Neoplasm of the body including metastasis

OBJECTIVES

At the end of this module you should

- Have a basic understanding of the epidemiology, etiology and pathogenesis, clinical features, pathological features, investigations, behavior and prognosis of various neoplasm of the body including metastasis.

SELF-DIRECTED LEARNING

- *To be prepared for this module you must:*
- Revise the anatomy and histology of the constituents of the sub epithelial tissues (excluding salivary glands) of the oral region
- Read the relevant chapters in Cawson's Oral Pathology and Oral medicine textbook
- Read your lecture notes and the notes and cases below

INTRODUCTION TO NEOPLASM VIDEO

https://www.youtube.com/watch?v=X28Z8vi-yXc

CONTENTS

MULTIPLE CHOICE

REFERENCES

LYMPHOMAS

Lymphomas are solid tumours of the immune system (Shankland, Armitage, & Hancock, 2012) and are all malignant. Lymphomas arise frequently from B cells, although could arise from any lymphocyte. The two main types of lymphomas are:
1. Hodgkin's lymphoma
2. Non-Hodgkin's lymphoma (Cawson & Odell, 2008).

Hodgkin's lymphoma is less common and accounts for approximately 10% of all lymphomas, whereas non-Hodgkin's lymphoma accounts for the remaining 90% of cases. It could be difficult to diagnose non-Hodgkin's lymphoma as the clinical features and the histological characteristics could vary significantly. Early diagnosis is important as effective and often curative therapies are then possible (Shankland et al., 2012).

HODGKIN'S LYMPHOMA

What is Hodgkin's Lymphoma?

Hodgkin's Lymphoma is a cancer of the lymphatic system. It is also known as Hodgkin's disease (Leukaemia Foundation Australia, 2015). Classical and nodular lymphocyte-predominant are the two main types of Hodgkin's lymphoma (NIH: National Cancer Institute, 2015).

Aetiology
The exact aetiology of this disease in most cases is unknown, although it has been suggested that damage to the genes which control blood cell development may be associated. It has also been proposed that in some cases it may be associated with alterations in the immune system. Furthermore, infection associated with Epstein-Barr virus (EBV), has been connected with Hodgkin's disease (Leukaemia Foundation Australia, 2015).

Clinical Presentation/Histological Characteristics
Often an enlarged lymph node is the first sign of Hodgkin's disease. This disease is able to spread to the lymph nodes, and later to the lungs, liver, and the bone marrow (NIH: National Cancer Institute, 2015). In Hodgkin's lymphoma, the cervical nodes are commonly the affected site, whereas oral lesions are uncommon.
Hodgkin's lymphoma and non-Hodgkin's lymphoma are not able to be distinguished clinically. On a histological basis, Hodgkin's lymphoma is characterised by the mixed cellular picture, as well as on occasions the presence of Reed-Sternberg giant cells with paired (mirror-image) nuclei (Cawson & Odell, 2008).

Diagnosis/Treatment
Hodgkin's disease is relatively rare. This disease is diagnosed by taking a thorough history, examination, haematological testing, and a biopsy (NIH: National Cancer Institute, 2015). A full blood count (FBC) and bone marrow biopsy and examination are often needed to diagnose

Hodgkin's lymphoma (Leukaemia Foundation Australia, 2015). Treatment is provided based on how far the disease has spread. Often treatment encompasses radiation therapy or chemotherapy. The treatment is more effective if the diagnosis is made early (NIH: National Cancer Institute, 2015). With some types of Hodgkin's disease, a permanent cure is possible. This is able to be achieved with irradiation of localised disease or combined chemotherapy (Cawson & Odell, 2008).

NON-HODGKIN'S LYMPHOMA

What is Non-Hodgkin's Lymphoma?

Non-Hodgkin's lymphoma is also sometimes referred to as B-cell and T-cell lymphomas. It is a cancer of the lymphatic system (Healthdirect Australia, 2013). These lymphomas encompass a heterogeneous group of cancers. It is suggested that about 85-90% of non-Hodgkin's lymphomas arise from B lymphocytes. The common site for the development of these malignancies is in the lymph nodes, although could occur in any tissue. They could include the more indolent follicular lymphoma or to the other end of the range could involve the aggressive and diffuse large B cell and Burkitt's lymphomas (Shankland et al., 2012).
In lymphoma, lymphocytes multiply in an abnormal way and collect in particular parts of the lymphatic system such as the lymph nodes. In this sense, the lymphocytes are not able to carry out their infection-fighting function, therefore making the individual more prone to infection (Healthdirect Australia, 2013).

High risk conditions
There is an increased risk of developing a lymphoma in some conditions. These include AIDS, some primary immunodeficiency diseases, cytotoxic immunosuppressive treatment, and connective tissue disease such as rheumatoid arthritis and Sjogren's syndrome. Mainly adults are affected. In the mouth, the lesions associated form non-descript and soft swellings which are painless in nature. If there is trauma, these swellings may become ulcerated (Cawson & Odell, 2008).

Signs/Symptoms
The most common symptom associated with Non-Hodgkin's lymphoma is swelling that is painless in the neck, armpit or groin. This swelling is associated with a lymph node in the particular area (Healthdirect Australia, 2013).

Clinical Presentation
Clinical presentation of non-Hodgkin's lymphoma is dependent on the site that is involved, the history of the lymphoma, and the presence of symptoms such as weight loss, night sweats, and rise in body temperature. The most common presentation associated with non-Hodgkin's lymphoma is painless lymphadenopathy. It is more generalised in non-Hodgkin's lymphoma than in Hodgkin's disease. Lymphomas which are low grade often present with peripheral lymphadenopathy, however, lymphomas which are more aggressive may cause fulminant signs
and symptoms. These aggressive forms may require urgent assessment and and/or treatment (Shankland et al., 2012).

Histological Characteristics
Histologically, non-Hodgkin's lymphoma could be diffuse and may show the appearance of predominantly small or large solid sheets of lymphocytes. However, alternatively they may show a follicular pattern. Follicular lymphomas, in most cases are low grade and hence have a better prognosis. Most neoplastic lymphocytes associated are of B-cell origin (Cawson & Odell, 2008). The malignant nature of these tumours is confirmed if invasion of adjacent tissues is able to be seen (Cawson & Odell, 2008).

Diagnosis
The diagnosis of this condition is confirmed by taking a biopsy (Healthdirect Australia, 2013). In the case of non-Hodgkin's lymphoma, any site could be the primary affected site. The most frequent extranodal site involved is the gastrointestinal tract. From the gastrointestinal tract, the stomach is the part which is most often affected (Shankland et al., 2012).

Treatment
In terms of management, treatment is provided with irradiation if the disease is localised. However, if the disease is disseminated, which represents the majority of patients then combination chemotherapy is required for treatment. Ulceration and infection are common oral complications associated with treatment (Cawson & Odell, 2008).

METASTATIC NEOPLASMS

Metastatic Neoplasms
Metastatic tumours to the oral region are uncommon, comprising only 1-3% of all malignant oral neoplasms. The occurrence of the metastatic lesions may be on the oral soft tissues, in the jaw bones or both. The primary sources of tumours metastatic to the oral region as the breast, lung and kidney. The mandible is the most common location for metastases. Due to its rarity, the diagnosis is challenging and should be considered in the differential diagnosis of inflammatory and reactive lesions which are common in the area.

Epidemiological Details
· Most metastatic tumours to the oro-facial region seen in 40-70 year olds
· In younger patients – metastasis is common in jaw bones compared to soft tissue
· Equal gender distribution in jaw bone metastasis, soft tissue metastasis 2:1 male to female
· Common sources of metastatic tumours to the oral region:
    - o lung
    - o breast
    - o kidney
    - o bone
· The breast is the common primary site for jawbone metastasis
· The lungs is the common primary site for oral soft tissue metastasis
· Jaw-bone to oral soft tissue metastasis ratio of 2:1

· Male – common primary sources from the lungs, followed by kidneys, prostate, liver, bone, thyroid and skin
· Female – common primary sources from the breast, less frequently from genital organs, bone and kidney

Clinical Presentation
The clinical presentation of metastatic tumours can be variable. Metastatic lesions to the oral soft tissue manifest as sub-mucosal mass particularly on the tongue. The progression of the disease causes progressive discomfort. Patients may complain of pain, bleeding, dysphagia, interference with mastication, and disfigurement. In edentulous patients, the lesions spread evenly between the tongue and alveolar mucosa. In the jaw, the mandibular molar area is the most common location of a metastatic lesion. The clinical manifestations include bony swelling with tenderness, pain, ulcer, haemorrhage, paraesthesia (around area of alveolar nerve innervation), and pathological fracture. Sometimes tooth mobility and trismus are present.

Radiographic Findings
Metastatic tumours do not possess characteristic radiographic appearances. Findings in the jaw may range from the absence of any manifestation to lytic or opaque lesion with ill-defined margins. In general, the balance between osteoblast and osteoclast activity determines the phenotype of metastatic bone lesions. Metastases from prostate cancer almost always shows osteoblastic lesions in bone. Bone metastases from kidney, lung or breast cancers often show osteolytic activity. Some other findings include a solitary radiolucency of jaw bone, the entire mandible has a moth-eaten appearance, and the cortical bone of adjacent structures (md. Canal, mx. Sinus, and nasal floor) is resorbed.

Histological Findings
Intraoral incisional biopsy and histopathological examination is the means to confirm and identify a malignant tumour and potentially its metastatic origin.

Treatment and Prognosis
The treatment and prognosis is based primarily on the site of origin and the degree of metastatic spread. The identification of a metastatic tumour usually represents a poor overall prognosis. Management may involve surgical resection, radiation, chemotherapy or a combination of these techniques. If the primary lesion is recurrent or widespread metastases, the jaw lesions should be managed conservatively. This is to reduce the patient's pain and preserve oral function through radiotherapy, chemotherapy or local surgical resection.

CONNECTIVE TISSUE NEOPLASM

As you know, the human body and its organs are made up of four basic tissue types, being:
1. Epithelial
2. Connective
3. Muscle and
4. Nervous tissue

In this segment of the SDL, we are going to explore connective tissue neoplasms including Fibroma, Fibrosarcoma, Lipoma, Neurilemmoma, Haemagioma and Osteoma. In particular, this section will compare between two fibrous connective tissue tumours, the benign fibroma tumor and the malignant fibrosarcoma. Connective tissue, originating from the mesoderm, is described as the tissue that provides support and connections for other tissues and organs through immune surveillance, the transportation of wastes and nutrients around the body, mechanical reinforcement as well as the storage of energy (Southern Illinois University School of Medicine, 2007). Made up of mostly collagen, elastic fibres and ground substances manufactured by fibrocytes (Zelger, 2002), the tissue type can be classified into further classes being:

1. Loose connective tissue – includes reticular, areolar and adipose tissues
2. Dense connective tissue – includes elastic, irregular and regular tissues
3. Cartilage tissue – includes elastic, fibrocartilage and hyaline tissues
4. Other connective tissue – includes lymphatics, bone and the blood (Porth, 2011)

Additional Resource - a simple and quick way to review/remember connective tissue in the body - https://www.youtube.com/watch?v=PYCNmwZg_F0

What are connective tissue neoplasms?

As described earlier, neoplasms, meaning 'new growth' and often referred to in lay terms as a tumor, are disorders involving the autonomous/deregulated differentiation and growth of cells that can occur anywhere in the body (Porth, 2011). Connective tissue neoplasms talks about those irregular neoplastic changes that occur in the body's connective tissues including those tissues just previous mentioned.

FIBROMAS

What

Determining the nature of a tumor can be partly done through a breakdown of the name itself. Benign tumors often end with the suffix –oma that is added to the parenchymal tissue type of which the growth originated (Porth, 2011). Using this rule, we can determine that a fibroma is a benign tumor (-oma) of the fibrous tissue (fibr-). These tumours are also referred to as fibroid tumours, fibroids, fibromatous or fibroblastic tumours.

Cause and Location

The most common cause of fibromas is irritation and hence are referred to as irritation fibromas. These may occur at any site but most often develop near the occlusal plane on the

buccal mucosa as shown by the image. Fibromas are commonly seen in adults however can appear at any age as well as in either sex.

Presentation/Signs & Symptoms
The lesion is typically round-to-ovoid in shape and will present firm to palpation. The surface tissue may be ulcerated due to the underlying trauma as well as show signs of hyperkeratosis (Lederman, 2014). More often than not, the tumours are asymptomatic and may get bigger over time if the cause (such as biting, tooth grinding or rubbing from ill-fitting dentures) is not removed.

Diagnosis and Treatment
Typically, fibromas so not go away and require surgical removal if causing irritation to the patient. At the time of removal, the lesion will be sent for examination to ensure they are non-malignant however, it is said that the prognosis of fibromas is very good if the cause can be identified and removed (American Academy of Dermatology, 2012).

Histology
Histologically, the lesion appears to be:
- Unencapsulated
- A modular mass
- Dense
- Occasionally arranged in haphazard fascicles of hyalinised fibrous connective tissue
- Occasionally a hyperkeratotic or atrophic surface epithelium (Lederman, 2014).

Differential Diagnosis
Clinical differential diagnosis of fibromas may include:
- Mucocele
- Benign or malignant salivary gland tumours
- Peripheral giant cell granuloma
- Neurofibroma

FIBROSARCOMA

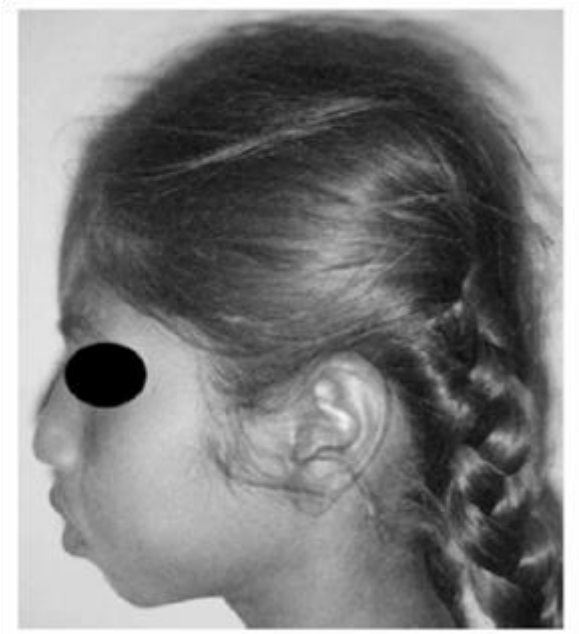


Fig. 1 Profile of the patient showing swelling over the lower left jaw

What

As the name suggests, a fibrosarcoma (FS) is a malignant (-sarcoma) mesenchymal neoplasm of the fibrous connective tissue (Porth, 2011) that is extremely rare in the oral cavity (Nanda, Mehta & Nanda, 2013). As well as presenting as a soft tissue mass, the tumour may also present as primary or secondary lesions within bone.

Aetiology

With an unknown true aetiology, many believe that radiation therapy is the foremost cause followed by trauma and some medical conditions including chronic osteomyelitis and Paget's disease, fibrous dysplasia and giant cell tumors (Divya, Patil, Kannan & Kesary, 2009). It is reported that FS may arise in both the soft tissue or within the bone of the oral cavity and is said to occur more commonly in the fifth and sixth decades of life.

Presentation/Signs and Symptoms

Although presentation may be unique to the patient, typically fibrosarcoma of the oral cavity may appear as a fibrous overgrowth, commonly presenting as a large swelling (Zachariades, 1985). Juvenile lesions may initially be asymptomatic progressing to a painful lesion often with ulceration and erythematous of the oral mucosa as the lesion develops. As the FS progresses and begins to involve nerves, hearing abnormalities may occur as well as other complications involving the TMJ and surrounding musculature ((Divya, Patil, Kannan & Kesary, 2009). According to Divya, Patil, Kannan & Kesary (2009), radiographically, a FS lesion presents 'as a lytic lesion with destructive patterns and minimal internal structure' (p.79). Others have suggested that root resorption commonly occurs due to erosion by the lesion (Kawai, Wakasa, Asaumi & Kishi, 2000).

Diagnosis

There are a number of special tests that can be performed in order to diagnose fibrosarcoma.

These include: (Dickey, 2014)

- Imaging studies

- Radiography - in order to evaluate bone involvement being any, primary or secondary
- CT Scan - helps to show bone involvement and extent of destruction
- MRI - detection of soft-tissue masses and intraosseous involvement
- Bone Scanning - helps to determine lesions stage

● Biopsy

- Core-needle or fine-needle
- Most common method used to follow up imaging techniques

Histology

There is a large extent of variability of differentiation of the FS cells when studied histologically which can be categorised into grades of low to high degrees of malignancy. Histological characteristics of the FS can be described as:

- Spindle cells
- Arranged in fascicles
- Low to moderate cellularity
- Herringone appearance
- Mild nuclear pleomorphism
- Rare mitosis
- Collagenous stroma

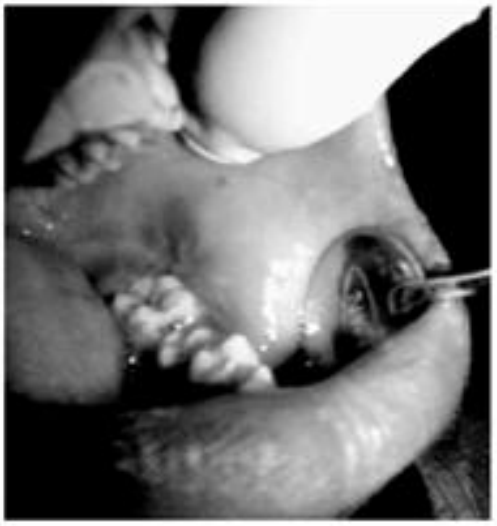


Fig. 2 Swelling in the left buccal mucosa

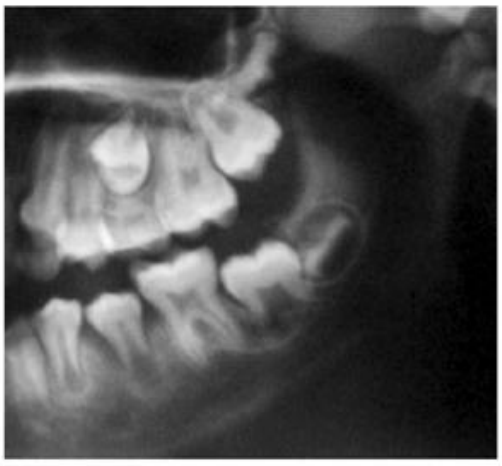


Fig. 3 Cropped panoramic image showing a radiolucent lesion circumscribed by a well-defined radio-opaque rim

LIPOMA

What is it?
A lipoma is an abnormal, asymptomatic (unless bitten), slow proliferation of mature adipocytes. It is a benign neoplasm that rarely occurs in the oral cavity, in which case, they mostly grow from the buccal fat pad. Lipomas are also well circumscribed. They may be soft, and yellowish in colour.

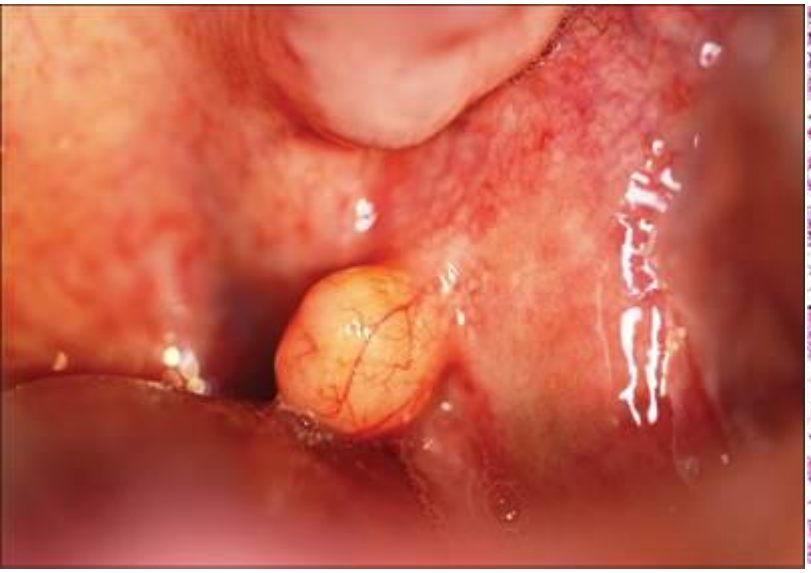
Types of lipomas
These are determined by the body part affected. Those of concern to us are:
- Esophageal lipoma - can cause airway obstruction, dysphagia, vomiting, and reflux
- Is there any other?

Aetiology
Unknown, however, genetics does play a role in their development. Being overweight does not predispose to the development. Lipomas affect all age groups, but tends to be most in middle aged people.

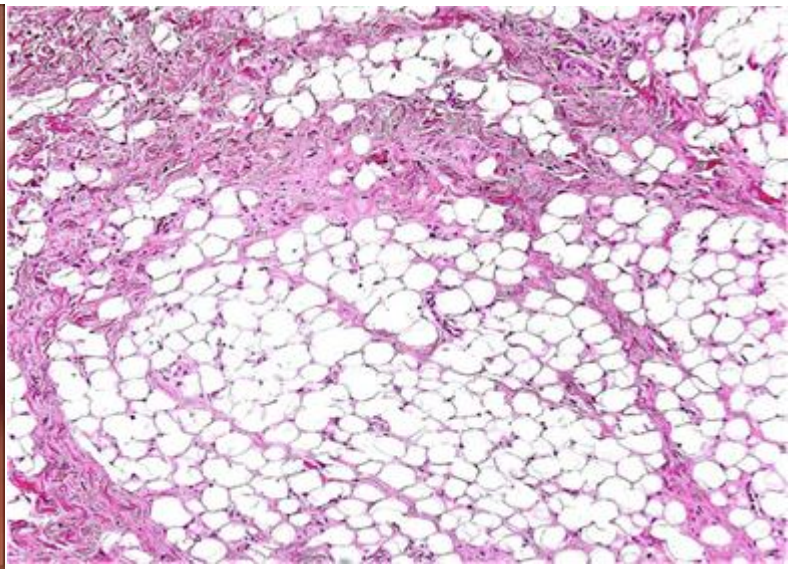
Signs and symptoms
Signs - soft to touch, movable, dome shaped, just under the skin
Symptoms - do not cause pain

Diagnosis
Can be made by a through history, visual inspection and palpation. If in doubt, an imaging investigation, via ultrasound or a biopsy may be taken to confirm preliminary diagnosis.

Clinical Photograph



Histological Slide



Differential diagnosis
- Neurofibroma
- Lymphatic tumour
- Epidermoid cyst
- Lipomatosis (extensive proliferation of adipocytes)
- Sialadenitis

Histology
Histologically, they present as normal fat containing adipocytes, surrounded by thin fibrous capsules.

Treatment
Lipomas can be completely excised (e.g. for aesthetic reasons), and recurrence is rare.

NEURILEMMOMA

Neurliemmomas are painless, slow growing tumours, which arise from Schwann cells. These tumours can be present in the cranium and peripheral nerves. In the head and neck region, the soft tissues, and the maxilla and the mandible are common areas for these tumours. The potential for malignancy is very low. The lesions are usually round and are well circumscribed and encapsulated. Neurilemmomas most commonly occur on the tongue. Due to the tumour, compression of the associated nerve can cause functional deficit and pain is severe.

There are two types of neurilemmomas based on the cellular patterns histologically:
1. Antoni Type A: The cells are elongated/ spindle shaped, with collagen fibres in between cells. The structure is organised, which gives a palisaded (fence-like) appearance.
2. Antoni Type B: Unorganised arrangement of cells and fibres.

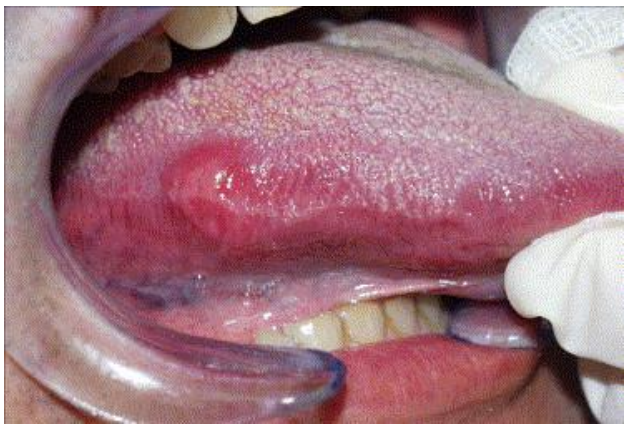
Aetiology
Unknown, however, they are associated with von Recklinghausen disease

Differential diagnosis
- Lipoma
- Neurosarcoma
- Ganglion cyst
- Fibroma
- Neurofibroma
- Giant cell tumour

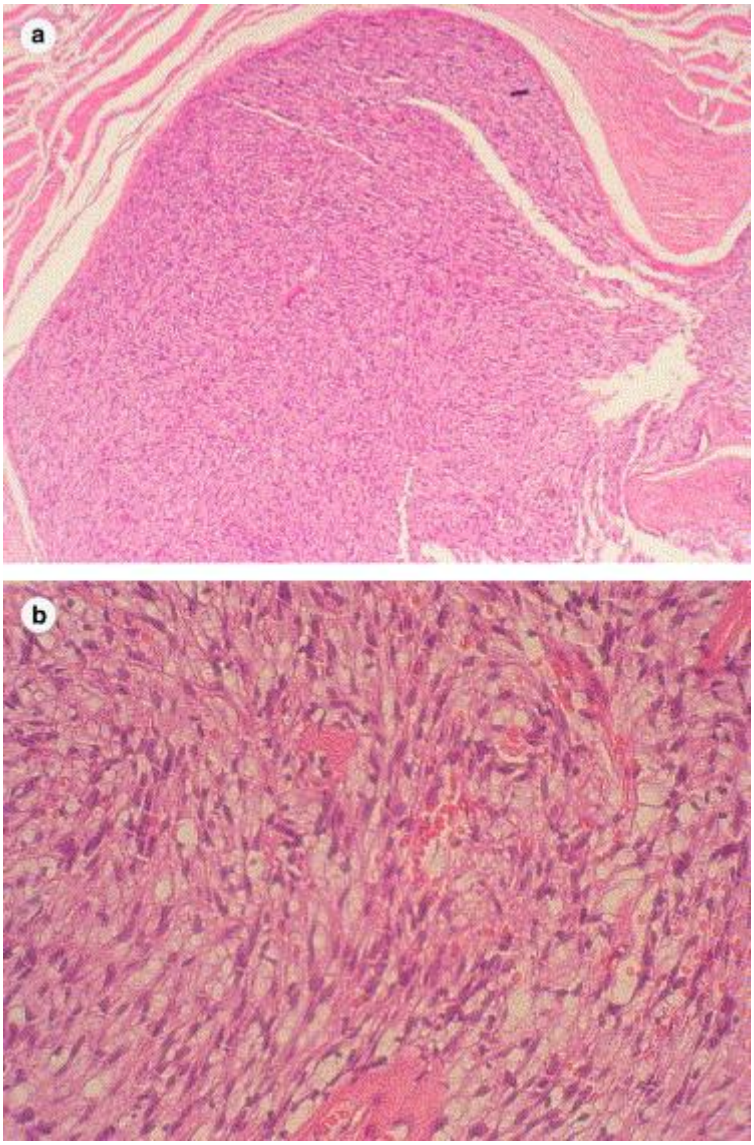
Diagnosis
Biopsy is needed to make a definitive diagnosis.

Treatment
Surgical excision, with recurrence very unlikely.

Clincial Photograph



Histological Slide



HAEMANGIOMA

What

Haemangiomas are benign tumours of vascular origin, due to proliferating endothelial cells (cells lining blood vessels). These lesions may be found in the mucosa, muscle, bone, salivary gland and skin in the head and neck region. The term, haemangioma, is often misused to incorrectly classify:

- developmental abnormalities (hamartomas)
- non-neoplastic cavernous haemangioma (cavernoma).
- inflammatory hyperplasias of the connective tissue that are very vascular

Aetiology

- Unknown (though hereditary involvement may be included as cytokines are associated with angiogenesis)

Clinical Presentation

- Appearance depends on location
  - Surface of skin: 'strawberry haemangiomas'
  - Just under skin: blueish swelling
- Venous lakes: bluish, red or purple colour in haemangiomas on the lip
- Spider naevi (haemangioma): common on face and upper chest
  - Central red papule with feeding capillary 'legs'
  - Also known as naevus araneus
  - In children and adults
  - Often in presence of extra oestrogen (e.g. pregnancy, poor liver function)

Types and Their Clinical Presentations

There are a number of types of hemangiomas that may present each with varying and similar characteristics. These include:

- *Cherry haemangioma: often on mid trunk*
  - Red, blue, purple or almost black
  - Increase in number ~ 40 y.o.
  - Unknown cause
  - Also known as Campbell de Morgan spots
- *Infantile haemangiomas; Congenital haemangiomas*
  - Formed during gestation

- Often misdiagnosed as scratch or bruise; diagnosis more clear after growth

- *Verrucous haemangioma*
  - Involve overgrowth and thickening of skin cells
  - Single lesion or group occurring most often on the legs
  - Do not resolve spontaneously and may need to be surgically excised

- *Eruptive neonatal haemangiomatosis*
  - Multiple capillary haemangiomas present at birth or develop with first few weeks of life
  - If only the skin is involved the disorder is called benign eruptive neonatal haemangiomatosis: these usually resolve spontaneously over time
  - If lesions are also present on internal organs of the body (e.g. GI tract, lungs, brain, eyes) this is called disseminated eruptive or diffuse neonatal haemangiomatosis: death generally occurs within the first few months of life
  - A newborn with multiple haemangiomas present must be investigated thoroughly for haemangiomas on internal organs

- *Ulcero-mutilating haemangiomatosis*
  - Rare disorder of multiple haemangiomas that form ulcers that lead to severe tissue damage

- *Acquired multiple haemangiomatosis*
  - Large numbers of haemangiomas appear in childhood or adulthood on the skin and internal organs, particularly the skeleton, brain and liver
  - Lesions persist indefinitely but are usually free of symptoms or complications

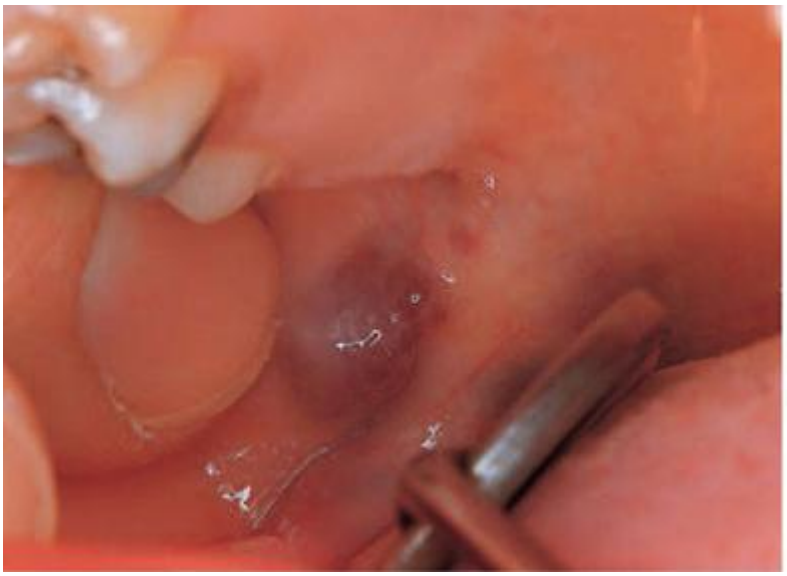
Histology

- Endothelial cell proliferation
- Capillary (superficial; rosettes of endothelial cells), cavernous (deep; large blood-filled sinusoids) or mixed

Investigations

- Usually clinical diagnosis
- Ultrasound scan if uncertain if underlying tissues affected
- Characteristic firm lobular structure with vessels separating lobules
- MRI or angiography in more complex cases

Clinical Photo



Complications

- Rarely cause complications
    - Ulcerations
    - Meninges involvement causing epilepsy and mental defect (Sturge-Weber syndrome)

Treatment and management

- Benign hence no treatment required
- Occasionally removed to exclude malignant skin lesions (e.g. nodular melanoma)
- Avoid excision unless trauma causes repeated bleeding episodes
    - Cryosurgery may remove haemangioma without excessive bleeding

OSTEOMAS

What are they?

An osteoma is a benign tumour growth of bone, most commonly found in bone of intramembranous ossification.

They are often incorrectly classified as:

- Exotoses: osseous overgrowths
    - Small: may occur as irregular bony growths on alveolar process surface
    - Torus palatinus and torus mandibularis: develop in characteristic sites (palate and mandible) and usually are symmetrical

Terminology

In order to understand osteomas more thoroughly, it is important to first understand commonly used terminology, being:

- Homoplastic osteoma
    - Arise from bone
- Heteroplastic osteoma
    - Arise from soft tissue

Clinical Presentation

- Benign, slow growing and usually asymptomatic.
- Incidental identification as a mass in the skull or mandible, or as the underlying cause of sinusitis or mucocele formation within the paranasal sinuses
- In the jaws, the osteoma occurs as a circumscribed hard protuberance projecting from the bone, or as a dense mass within the bone. Histologically, the lesion consists of cancellous or cortical bone.
- Gardner syndrome
    - Multiple osteomas of jaw
    - Polyposis coli; with high malignant potential and often other abnormalities (dental defects, epidermal cysts or fibromas)
    - Inherited autosomal dominant trait
    - Weak penetrance
    - Early recognition: prompt bowel radiography or endoscopy and possibly prophylactic colectomy
- Compact and cancellous osteoma

Locations

They commonly occur in the head and neck. The most common locations are:

- Paranasal sinus osteoma
- Skull vault osteoma
- Mandibular osteoma

Histology

Osteomas present as different patterns depending on their type and maturity. These include:

- Ivory osteoma
    - Otherwise known as eburnated osteoma
    - dense bone which lacks haversian system
- Mature osteoma
    - also known as osteoma spongiosum
    - resembles 'normal' bone, including trabecular bone often with marrow
- mixed osteoma
    - mixture of ivory and mature histology

Radiographic Features

Radiographic investigations shows any underlying pathology

- Ivory osteomas: very radio dense, similar to normal cortex
- Mature osteomas may show central marrow.

Treatment and Prognosis

As these tumours are benign excision is only required if they cause adjacent complications or mass effect. Some common complications include:

- Mucocoele formation
- Denture fitting interference
- Functional impairment
- Cosmetic impairment

Clinical Photo #1

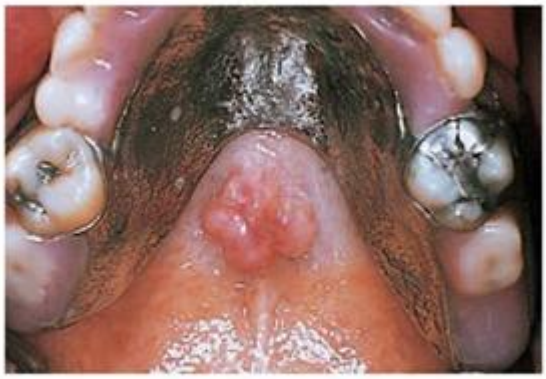


Fig. 9.2 **Torus palatinus.** Palatal tori range from small smooth elevations to lobular swellings such as this. The bone is covered by only a thin mucosa which is prone to t[illegible]

Clinical Photo #2

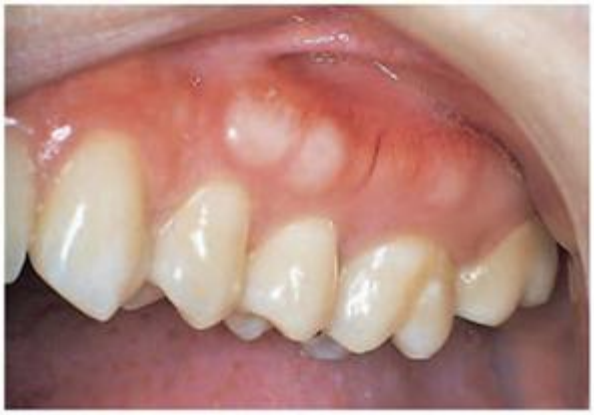
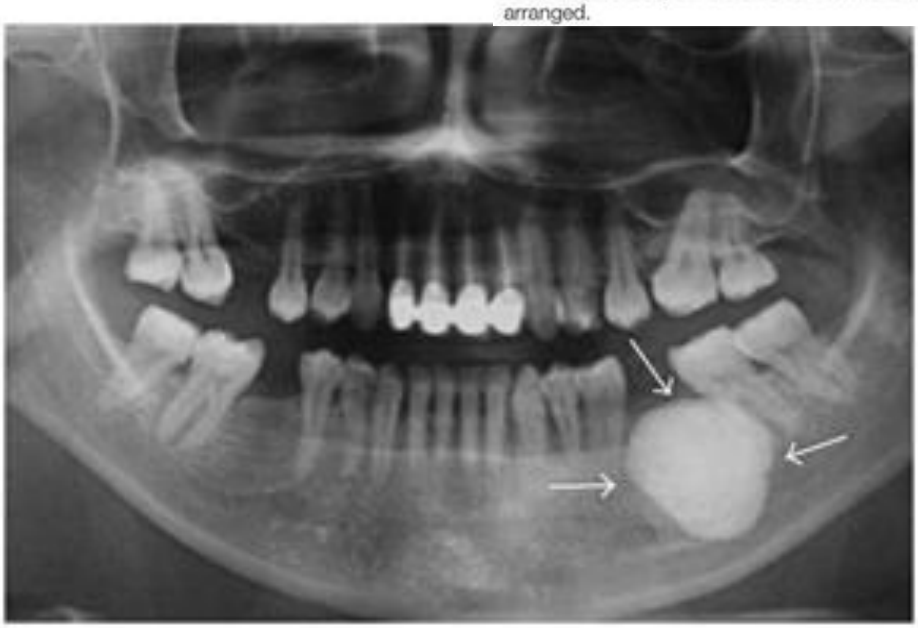


Fig. 9.1 **Exostoses.** Bony exostoses, aside from tori, are found most frequently buccally on the alveolar bone and are often symmetrically arranged.



MULTIPLE CHOICE

Multiple Choice Q1 -
Reed-Sternberg giant cells:
a. Could be found in Hodgkin's lymphoma
b. Could be found in non-Hodgkin's lymphoma
c. Have paired (mirror-image) nuclei
d. a and c are correct
e. b and c are correct

Multiple Choice Q2 -
The most common type of lymphoma:
a. Is Hodgkin's lymphoma
b. Is non-Hodgkin's lymphoma
c. Is also referred to as B-cell or T-cell lymphomas
d. Has classical and nodular lymphocyte-predominant as the main types
e. b and c are correct
f. a and d are correct

Multiple Choice Q3
Which is false:
a. soft tissue metastasis 2x more likely to occur in men
b. the most common primary source of metastatic lesion is from the lung and breast
c. metastasis into the oral cavity is uncommon
d. primary source of metastasis for women is from the lungs
Which is true:

Multiple Choice Q4
a. metastatic tumours from the oral cavity are uncommon
b. metastatic tumours to the oral cavity are uncommon
c. metastatic tumours comprise about 4% of all oral malignant neoplasms
d. the recurrence of oral metastatic lesions may be in the bone or soft tissue

Multiple Choice Q5
What is not true of a fibroma?
A. Is a benign tumour
B. Are commonly asymptomatic
C. Are more commonly seen in women than men
D. Are typically a dense and un-encapsulated

Multiple Choice Q6
What is the single most important characteristic in differentiating benign and malignant tissue in all types of connect tissue tumours?
A. Spindle shaped cells
B. The amount of abnormal mitotic figures
C. The appearance of the surrounding tissue
D. The involvement of surround nerves

Multiple Choice Q7
Lipomas most commonly occur in the:
a. Buccal mucosa
b. Alveolar ridge
c. Hard palate
d. Adipocytes

Multiple Choice Q8
Neurilemmomas commonly affect which cell?
a. Neurones
b. Schwann cells
c. Oligodendrocytes
d. Astrocytes

Multiple Choice Q9
What are does it mean when referring to a 'strawberry haemangioma'?
a. it is shaped like a strawberry
b. it has corrugated surface like a strawberry
c. on surface of skin
d. it is just under skin

Multiple Choice Q10
What types of histological patterns of osteoma are there?
a. ivory osteoma
b. immature osteoma
c. combined osteoma
d. isolated osteoma

Answers

1.) d
2.) e
3.) d
4.) d
5.) c
6.) b
7.) a
8.) b
9.) c
10.) a

REFERENCES

Cawson, R. A., & Odell, E. W. (2008). *Cawson's Essentials of Oral Pathology and Oral Medicine*. Elsevier Health Sciences UK.

Cawson, R. A., Odell, E. W., & Porter, S. R. (2008). Cawson's Essentials of Oral Pathology and Oral Medicine. London: Elsevier Health Sciences UK.

Columbia University College of Dental Medicine. (2012). Fibromas. Retrieved from http://www.simplestepsdental.com/SS/ihtSSPrint/r.==/st.32219/t.32129/pr.3/c.351800.html

Dicky, I. D. (2014). Fibrosarcoma Workup. Retrieved from http://emedicine.medscape.com/article/1257 520-workup#c5

Divya, A., Patil, R., Kannan, N., & Kesary, S. P. (2009). Fribrosarcoma of the mandible: a case report of a unique radiographic appearance. *Journal of Oral Radiology,* 25, 77-80. Retrieved from http://search.proquest.com.ez.library.latrobe.edu.au/docview/883402472?accountid=12001&OpenUrlRefId=info:xri/sid:primo

Flickinger, F. W., Lozano, R. L., Yuh, W. T. C., & Sachs, M. A. (1989). Neurilemoma of the tongue: MR findings. *Journal of Computer Assisted Tomography, 13*(5), 886-888. doi:10.1097/00004728-198909000-00025

Healthdirect Australia. (2013). Non-Hodgkin lymphoma (B cell and T cell lymphoma). Retrieved from http://www.healthdirect.gov.au/non-hodgkin-lymphoma

Hirshberg, A., Shnaiderman-Shapiro, A., Kaplan, I., & Berger, R. (2008). Metastatic tumours to the oral cavity – Pathogenesis and analysis of 673 cases. *Oral Oncology* , 743-752.

Juliasse, L. E. R., Nonaka, C. F. W., Pinto, L. P., Freitas, R. A., & Miguel, M. C. C. (2010). Lipomas of the oral cavity: clinical and histopathologic study of 41 cases in a Brazilian population. *Eur Arch Otorhinolaryngol, 267,* 459-465. doi:10.1007/s00405-009-1010-z

Kawai, N., Wakasa, T., Asaumi, J., & Kishi, K. (2000). A radiographic study on resorption of tooth root associated with malignant tumours. *Journal of Oral Radiology,* 16, 55-65.

Knipe, H., & Gaillard, F. (2015). Osteoma. Retrieved 07 September, 2015, from http://radiopaedia.org/articles/osteoma

Kumar, G. S., & Manjunatha, B. S. (2013). Metastatic tumors to the jaws and oral cavity. *Journal of Oral and Maxillofacial Pathology*, 71-75. Lederman, D. A. (2014). Oral Fibromas and Fibromatoses. Retrieved from http://emedicine.medscape.com/article/1080948-overview#a2

Nanda, K. D., Mehta, A., & Nanda, J. (2013). Fibrosarcoma of the mandible: a diagnostic dilemma. *Journal of Clinical and Diagnostic Research,* 18, 1804-1805. doi: 10.7860/JCDR/2013/5608.3295

Leukaemia Foundation Australia. (2015). Hodgkin Lymphoma. Retrieved from http://www.leukaemia.org.au/blood-cancers/lymphomas/hodgkin-lymphoma

NIH: National Cancer Institute. (2015). General Information About Adult Hodgkin Lymphoma. Retrieved from http://www.cancer.gov/types/lymphoma/patient/adult-hodgkin-treatment-pdq

NIH: National Cancer Institute. (2015). Hodgkin disease. Retrieved from https://www.nlm.nih.gov/medlineplus/hodgkindisease.html

Shankland, K. R., Armitage, J. O., & Hancock, B. W. (2012). Non-hodgkin lymphoma. *The Lancet 380*(9844),848-57.Retrievedfrom http://search.proquest.com.ez.library.latrobe.edu.au/docview/1080938822?OpenUrlRefId=info:xri/sid:primo&accountid=12001

Southern Illinois University School of Medicine (2007). Basic Tissue Types. Retrieved from http://www.siumed.edu/~dking2/intro/4basic.htm

Porth, C. M. (2011). *Essentials of Pathophysiology.* Philadelphia: Wolters Kluwer Health

Zachariades, N. (1985). Fibrosarcoma of the mandible. *The British Journal of Oral and Maxillofacial Surgery*, 23, 174-182.
Retrieved from http://ac.els-cdn.com.ez.library.latrobe.edu.au/0266435685900877/1-s2.0-0266435685900877-main.pdf?_tid=bf1811ea-457d-11e5-86d2-00000aacb361&acdnat=1439884388_cc5242f30f5be5c83b61466340e034a4

Zelgar, B. (2002). Connective tissue tumors. Recent Results in Cancer Research, 160, 342-350.
Retrieved from http://www.ncbi.nlm.nih.gov/pubmed/12079232