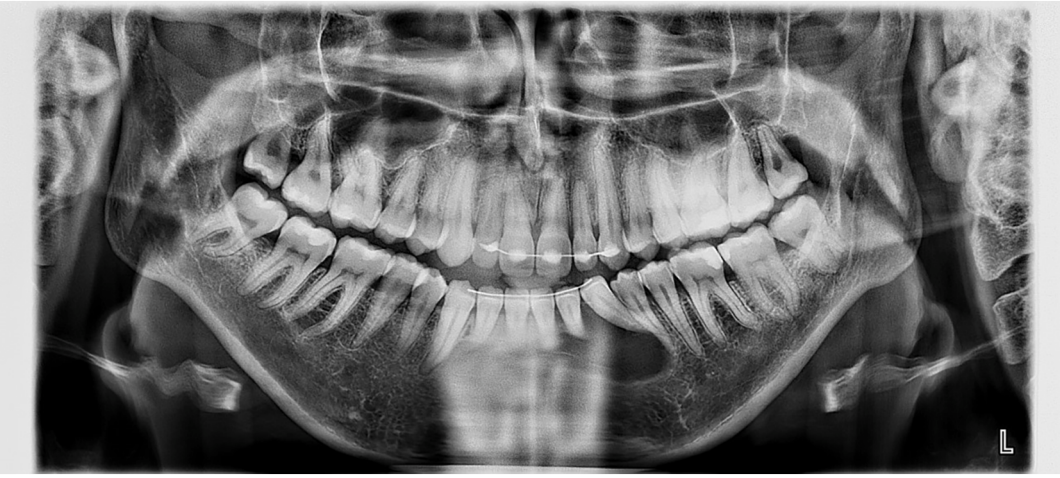

Fig. 3. First panaromic radiograph of the patient.

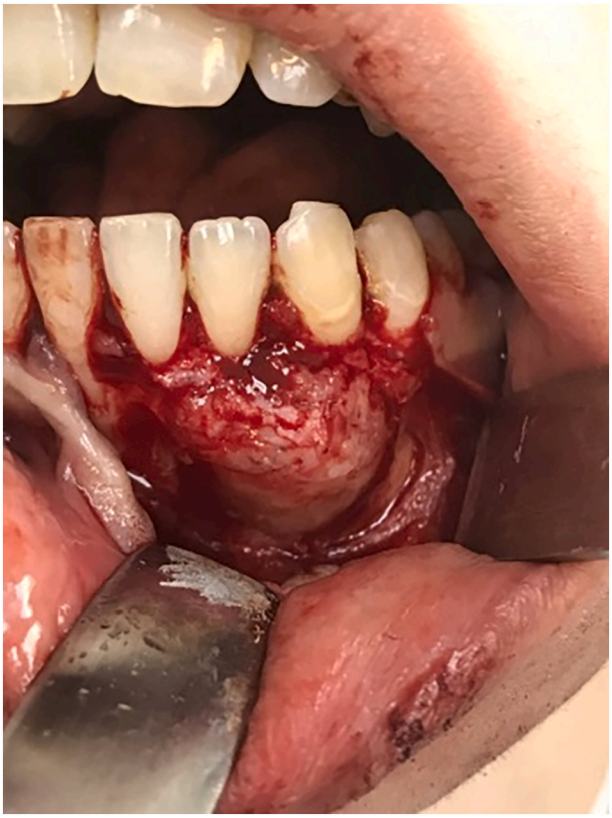

Fig. 4. Intraoral view during surgery after periosteal elevation.

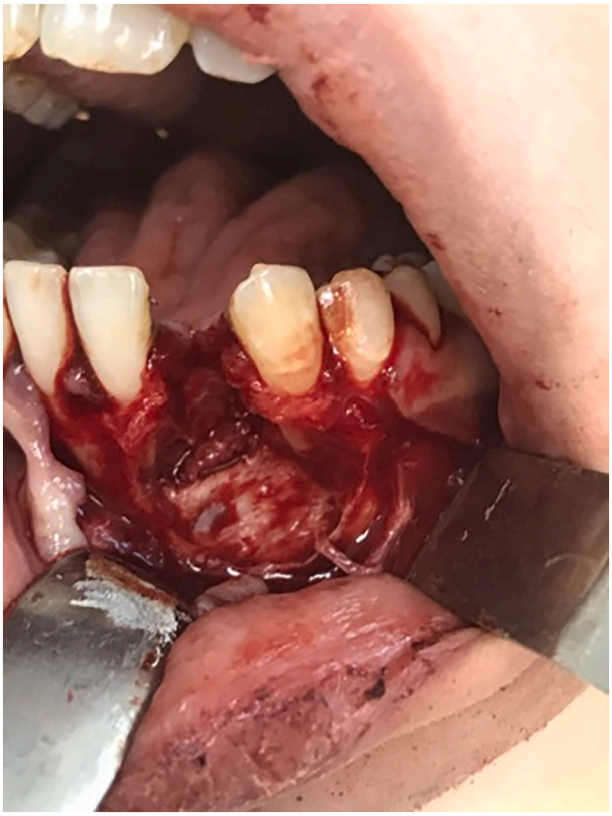

Fig. 5. Appearance after tooth extraction and removal of the lesion.

pathology for histopathological examination (Fig. 6).

In the pathologically examined sections, a tumoral mass consisting of fibroblastic spindle cell proliferation with mixoid stroma and thin collagen fibers in places was observed. No mitotic activity, necrosis or atypical changes were observed (Figs. 7, 8).

No recurrence was found in the patient, whose radiological and clinical follow-up was performed for three years. It is followed by panoramic films that the tooth roots come back to their former places and the bone tissue is formed again (Fig. 9, 10, 11).

An English-language literature review was conducted to prove that the incidence of odontogenic fibromyxoma in the jaws is rare. Search terms included "fibromyxoma", "myxofibroma", "odontogenic fibromyxoma" and "odontogenic myxofibroma".

3. Discussion

Odontogenic fibromyxoma is a slow-growing neoplasm and usually occurs in people in their 20s and 40s. In our case, the diagnosis was made also third decade, which is consistent with the literature. It is rarely seen in adults over 50 and children under 10 years of age but search of the literature, it was determined that 16 of the 63 cases were aged 10 and below; and only 3 cases were aged 50 and over [1,9,23] (Table 1).

Most studies reported that odontogenic fibromyxomas are more common in females than males [7,10–13,16,20,21,23–25]. In our literature review, it was seen that 33 of the cases in which gender was specified were female and 26 were male. The ratio of females to males is

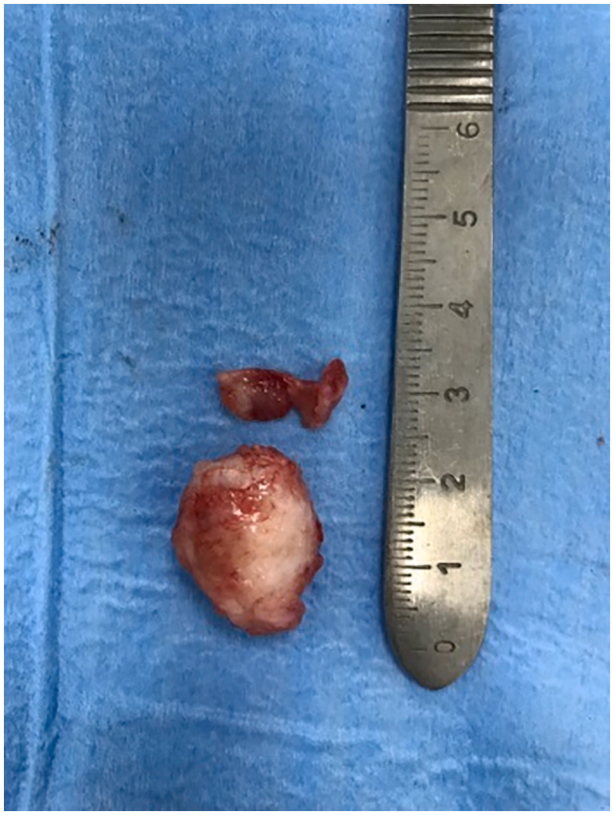

Fig. 6. Appearance of the removed lesion.

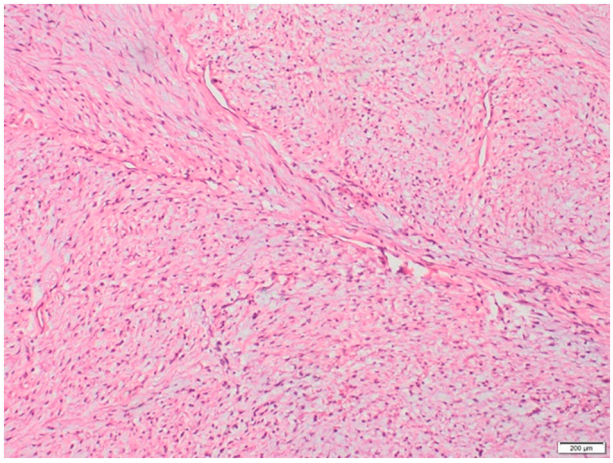

Fig. 7. Histopathological image at ×10 magnification.

1.26 and this data supports that odontogenic fibromyxoma is most common in females. However, according to some other studies there is no difference due to race or gender in the occurrence of odontogenic fibromyxoma [14,15,17,21,23].

In the literature review, 36 of the cases are seen in the mandible and 24 in the maxilla, 25 of them are said to be in the posterior region and 16 of them are in the anterior region (Table 1). In our case, although the lesion was seen in the anterior mandible; confirms that fibromyxomas are seen in both the maxilla and mandible and the most common site is the posterior part of the mandible [7,9–16,20,21,23–25,27,28]. However, some other articles reported equal incidences both in the mandible and maxilla [14,21,23,25]. An elderly patient with odontogenic fibromyxoma showed an anterior portion of the mandible [28]. The maxilla

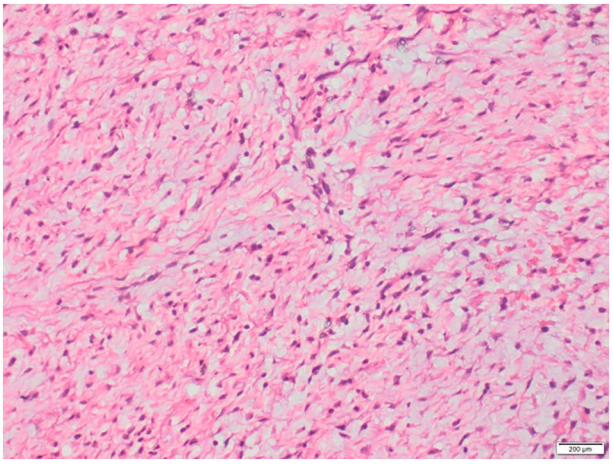

Fig. 8. Histopathological image at ×20 magnification.

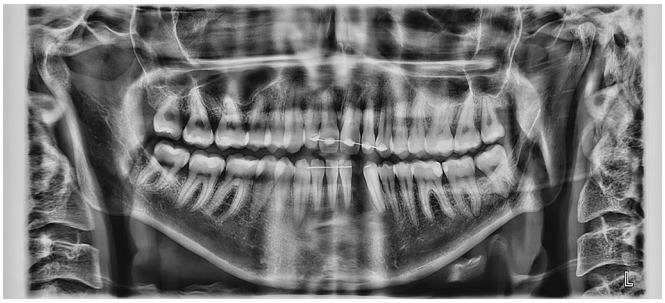

Fig. 9. Panaromic radiograph taken 6 months after the operation.

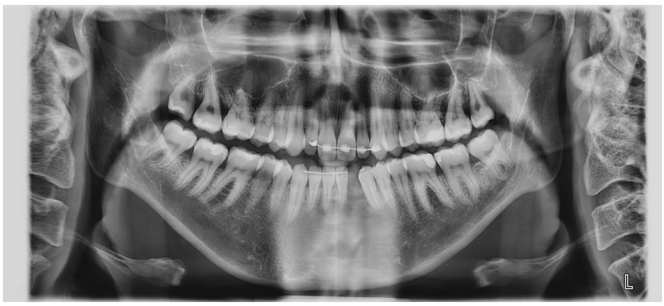

Fig. 10. Panoramic radiograph taken 1 year after the operation.

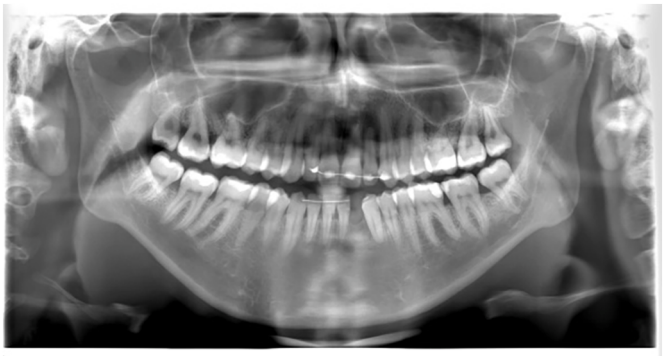

Fig. 11. Panoramic radiograph taken 3 years after the operation.

and the anterior part of the mandible are rarely affected but when found in the maxilla, it is generally more aggressive than in the mandible and can enlarge to the zygoma, maxillary sinus, and even the orbits [7,11,23,24].

Odontogenic fibromyxomas are generally rare, slow-growing, benign, asymptomatic, present with painless swelling and behave in a locally aggressive manner [6–15,17,21,23–28]. Pain is mostly seen in the case of infection, adjacent anatomical structures, or neural involvement [6,16,21]. Rarely in some other cases, during clinical examination patients complains of missing teeth, impacted teeth, malocclusion, paresthesia, hypesthesia, anesthesia, and deformity of the maxillofacial region [9,13,14,20,23,24,26,27,29]. In our case, the patient applied to us because of painless swelling. In the panoramic radiograph, it was seen that there was a displacement of the tooth roots which is more common instead of root resorption [10,12,14,17].

There is a discrepancy with fibromyxoma reports, as many classify it under the general term “myxoma” which makes it difficult to review in the literature. According to Reddy et al. and Dietrich et al. Virchow was the first to use the term myxoma in 1863. The term fibromyxoma in the jaw was described according to Reddy et al. by Dietrich et al. and according to Dietrich; Marcove et al. was described as the first fibromyxoma term in extragnathic location in1964 [1,9,11]. Our review of the literatüre, for previous reports of fibromyxoma, was based on case reports that report a “fibromyxoma”.

Fibromyxomas occur in soft and bony tissues. Myxomas can be found in the heart, skin, and subcutaneous tissue and centrally in the bone, but myxomas of the jaws are encountered rarely [9,11].

Fibromyxomas differ from the myxomas occurring in long bones, which tend to recur and become malignant. Myxofibroma in any form and location is rarely seen and it is considered more uncommon in the jawbones than in the rest of the other bones in the skeleton [10,15,17,20]. Fibromyxoma of the jaw shows better diagnosis than occurring in long bones of the skeleton [11].

Panoramic radiographs are the primary examination method. Panoramic radiography was the way to determine the lesion's extension, shape, circumference, size, number, and effects on surrounding structures. In our case, the lesion has uniloculer large radiolusent area which involves the roots of teeth in the panoramic radiograph. MRI and CT scans are helpful when panoramic radiographs are insufficient or when we want to see the bone spread fully. They provide better information on the degree of cortication and expansion when compared with plain radiographs. MRI can reveal the solid or cystic composition in any part of the lesion and the inaccessible areas [8,9,12,15,21].

Histologically odontogenic fibromyxomas are characterized by stellate-to-spindle-shaped cells and loose myxoid in the stroma matrix of collagen fibers. Fibromyxomas also contain a high amount of hyaluronic acid [7,9,11–14,16,18,21,23–25,28]. Odontogenic epithelial nests may be present, but they are not necessary for diagnosis [12,20].

Each removed lesion should be examined pathologically. Odontogenic fibromyxomas are generally gray-white to yellow in color, gelatinous, semisolid, unencapsulated, and well-delineated masses [9–11,13,20,22,23]. Malignant degeneration is not seen and the presence of a true malignant type of this tumor (myxosarcoma) is not evident [18,22].

Accurate results cannot be obtained with aspiration biopsy because the contents are mostly solid. As a result of the histopathological evaluation, a definitive diagnosis can be made. In case of large lesions, a biopsy may be required to understand the nature of the tumor and to plan treatment [7,11].

To prevent myasthenic crisis in patients with myasthenia gravis, surgery should be performed with a minimally invasive approach and under the best possible medical supervision. For minor procedures that can be performed in the office under local anesthetic, appointment times should be kept short, typically in the morning hours to take advantage of more muscle strength [30,31]. For these reasons, we performed the operation of our patient in the morning hours and under local anesthesia in clinical conditions, since the lesion was not very large.

It should be treated surgically as complete enucleation or radical resection of the mass [17,27]. The size of the lesion and the age of the patient allows us to decide whether the surgery should be performed under local or general anesthesia. It is seen that only 3 of the 63 published cases, including our case, were performed under local anesthesia and the rest were performed under general anesthesia.

Some antibiotics have muscle relaxant properties, for that reason antibiotics should only be used after consulting the patient's neurologist. Penicillin and its derivatives are not associated with neuromuscular blocking properties, although ampicillin has rarely been reported to increase weakness in MG patients [30,31]. In our case, amoxicillin group antibiotics, pain relievers and mouthwash were prescribed for use in the post-operative period.

Fibromyxomas are locally invasive and aggressive lesions but do not metastasize. After enucleation or less extensive procedures has a high rate of recurrence [7,9,15–17,20–22,29]. The recurrence rate ranges from 10 to 33 % with an average of 25 %. Recurrence is more common in young people, especially before puberty and before growth stops [7,9,11,13,16,17,23,24].

Reasons for the high recurrence rate are not yet fully known. This includes tumor cells, dental lamina or satellite cysts within the bone margin thought to have an effect [29]. Some studies show this because of the infiltrative nature of these tumors and their ill-defined margin from the surrounding tissues [11,18].

Fibromyxomas seen in the jaws has a better prognosis than those seen in the long bones. Fibromyxomas of long bones are often malignant and tend to recur with great frequency even if removed. On the other hand, fibromyxomas seen in the jaws are less likely to recur after removal [11,27]. Almost all cases of odontogenic myxofibromas are cytologically benign and the patients rarely die of the tumors except few cases [10,18].

Clinically, most recurrences occur within 2 years but in some patients, recurrence occurs several years after surgery. For this reason, long-term follow-up is recommended [9,13,15,16,20,24]. To understand the aggression of odontogenic fibromyxomas, some resources claimed to evaluate Ki67 immune expression together with clinical findings [28].

In our literature review, recurrence was seen in only 5 of 63 cases. Of these, 3 cases were followed for 3 years or more, and 2 of them occurred as a result of a 1-year follow-up. In our case, a 3-year clinical and radiological follow-up was performed and no recurrence was found.

4. Conclusions

Differential diagnosis of odontogenic fibromyxoma, which is rare in the jaws, should be made well and the possibility of recurrence should not be forgotten. Long-term follow-up becomes even more important in such cases.

In muscle diseases such as MG, procedures should be performed in the morning and with minimally invasive surgical planning.

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Ethical approval

Patients gave their informed consent before taking any radiograph and any application according to the principles of the Helsinki Declaration, including all amendments and revisions.

Consent for publication

All authors gave consent for the paper.

Research registration

None.

Guarantor

Dr. Bedriye Gizem Çelebioğlu Genç

Availability of data and materials

The data sets used and/or analyzed during the current study are available from the corresponding author on reasonable request.

CRediT authorship contribution statement

Bedriye Gizem Çelebioğlu Genç was a principal investigator and a major contributor in data collection, data entry, manuscript writing, and literature search. Kaan Orhan was co-investigator and supervisor in the study. All authors have read and approved the manuscript.

Declaration of competing interest

The authors declare that they have no competing interests.

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