Oral medicine for the general practitioner: lumps and swellings

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This series of five papers summarises some of the most important oral medicine problems likely to be encountered by practitioners.

Some are common, others rare. The practitioner cannot be expected to diagnose all, but has been trained to recognise oral health and disease, and should be competent to recognise normal variants, and common orofacial disorders. In any case of doubt, the practitioner is advised to seek a second opinion from a colleague. The series is not intended to be comprehensive in coverage either of the conditions encountered, or all aspects of diagnosis or treatment: further details are available in standard texts, in the further reading section, or from the internet. The present article discusses aspects of lumps and swellings.

Lumps and swellings

Lumps and swellings in the mouth are common, but of diverse aetiologies (Table 1), and some represent malignant neoplasms. Therefore, this article will discuss lumps and swellings in general terms, but later focus on the particular problems of oral cancer and of orofacial granulomatosis, presentations of which can also include oral ulceration.

Most patients have only a passing interest in their mouths but some examine their mouths out of idle curiosity, some through fear, perhaps after hearing of someone with 'mouth cancer'. Thus some individuals discover and worry about normal anatomical features such as tori, the parotid papilla, foliate papillae on the tongue, or the pterygoid hamulus. The tongue often detects even a very small swelling, or the patient may first notice it because it is sore (Figure 1). In contrast, many oral cancers are diagnosed far too late, often after being present several months, usually because the patient ignores the swelling.

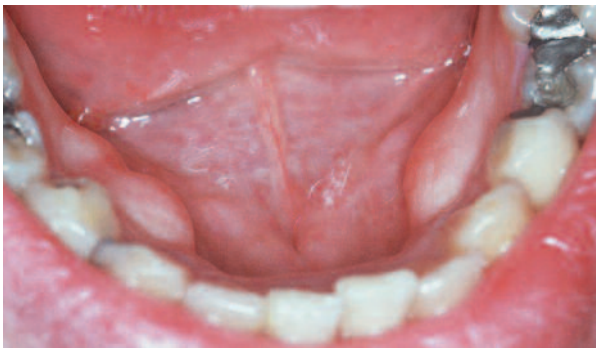

Figure 1: Torus mandibularis.

Many different conditions, from benign to malignant, may present as oral lumps or swellings (see Tables 1 to 5) including:

Developmental Unerupted teeth, and tori are common causes of swellings related to the jaws

Inflammatory Dental abscess is one of the most common causes of oral swelling. However, there are a group of conditions characterised by chronic inflammation and granulomas, which can present with lumps or swellings. These, which include Crohn's disease, orofacial granulomatosis, and sarcoidosis, are discussed below

Neoplasms Oral squamous cell carcinoma (OSCC),

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Kaposi's sarcoma, lymphomas and other neoplasms may present as swellings, as discussed below. Occasionally metastatic malignant disease may present as a lump in the mouth or jaw

Traumatic Haematoma may cause a swelling at the site of trauma. The flange of a denture impinging on the vestibular mucosa may stimulate a reactive irregular hyperplasia (denture-induced hyperplasia)

Hormonal Pregnancy may result in a gingival swelling (pregnancy epulis)

Drug-induced A range of drugs can produce gingival swelling - most common are phenytoin, ciclosporin and calcium channel blockers (Table 2)

Viral lesions Papillomas, common warts (verruca vulgaris), genital warts (condyloma acuminatum) and focal epithelial hyperplasia (Heck's disease) are all lumps caused by human papillomaviruses

Fibro-osseous lesions Fibrous dysplasia and Paget's disease can result in hard jaw swellings.

Diagnosis

Important features to consider when making the provisional diagnosis of the cause of a lump or swelling include:

Position The anatomical position should be defined and the proximity to other structures (e.g. teeth) noted

- Midline lesions tend to be developmental in origin (e.g. torus palatinus)
- Bilateral lesions tend to be benign (e.g. sialosis - salivary swelling in alcoholism, diabetes or other conditions)
- Most neoplastic lumps are unilateral

Other similar or relevant changes elsewhere in the oral cavity should be noted

Size The size should always be measured and recorded. A diagram and photograph may be helpful

Shape Some swellings have a characteristic shape that may suggest the diagnosis: thus a parotid swelling often fills the space between the posterior border of the mandible and the mastoid process

Colour Brown or black pigmentation may be due to a variety of causes such as a tattoo, naevus or melanoma. Purple or red may be due to a haemangioma, Kaposi's sarcoma or giant-cell lesion

Temperature The skin overlying acute inflammatory lesions, such as an abscess, or over a haemangioma, is frequently warm

Tenderness Inflammatory swellings such as an abscess

Table 1: Main conditions which may present as lumps or swellings in the mouth

Normal anatomy	Pterygoid hamulus
	Parotid papillae
	Lingual papillae
Developmental	Unerupted teeth
	Odontogenic cysts
	Eruption cysts
	Developmental cysts (e.g. thyroglossal, dermoid)
	Haemangioma
	Lymphangioma
	Maxillary and mandibular tori
	Hereditary gingival fibromatosis
	Lingual thyroid
Inflammatory	Abscess
	Cellulitis
	Crohn's disease
	Cysts
	Human papillomavirus-induced lesions (warts etc)
	Insect bites
	Orofacial granulomatosis
	Pyogenic granuloma
	Sarcoidosis
	Sialadenitis
Traumatic	Denture granulomata
	Epulis
	Fibroepithelial polyp
	Haematoma
	Mucocele
	Surgical emphysema
Neoplasms	Carcinoma
	Leukaemia
	Lymphoma
	Myeloma
	Odontogenic tumours
	Others
Fibro-osseous	Cherubism
	Fibrous dysplasia
	Paget's disease
Hormonal	Pregnancy epulis/gingivitis
	Oral contraceptive pill gingivitis
	Sialosis
Metabolic	Amyloidosis
	Other deposits
Drugs	Phenytoin
	Ciclosporin
	Calcium channel blockers
Allergic	Angioedema

Table 2: Oral malignant neoplasms

Common
Squamous cell carcinoma
Less common
Salivary gland tumours
Malignant melanoma
Lymphomas
Neoplasms of bone and connective tissue
Some odontogenic tumours
Maxillary antral carcinoma (or other neoplasms)
Metastatic neoplasms (breast, lung, kidney, stomach, liver)
Langerhans cell histiocytoses
Kaposi's sarcoma

are characteristically tender, although clearly palpation must be gentle to avoid excessive discomfort to the patient

Discharge Note any discharge from the lesion (e.g. clear fluid, pus, or blood), orifice, or sinus

Movement The swelling should be tested to determine if it is fixed to adjacent structures or the overlying skin/mucosa such as may be seen with a neoplasm

Consistency Palpation showing a hard (indurated) consistency may suggest a carcinoma. Palpation may cause the release of fluid (e.g. pus from an abscess) or cause the lesion to blanch (vascular) or occasionally cause a blister to appear (Nikolsky sign) or to expand. Sometimes palpation causes the patient pain (suggesting an inflammatory lesion). The swelling overlying a bony cyst may crackle (like an eggshell) when palpated or fluctuation may be elicited by detecting movement of fluid when the swelling is compressed. Palpation may disclose an underlying structure (e.g. the crown of a tooth under an eruption cyst) or show that the actual swelling is in deeper structures (e.g. submandibular calculus)

Surface texture The surface characteristics should be noted: papillomas have an obvious anemone-like appearance; carcinomas and other malignant lesions and deep fungal and other chromic infections tend to have a nodular surface and may ulcerate. Abnormal blood vessels suggest a neoplasm

Ulceration Some swellings may develop superficial ulceration such as squamous cell carcinoma. The character of the edge of the ulcer and the appearance of the ulcer base should also be recorded

Margins Ill-defined margins are frequently associated with malignancy, whereas clearly defined margins are suggestive of a benign lesion

Number of swellings Multiple lesions suggest an infective or occasionally developmental, origin. Some conditions are associated with multiple swellings of a similar nature, e.g. neurofibromatosis.

Investigations

The medical history should be fully reviewed, since some systemic disorders may be associated with intra-oral or facial swellings (Table 1). The nature of many lumps cannot be established without further investigation:

- Any teeth adjacent to a lump involving the jaw should be tested for vitality, and any caries or suspect restorations investigated.
- The periodontal status of any involved teeth should also be determined.
- Imaging of the full extent of the lesion and possibly other areas is required whenever lumps involve the jaws. OPT and special radiographs (e.g. of the skull, sinuses, salivary gland function), computerised

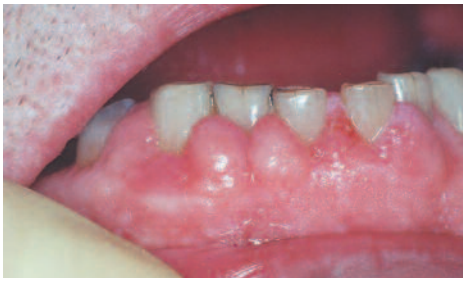

Figure 2: Gingival swelling caused by nifedipine.

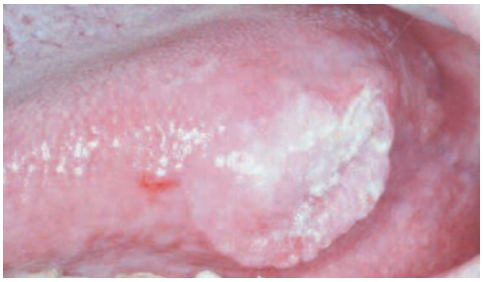

Figure 3: Oral squamous cell carcinoma.

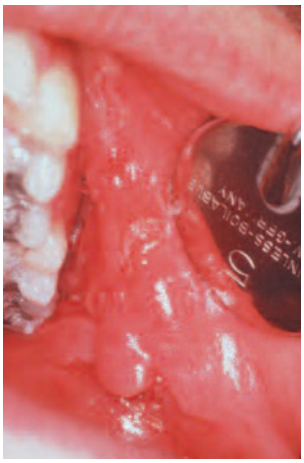

Figure 4: OFG (orofacial granulomatosis).

tomography (CT scans) or magnetic resonance imaging (MRI), or ultrasound may, on occasions, be indicated. Photographs may be useful for future comparison.

- Blood tests may be needed, particularly if there is suspicion that a blood dyscrasia or endocrinopathy may underlie the development of the lump.

Management

Specialist referral may be indicated if the practitioner feels:

- The diagnosis is unclear
- A serious diagnosis such as cancer is possible
- Systemic disease such as Crohn's disease, may be present
- Unclear as to investigations indicated
- Complex investigations are indicated
- Unclear as to treatment indicated
- Treatment is complex
- Treatment requires agents not readily available
- Unclear as to the prognosis
- The patient would be happier.

Oral cancer

Oral cancer is the most common malignant epithelial neoplasm affecting the mouth. More than 90% is oral squamous cell carcinoma (OSCC). Cancers of the oral cavity are classified according to site:

- Lip (International Classification of Diseases (ICD) 140)
- Tongue (ICD 141)
- Gum (ICD 143)
- Floor of the mouth (ICD 144)
- Unspecified parts of the mouth (ICD 145).

Other malignant oral neoplasms (Table 2) include:

- Other epithelial malignancies e.g. melanoma
- Secondary carcinomas
- Sarcomas e.g. Kaposi's sarcoma
- Lymphoreticular neoplasms e.g. lymphomas.

Oral squamous cell carcinoma

Oral squamous cell carcinoma (OSCC) is among the ten most common cancers worldwide and seems to be increasing. The number of new mouth (oral) and oropharyngeal cancers are currently estimated to be 300,000 cases worldwide,

Table 3: Potentially malignant oral lesions

Lesion	Aetiology	Features
Erythroplasia	Tobacco/alcohol	Flat red plaque
Leukoplakia	Tobacco/alcohol	White or speckled plaque
Proliferative verrucous leukoplakia	Tobacco/alcohol/ human papillomavirus (HPV)	White or speckled or nodular plaque
Sublingual keratosis	Tobacco/alcohol	White plaque
Actinic cheilitis	Sunlight	White plaque/erosions
Lichen planus	Idiopathic	White plaque/erosions
Submucous fibrosis	Areca nut	Immobile mucosa
Discoid lupus erythematosus	Idiopathic	White plaque/erosions
Chronic candidosis	Candida albicans	White or speckled plaque
Syphilitic leukoplakia	Syphilis	White plaque
Atypia in immunocompromised patients	papillomavirus	White or speckled plaque
Dyskeratosis congenita	Genetic	White plaques
Paterson-Kelly syndrome (sideropenic dysphagia; Plummer-Vinson syndrome)	Iron deficiency	Post-cricoid web

amounting to around 3% of total cancers. OSCC is seen predominantly in males but the male: female differential is decreasing. OSCC is seen predominantly in the elderly but is increasing in younger adults.

Potentially malignant states

Some potentially malignant (precancerous) lesions, which can progress to OSCC, include especially (Table 3):

- Erythroplasia (erythroplakia (Scully, 2003)), - this is the most likely lesion to progress to carcinoma, and is very dangerous
- Leukoplakias (Scully, 2003), particularly:
    - Nodular leukoplakia
    - Speckled leukoplakia
    - Proliferative verrucous leukoplakia
    - Sublingual leukoplakia
    - Candidal leukoplakia
    - Syphilitic leukoplakia

Some other potentially malignant (precancerous) conditions include:

- Actinic cheilitis (mainly seen on the lower lip)
- Lichen planus (mainly the non-reticular type)
- Submucous fibrosis (mainly in users of areca nut)
- Rarities such as:
    - Dyskeratosis congenita
    - Discoid lupus erythematosus
    - Paterson-Kelly syndrome (sideropenic dysphagia; Plummer-Vinson syndrome).

Predisposing factors (risk factors)

OSCC is most common in older males, in lower socio-economic groups and in ethnic minority groups. In the developed world, OSCC is seen especially in tobacco and alcohol users.

Tobacco releases a complex mixture of at least 50 compounds including polycyclic aromatic hydrocarbons

Table 4: A TNM classification of malignant neoplasms

Primary tumour size (T)	
T_x	No available information
T_0	No evidence of primary tumour
T_{is}	Only carcinoma in situ
T_1, T_2, T_3, T_4	Increasing size of tumourb
Regional lymph node involvement (N)	
N_x	Nodes could not or were not assessed
N_0	No clinically positive nodes
N1	Single clinically positive homolateral node less than 3cm in diameter
N_2	Single clinically positive homolateral node 3cm t6 cm in diameter, or multiple clinically positive homolateral nodes, none more than 6cm in diameter
N_{2a}	Single clinically positive homolateral node 3-6cm in diameter
N_{2b}	Multiple clinically positive homolateral nodes,none more than 6cm in diameter
N_3	Massive homolateral nodes (s), bilateral nodes, or contralateral node (s)
N_{3a}	Clinically positive homolateral node(s), one more than 6cm in diameter
N_{3b}	Bilateral clinically positive nodes
N_{3c}	Contralateral clinically positive node(s)
Involvement by distant metastases(M)	
M_x	Distant metastasis was not assessed
M_0	No evidence of distant metastasis
M_1, M_2, M_3	Distant metastasis is present. Increasing degrees of metastatic involvement, including distant nodes

a Several other classifications are available, e.g. STNM (S = site).
b T_1 maximum diameter 2 cm; T_2 maximum diameter of 4 cm; T_3 maximum diameter over 4cm. T_4 massive tumour greater than 4cm diameter, with involvement of antrum, pterygoid muscles, base of tongue or skin

such as benzpyrene, nitrosamines, aldehydes and aromatic amines.

Alcohol (ethanol) is metabolised to acetaldehyde, which may be carcinogenic. Nitrosamine and urethane contaminants may also be found in some alcoholic drinks.

Betel quid often contains betel vine leaf, betel (areca) nut, catechu, and slaked lime together with tobacco. Some 20% of the world's population use betel. In persons from the developing world, OSCC is seen not only in tobacco or alcohol users but particularly in betel quid users. Various other chewing habits, usually containing tobacco, are used in different cultures (e.g. Qat, Shammah, Toombak).

Other factors

Neither do all tobacco/alcohol users develop cancer, and equally nor do all patients with cancer have these habits. The predisposition to OSCC is thus attributed mainly to specific risk factors such as tobacco and alcohol, but other factors, which may also play a part, include:

- Deficiencies of vitamins A, E or C
- An impaired ability to metabolise carcinogens and/or
- An impaired ability to repair DNA damaged by carcinogens and micro-organisms such as candida and human papillomaviruses (HPV). For example, HPV are especially implicated in tonsillar carcinoma.
- Actinic radiation may predispose to lip cancer.

Table 5: Prognosis for intraoral carcinoma

Stage	TNM	Approximate % survival at five years
1	T1 N0 M0	85
11	T2 N0 M0	65
111	T3 N0 M0 T1, T2 or T3 N1 M0	40
1V	Any T4,N2,N3 or M1	10

Adapted from Sciubba (2001)

- Immune defects may predispose to OSCC, especially lip cancer, which is increased in, e.g. immunosuppressed renal transplant recipients.

Pathogenesis

OSCC arises as a consequence of multiple molecular events causing genetic damage affecting many chromosomes and genes, and leading to DNA changes. The accumulation of genetic changes leads to cell dysregulation to the extent that growth becomes autonomous and invasive mechanisms develop - this is carcinoma.

Clinical Features

Most oral cancer is carcinoma on the lower lip; the other main site is the postero-lateral border/ventrum of the tongue (Table 3).

OSCC may present as a red lesion (erythroplasia); a granular ulcer with fissuring or raised exophytic margins; a white or mixed white and red lesion; a lump sometimes with abnormal supplying blood vessels; an indurated lump/ulcer i.e. a firm infiltration beneath the mucosa; a non-healing extraction socket; a lesion fixed to deeper tissues or to overlying skin or mucosa; or cervical lymph node enlargement, especially if there is hardness in a lymph node or fixation. OSCC should be considered where any of these features persist for more than three weeks.

It is important to note that in patients with OSCC, a second primary neoplasm may be seen elsewhere in the upper aerodigestive tract in up to 25% over three years. Indeed, many patients treated for OSCC succumb to a second primary tumour rather than a recurrence of the initial primary.

Diagnosis

Management of early cancers appears to confer survival advantage and is also associated with less morbidity and needs ess mutilating surgery. Thus it is important to be suspicious of oral lesions - particularly in patients at high risk, such as older males with habits such as the use of tobacco, alcohol or betel. There should thus be a high index of suspicion, especially of a solitary lesion. Clinicians should be aware that single ulcers, lumps, red patches, or white patches - particularly if any of these are persisting for more than three weeks may be manifestations of malignancy.

Frank tumours should be inspected and palpated to determine extent of spread; for tumours in the posterior tongue, examination under general anaesthetic by a specialist may facilitate this.

The whole oral mucosa should also be examined as there may be widespread dysplastic mucosa ('field change') or even a second neoplasm, and the cervical lymph nodes and rest of the upper aerodigestive tract (mouth, nares, pharynx, larynx, oesophagus) must be examined.

Investigations

An incisional biopsy is invariably required. The biopsy should be sufficiently large to include enough suspect and apparently normal tissue to give the pathologist a chance to make a diagnosis and not to have to request a further specimen. Since red rather than white areas are most

likely to show dysplasia, a biopsy should be taken of the former. Some authorities always take several biopsies at the first visit in order to avoid the delay and aggravation resulting from a negative pathology report in a patient who is strongly suspected as suffering from a malignant neoplasm. Attempts to clinically highlight probably dysplastic areas before biopsy, e.g. by the use of chemiluminescence, toluidine blue dye and other vital stains, may be of some help where there is widespread 'field change'. Molecular techniques and DNA ploidy are being introduced for prognostication in potentially malignant lesions and tumours, and to identify nodal metastases.

It is essential to determine whether bone or muscles are involved or if metastases - initially to regional lymph nodes and later to liver, bone and brain - are present. Imaging may be needed. Another important aspect in planning treatment is to determine if there is malignant disease elsewhere, particularly whether other primary tumours are present, and therefore endoscopy may be necessary.

Finally, the specialist also needs to ensure that the patient is as prepared as possible for the major surgery required, particularly in terms of general anaesthesia, potential blood loss and ability to metabolise drugs, and to address any potential medical, dental or oral problems pre-operatively, to avoid complications. Therefore almost invariably indicated are:

- Medical examination
- Biopsy of equivocal neck lymph nodes
- Jaw and chest radiography
- MRI or CT
- Electrocardiography
- Blood tests

Selected patients may also need:

- Bronchoscopy - if chest radiography reveals lesions
- Endoscopy - if there is a history of tobacco use
- Gastroscopy - if PEG (per-endoscopic gastrostomy) is to be used for feeding post-surgery
- Liver ultrasound – to exclude metastases
- Doppler duplex flow studies and angiography: to help in planning free flaps for reconstruction.

Management

If you are concerned, phone, email or write for an urgent specialist opinion, which is indicated if you feel a diagnosis of cancer is seriously possible or if the diagnosis is unclear. One of the most difficult clinical situations in which clinicians find themselves is with the patient in whom cancer is suspected. Patient communication and information are important. If the patient is to be referred to a specialist for a diagnosis and insists (rightly) on a full explanation as to why there is a need for a second opinion, it is probably better say that you are trained more to be suspicious but hope the lesion is nothing to worry about, though you would be failing in your duty if you did not ask for a second opinion. However, you should leave discussion of actual diagnosis, treatment and prognosis to the specialist concerned, as only they are in a position to give accurate facts to the patient concerned.

Cancer treatment and planning involves a team including a range of specialities including surgeons, anaesthetists, oncologists, nursing staff, dental staff, nutritionists, speech and physiotherapists, and others. Increasingly, Head and Neck Tumour Boards are being developed along with Cancer Networks to facilitate the collaboration of providers of cancer services to provide seamless care based on best practice (see http://www.eastman.ucl.ac.uk/hntb/index.html). Consensus guidelines to treatment are now being published.

OSCC is now treated largely by surgery and/or radiotherapy to control the primary tumour and metastases in cervical lymph nodes. Treatment and prognosis depend on the TNM classification (Tables 4 & 5). The planning phase includes discussions regarding restorative and surgical interventions required before cancer treatment, including osseointegrated implants and jaw and occlusal reconstruction and therapy is also planned to avoid post-operative complications. As much oral care as possible should be completed before starting cancer treatment.

Oral care is especially important when radiotherapy is to be given, since there is a liability particularly to mucositis, xerostomia and other complications, and a risk of osteonecrosis - the initiating factor for which is often trauma, such as tooth extraction, or ulceration from an appliance, or oral infection.

Orofacial granulomatosis

Orofacial granulomatosis (OFG) is an uncommon but increasingly recognised condition seen mainly in adolescents and young adults which usually manifests with facial and/or labial swelling, but which can also manifest with angular stomatitis and/or cracked lips, ulcers, mucosal tags, cobble-stoning, or gingival swelling (Table 4). A minority of patients with similar features have gastrointestinal Crohn's disease, swelling or have sarcoidosis.

The aetiology of OFG is unknown but there may be an

HLA association (A3, B7, DR2). In some there is a postulated reaction to food or other antigens (particularly to additives such as benzoates or cinnamon), or metals such as cobalt. Reactions to paratuberculosis, Borrelia burgdorferi or mycobacterial stress protein mSP65 have been hypothesised but not proven. Most patients appear to develop the problem in relation to dietary components such as chocolate, nuts, cheese or food additives.

Conditions related to OFG include Miescher's cheilitis - where lip swelling is seen in isolation, and Melkersson-Rosenthal syndrome- where there is facial swelling with fissured tongue and facial palsy.

Diagnosis

Diagnosis is clinical, supported by blood tests, endoscopy, imaging and biopsy to differentiate from Crohn's disease, sarcoidosis, tuberculosis and foreign body reactions. Specialist care is usually indicated.

Management

Management is to eliminate allergens such as chocolate, nuts, cheese or food additives and treat lesions with intralesional corticosteroids or occasionally systemic clofazimine or sulphasalazine.

Crohn's disease

Crohn's disease is a chronic inflammatory idiopathic granulomatous disorder. Many causal factors have been hypothesised, one of the most recent being that it may be caused by Mycobacterium paratuberculosis. This remains to be proved. Crohn's disease affects mainly the small intestine (ileum) but can affect any part of the gastrointestinal tract, including the mouth. There may also be features of gastrointestinal involvement such as abnormal bowel movements, pain, or weight loss.

About 10% of patients with Crohn's disease of the bowel have oral lesions. Oral lesions may be seen in the absence of any identifiable gut involvement and are the same as those seen in OFG - reddish raised lesions on the gingiva, hyperplastic folds of the oral mucosa (thickening and folding of the mucosa producing a 'cobblestone-type' of appearance, and mucosal tags), ulcers (classically linear vestibular ulcers with flanking granulomatous masses), facial swelling and angular cheilitis.

Diagnosis

Oral biopsy, haematological, gastrointestinal and other investigations may be required in suspected Crohn's disease especially to exclude sarcoidosis. Specialist care is usually indicated. Histologically, the epithelium is intact but thickened, with epithelioid cells and giant cells surrounded by a lymphocytic infiltration.

Management

Topical or intralesional corticosteroids may effectively control the oral lesions but more frequently systemic corticosteroids, azathioprine or salazopyrine are required.

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Further reading

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