

Oral surgery II:

Part 4. Common oral lesions

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In brief

Addresses issues related to the surgical management of soft tissue lesions/masses of the mouth.

Highlights that management of pathology specimens requires care and attention to detail.

Discusses surgical treatment of common oral soft tissue lesions, together with specific indications for cryosurgery, diathermy and laser surgery.

Lesions of the mouth are surprisingly common and vary from the totally innocuous to highly malignant neoplasms. As required for the management of all patients, a clear and concise history and a thorough clinical examination are essential. In addition, radiographs and other laboratory investigations may be required to formulate a differential diagnosis. A definitive diagnosis, on which treatment planning should always be based, can usually only be confirmed following a histological examination. This may be obtained through a biopsy or following total excision of a lesion.

Presentation and examination

Benign lesions are usually clearly demarcated but some may have diffuse margins with no tendency to undergo malignant change. They may present as soft tissue, intrabony or composite lesions and affect a variety of

tissue structures. In most cases they are slow growing and, in the developed world, rarely cause anything other than minor irritation. In the developing world, however, 'benign' lesions can cause horrendous problems as they may grow to an enormous size – displacing other structures and even slowly suffocating untreated patients.

Benign lesions present in a variety of ways, which may include:

- Swelling
- Change in colour and/or texture
- Ulceration
- Asymmetry.

On examining and palpating any lesion its features should be recorded. As an aide-memoire these can be remembered as beginning with six letter S's and two letter C's:

- Site
- Size
- Shape
- Surface
- Structures
- Superficial (or deep)
- Colour
- Consistency.

If there is any suggestion of fluctuance, the possibility of fluid or pus should be considered and confirmed with bimanual palpation (if large enough) or transillumination. Aspiration should be performed on these lesions, preferably prior to or at the time of definitive biopsy, which may aid the formulation of a differential diagnosis and exclude haemangioma.

Anatomical knowledge is important when investigating lesions lying within the deeper structures to exclude the possibility of palpating normal structures such as muscles, salivary gland tissue, lymph nodes and blood vessels. Recognition of normal variation must be excluded first either in soft tissue (racial

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ORAL SURGERY II*

Part 1. Acute management of dentoalveolar trauma

Part 2. The maxillary sinus (antrum) and oral surgery

Part 3. Cysts of the mouth and jaws and their management

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Some mucosal lesions can produce changes in the underlying bone, usually of an inflammatory nature, which may be evident on radiographic examination. True intrabony lesions tend to present as radiolucent or radio-opaque areas on radiographs, or occasionally a combination of the two, depending on the actual cause. Some lesions have characteristic clinical features but in most cases a surgical biopsy is required to confirm the diagnosis, exclude alternatives and plan treatment (see 'Biopsy techniques' in Part 3 of this series or on page 49 of the *BDJ Clinical Guide*).



Fig. 1 (a) Gingival racial pigmentation; (b) Stenson's duct; (c) Wharton's duct

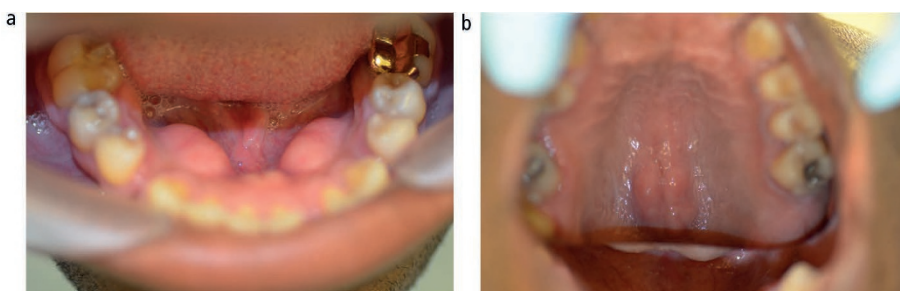


Fig. 2 (a) Mandibular tori; (b) Maxillary torus

pigmentation, Stenson's and Wharton's ducts, Fig. 1) and hard tissue mimicking soft tissue swellings (mandibular and maxillary tori, Fig. 2). Where lesions lie in close proximity to bone, radiographs may be required to exclude the possibility of a dental cause, such as an abscess or a cyst. When this is suspected, tooth vitality tests should be performed – preferably prior to radiographic examination.

Lesion classification

The classification of benign oral lesions is complicated by the variety of possible diagnoses but a modification of the surgical sieve is a useful starting point.

A slightly modified 'surgical sieve' for these lesions is summarised in Table 1 and a pragmatic differential diagnosis list of lesions based on site is provided in Table 2. Fig. 3 illustrates some examples.

Table 1 Surgical sieve for intraoral lesions	
Lesion type	Lesion type
Congenital	Polyps, exostoses, bone lesions, vascular lesions
Acquired	
Inflammatory/traumatic	Hyperplasia, polyps, ulceration
Cystic	Mucous retention cysts, ranulae
Idiopathic/immunological	Mucosal/skin disease, ulceration, erosion
Neoplastic (refer!)	Leukoplakia and erythroplakia, non-healing ulcers and swellings



Fig. 3 (a) Gingival 'epulis' confirmed to be pyogenic granuloma; (b) Polyp-type lesion with the characteristic keratinised, lumpy surface of a papilloma; Papillomatous lesion (c) on the lip and (d) on the palate; (e) Oral mucosal traumatic ulcer related to the sharp edges of broken dentition; (f) Fibroepithelial polyp on geographic tongue or erythema multiforme

Table 2 Differential diagnosis

Presentation	Diagnosis		
	Most common	More rare	Important to exclude
Soft tissue expansion of the palate (excluding hard tissue expansion, eg palatal torus)	<ul style="list-style-type: none"> Pleomorphic adenoma Dental apical or periodontal abscess Impacted tooth 	<ul style="list-style-type: none"> Lymphoma 	<ul style="list-style-type: none"> Any malignant salivary neoplasm Any lesion penetrating from the nose or antrum
Soft tissue expansion of the gingivae (excluding hard tissue expansion, eg lingual torus)	<ul style="list-style-type: none"> Denture-induced hyperplasia Giant-cell lesion – pyogenic granuloma Fibroepithelial lesion, lipoma 	<ul style="list-style-type: none"> Kaposi's sarcoma Langerhans' cell lesions (histiocytosis X) 	<ul style="list-style-type: none"> Squamous cell carcinoma of mucosa or alveolus Central bone cystic lesions that have expanded or eroded through the buccal or lingual bone (ameloblastoma, myxoma)

Polyps and epulides

A variety of hyperplastic and inflammatory lesions can affect the gingiva and mucosa. A pathological swelling of the gingiva is known as an epulis (pl. epulides) but this is a descriptive clinical term and not a diagnostic one (see Fig. 3). Similarly, a pathological swelling of the mucosa is termed a polyp, which may be broad-based (sessile) or narrow-based (pedunculated) (see Fig. 3f). Most polyps and epulides are either hyperplastic or inflammatory, although benign neoplasms may occasionally be encountered.

The most common lesion, which is almost always traumatic in origin, is the somewhat ubiquitous but very variable fibroepithelial polyp. This usually presents on the buccal or labial mucosa and occasionally on the lateral border of the tongue. Fibroepithelial polyps may present in an identical fashion to benign neoplasms which are much rarer. However, since both require simple excision the diagnosis is largely academic. Indeed, the antiquated term 'fibroma' and fibroepithelial polyp were often used interchangeably with no clear understanding of their histology. For this reason, the use of the term fibroma should be discontinued and true benign neoplasms more accurately described based on their histology.

Importantly, any localised swelling associated with the gingivae or related soft tissues is most likely to be caused by dental infection and this must be excluded in the first instance. Chronic apical periodontitis can present as an acute abscess with swelling or as a chronic sinus discharging in the buccal sulcus (Fig. 4) and neither should be biopsied until dental infection is excluded (vitality tests and periapical radiographs). Rarely chronic dental infections can present as extraoral draining sinuses often proving a diagnostic challenge for those without dental knowledge.

The precise location of the lesion is paramount in differential diagnosis (see

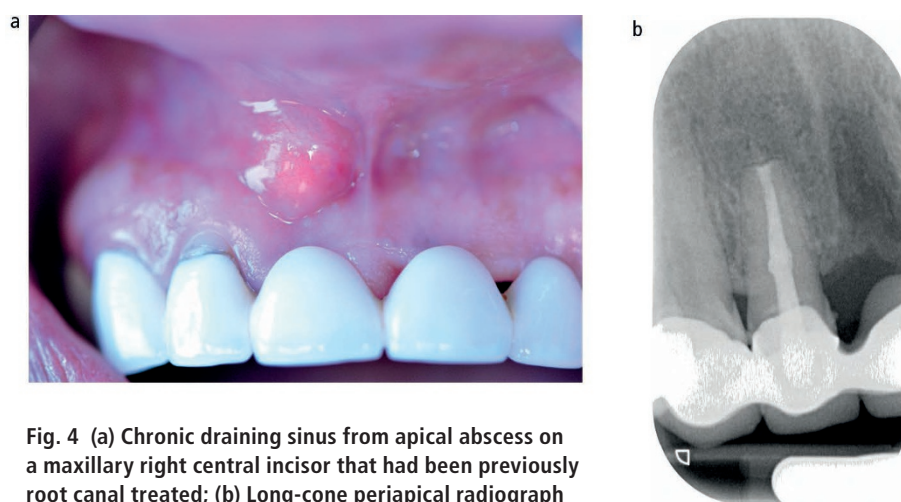


Fig. 4 (a) Chronic draining sinus from apical abscess on a maxillary right central incisor that had been previously root canal treated; (b) Long-cone periapical radiograph



Fig. 5 Palatal swelling. Differential diagnosis should exclude dental infection and an unerupted tooth before considering pleomorphic adenoma or lymphoma

Table 2). If presented with a palatal swelling (Fig. 5) the most likely cause is dental periapical infection associated with palatal roots of molars or premolar or lateral incisor teeth. Once

dental infection has been excluded, pleomorphic adenoma (see Chapter 8 of the BDJ Clinical Guide) or lymphoma must be excluded. This would usually be done by an incisional biopsy if



Fig. 6 (a) Fibroepithelial polyp affecting attached gingivae adjacent to a vital mandibular second molar; (b) Excision (elliptical around the base) using a scalpel; (c) Post-surgical defect requiring a single 4/0 Vicryl Rapide suture

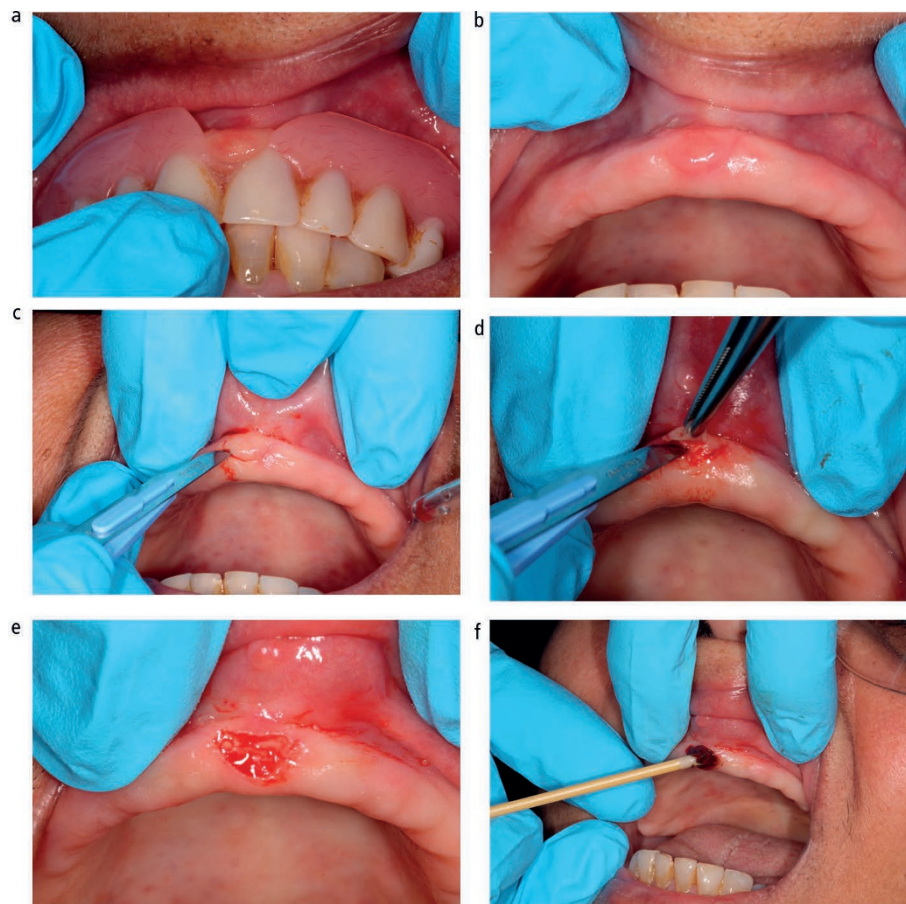


Fig. 7 Denture-induced hyperplasia. (a) Fibroepithelial polyp associated with denture flange; (b) Dentures removed; (c) An elliptical incision is made with a scalpel around the lesion at the base; (d) With a scalpel and College toothed forceps, the lesion is carefully dissected away from the base; (e) Excised polyp base; (f) The base of the excision is treated with haemostatic agent as primary closure is not possible on the attached gingivae

the lesion is large or excisional if small (<1 cm). In these cases it is important to involve a wider team as local recurrence, exclusion of neoplasia and medical factors must be excluded.

Oral papillomas

Oral papillomas (see Figs 3b–d) are usually hyperplastic lesions induced by the human papilloma virus. The incidence of oral papillomata has increased over the last decade

probably due to unprotected oral sex. They may be simply excised or, where they have a broader base, a wider elliptical excision is performed (as outlined in Fig. 6). If there is an element of continuing traumatic irritation (eg sharp cusp edges) this should be eradicated prior to or during surgery. Another common presentation is an exophytic growth made up of numerous finger-like projections.

Benign lesions of the palate, including 'leaf'

fibromas (a fibroepithelial lesion), granulomas and even small benign tumours can be excised (down to the palatal bone if necessary) without the need for closure of the mucosal tissues. Such lesions heal extremely well by secondary intention. Haemostasis can be a problem and may require electrocoagulation if the palatine vessels have been cut. Alternatively, the use of a proprietary adhesive dressing such as Coe Pak or impregnated gauze may be used to cover the wound. Occasionally, a palatal stent can be made with acrylic coverage of the defect using an orthodontic removable appliance for temporary coverage.

Denture-induced hyperplasia

In the edentulous patient, one of the most common benign soft tissue lesions is denture-induced hyperplasia, which is related to the friction between an ill-fitting denture and the gingiva. Over the years it has been known under a variety of names, including denture stomatitis, denture granuloma, denture sore mouth and inflammatory papillary hyperplasia (Fig. 7). None accurately describes the histological presentation, which varies depending on the maturity of the lesion and the aetiological factors.

Initial treatment should focus on alleviating trauma by trimming the denture, sometimes extensively. The patient may then continue to wear the modified prosthesis. However, in severe cases it may be necessary to remove the denture for 14 days. Frequently, some reduction in the size of the lesion will take place within this period and the situation can then be reassessed. The possibility of candidal infection should also be borne in mind and treated with systemic antifungal agents when present.

Where sulcus depth is likely to be compromised, sutures should be avoided. Small lesions should be excised just to the depth of the submucosa, haemostasis being obtained with electrocautery. Re-epithelialisation occurs rapidly and new dentures can be constructed

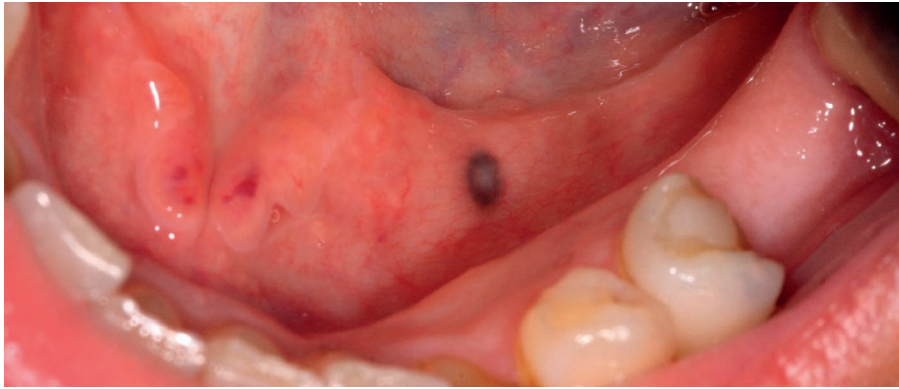


Fig. 8 A melanotic macule in the left floor of the mouth

within 6 weeks of surgery. In the case of large, extensive lesions, new dentures should be delayed for 3 months and tissue conditioners applied to the modified original denture. Stabilisation of the prosthesis using osseointegrated implants often provides the best (if not the cheapest) long-term success.

Ulcerative lesions

The most common ulcerative lesion seen is a traumatic ulcer (see Fig. 3e). These ulcers must be associated with a history of trauma or a localised cause. Resolution occurs when the cause for the trauma is removed or remedied. If the ulcer is persistent suspect neoplasia or another underlying cause for oral ulceration (viral, connective tissue disease or medication). It is not the remit of this article to cover

causes or management of oral ulceration in detail. There have been some excellent reviews on this topic.¹⁻³

Vesiculobullous lesions

Oral mucosal lesions presenting as vesicles or blisters are likely to be related to viral or autoimmune disorders. This article is not intended to provide an overview of this pathology but the authors recommend these reviews.^{4,5}

White lesions

This article does not provide an overview of these lesions but recommended reading includes reference 6.

The appearance of whiteness is due to hyperkeratosis which, when soaked in saliva, appears white compared with the red background oral

mucosa. Many white lesions may be benign (traumatic, genetic or due to connective tissue diseases) but some may be potentially malignant (see Chapter 11 of the BDJ Clinical Guide).

Red and pigmented lesions

Intraoral pigmentation

Intraoral pigmentation is not uncommon and is occasionally mistaken for melanoma, which is rare. The intraoral freckle (or ephelis) may occasionally be raised but is most often a flat lesion detectable only by its abnormal brown pigmentation. Biopsy is only indicated if there is any uncertainty about the clinical diagnosis or if the lesion has altered in any way. If there is any real suspicion of melanoma, referral to a maxillofacial unit should be undertaken without delay.

Melanotic macules

Melanotic macules (Fig. 8) are probably the most common pigmented lesions and are frequently seen on the lower lip near the midline. Intraoral melanotic macules are most common on the gingiva, followed by the buccal mucosa. If multiple diffuse macules are identified, the possibility of Addison's disease, Peutz-Jeghers syndrome or other conditions such as drug-induced hyperpigmentation should be considered.

True intraoral naevi (common moles)

Although common on the skin, naevi are fairly rare inside the mouth. Other pigmented lesions may be due to amalgam tattoos (Fig. 9a), melanin (particularly in black-skinned people) (see Fig. 1a), venous conglomerations or true haemangiomas (Fig. 9b).

Haemangiomas

Haemangiomas may present as localised discrete lobules or multiple lesions (Fig. 9c and d). Attempts at surgical excision are occasionally met with profuse bleeding and the surgeon must be certain that he or she will be able to obtain haemostasis prior to commencing. An alternative method is to use cryosurgery (Fig. 15), which will often produce complete regression.

Central haemangiomas may present as solitary radiolucent lesions, which may in some cases appear multilocular. They can resemble cysts, giant-cell lesions and odontogenic tumours such as ameloblastomas. It is, therefore, advisable to aspirate any lesion where vascular involvement may be suspected,

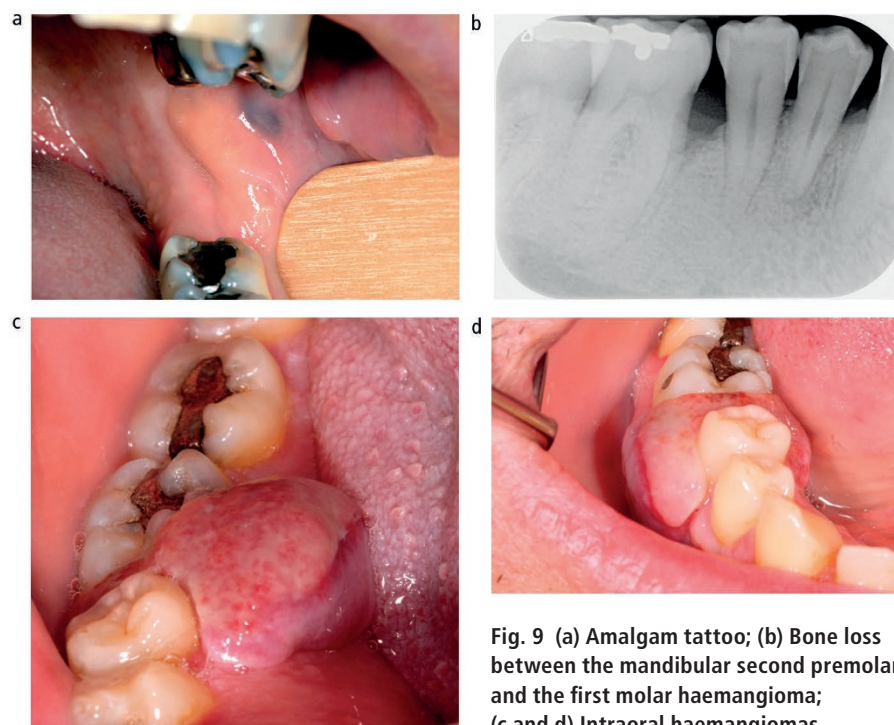


Fig. 9 (a) Amalgam tattoo; (b) Bone loss between the mandibular second premolar and the first molar haemangioma; (c and d) Intraoral haemangiomas

prior to definitive surgery, to exclude the possibility of a haemangioma or the even rarer lymphangioma.

Modern techniques in the use of ruby lasers for superficial haemangiomas or angiograms to assess and treat larger arteriovenous lesions have revolutionised management of these cases. Where the diagnosis is suggestive of a vascular lesion of any size, further investigations should be undertaken to establish the nature of the vascularity. If the lesion is too extensive to remove safely, the possibility of embolisation angiography should be considered, although this does have an associated morbidity and mortality. If it is used to shrink the lesion, excision should be carried out soon after embolisation. Rarely, bleeding is so profuse that the external carotid artery has to be ligated and this is hardly a procedure one wishes to be faced with in the dental chair. An excellent review of red and pigmented lesions is recommended.⁷

Granulomatous, infective and other reactive lesions

In addition to the benign hyperplastic and neoplastic lesions of the mouth, a number of oral lesions result from infections or other causes. Some of these were quite common in the past but are now seldom seen outside the developing world (eg tuberculous and syphilitic ulcers). Nonetheless, with the re-emergence of multidrug resistant tuberculosis and more liberal attitudes to sex, the possibility of rarer lesions must always be borne in mind and explored.

Pyogenic granuloma and pregnancy epulis

More common oral lesions include the pyogenic granuloma (Fig. 10a) and its variant, the pregnancy epulis (see Fig. 3a). Neither lesion is pus filled nor a true granuloma, as the name seems to suggest, but they are principally vascular in nature. The pregnancy epulis may regress spontaneously at term or at least reduce to a size which can more easily be excised. Because the hormonal influence is such an aggravating factor, only those epulides that cannot be managed conservatively (scaling and polishing plus strict oral hygiene measures) to term should be excised.

Peripheral giant-cell lesions

Peripheral giant-cell lesions (Fig. 10b) are seen less frequently, and the pathological implications of the correct diagnosis must be considered. Their appearance is similar to that of pyogenic granulomas, with a red to

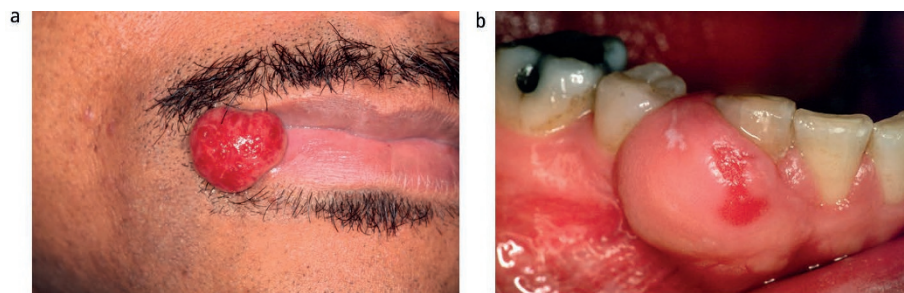


Fig. 10 (a) Pyogenic granuloma; (b) Peripheral giant-cell granuloma

Table 3 Biopsy techniques

Excisional	Complete removal of a lesion with surrounding normal tissue (width and depth >1–2 mm) so that it can be examined histologically
Incisional	Removal of a portion of the lesion or a sample of the abnormal tissue for diagnostic purposes
Punch	Removal of a cylinder of tissue with a disposable instrument designed for that purpose
Aspiration	Fine needle cytology for deep soft tissue lesions or aspiration of fluid for microscopic or other examination
Cytology	Obtaining a sample of cells for microscopic or other examination, often but not exclusively by scraping the lesion surface

bluish-purple tinge; they are usually sessile and under 2 cm in diameter. By far the commonest site is on the gingiva, although they can appear on edentulous areas of the alveolar ridge.

Microscopically, they appear as large numbers of multinucleated giant cells in an ovoid and spindle-shaped mesenchymal stroma. Treatment usually involves surgical excision of the lesion down to the bone. Adjacent teeth should be thoroughly scaled to remove any possible source of irritation. Even so, a 10% recurrence rate is not unusual.

If there is any suggestion of incomplete excision, careful follow-up or further surgery must be undertaken. Evidence indicates that small giant-cell lesions may be better treated by injection of local steroids.⁸ Central giant-cell lesions (within bone) are separate pathology and likely to be associated with parathyroid increased activity described in the hard tissue section.

Benign neoplastic lesions

These are relatively uncommon but are mentioned for completeness and because, occasionally, a biopsy of what clinically appears to be a fibroepithelial polyp is returned by the pathologist as something quite unusual, eg a benign fat tumour (lipoma) or a tumour arising from the nervous tissues (neurofibroma or neurilemmoma/schwannoma). Although most of these conditions are completely benign, some are locally aggressive and referral to a

hospital specialist should automatically follow any unusual diagnosis or presentation.

Various lesions affect the tongue, including fibroepithelial polyps, erythema migrans and traumatic or viral ulceration. The presence of unexplained ulceration or areas of erythroplakia should always raise concern that a lesion may be malignant. Referral to a specialist unit is mandatory if this is a serious possibility.

Diagnosis and treatment

Essentially, the management of most small benign soft tissue lesions is excisional biopsy, but the exclusion of malignancy is paramount. The result of any biopsy should enable a diagnosis to be made, although in some cases it is still not possible to be 100% certain and further investigations may be required.

The various biopsy techniques are summarised in Table 3 and discussed in this section. Other methods of treatment are also detailed.

Normal anatomy

It is self-evident that biopsies should only be taken of suspected pathological lesions and that a sound knowledge of what may be anatomically normal is essential. Subjecting patients to biopsies of foliate papillae or mandibular tori is at the least embarrassing and at worst a source of potential litigation! Normal anatomy is shown in Fig. 11.

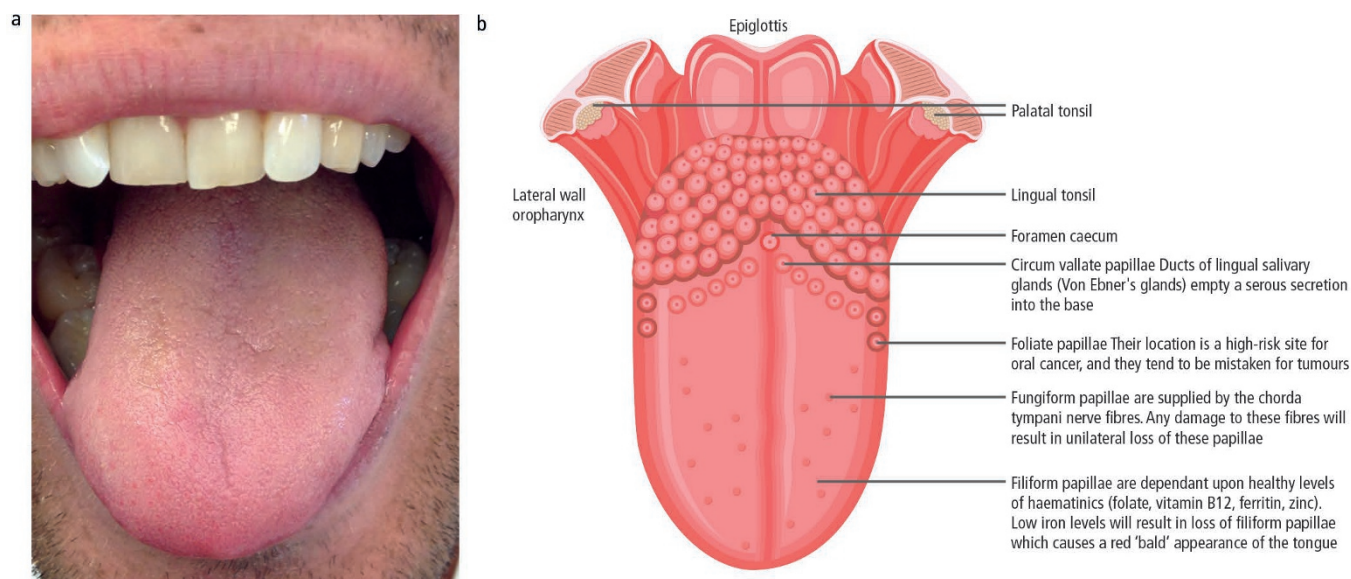


Fig. 11 Normal lingual clinical anatomy

Biopsy techniques

A biopsy may be defined as the removal of a tissue sample for microscopic or other diagnostic examination. The word biopsy is freely used as a verb (the process of obtaining a specimen) or a noun (the specimen so obtained), and there are many different techniques and many specific reasons for performing one. The techniques are listed in Table 3 and discussed in more detail in this section.

It is important to remember that the general principles of surgery apply equally to a small biopsy as to a major excision. Before undertaking any surgical intervention a full history and examination should lead to a provisional diagnosis or differential diagnosis.

In most cases, biopsy of the oral soft tissues can be performed under local anaesthesia. Wherever possible, regional blocks should be used so as to avoid disruption of the anatomical architecture of the lesion. If a block is not practical, infiltration should be given at a distance from the lesion.

It is important to re-emphasise the need for a sound knowledge of the normal anatomical appearance of all mucosal surfaces and their variations. Referring patients to have their pterygoid hamuli assessed or removed is not good clinical practice.

Excisional biopsy

Most soft tissue lesions with a diameter of 1 cm or less can be treated by excisional biopsy, ie the complete removal of the entire lesion. If neoplasia or dysplasia are suspected, urgent referral to a head and neck cancer centre should

be arranged so that the patients can be fully worked up and promptly treated.⁹ However, simple white lesions with no evidence of inflammatory change are amenable to biopsy in general practice as they are low risk.

Pedunculated lesions

Lesions connected to the underlying tissue by a short stalk (pedicle), eg papillomas (see Figs 3b and c) and fibroepithelial polyps (see Fig. 3f), can be retracted using a suture, allowing incision across the pedicle with a number 15 blade or sharp curved scissors. Alternatively, the pedicle can be tensioned with Gillies forceps prior to excision, using an elliptical shaped incision at the base to excise the lesion before closure where possible (see Fig. 6). If the lesion is on attached gingivae primary closure may not be possible (see Fig. 7). Another technique for larger or more vascular lesions involves placing a 'purse' suture around the base of the pedicle. This can be used to retract the stalk of the lesions during excision and allows immediate closure with minimal blood loss.

Sessile lesions

Raised, wide-based lesions, eg diffuse denture-related fibrous hyperplasia, pyogenic granulomas and giant-cell epulides, can be excised following an elliptical incision; they are then removed using sharp or blunt dissection (depending on the proximity of blood vessels etc.) through the best plane of dissection.

Mucosal lesions in freely mobile mucosa can be difficult to manipulate, and excision

may be facilitated by bimanual assistance with stable manual retraction by a surgical assistant (Fig. 12), often using gauze to improve mucosal 'grip', placing a 'stay' suture through the lesion before commencing excision. Alternatively, a suture can be placed following the initial incision through the edge of the specimen. This allows the operator to retract the lesion, causing minimal damage, rather than crushing the tissues with forceps.

Sessile lesions require incisions around the lesion, followed by dissection of the submucosal layer under the lesion. Dissection using an appropriate pair of scissors is undertaken by inserting them in a closed position. The blades are then opened gently and removed in the open position. This procedure is repeated until the lesion is freed. Closure of the wound is usually achieved with interrupted sutures. Owing to the wide base of these lesions, the adjacent normal tissue may need to be undermined in order to achieve primary closure. Rarely, this is not possible and a dressing or haemostat has to be used to cover the wound.

Minor salivary gland lesions (mucoceles)

These may be mucous extravasation cysts, where saliva has leaked into the local tissues from the minor salivary gland ducts, mucous retention cysts, in which the duct is damaged and the saliva is contained within the stretched duct. Salivary disease and its management is covered in Chapter 8 of the BDJ Clinical Guide; however, local labial gland biopsy is a common soft tissue surgical procedure undertaken in the dental chair under local anaesthesia (Fig. 13).

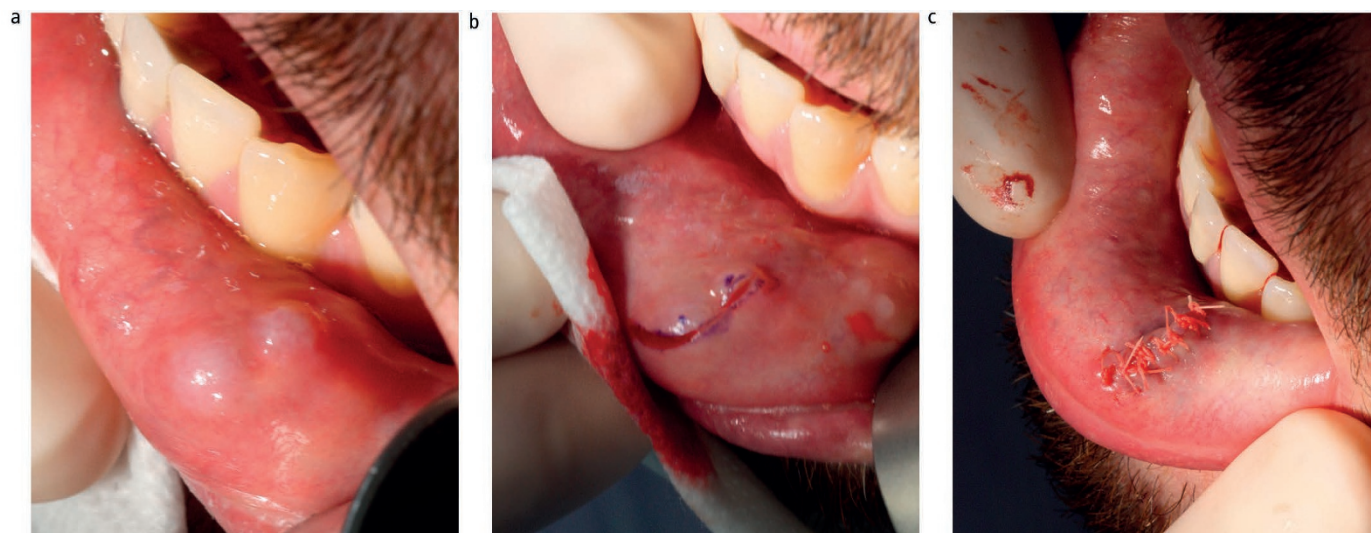


Fig. 12 (a) Mucous retention cyst or mucocele of the lower lip; (b) Local elliptical incision allows for excision of the cyst and underlying minor salivary glands; (c) Primary closure of incision with Vicryl Rapide sutures



Fig. 13 (a) Local superficial mucosal incision for access to the minor submucosal salivary glands; (b) Sharp or blunt dissection submucosally to free overlying tissue, for closure and to mobilise the minor salivary glands; (c) Blunt dissection allowing mobilisation of the minor salivary gland for biopsy prior to incision closure with Vicryl Rapide sutures

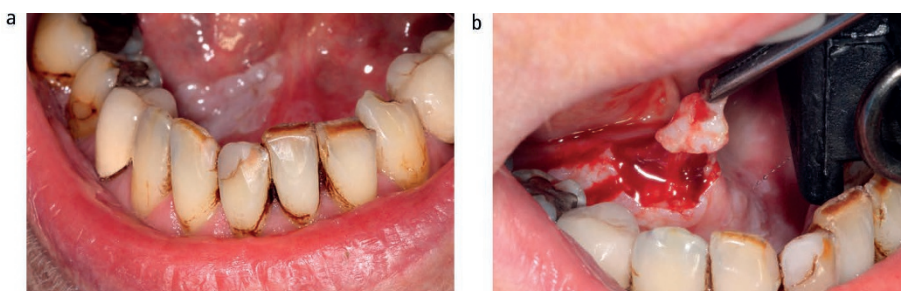


Fig. 14 (a) Potentially malignant leukoplakic lesion in the floor of the mouth before biopsy; (b) Incisional biopsy

This local biopsy, with significantly easier access and lower morbidity than sampling tissue from the parotid or other major salivary glands, will aid in confirming inflammatory changes seen in Sjögren's syndrome. Four or five small mucosal glands should be sent in formal saline for histological examination.

Incisional biopsy

Where a lesion is extensive or diagnosis is required before definitive surgery, it may be

preferable to perform an incisional biopsy unless there is a marked likelihood of malignancy (when immediate referral is indicated). The purpose of the incisional biopsy is to acquire representative material and it is essential in such cases to provide the pathologist with an adequate specimen, in terms of both width and depth (Fig. 14). With an incisional biopsy, a specimen at least 10 mm long and 6 mm wide should be obtained, which should be excised to an even and adequate depth.

If the biopsy gives any suspicion of malignancy (unusually friable tissue/unexplained bleeding etc.) referral to the local oral cancer network team is mandatory (see Chapter 11 in the BDJ Clinical Guide).

Specimen handling

The specimen should usually be placed on a small piece of blotting paper and transferred carefully into at least ten times its own volume of neutral buffered formalin (10% v/v). However, the accurate diagnosis of some specimens requires specialised techniques such as immunofluorescence, and in such cases the pathologist may not want the specimen fixed. The clinician then has the following options:

- Keeping the specimen in a piece of sterile gauze moistened with isotonic saline and arranging rapid delivery to the laboratory
- Placing it in a dedicated transport medium such as Michel's medium which will preserve the specimen without fixation for 23 days

- Freezing the specimen in liquid nitrogen.
- Whichever option is selected, under no circumstances should the biopsy specimen be allowed to dry out as this will ruin the value of the histology. In addition, some conditions requiring biopsy are potentially serious even if not malignant (eg autoimmune bullous lesions) and should be performed in a hospital environment
- Careful handling of the biopsy needs to be supplemented by accurate labelling of the specimen and completion of a pathology request form. The pathologist should always be provided with a brief history and clinical account of the lesion, which should include the items in Table 4.

Specialised/modified biopsy techniques

In addition to the standard incisional and excisional biopsy procedures, a number of specialised techniques may also be used. None of these is likely to be indicated in general practice, although simple aspiration of fluid-filled lesions is certainly beneficial on occasions. Treatment planning for various soft tissue lesions is summarised in Table 5. Finally, there are several modifications to the standard biopsy techniques that need to be applied to specific situations and these are dealt with in the next section.

Other forms of treatment

Cryosurgery

Cryosurgery can be defined as the freezing of tissue in order to cause its controlled necrosis (Fig. 15). Its mechanism consists of rapid heat transfer to freeze the tissue, followed by thawing, which results in tissue damage that promotes inflammation and necrosis of the involved tissue. The response of various cells to freeze-thawing varies: melanocytes are the

Table 4 Essential information for the pathologist

Date of specimen	
Patient details	<ul style="list-style-type: none"> • Name, gender, age, relevant medical history
Clinical information	<ul style="list-style-type: none"> • History, symptoms – especially any previous biopsy/treatment • Examination, signs: site, size, shape, texture, colour, duration • Risk factors: alcohol, smoking habits
Investigations undertaken	<ul style="list-style-type: none"> • Microbiological, radiological, haematological • Previous biopsy and type
Differential diagnosis	
Specimen details	<ul style="list-style-type: none"> • Descriptive and/or diagrammatic
Type of investigation required	<ul style="list-style-type: none"> • Histology/microbiology etc.
Date of next appointment	
Name and address of surgeon	

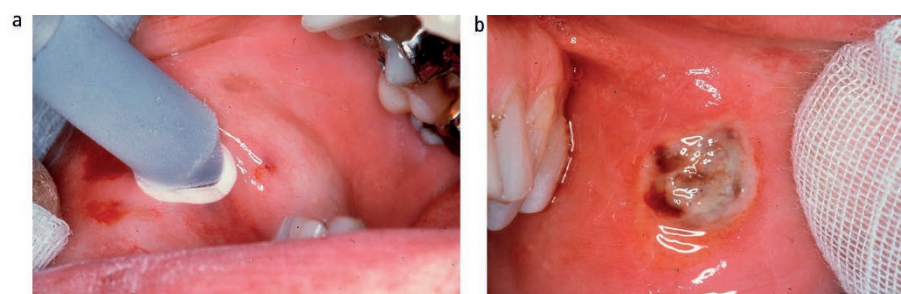


Fig. 15 (a) Application of a cryoprobe to a buccal superficial haemangiomatous lesion; (b) Early postoperative appearance

most susceptible cells, followed by basal cells, keratinocytes, bacteria, connective tissue, axon myelin sheath and viruses, although this is of little practical relevance. The mechanisms by which cryosurgery is effective have been comprehensively investigated.¹⁰ It is also believed that there may be immunological effects, since the procedure could stimulate the host immune system and there are reports of the disappearance of distant metastases after cryosurgery of a primary tumour.¹¹

Liquid nitrogen is used by direct application or via probes delivering freeze and thaw cycles. Cryosurgery has also been used alongside other surgical methods in treating a vast array of oral lesions, including pyogenic granuloma, angioma, actinic cheilitis, keratoacanthoma, lichen planus, mucous cysts and papillary hyperplasia of the palate, among others.

Cryosurgery is useful in treating a number of conditions but it is subject to complications including:

Table 5 Treatment planning for pathological lesions of the mouth and jaws

Benign soft tissue lesions	Haematology	Incisional biopsy	Excisional biopsy	Laser therapy	Cryotherapy	Diathermy
Fibroepithelial polyp/denture granuloma			✓	✓		
Papilloma			✓	✓		
Lipoma			✓			
Pyogenic granuloma (identify cause)			✓	✓		
Peripheral giant-cell granuloma	✓		✓			
Haemangioma (depends on size and anatomy)					✓	✓
Neurofibroma/neurilemmoma			With care			
Lymphoma (identify cause)	✓	Unless nodal				

- *Immediate:* Pain during freezing, swelling, vesicle formation
- *Prolonged:* Severe pain and disproportionate swelling (the lip and tongue being particularly vulnerable).

On the positive side, however, scarring is minimal and the cosmetic result is usually excellent.

A reliable pathological specimen cannot be obtained during this procedure so cryosurgery is contraindicated if the aetiology of the lesion is unknown or possibly premalignant or malignant.¹²

Diathermy

Diathermy is a technique by which an electric current is used to deliver heat in order to cut or destroy tissue. Two basic types exist:

- Monopolar diathermy involves a current passed from the instrument tip through the patient and is earthed via the common electrode plate
- Bipolar diathermy uses a current passing from one instrument tip to another via a small volume of tissue.

Coagulation is also achievable using diathermy or the instrument can be used with a combination of coagulation and cutting.

The main advantage of diathermy is that it minimises blood loss; however, this is at the cost of the tissue margins being damaged by the heat and the need for total excision of a specimen in order to obtain a pathologist's opinion.

The disadvantages of diathermy include burns, possible explosions due to the proximity of any flammable anaesthetic gases, and electrocution. Caution must also be exercised in patients with a pacemaker.

Laser surgery

The equipment required to perform laser surgery includes a lasing medium, an electromagnetic energy source and a system of optical amplification. The lasing medium – gas, aqueous or crystalline – determines the wavelength of light emitted and therefore the characteristics of the different types – carbon dioxide (CO₂), neodymium/yttrium aluminium garnet (Nd:YAG) and potassium titanyl phosphate (KTiOPO₄ or KTP)¹³

Lasers can be used for cutting, tissue vaporisation or coagulation (protein denaturation resulting in cell death and haemostasis). The advantages of lasers include no need for

sutures (usually), a less invasive procedure and less pain and bleeding. The types of lesions that may respond well to laser surgery include:

- Severe aphthous ulcers and erosive lichen planus. Patients often report a reduction in pain from their lesions following treatment
- Fraenum release or reduction (see chapter 6 in the BDJ Clinical Guide)
- Excision of fibroepithelial lesions (see earlier in this article)
- Papilloma removal
- Haemangioma obliteration
- Premalignant lesions, including leukoplakia/erythroplakia, which may be a precursor for cancer or may actually have undergone malignant change
- Selected malignant tumours.

In many cases, the use of a CO₂ laser has many advantages over conventional surgery, including less post-operative pain, bleeding and swelling. Less scarring is caused and sutures are frequently unnecessary. In addition, it may be possible to avoid grafts or flaps in some cases. However, specialised training in the use of lasers is required and no pathological specimen can usually be obtained for the explicit confirmation of a diagnosis.

Other soft tissue procedures

Cosmetic soft tissue surgery

The ever-growing demand for cosmetic procedures has extended to oral surgery, with a variety of possible treatments. These vary from simple procedures such as crown lengthening for infraocclusal (submerged) teeth to more complex procedures such as multiple tissue grafting.¹⁴ Gingival recession (Miller Class I–III) and other defects may also require interceptive treatment. Surgery may include a full-thickness buccal flap, intramarrow penetrations, bone graft placement and primary flap closure. For more severe cases and thin biotypes a submerged connective tissue graft placement and two-stage surgery,¹⁵ possibly with gingival grafting, may be required.¹⁶ Subepithelial connective tissue grafting, in conjunction with a coronally advanced flap, is a widely performed periodontal procedure,^{16,17} although the creation of a partial-thickness flap may be less effective than a full-thickness flap for the management of these patients.

Fraenectomy

There remains a limited evidence base for either labial or lingual fraenectomy. Many rumours exist that trained midwives regularly

'snip' significant lingual fraena to facilitate breast feeding in neonates or infants under 4 months of age. There is little research on this matter, although the National Institute for Health and Care Excellence has published on the subject.¹⁸

The indications cited for labial fraenectomy include:

- Excision of fibrous tissue in order to align the central incisor roots to close a diastema
- Enhancement of the stability of orthodontic rotation of central incisors
- Minimisation of root exposure due to 'functional' retraction of labial gingivae.

A case report describes a method for coronally repositioning gingiva for root coverage over the maxillary central incisors while simultaneously performing a fraenectomy.¹⁹ Increasingly, CO₂ lasers are being used for these procedures, minimising pain and post-surgical scarring. However, it must be borne in mind that a significant aesthetic defect (black triangle) can arise due to shortening of the interdental papillae, which itself may require additional grafting – not always with a satisfactory result.¹⁶

Salivary lesions

Biopsy of minor salivary glands should use a vertical incision (as seen in Fig. 12) rather than horizontal incision (as seen in Fig. 13) to prevent mental branch nerve injury. Salivary gland biopsy is discussed in more detail in Chapter 8 of the BDJ Clinical Guide, which also addresses the removal of salivary calculi.

Summary

Many dentists develop a dislike for undertaking surgery for soft tissue lesions. There are, however, many lesions that can be treated in an outpatient environment and accurate clinical diagnosis is the foundation of all treatment. Careful history taking and clinical examination of patients will ensure that they are not subjected to unwarranted or even damaging surgical interventions. Subject to the lesion being sufficiently small and not adjacent to any important anatomical structure, many benign lesions can be treated in a general practice setting. However, larger lesions or those with any serious question of diagnosis should be referred for a specialist opinion and treatment.

It is imperative that results of all investigations, including biopsies, are followed up and communicated to the patient, and to their general medical practitioner if required. It

would be considered substandard care if the investigation and patients were not followed up.

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