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CASE REPORT

Non-ossifying fibroma of the mandible: A case report and review of the literature

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Abstract

The case reported here is a large non-ossifying fibroma (NOF) of the mandible presenting in a 24-year-old male patient. The lesion was diagnosed through radiological and histopathological assessment. It remains under observation without surgical intervention, despite its large size, as the extensive surgery to remove it is not currently justifiable. Whilst common at the metaphysis of the long bones in paediatric patients, NOFs are rarely observed in the jaw bones. These benign fibrous lesions are often asymptomatic and may be an incidental radiological finding. Most NOFs of the limbs presenting in children will not require any treatment, and spontaneously resolve when growth ceases. However, regarding mandibular lesions, the majority of historical cases have been successfully treated with curettage and do not recur. Due to their scarcity, the outcomes for untreated NOFs of the gnathic bones are not reliably known. We discuss the clinical, radiological and histopathological findings for this case. A thorough literature review of previous reports of this rare entity reveals the typical characteristics and behaviour of this lesion.

KEYWORDS

fibrous cortical defect, fibrous xanthoma, Non-ossifying fibroma, mandible, xanthogranuloma

CASE REPORT

This case report concerns a 24-year-old male patient who presented to oral and maxillofacial surgery with a swelling of the right mandible, as well as recent history of extraction of the partially erupted lower left third molar due to recurrent pericoronitis and vertical impaction. On examination, there was no facial asymmetry and no dysfunction of cranial nerves V and VII. A diffuse and firm intraoral swelling was noted, which extended from the lower right second molar, up the mandibular ramus. The orthopantomogram (OPG) taken at initial assessment (Figure 1) revealed a large multilocular radiolucency in the right mandible, extending from the distal root of the lower right first molar to the superior aspect of the ramus. This lesion appeared to encompass the unerupted lower right third molar (LR8). CT imaging of the facial bones was then used to further investigate the nature of this lesion (Figures 2–3). The lesion was seen to be expansile and multilocular, centred around the LR8, with radiological measurements of 21 × 51 × 64 mm. Involvement of the angle and coronoid process were also noted. As illustrated by the 3D reconstruction shown in Figure 3, the lesion caused significant cortical bone thinning to the point of a breach in areas. The radiological differential diagnoses given were ameloblastoma, odontogenic myxoma and central giant cell tumour.

Incisional biopsies of both soft tissue and bone were taken from the right posterior mandible. Histological examination revealed the lesion to be a non-ossifying fibroma (NOF) of the mandible. The soft tissue contained streams of monomorphic fibroblasts which arranged in a storiform pattern, with predominantly small round nuclei and focal intracytoplasmic inclusions. Abundant xanthomatous histiocytes and occasional multinucleated giant cells were also present. No bone formation, cystic elements or malignant features were identified. Representative images of the haematoxylin and eosin-stained tissue can be seen in Figure 4. The perilesional bone appeared vital and unaffected.

A panel of immunohistochemistry was completed to confirm the diagnosis and exclude the differentials. The xanthoma cells showed patchy expression of CD68 and CD163. However, expression of S100, AE1/AE3, CD1A, CD45, SMA, Desmin, CD34, HMB45 or Factor 13a was not seen in the lesional fibroblast population. The Ki67 rate of proliferation was approximately 1% throughout the specimen.

Other xantho-granulomatous lesions were excluded on the basis of the clinical history, morphological features and immunohistochemical profile. The primary differential diagnosis was Erdheim-Chester disease. However, the unusual location, unilateral distribution and lack of Factor 13a positivity made this diagnosis unlikely. Similarly, the lack of Factor 13a and morphology also ruled out a benign fibrous histiocytoma. Furthermore, Langerhans cell histiocytosis was excluded as the lesion was CD1A and S100 negative. Finally, extra-nodal Rosai Dorfman was deemed unlikely due to the lack of emperipolesis or lymphadenopathy. Intra-osseous xanthoma was considered, however, this entity is controversial and lies on a morphological spectrum with NOFs, with

Clinical Relevance

The clinical and radiological appearances of non-ossifying fibromas of the mandible may be indistinguishable from other, more destructive, intraosseous pathological entities. Therefore, a good understanding of the characteristics and behaviour of these benign fibrous lesions is essential to ensure that the most appropriate treatment modality is adopted.

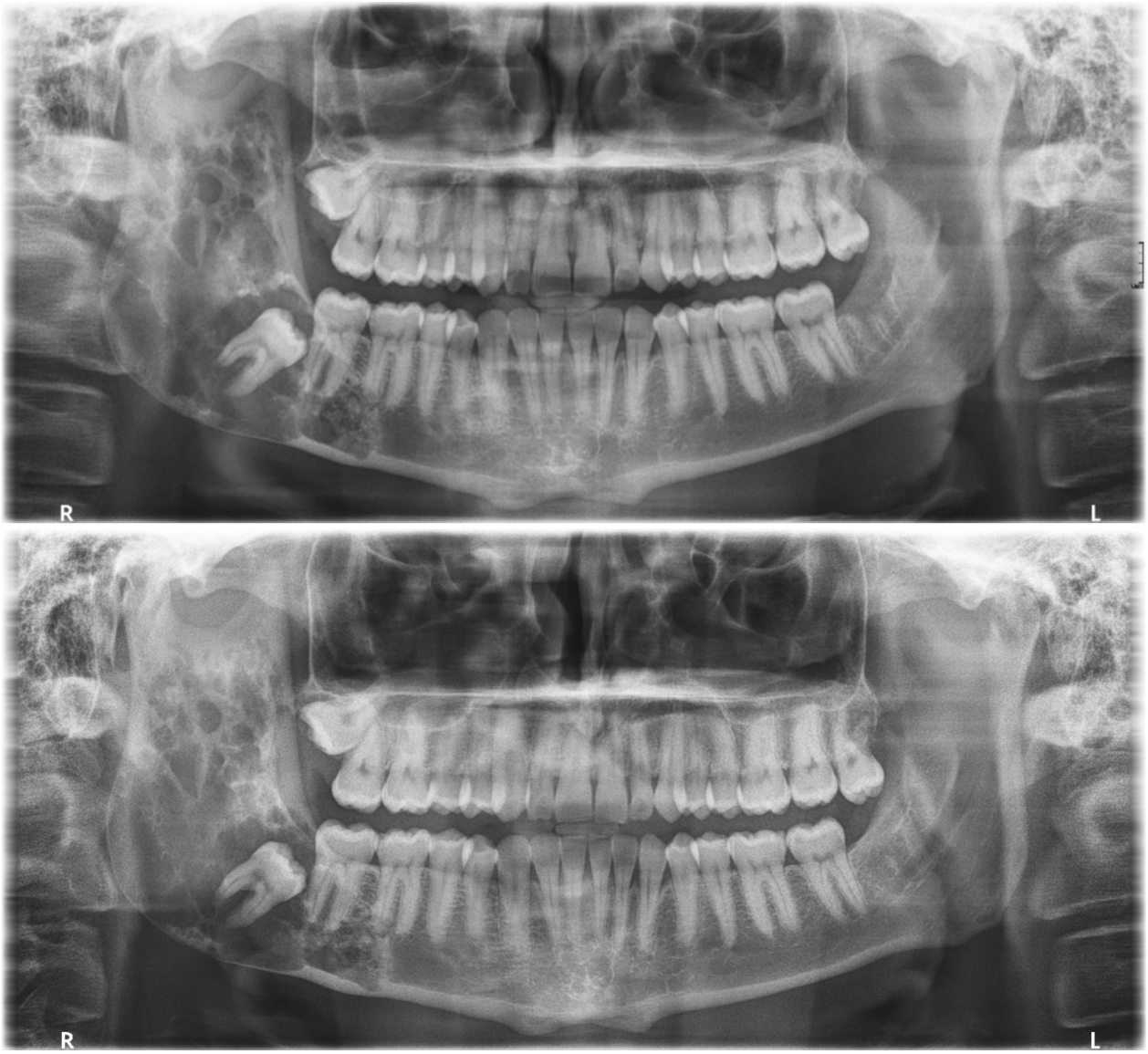

FIGURE 1 Two full orthopantomogram radiographs showing a multilocular radiolucency in the right mandible. The lesion appears unchanged in the 11 months between the initial assessment (top) and the review appointment (bottom).

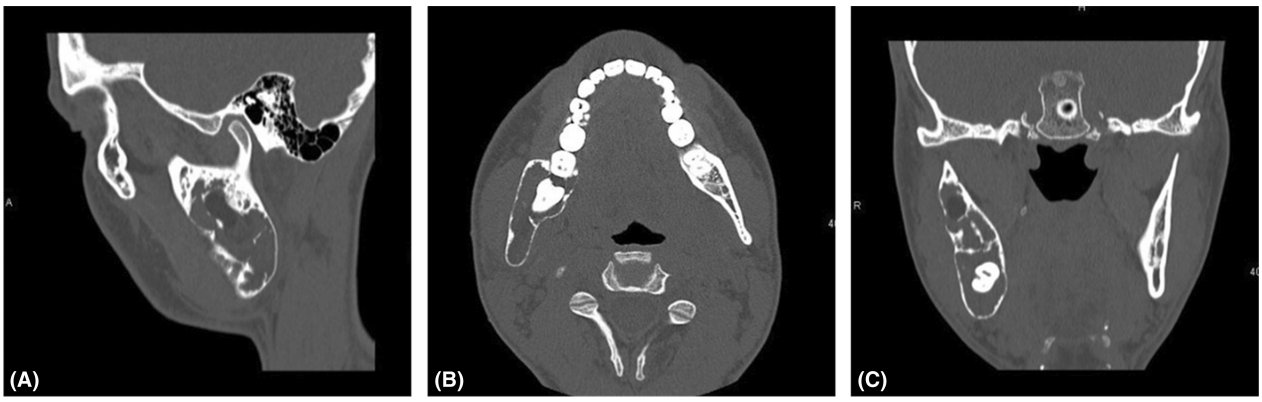

FIGURE 2 (A) Sagittal, (B) axial and (C) coronal planes of the CT scan showing cortical expansion. Taken at the initial assessment.

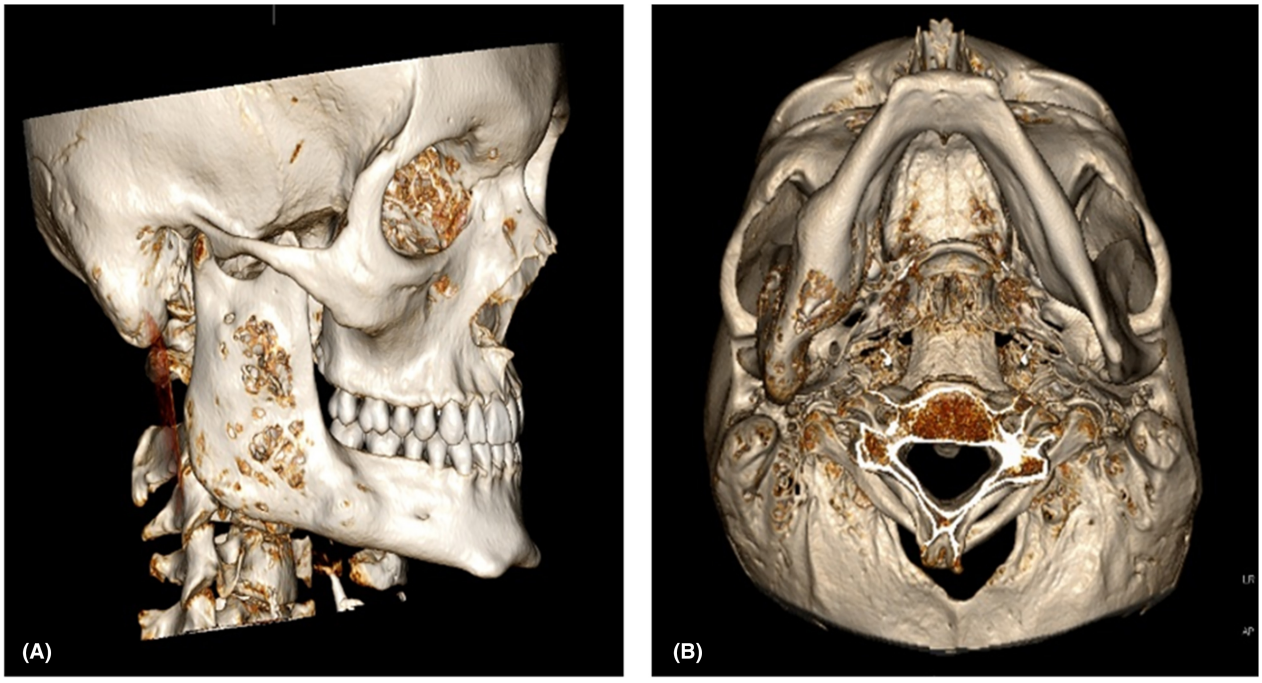

FIGURE 3 (A) Sagittal and (B) axial 3D reconstructions of the facial bones derived from the CT scan showing cortical expansion and breach. Taken at the initial assessment.

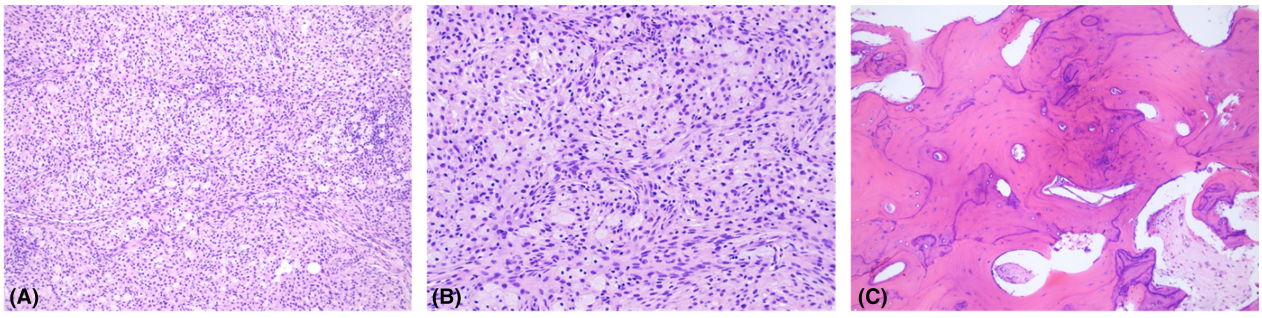

FIGURE 4 Haematoxylin and eosin-stained tissue of (A) lesional tissue at 10x magnification showing storiform fibroblasts, (B) lesional tissue at 20x magnification showing xanthomatous histocytes, and (C) unaffected perilesional bone (decalcified).

no clear criteria to distinguish between the two. NOF was favoured as the predominant cell population comprised storiform fibroblasts, as opposed to xanthomatous histiocytes.[1]

At post-biopsy follow-up appointment, the patient did not have any symptoms from their jaw and was able to eat and drink without difficulty. The lower right third molar remains unerupted and asymptomatic. It was deemed that surgical intervention was not indicated at the time. To remove the lesion in total would involve partial mandibulectomy including temporomandibular joint disarticulation and reconstruction with a fibula-free flap. It would be difficult to justify this extensive operation for a non-malignant pathology in a young patient, unless significant symptoms or progression of the disease were to occur in future. A repeat OPG was taken 11 months later (Figure 1) which revealed that the lesion remains radiologically unchanged.

DISCUSSION

Non-ossifying fibroma (NOF) is synonymous with the terms xanthogranuloma, fibrous xanthoma and fibrous cortical defect. These terms all describe benign fibrous defects of developing bone. The aetiology of NOFs is not well understood in relation to either the long or gnathic bones. However, it has been suggested that these benign developmental tumours may originate from metaphyseal cartilaginous rests or derive from mature connective tissue with a traumatic aetiology.[2] No obvious links between isolated NOFs and genetic or environmental factors have been found.

NOFs are separate entities from ossifying fibromas and differ in both their radiological and histopathological appearances. Ossifying fibromas occurring in tooth-bearing regions of the jaws are likely to be of odontogenic origin, and may be referred to as cemento-ossifying fibromas. These benign fibrosseous lesions present with painless expansion and a radiolucent or mixed appearance, which becomes more radiopaque with time. On histology, cemento-ossifying fibromas comprise variable amounts of calcified material resembling bone and cementum within a fibroblastic stroma. They are treated with surgical excision.[3]

It is estimated that NOFs of the long bones are present in up to 30% of all children.[4] Due to their abundance and characteristic radiological appearance, these lesions are often

TABLE 1 Review of the literature: case reports of non-ossifying fibromas of the mandible.

Case report	Year	Patient age	Patient sex	Maximum dimension (mm)	Site of lesion	Treatment	Recurrence?
Rudy and Scheingold[5]	1964	49	Female	70	Body/ramus	Curettage	No
Quinn et al.[6]	1970	21	Female	20	Angle	Curettage	No
Liaw et al.[7]	1979	17	Female	Not given	Posterior mandible	Resection	No
Makek[8]	1980	20	Male	Not given	Condyle	Resection	No
Ide et al.[9]	1982	37	Female	Not given	Body	Curettage	No
Mirra et al.[10]	1982	12	Female	Not given	Body	Curettage	No
Park et al.[11]	1982	21	Female	5	Body	Curettage	No
Elzay et al.[12]	1984	11	Female	30	Ramus	Curettage	No
Elzay et al.[12]	1984	11	Female	20	Angle/ramus	Curettage	No
Bessho et al.[13]	1986	28	Male	20	Body	Curettage	No
Aldred et al.[14]	1989	18	Female	5	Condyle	Resection	No
Roche et al.[15]	1993	26	Female	30	Posterior mandible	Curettage	No
Mizukawa et al.[16]	1997	7	Male	15	Body	Curettage	No
Uçkan et al.[17]	1999	16	Female	Not given	Body	Curettage	No
Bailey et al.[18]	2001	6	Female	15	Angle	Curettage	No
Hudson et al.[19]	2003	13	Male	12	Condyle	Curettage	No
Chrcanovic et al.[20]	2010	15	Male	30	Angle	Curettage	No
Abdelsayed et al.[21]	2010	14	Female	30	Ramus	Curettage	No
Abdelsayed et al.[21]	2010	27	Male	45	Ramus	Curettage	No
Bowers et al.[22]	2013	22	Female	12	Ramus	Curettage	No
Turki[23]	2014	12	Female	37	Symphysis/body	Curettage	No
Mannan et al.[2]	2015	15	Male	21	Angle/body	Curettage	No
Hammad and Schlieve[24]	2021	11	Female	15	Condyle	Curettage	No
Current case	2023	24	Male	64	Ramus/angle/body	None	N/A

diagnosed from plain film alone. Spontaneous regression as the child grows towards maturity is considered typical, and surgical intervention is not routine. Contrastingly, all reported cases of gnathic NOFs were diagnosed by histological examination and managed with curettage or resection. Unlike NOFs of the long bones, the outcomes for untreated mandibular lesions are largely unknown.

Although the pool of cases is small, the most common presentation of mandibular NOFs can be estimated from a review of the literature (Table 1). Including the current report, 24 cases were identified.[2,5–24] Roughly 67% of cases were seen in females, with an average age at presentation of approximately 19 years old. This drastically differs from the NOFs of the long bones, which are twice as common in males as they are in females,[25] with a mean age of just 12 years old.[26] Of the cases specifying the patient's presenting complaint, 53% mentioned noticeable swelling, with 26% experiencing pain or discomfort. Otherwise, 47% were asymptomatic at presentation, with just one case identifying dental mobility.[23]

The maximum dimensions of the reported lesions ranges from 5 to 70 mm, with an average of 26 mm. At 64 mm in maximum dimension, the present case is the largest reported since 1964. In the vast majority of previous cases, the monostotic or polyostotic nature of the lesion is not specified, likely due to the fact that full-body imaging is not indicated when a single NOF is identified. However, the lesions are presumed to be solitary when not otherwise specified. Just one case reports multiple NOFs of both the mandible and long bones, which lead to a diagnosis of Jaffe-Campanacci syndrome.[10] This rare condition is also characterised by café au lait pigmentation of the skin.[27] All previous lesions were removed by resection or curettage with no reports of recurrence.

Of the 24 cases found for the purpose of this report, 10 involved the body of the mandible, with the second most common location being the ramus. It has been proposed that areas of bone with a larger amount of red bone marrow, such as these, are more susceptible to developing an NOF.[18] NOFs of the maxilla, where little red marrow is present, are extremely rare, with only a single case found in the literature.[28]

Regardless of whether conservative removal of mandibular NOFs is necessary, an incisional biopsy is required to obtain a definitive diagnosis, due to the wide range of conditions the radiological appearance could represent. For the case presented, the differential diagnoses suggested by the radiologist were ameloblastoma, odontogenic myxoma and central giant cell tumour. While all these lesions can present radiologically as multilocular radiolucencies of the mandible, they are all histologically distinct. For example, ameloblastoma was ruled out on the basis of the lesion containing no odontogenic epithelium, while the lack of myxoid stroma meant an odontogenic myxoma could also be excluded. Multinucleated giant cells can be seen in NOFs, although these are sparse in comparison to a central giant cell tumour. Cystic change is not often seen unless the lesion is coupled with a pathologic fracture.[29]

CONCLUSION

This case report highlights an interesting case of a particularly large NOF of the mandible, which remains under observation without surgical intervention. We have summarised the current literature regarding NOFs of the jaws. Despite its radiological similarity to more locally destructive tumours, NOFs can be easily separated from these differential diagnoses following biopsy and histopathological assessment. Appropriate knowledge of this tumour ensures that a conservative treatment approach is considered. It is interesting to give thought to routinely monitoring these lesions for signs of regression, in the absence of any patient discomfort or dysfunction.

AUTHOR CONTRIBUTIONS

Mollie Clark: Writing; literature search. Daniel Brierley: Writing; proofreading; interpretation of histology. Chi-Hwa Chan: Writing; proofreading; clinical details. David Hughes: Proofreading; histology review. Omar Shadid: Clinical details.

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CONFLICT OF INTEREST STATEMENT

The authors declare that they have no conflict of interest.

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