

THE DIFFERENTIAL DIAGNOSIS OF SOME CYSTS AND TUMOURS OF THE JAWS

A REPORT OF 10 CONSECUTIVE CASES

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When dealing with tumours and cysts of the jaws, 2 groups must be considered:

1. Those peculiar to jaws and which arise from the odontogenic tissues.

2. Those which may occur anywhere in the skeleton.

For the purpose of this discussion a detailed classification of tumours, cysts and dystrophies of bones is not indicated. Such a classification may be readily obtained from text-books on various subjects related to pathology and surgery of the jaws. The steps in the diagnosis of any lesion, including cysts and tumours, consist of the following:

1. History.

2. Examination, including (a) inspection, (b) palpation, (c) percussion, and (d) sometimes auscultation.

3. Special methods, including (a) X-rays, (b) blood analysis and blood counts, and (c) urine analysis.

In dealing with jaw lesions it is also extremely important to determine the condition of the teeth, especially as far as their vitality is concerned, and whether caries is present.

HISTORY

Usually patients with jaw tumours give a history of long duration. These lesions produce slight pain, and there may be periods of remission. Patients may complain of attacks of toothache. As the lesion becomes apparent, the patient may notice deformity of the jaw and of the occlusion of the teeth.

It is important to find out whether there is a history of trauma to, or of previous carious involvement of, the teeth, since this may indicate the nature of the lesion.

Furthermore, it should be ascertained if any previous treatment was performed, since this can completely alter the whole clinical picture. Commonly, a tooth has been extracted or the lesion has been incised. Teeth may be extracted as a result of toothache or displacement which may be unrelated to the condition. Superadded infection may occur and this can completely confuse the issue.

Restricted jaw movement is uncommon with most benign tumours, but does occur with malignant tumours. It is important to establish in the history whether other bones of the skeleton are also involved.

CLINICAL FEATURES

During their early development tumours of the jaws are not clinically obvious, but may be discovered on routine radiological examination. When the lesion becomes of some size deformity of the part is apparent.

The majority of *soft* and *cystic* lesions are endosteal in origin, and thus expand the bone as they increase in size. Earlier, new periosteal bone formation is coincident with endosteal destruction, and thus a bony expansion is found. In the later stages the tumour breaks through its bony shell and then has an easy passage through the soft tissues.

Calcified lesions, whether endosteal or periosteal in origin, are felt as bony masses or expansions. Thus, soft lesions which are still enclosed in the bone are clinically indistinguishable from the calcified lesions, but when they break through the bone their true texture manifests itself.

Maxillary Tumours

The maxillary deformities produced depend on the site of the lesion. In the antrum, tumours may grow outwards and produce a swelling of the side of the face, or they may grow upwards and disturb the normal anatomy of the eye. They may grow inwards and obstruct the nasal passages or they may enlarge downwards and produce a swelling of the palate.

Tumours in the anterior part of the maxilla may enlarge in 3 directions. They may lift the floor of the nose, or produce a swelling of the palate, or project forwards into the vestibule of the mouth pushing the nostrils and upper lip forwards and upwards.

Large nasopalatine, globumaxillary or dental cysts, which have beaten the expansion rate of the bone, cross-fluctuate from the vestibule of the mouth to the palate. Furthermore, with these large cysts it is remarkable how rarely the articulation of the incisor teeth is disturbed, even though extensive resorption of the roots of these teeth takes place.

Mandibular Tumours

In the mandible the lesion may be confined to the tooth-bearing portion, or exclusively to the ascending ramus. Very extensive lesions involve both parts. Here again the

majority are endosteal in origin in their early stages, and only when they have broken through the bony expansion can their true character be appreciated. In very large cystic lesions with extensive bony destruction it may be possible with careful palpation to distinguish between a single cyst and multiple cysts. This is especially so if the cysts in the lower vestibule of the mouth, where the bony destruction occurs very early on, are examined.

SPECIAL METHODS — X-RAYS

Of the special methods used for the diagnosis of jaw tumours and cysts, radiographs are the most important. There are certain features concerning these X-ray pictures which need special mention at this stage:

1. Effect of the Lesion on the Teeth

This depends on the rapidity of growth of the lesion, its nature, and the complement of teeth standing at the time.

Simple cystic lesions, such as the simple dental cyst and the dentigerous cyst, show a greater tendency to absorb the roots of teeth without displacing them.

Solid lesions, such as the fibromas, osteomas and myxomas, have been seen to resorb the roots of the teeth, but more often tend to displace the teeth bodily.

When a full dentition exists, it is remarkable how a lesion may extend from one angle of the mandible to the other without disturbing the occlusion of the teeth in the slightest. Here resorption of the roots is extensive. This is very often seen with large simple cystic lesions which follow the cancellous bone. When many teeth are missing, simple cysts still show a greater tendency to resorb roots and tilt teeth rather than to shift them as is the usual case with solid lesions.

A radiolucent area related to the apex of a tooth represents a simple dental cyst. It is a well-known fact that a dentigerous cyst is one in which the crown of a tooth projects into a radiolucent cavity; however, any lesion developing before eruption of the dentition is complete may so displace a tooth that the radiological impression is given that one is dealing with a dentigerous cyst when, in fact, it may be anything but that.

2. The Lesion, its Edge and the Bone Pattern Beyond

Simple cysts appear as almost completely radiolucent areas with a sharp radiopaque margin, and the bone pattern beyond is normal. In the ascending ramus the radiolucency is somewhat less because of the greater soft-tissue covering.

The typical adamantinoma shows its usual trabeculation and a sharp radiopaque margin at its edge, but the bone pattern beyond is abnormal in that very small loculi are often seen.

Certain benign solid lesions, such as the fibromas, ossifying fibromas, myxofibromas and complex composite odontomas, present with a sharply defined radiopaque margin and a normal bone pattern beyond, but the lesion is somewhat less translucent than a cyst, especially in ossifying fibromas, and obviously depends on the extent of ossification or calcification of the lesion.

Malignant tumours, including some of the secondary lesions, show a diffuse destruction of bone without any definite edge. Osteoclastoma in its usual form produces

a soap-bubble appearance. The osteodystrophies show a diffuse overgrowth of bone.

3. False Pictures

(a) A simple cyst in the mandible can present a very deceptive X-ray picture. If, while enlarging and taking the line of least resistance in the bone, it produces several small perforations of the inner and outer plates, the X-ray appearance would then be multilocular in character, while in actual fact numerous extensions of a single cavity are being seen.

(b) A simple cyst may become decompressed as a result of tooth extraction, ulceration or surgical drainage. This decompression would lead to a large amount of new-bone formation. The X-ray picture would now suggest an ossifying lesion.

(c) With simple cysts in the symphyseal region, a lateral oblique X-ray picture gives an overlap of the left and right horizontal rami, and the impression may be gained that one is dealing with trabeculation, while in fact a single cavity exists.

(d) Solid tumours of the mandible may so indent the inner plate, without perforating it, that again the impression of trabeculation arises.

CASE REPORTS

Some of the following case reports will illustrate the difficulties that may be encountered in the diagnosis of jaw-bone tumours.

Case 1. African Male (A.R.), Aged 21 Years (Fig. 1)

This patient was admitted with a diffuse swelling of the left side of the face and stated that this had first appeared about 9 months before admission. The swelling enlarged slowly and was occasionally painful.

On examination a hard, bony mass or expansion of the left angle and ramus of the mandible was found. It was non-tender and there was no trismus. The mandibular teeth present were 87654321/1234567. The left mandibular third molar had been extracted 6 months before admission because of pain at the angle of the jaw.

The right lateral oblique view of the mandible showed a similar, but smaller, lesion at the right angle. The possibility of a generalized condition was ruled out when the serum-calcium level was found to be normal.

Biopsy report of the enucleated lesion confirmed the original diagnosis of a simple odontogenic cyst.

Case 2. Female (M.M.), Aged 30 Years (Fig. 2)

This patient gave a history of pain and swelling of the left side of the mandible that had been present for years. At one stage during this period a few teeth were extracted on the left side and gave relief for a considerable time. During the last 18 months the swelling had grown progressively larger.

Examination showed a large, well-circumscribed, bony swelling of the left body of the mandible. Orally the swelling was seen to extend from the left central to the left molar region. The left central and lateral incisor teeth were present, but were involved in this lesion.

At operation, a fibrous mass which was easily enucleated was found. On cutting into the mass a central cavity was exposed.

Microscopic examination showed this to be a highly infected simple cyst with a very thick capsule. This case demonstrates very well the alteration in bone pattern that occurs when a cyst has undergone decompression.

Case 3. African Female (R.B.), Aged 12 Years (Fig. 3)

This patient was admitted to hospital with a swelling of the left side of the ramus of the mandible. The swelling was painful and had been present for 1 year. On examination a smooth, circumscribed expansion of the body of the mandible was

found. It was non-tender. In the vestibule of the mouth the swelling was large and smooth, and felt hard. The teeth standing in the left half of the mandible were /1234E6

At operation a smooth, jelly-like mass was found, which was easily enucleated with the unerupted tooth attached. The mass was intimately attached to the neck of the tooth and was part of the tooth follicle. The biopsy report was of an odontogenic myxofibroma.

Case 4. African Female (P.M.), Aged 19 Years (Fig. 4)

This patient was admitted to hospital in August 1958 with a growth in the symphyseal region of the mandible. The growth was occasionally painful and had been present for about 1 year.

On examination, there was a large swelling of the alveolus in the symphyseal region of the mandible. The swelling was hard. Despite the fact that the left central and lateral incisor teeth were missing, it was obvious that the lesion had separated the remaining anterior teeth. Externally there was no noticeable deformity of the chin.

An oral biopsy demonstrated myxofibroma. At operation a well-circumscribed mass was found which was easily enucleated.

It was now obvious that the trabecular appearance seen on X-ray was due to the manner in which the lesion had affected the inner plate of the mandible. Numerous pits and bony ridges were seen. Histopathology confirmed a myxofibroma.

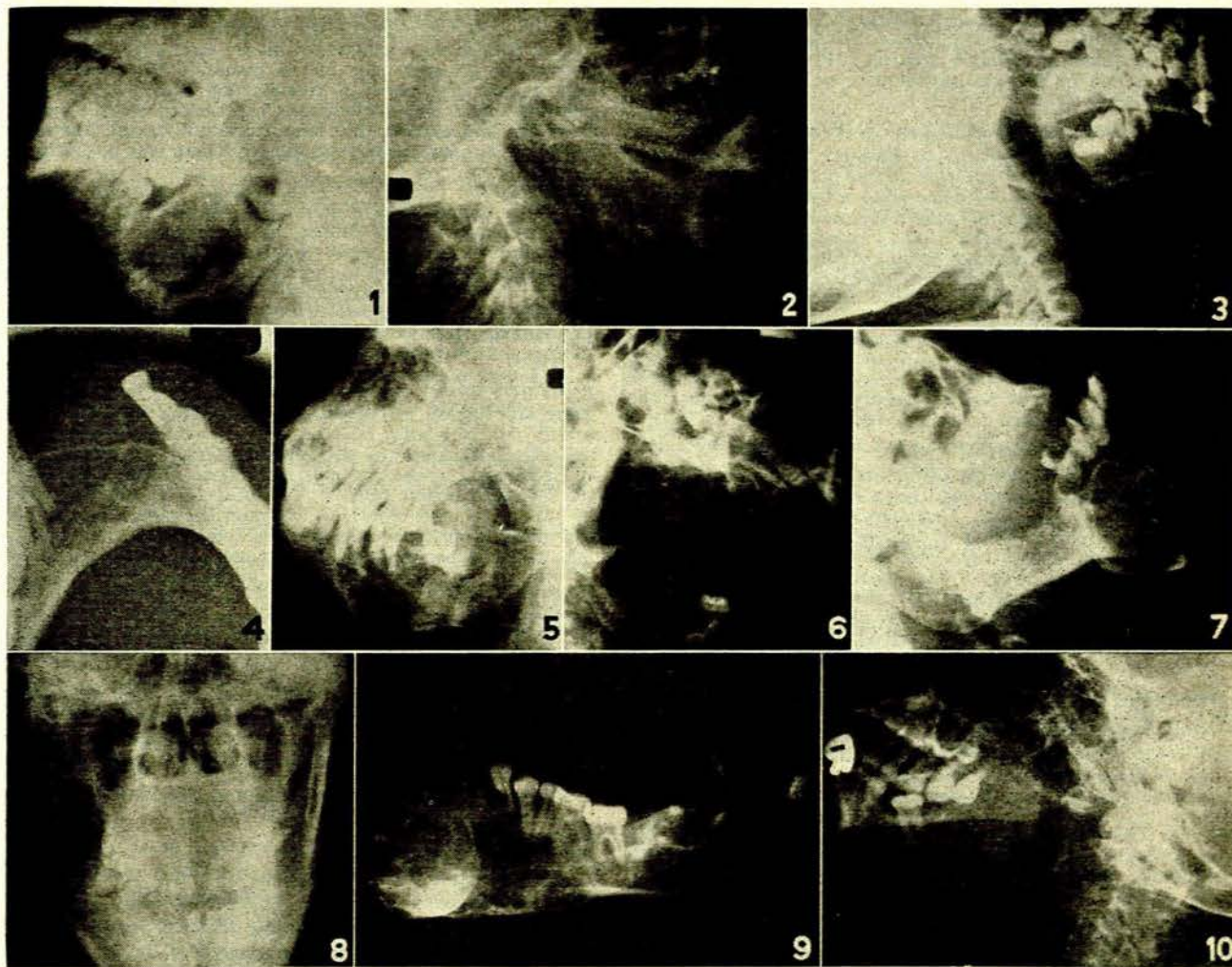


Fig. 1. Case 1. Showing a circular radiolucent area in the left ramus. There is a sharply defined margin to this area and the bone pattern beyond is normal. The posterior anterior view (not reproduced) shows expansion of the inner and outer plates of the ascending ramus. The diagnosis made when the X-rays were taken was of a simple cyst. Note the lesser degree of translucency than is usually seen in a simple cyst of the body of the mandible.

Fig. 2. Case 2. Showing a sharply defined lesion of the left horizontal ramus. There is a great amount of new-bone formation within the lesion (cotton-wool appearance), suggesting that this is a mature ossifying fibroma.

Fig. 3. Case 3. Showing a large, sharp-edged radiolucent area in the mandible. Projecting into the cavity is the crown of a partially developed tooth. This picture suggests a dentigerous cyst.

Fig. 4. Case 4. Showing what appears to be an irregular lesion with bony trabeculae passing through it.

Fig. 5. Case 5. This X-ray shows many interesting features. The fairly well-circumscribed lesion has a cotton-wool appearance, but a few trabeculae appear to pass through it. The 3rd molar tooth has been pushed backwards bodily, and shows root absorption.

Fig. 6. Case 6. Showing a large, fairly radiolucent area in the mandible with trabeculation. An unerupted third molar is present in the lower part of the lesion.

Fig. 7. Case 7. Showing the cystic lesion arising from the cut end of the mandible. The characteristic trabeculation is present and beyond the large cystic cavity there is a small locule in the mandible which shows the invasive character of the adamantinoma.

Fig. 8. Case 8. Showing irregular destruction of the right ascending ramus of the mandible, with a washed-away appearance.

Fig. 9. Case 9. X-ray of the disarticulated specimen, showing the typical soap-bubble appearance of the bone, and patches of normal bone scattered throughout the lesion, especially in the region of the angle of the mandible.

Fig. 10. Case 10. Showing almost complete destruction of the bone of the ramus and angle of the mandible, with a mere strip of the lower border of the bone and a portion of the condyle still present.

Case 5. African Male (W.P.), Aged 46 Years (Fig. 5)

This patient was admitted with a swelling of the right side of the body of the mandible. The swelling had been present for about 1 year. The patient gave a history of trauma, followed by swelling. About 3 months before admission, the swelling became very painful and then discharged foul material at the angle of the jaw.

Examination showed a bony-hard swelling of the right body of the mandible. A depressed scar was visible over the angle of the mandible. The hard swelling was also visible in the vestibule in the right molar region. The serum-calcium level was 5.6 mEq./l., and the serum-inorganic-phosphorus level was 3.4 mg. per 100 ml.

The provisional diagnosis was an ossifying fibroma. At operation, a pale, well-circumscribed, but convoluted, rubbery mass was found and was easily enucleated. Biopsy demonstrated an ossifying fibroma.

The apparent trabeculation seen on X-ray was produced by the indentation of the convoluted mass on the inner plate of the mandible.

Case 6. African Male (P.M.), Aged 39 Years (Fig. 6)

This patient was admitted to hospital with an extremely painful swelling of the left side of the face which had been present for about a year. At one stage a lower 2nd molar was extracted, but this gave no relief. A small sinus was present at the angle of the mandible. On examination, a bony-hard expansion of the left angle of the mandible was felt. The sinus at the angle was discharging pus, and trismus was present.

The differential diagnosis at this stage was: (1) adamantinoma, (2) dentigerous cyst, or (3) ossifying fibroma, bearing in mind that the X-ray picture was now confused by a certain amount of decompression owing to the superimposed infection and resulting sinus. At operation the multilocular character of the lesion was obvious and a resection was carried out. The biopsy report confirmed adamantinoma.

Case 7. African Female (E.P.), Aged 40 Years (Fig. 7)

This patient was admitted for treatment of a large swelling in the symphyseal region of the mandible. This had been present for about 1 year. Ten years earlier she had had a similar, but larger, swelling of the right side of the jaw. For this, a resection of the right half of the mandible had been carried out. Examination of the mass showed it to be cystic and arising from the cut end of the left half of the mandible.

At operation the lesion was resected. Histological examination of the specimen demonstrated adamantinoma.

Case 8. African Female (T.N.), Aged 55 Years (Fig. 8)

This patient was admitted with a swelling on the right side of the face. The swelling was not very painful and had been present for about 4 months. She also gave a history of having had a total thyroidectomy a few years previously. This was followed by a course of radiotherapy.

Examination showed a smooth, rounded swelling in the right parotid region. The skin over the lesion was mobile and normal. The lesion was non-tender and did not fluctuate, but was firm and fixed to the deeper structures. It moved when the mouth opened and closed. There were mobile submandibular lymph nodes present. Oral examination showed that the mass also extended into the mouth in the retromolar region of the mandible and was ulcerated in relation to the 3rd maxillary molar tooth. This was obviously a lesion of bone extending in all directions. There was no trismus.

A biopsy was performed and the report was as follows: 'Fairly mature thyroid follicles containing abundant colloid. This is a metastatic deposit of a well-differentiated follicular adenocarcinoma of the thyroid'.

The patient was referred to the radiotherapy department for further treatment.

Case 9. African Female (J.M.), Aged 14 Years (Fig. 9)

This patient was admitted to hospital with a very large and painful swelling of the whole of the right half of the mandible. This had been present for about 3 years. The patient gave a history of a similar lesion on the left side when she was about 8 years old. For this the left side of the mandible was resected and then replaced with a bone graft. Examination revealed a fairly regular bony expansion of the existing part of the

mandible from the left canine region up to the right condylar head. The bone graft on the left side was easily palpated.

On oral examination, the lesion had broken through its bony covering in the symphyseal region and felt firm to the touch.

The blood chemistry was as follows: the serum-calcium level was 4.5 mEq./l., and the serum-inorganic-phosphorus level was 5.2 mg. per 100 ml.

The differential diagnosis was: (1) central osteoclastoma, or (2) adamantinoma.

At operation the expanded mandible was exposed, and since it was found to be completely riddled with solid tumour, a disarticulation was carried out. Biopsy demonstrated a central osteoclastoma. Postoperative radiotherapy was considered, but it was decided not to give it.

Case 10. African Female (T.M.), Aged 42 Years (Fig. 10)

This patient was admitted with a very large and painful swelling of the right side of the mandible. The swelling had been present for about 3 months and was a very rapidly growing lesion. The patient also experienced severe bouts of toothache and earache, and complained of having had severe backache and pain in both shoulders. There was no history of loss of weight.

Examination revealed a large, tender swelling of the right side of the mandible. The swelling was well-circumscribed and rubbery in consistency. Orally, the swelling was visible in the molar and retromolar regions of the mandible and was grossly ulcerated in relationship to the upper molars. Clinical examination of the back was inconclusive.

X-rays showed numerous punched-out lesions in the skull and complete collapse of the body of the 6th thoracic vertebra.

Blood investigation showed the following:

1. A mild normochromic normocytic anaemia, with haemoglobin 11.1 G. per 100 ml., haematocrit 33%, and MCHC 34. There were 5,900 leucocytes per c.mm., the ESR (Wintrobe) was 58 mm. per hour, and the platelets were adequate.

2. Blood chemistry — alkaline phosphatase 5.7 units per 100 ml., acid phosphatase 2.2 units per 100 ml., blood urea 13 mg. per 100 ml., serum calcium 4.8 mEq./l., serum phosphorus 3.9 mEq./l., blood chlorides 103 mEq./l., blood CO₂ content 24.2 mEq./l., and serum sodium 132 mEq./l.

3. Blood paper electrophoretic pattern (all values in G. per 100 ml.) — total proteins 10.2, albumin 2.77 (27.2%), α_1 -globulin 0.48 (4.7%), α_2 -globulin 0.71 (7.0%), β -globulin 0.98 (9.7%), and γ -globulin 5.26 (51.4%).

This picture is compatible with a diagnosis of multiple myelomatosis.

There was no Bence Jones protein in the urine.

The mandibular mass was removed and the microscopic section of the specimen demonstrated plasmacytoma, of the multiple myelomatosis type. Once she was relieved of the jaw pain, the patient refused further palliative treatment for the disease.

SUMMARY OF THE CASES

Two Variations of the Simple Cyst

Case 1 shows the variation in translucency of a simple cyst in the ascending ramus of the mandible.

Case 2 demonstrates a simple cyst of long duration which has undergone decompression.

Three Benign Soft-tissue Tumours of Bone

Case 3 shows a myxofibroma which, to all intents and purposes, simulated a dentigerous cyst, but at operation presented as a solid tumour.

Cases 4 and 5 demonstrate the irregular destruction of bone by benign lesions, creating the impression of trabeculation or multiloculation.

Two Varieties of Adamantinoma

Case 6 demonstrates an almost irregular alteration of the bone, with the malposition of a molar tooth suggesting the presence of a dentigerous cyst.

Case 7 shows trabeculation which suggests a multi-ocular lesion.

Malignant Tumours

Case 8 shows a metastatic thyroid tumour in the mandible.

Case 9 is an example of an osteoclastoma.

Case 10 shows a plasmacytoma of the mandible.

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