

Multiple benign fibrous histiocyto- mas of the mandible: A case report and review of the literature

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Abstract. Benign fibrous histiocyto-
mas (BFH) mostly occurs on the skin of the extremities, while it is unusual to manifest on the bone and mandibular involvement of BFH is even rarer. The present study reports a case of BFH in a 42-year-old female who had a slowly progressive swelling of the bilateral mandible and slight facial asymmetry over a period of 4 months. However, the outcome of this patient was unsatisfactory, with the first and second recurrence observed 16 and 46 months after surgery, respectively. The present case suggests that BFH has a risk of recurrence after transoral curettage. Regular follow-up is advised to detect tumor recurrence after the surgery of transoral curettage.

Introduction

Benign fibrous histiocyto-
mas is a type of mesenchymal tumor that was first reported by Stout and Lattes (1) in 1967; it mostly occurs on the skin of the extremities, while bony involvement is uncommon, with <100 reported cases to date (2-5). According to the 2020 World Health Organization (WHO) classification of tumors of bone, BFH is categorized into the same disease entity as non-ossifying fibroma (3). Most bony BFHs occur in the pelvic bone, femur and tibia, which share identical histological characteristics with cutaneous BFH (5-8). However, mandibular involvement of BFH is rare and only 11 cases have been reported to date (5,7,9-16). The present study reported a case of mandibular multiple BFH treated at the Affiliated Hospital of Stomatology, Sun Yat-Sen University (Guangzhou, China), who was followed up for 46 months. Furthermore, a literature search concerning mandible BHF was performed

in Medline (www.medline.com) with the keywords 'Benign fibrous histiocyto-
mas' and 'Mandible' to summarize the clinicopathological features, as well as points regarding the diagnosis and treatment of mandible BFH.

Case report

In November 2017, a 42-year-old female with slowly progressive swelling of the bilateral mandible and slight facial asymmetry over a period of 4 months was referred to the Department of Oral and Maxillofacial Surgery of the Affiliated Hospital of Stomatology, Sun Yat-Sen University (Guangzhou, China). The patient denied any history of dental pain or pus discharge. The first molars of the bilateral mandible underwent root canal treatments in an outpatient setting one month prior to presentation. However, the swelling did not subside significantly. The mandibular molars were finally extracted in an outpatient setting due to unsatisfactory therapeutic outcomes. Thereafter, the patient consulted our department for further treatment. Physical examination revealed hard but non-tender swelling involving the area from the second premolar to the first molar of the bilateral mandible, covered by normal mucosa, and the loss of buccal vestibular depth was noticed. The first molar of the bilateral mandible was missing and the tooth extraction wound exhibited no obvious abnormality. Palpation examination of regional lymph nodes was negative.

Panoramic radiograph revealed two diffuse, well-defined multilocular osteolytic radiolucency areas from the second premolar to the first molar of the bilateral mandible, which were surrounded by sclerotic rims (Fig. 1A). In cone-beam computed tomography (CBCT) images, expansion of the buccal cortex and even certain cortical defects of the involved region were observed (Fig. 1B).

Under general anesthesia via naso-tracheal intubation, the patient was treated by transoral curettage and discharged from the hospital 7 days after the surgery. After 16 months, the patient felt gingival swelling and discomfort in the left posterior area. Intraoral examination indicated swelling in the region of the lower left first premolar to the left second premolar region of the mandible. A panoramic radiograph revealed a rounded hypodense image of the apical root of the patient's lower left first premolar (Fig. 1C). The patient underwent surgical curettage of the lesion and mandibular left first premolar extraction. At 46 months after the first surgery,

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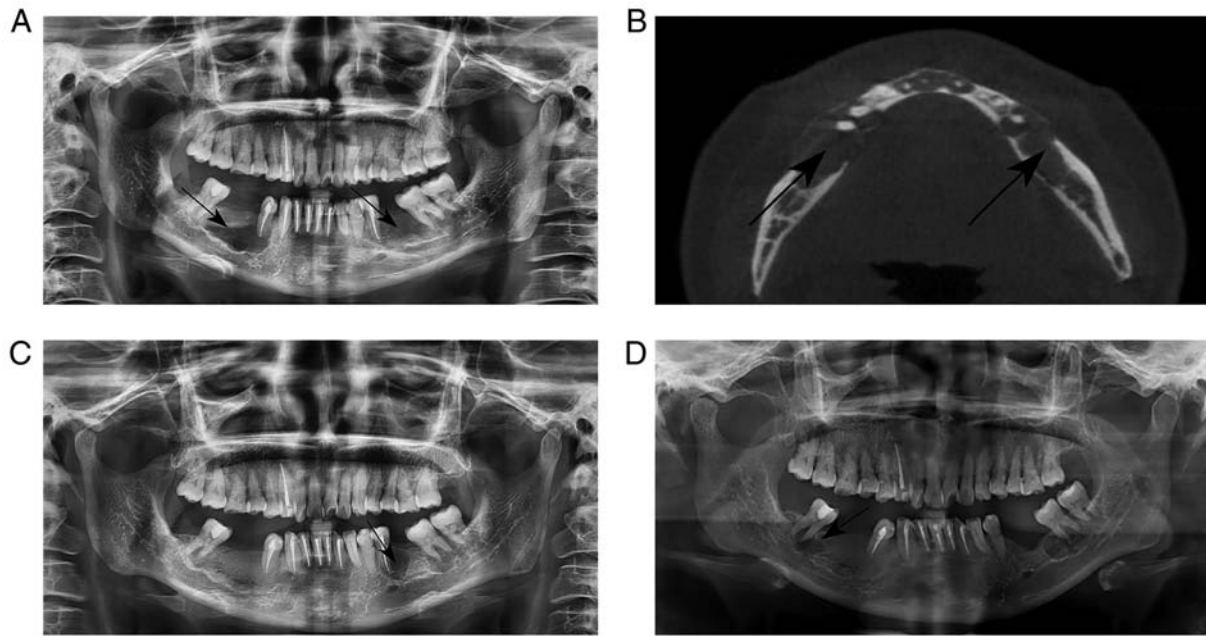


Figure 1. Preoperative imaging examination of the patient. (A) Panoramic radiography image of the patient; low-density image from the premolar to molar area of the bilateral mandible (arrows), which are surrounded by sclerotic rims. (B) Axial position of cone-beam computed tomography imaging, with cortical expansion of the buccal side and even cortical defects in the involved region (arrows). (C) Panoramic radiography image of the patient 16 months after surgery, which indicates a rounded hypodense image of the apical part of the lower left first premolar (arrow). (D) Panoramic radiography image of the patient 46 months after the first surgery with a hypointense image of the apical region of the right lower second molar (arrow).

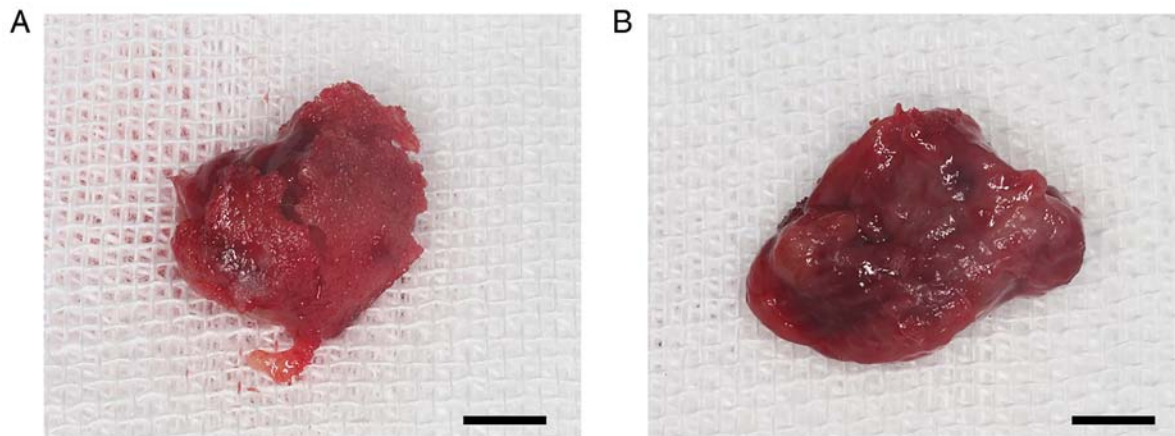


Figure 2. General view of the tumors removed by transoral curettage. The tumors removed from the (A) left and (B) right side of the mandible had a hyperemic surface and medium texture (scale bar=1 cm).

routine follow-up examination revealed gingival swelling in the area from the right lower first molar to the second molar and the panoramic radiograph revealed a low-density image of the apical part of the right lower second molar (Fig. 1D). The patient underwent surgical curettage of the lesion again.

Generally, the tumors in the first surgical resection were partly congestion, well-encapsulated and consisted of solid masses (Fig. 2), in which the maximum diameter of the left tumor (Fig. 2A) and the right tumor (Fig. 2B) were about 3.5 and 4.0 cm, respectively. The patient was asked to revisit 1 month, 3 months, half a year and annually thereafter. Histological evaluation with hematoxylin-eosin staining (the paraffin sections were dyed with hematoxylin for 5 min and the stained in eosin dye solution for 2 min at the room

temperature of 25°C) revealed that the tumors in the first surgical resection consisted of diffused spindle-shaped cells, which were arranged in a storiform pattern and surrounded by a large amount of collagen fibers. A small number of mitoses were noted but no nuclear atypia (Fig. 3A). Furthermore, on immunohistochemical examination (17,18), tumor cells were strongly positive for CD68 (Fig. 3B) and XIIIa factor (FXIIIa) (Fig. 3C), weakly positive for alpha smooth muscle actin (α -SMA) (Fig. 3D) and desmin (Fig. 3E), and negative for CD34 (Fig. 3F). The monoclonal antibodies used were all from Thermo Fisher Scientific. The catalogue number of CD68, FXIIIa, α -SMA, desmin and CD34 were 14-0688-82, PA5-102931, 701457, MA1-06401 and 14-0341-82. The dilution ratios all were 1:200. The diagnosis of bilateral mandible

Table I. Summary of clinical data of reported cases of mandible BFH from 1980 to 2021.

Author, year	Age/ gender	Site	Syndrome	Duration	Surgical approach	Follow-up	Recurrence	(Refs.)
Pattamparambath <i>et al</i> , 2016	51/F	R, P	Swelling	15 Y	SM	NA	NA	(16)
Vyloppilli <i>et al</i> , 2015	46/F	L, P	Swelling and pain	3 Mo	SM	NA	NA	(15)
Shoor <i>et al</i> , 2015	30/F	L, P	Swelling and pain	1 Y	SM	2 Y	None	(14)
Ou <i>et al</i> , 2012	31/M	L, P	Swelling and pain	1 Mo	SM	58 Mo	None	(13)
Tanaka <i>et al</i> , 2011	80/M	R, P	Swelling and pain	2Y	TC	6 Mo	Yes	(12)
Katagiri <i>et al</i> , 2008	48/M	R, CP	No symptom	NA	TC	NA	NA	(11)
Kishino <i>et al</i> , 2005	49/F	L, P, CP	Swelling and pain	NA	SM	35 Mo	None	(10)
Heo <i>et al</i> , 2004	42/M	L, P	Swelling	8 Y	SM	12 Mo	None	(9)
Ertaş <i>et al</i> , 2003	32/M	A	Swelling	NA	TC	NA	NA	(7)
Remagen <i>et al</i> , 1986	17/M	L, P	Swelling	3 Y	NA	4 Mo	None	(5)
White and Makar, 1986	29/F	L, P	Swelling	NA	TC	24 Mo	None	(4)
Wang <i>et al</i> , 2022 (1st time)	42/F	B, P	Swelling	4 Mo	TC	16 Mo	Yes	Present study
Wang <i>et al</i> , 2022 (2nd time)	44/F	L, A	Swelling	NA	TC	22 Mo	Yes	Present study
Wang <i>et al</i> , 2022 (3rd time)	46/F	R, A	Swelling	NA	TC	NA	NA	Present study

F, female; M, male; L, left; R, right; B, bilateral; A, anterior; P, posterior; CP, condylar process; Y, year(s); Mo, months; SM, segmental mandibulectomy; TC, transoral curettage; NA, not available.

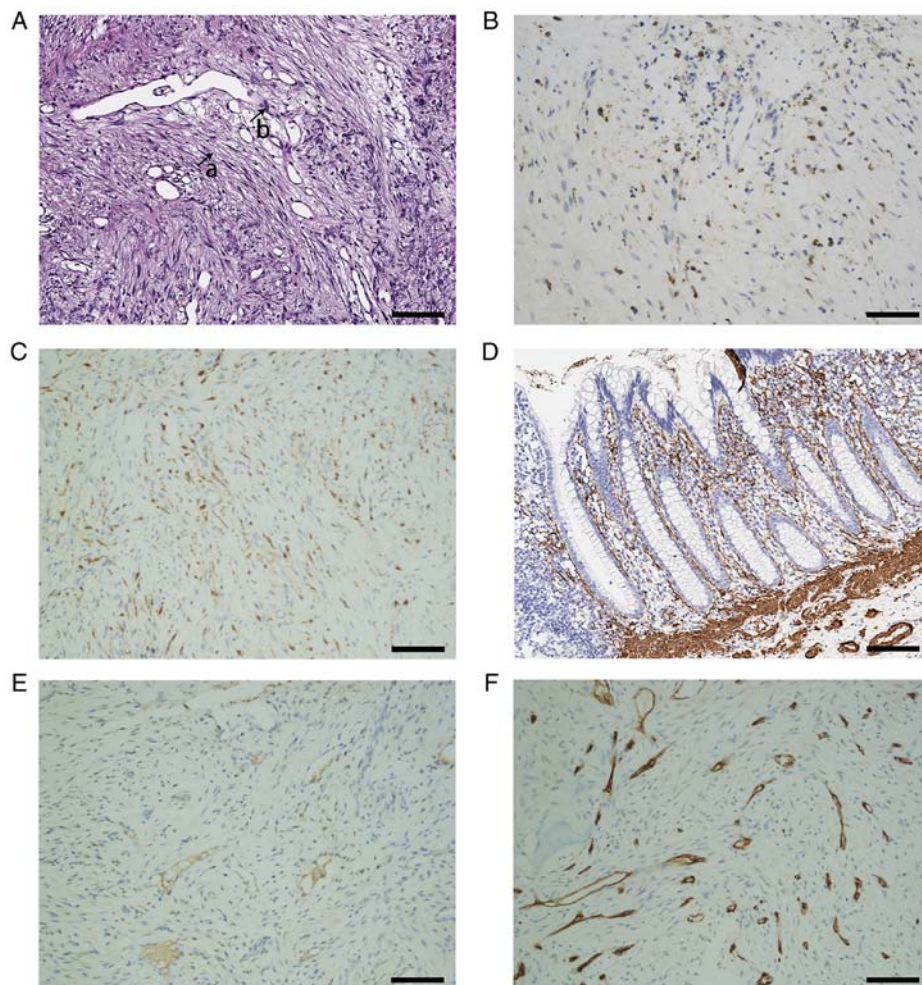


Figure 3. Pathological examination of the tumors. (A) Histology indicated that the tumors consisted of spindle-shaped cells and collagen fibers, and the former were arranged in a storiform pattern and surrounded by the latter. The arrows a and b indicated the collagen fiber and cell, respectively. (H&E staining; magnification, x200). Immunohistochemistry suggested that the tumor cells were strongly positive for (B) CD68 and (C) XIIIa factor, while they were weakly positive for (D) α -SMA and (E) desmin. (F) The tumor cells were negative for CD34 (magnification, x200; scale bars, 100 μ m).

BFH was made. The pathological examination results of the latter two surgically removed tumors were the same as the first surgically removed tumor.

Discussion

Fibrous histiocytoma represents a group of diverse tumors, with both fibroblast and histiocytic differentiation, which was first described by Stout and Lattes (1) in 1967 (19,20). In the criteria of histological classification for bony tumors proposed by the WHO, 2nd edition, BFH was used to describe those independent tumors different from the connective tissue ones (2,13,21). Cutaneous BFH involvements are mostly seen but bony involvement of BFH is uncommon (4,21-24), and mandible BFH is rare, with only 11 reported cases in the past 40 years (Table I).

The etiology of mandible BFH remains to be fully established. According to certain experts, the tumor cells are derived from fibroblasts (24), while others assume that the tumor originates from the dendritic cells based on the evidence that the tumor is strongly positive for FXIIIa (20-23); furthermore, inflammation, viral infections and injuries may be major causes of bony BFH (25,26).

Mandible BFH shares similar histopathological features with cutaneous BFH, which are characterized by whirled or radially arranged fibrous tissue, heterogeneous polynuclear giant cells, foamy cells, hemosiderin deposition and infiltration of a small amount of chronic inflammatory cells (13,16,27,28). Immunohistochemical staining helps clarify the composition of the tumor, which is positive for CD68, vimentin, α -1-antitrypsin and α -1-antichymotrypsin, but negative for CD34, S-100 protein, epithelial membrane antigen, α -SMA and cytokeratin (21,29-31). In the present case, immunohistochemical staining of the tumor indicated strong positivity for FXIIIa and CD68, weak positivity for desmin, partial positivity for SMA and negativity for CD34, indicating that the tumors consisted of avascular fibrous tissue and muscle tissue. According to the clinical characteristics of mandible BFH, the differentiation of BFH from giant cell tumor (GCT) and aneurysmal bone cyst (ABC) is required, which share an identical clinical manifestation of swelling (32,33). GCT consists of osteoclast-like multinucleated giant cells, scattered in the background of mononuclear stromal cells, which is strongly positive for CD14, human leukocyte antigen-DR, α -SMA and CD33 (32,34). ABC has an appearance similar to soap bubbles on macroscopic examination, which is comprised of numerous blood sinuses of different sizes, with a large number of blood cells (33,35).

In addition to the patient in the present case report, 11 cases of mandible BFH have been reported over the past four decades (Table I). The average age at onset was 41.3 years (range, 17-80 years). The incidence of mandible BFH was slightly higher in males than in females and unilateral lesions were more frequently described (10 cases, 90.9%), with a slight tendency in the left region of the mandible (63.6%). According to the reported cases, two mandible BFHs occurred in the condylar process (10,11). Most patients presented with swelling of the involved area (5,9,16) and certain patients had complaints of pain (5 cases, 45.4%). Only one patient had a history of pus discharge (10) (Table I). Cell marker

studies have suggested a fibroblastic origin for BFH (36). Walther *et al* (37) and Płazczyca *et al* (38) considered that the development of BFH may be associated with abnormalities in the protein kinase C gene. However, there are no studies demonstrating that recurrence of BFH is associated with a certain pathological condition (39). Mandible BFH appears as a unilocular or multilocular radiolucency with an irregular margin and at times a sclerotic rim in panoramic radiography images (5,9,10). CBCT is helpful in determining the continuity of the mandible cortex, the axial section indicates a well-defined osteolytic lesion with the buccal cortex expansion and in certain cases, the continuity of the cortical bone was even interrupted (5,9,12).

The surgical approaches were described in 10 cases. Clinically, the most common surgical methods for mandible BFH are segmental mandibulectomy and transoral curettage. Segmental mandibulectomy accounted for 54.5% of all of the cases included in the present literature review and transoral curettage was performed for the remaining patients. Follow-up data were included in 7 cases, which suggested that the prognosis of mandible BFH was good overall, with only one recurrence and transformation into the malignant form (12). According to the results of the present review, the choice of surgical method for mandible BFH is mainly based on the size of the mass and also the general condition of the patient. Transoral curettage is suggested when the CBCT scan indicates that the maximum diameter of the BFH lesion is <5.0 cm, while segmental mandibulectomy is advisable when it exceeds 5.0 cm (7,9,13). However, Heo *et al* (9) performed segmental mandibulectomy for the tumor with a maximum diameter of <5.0 cm. Tanaka *et al* (12) and Ertaş *et al* (7) chose to perform transoral curettage for masses with a maximum diameter of >5.0 cm. In 6 cases of segmental mandibulectomy of BFH, there was no recurrence during the follow-up period. However, in 4 cases of transoral curettage, one was confirmed to have recurrence within the follow-up period, and in the case of the present study, recurrences of the BFH occurred 16 and 46 months after the first transoral curettage. Transoral curettage helps to maintain the continuity of the mandible, the occlusion relationship and outlook of the surgery, but it brings the risk of BFH recurrence. While segmental mandibulectomy is able to remove the tumor completely and reduce the chance of tumor recurrence, it has more complex operative procedures and a longer period of recovery after the surgery. Furthermore, the financial burden on patients and the difficulties of reconstructing the occlusion relationship after segmental mandibulectomy cannot be underestimated. The recurrence rate of mandible BFH is relatively low, with only one recurrence of the 11 previous cases (9%). Still, it is noteworthy that the recurrence of the tumor may transform into its malignant form (12,36). However, to the best of our knowledge, metastasis of BFH has never been reported. Regular follow-up of patients with mandible BFH is advisable after transoral curettage due to the potential recurrence and malignant transformation of the tumor. In conclusion, mandible BFH is rare and the diagnosis of mandible BFH should only be made based on evidence of histopathological and immunohistochemical staining. The appropriate surgical methods were selected based on the general condition of the patients and the size of the mass.

Regular follow-up is advisable to detect the recurrence of the tumor after transoral curettage.

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Availability of data and materials

All data generated or analyzed during this study are included in this published article.

Authors' contributions

QT was responsible for the study conception; YW was responsible for the design of the study and drafting of the manuscript; YH and WC were responsible for reviewing the literature and collecting relevant data. WC and QT were responsible for revising the manuscript for important intellectual content. QT and YW confirm the authenticity of all the raw data. All authors read and approved the final manuscript.

Ethics approval and consent to participate

Not applicable.

Patient consent for publication

Informed written consent was obtained from the patient for publication of this report and any images.

Competing interests

The authors declare that they have no competing interests.

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