

2

Diagnosis: examination

The patient will know if you care, well before they care if you know.

Anonymous

INTRODUCTION

The clinical examination of the patient should start as the patient enters the clinic and is greeted by the clinician. The history and clinical examination are designed to put the clinician in a position to make a provisional diagnosis, or a differential diagnosis. Special tests or investigations may be required to confirm or refine this diagnosis or elicit other conditions. Physical disabilities, such as those affecting gait, and learning disability are often immediately evident as the patient is first seen, and blindness, deafness or speech and language disorders may be obvious. You should also be able to assess the patient's mood and general wellbeing but, if in any doubt, ask for advice. Other disorders, such as mental problems, may become apparent at any stage. The patient should be carefully observed and listened to during history taking and examination; speech and language can offer a great deal of information about the medical and mental state. Some patients bring written material that can be helpful (e.g. an accurate list of their illnesses and/or medications) and increasingly patients use the internet and come with print-outs. Others may bring less meaningful drawings or histories, which have led some to coin the phrase – *la maladie du petits papiers* – the illness of small pieces of paper. All these factors can help build a picture of the patient and their condition. As a general rule, if you think a patient looks ill, they probably are.

Always remember that the patient has the right to refuse all or part of the examination, investigations or treatment. A patient has the right under common law to give or withhold consent to medical examination or treatment. This is one of the basic principles of healthcare. Patients are entitled to receive sufficient information in a way they can understand about the proposed investigations or treatments, the possible alternatives and any substantial risk or risks, which may be special in kind or magnitude or special to the patient, so that they can make a balanced judgment (UK Health Department, 19.2.99. HSC 1999/031).

There may be cultural sensitivities but, in any case, no examination should be carried out in the absence of a chaperone – preferably of the opposite sex to the practitioner.

GENERAL EXAMINATION

Medical problems may manifest in the fully clothed patient with abnormal appearance or behaviour, pupil size, conscious level, movements, posture, breathing, speech, facial colour, sweating or wasting. General examination may sometimes include the recording of body weight and the 'vital signs' of conscious state, temperature, pulse, blood pressure and respiration. The dentist must be prepared to interpret the more common and significant changes evident in the clothed patient.

VITAL SIGNS

Vital signs include conscious state, temperature, pulse, blood pressure and respiration:

- The conscious state: any decrease in this must be taken seriously, causes ranging from drug use to head injury.
- The temperature: the temperature is traditionally taken with a thermometer, but temperature-sensitive strips and sensors are available. Leave the thermometer in place for at least 3 min. The normal body temperatures are: oral 36.6°C; rectal or ear (tympanic membrane) 37.4°C; and axillary 36.5°C. Body temperature is usually slightly higher in the evenings. In most adults, an oral temperature above 37.8°C or a rectal or ear temperature above 38.3°C is considered a fever (pyrexia). A child has a fever when ear temperature is 38°C or higher.
- The pulse: this can be measured manually or automatically (**Fig. 2.1**). The pulse can be recorded from any artery, but in particular from the following sites:
 - the radial artery, on the thumb side of the flexor surface of the wrist
 - the carotid artery, just anterior to the mid-third of the sternomastoid muscle
 - the superficial temporal artery, just in front of the ear.

Pulse rates at rest in health are approximately as follows:

- infants, 140 beats/min
- adults, 60–80 beats/min.

Pulse rate is increased in:

- exercise
- anxiety or fear
- fever
- some cardiac disorders
- hyperthyroidism and other disorders.

The rhythm should be regular; if not, ask a physician for advice. The character and volume vary in certain disease states and require a physician's advice.



Fig. 2.1 Pulse meter (nail varnish must be removed from the finger tested)

- The blood pressure: this can be measured with a sphygmomanometer (**Fig. 2.2**), or one of a variety of machines. With a sphygmomanometer the procedure is as follows: seat the patient; place the sphygmomanometer cuff on the right upper arm, with about 3 cm of skin visible at the antecubital fossa; palpate the radial pulse; inflate the cuff to about 200–250 mmHg or until the radial pulse is no longer palpable; deflate the cuff slowly while listening with the stethoscope over the brachial artery on the skin of the inside arm below the cuff; record the systolic pressure as the pressure when the first tapping sounds appear; deflate the cuff further until the tapping sounds become muffled (diastolic pressure); repeat; record the blood pressure as systolic/diastolic pressures (normal values about 120/80 mmHg, but these increase with age).

RESPIRATION

The normal reference range for respiration in an adult is 12–20 breaths/min.

OTHER SIGNS

- Weight: weight loss is seen mainly in starvation, malnutrition, eating disorders, cancer (termed cachexia), HIV disease (termed ‘slim disease’), malabsorption and tuberculosis and may be extreme as in emaciation. Obesity is usually due to excessive food intake and insufficient exercise.



Fig. 2.2 Sphygmomanometer

- Hands: conditions such as arthritis (mainly rheumatoid or osteoarthritis) (**Figs 2.3** and **2.4**) and Raynaud phenomenon (Ch. 56; **Fig. 2.3**), which is seen in many connective tissue diseases, may be obvious. Disability, such as in cerebral palsy, may be obvious (**Fig. 2.5**).
- Skin: lesions, such as rashes – particularly blisters (seen mainly in skin diseases, infections and drug reactions), pigmentation (seen in various ethnic groups, Addison disease and as a result of some drug therapy).
- Skin appendages: nail changes, such as koilonychia (spoon-shaped nails) – seen in iron deficiency anaemia, hair changes, such as alopecia, and finger clubbing (**Fig. 2.6**), seen mainly in cardiac or respiratory disorders. Nail beds may reveal the anxious nature of the nail-biting person (**Fig. 2.7**).

Extraoral head and neck examination

The face should be examined for lesions (**Table 2.1**) and features such as:

- swellings, seen in inflammatory and neoplastic disorders in particular
- pallor, seen mainly in the conjunctivae or skin creases in anaemia
- rash, such as the malar rash in systemic lupus erythematosus. Malar erythema may indicate mitral valve stenosis.
- erythema, seen mainly on the face in an embarrassed or angry patient, or fever (sweating or warm hands), and then usually indicative of infection.



Fig. 2.3 Raynaud syndrome in scleroderma



Fig. 2.4 Heberden nodes of osteoarthritis



Fig. 2.5 Cerebral palsy

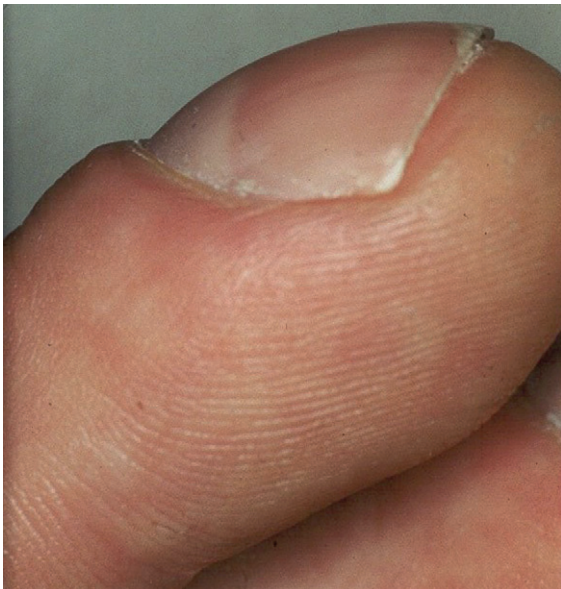


Fig. 2.6 Clubbing



Fig. 2.7 Nail biting

Eyes should be assessed for visual acuity and examined for features such as:

- corneal arcus which may be seen in hypercholesterolaemia
- exophthalmos (prominent eyes), seen mainly in Graves thyrotoxicosis
- jaundice, seen mainly in the sclerae in liver disease
- redness, seen in trauma, eye diseases, or Sjögren syndrome
- scarring, seen in trauma, infection or pemphigoid.

Inspection of the neck, looking particularly for swellings or sinuses, should be followed by careful palpation of all cervical lymph nodes and salivary and thyroid glands, searching for swelling or tenderness. The neck is best examined by observing the patient from the front, noting any obvious asymmetry or swelling, then standing behind the seated patient to palpate the lymph nodes (**Fig. 2.8**). Systematically, each region needs to be examined lightly with the pulps of the fingers, trying to roll the lymph nodes against harder underlying structures:

- Lymph from the superficial tissue of the head and neck generally drains first to groups of superficially placed lymph nodes, then to the deep cervical lymph nodes (**Figs 2.9–2.12** and **Table 2.2**).
- Parotid, mastoid and occipital lymph nodes can be palpated simultaneously using both hands.
- Superficial cervical lymph nodes are examined with lighter fingers as they can only be compressed against the softer sternomastoid muscle.
- Submental lymph nodes are examined by tipping the patient's head forward and rolling the lymph nodes against the inner aspect of the mandible.
- Submandibular lymph nodes are examined in the same way, with the patient's head tipped to the side which is being examined. Differentiation needs to be made between the submandibular salivary gland and submandibular lymph glands. Bimanual examination using one hand beneath the mandible to palpate extraorally and with the other index finger in the floor of the mouth may help.
- The deep cervical lymph nodes which project anterior or posterior to the sternomastoid muscle can be palpated. The jugulodigastric lymph node in particular should be specifically examined, as this is the most common lymph node involved in tonsillar infections and oral cancer.
- The supraclavicular region should be examined at the same time as the rest of the neck; lymph nodes here may extend up into the posterior triangle of the neck on the scalene muscles, behind the sternomastoid.

Table 2.1 The commoner descriptive terms applied to lesions

Term	Meaning
Atrophy	Loss of tissue with increased translucency, unless sclerosis is associated
Bullae	Visible accumulations of fluid within or beneath the epithelium, >0.5 cm in diameter (i.e. a blister)
Cyst	Closed cavity or sac (normal or abnormal) with an epithelial, endothelial or membranous lining and containing fluid or semisolid material
Ecchymosis	Macular area of haemorrhage >2 cm in diameter (bruise)
Erosion	Loss of epithelium which usually heals without scarring; it commonly follows a blister
Erythema	Redness of the mucosa produced by atrophy, inflammation, vascular congestion or increased perfusion
Exfoliation	The splitting off of the epithelial keratin in scales or sheets
Fibrosis	The formation of excessive fibrous tissue
Fissure	Any linear gap or slit in the skin or mucosa
Gangrene	Death of tissue, usually due to loss of blood supply
Haematoma	A localized tumour-like collection of blood
Keloid	A tough heaped-up scar that rises above the rest of the skin, is irregularly shaped and tends to enlarge progressively
Macule	A circumscribed alteration in colour or texture of the mucosa
Nodule	A solid mass in the mucosa or skin which can be observed as an elevation or can be palpated; it is >0.5 cm in diameter
Papule	A circumscribed palpable elevation <0.5 cm in diameter
Petechia (pl. petechiae)	A punctate haemorrhagic spot approximately 1–2 mm in diameter
Plaque	An elevated area of mucosa >0.5 cm in diameter
Pustule	A visible accumulation of free pus
Scar	Replacement by fibrous tissue of another tissue that has been destroyed by injury or disease An <i>atrophic</i> scar is thin and wrinkled A <i>hypertrophic</i> scar is elevated with excessive growth of fibrous tissue A <i>cribriform</i> scar is perforated with multiple small pits
Sclerosis	Diffuse or circumscribed induration of the submucosal and/or subcutaneous tissues
Tumour	Literally a swelling The term is used to imply enlargement of the tissues by normal or pathological material or cells that form a mass The term should be used with care, as many patients believe it implies a malignancy with a poor prognosis
Ulcer	A loss of epithelium, often with loss of underlying tissues, produced by sloughing of necrotic tissue
Vegetation	A growth of pathological tissue consisting of multiple closely set papillary masses
Vesicle	Small (<0.5 cm in diameter) visible accumulation of fluid within or beneath the epithelium (i.e. small blister)
Wheal	A transient area of mucosal or skin oedema, white, compressible and usually evanescent (AKA urticaria)

- Parapharyngeal and tracheal lymph nodes can be compressed lightly against the trachea.
- Some information can be gained by the texture and nature of the lymphadenopathy.
- Tenderness and swelling should be documented. Lymph nodes that are tender may be inflammatory (lymphadenitis). Consistency should be noted. Nodes that are increasing in size and are hard, or fixed to adjacent tissues may be malignant.
- Both anterior and posterior cervical nodes should be examined as well as other nodes, liver and spleen if systemic

disease is a possibility. Generalized lymphadenopathy with or without enlargement of other lymphoid tissue, such as liver and spleen (hepatosplenomegaly), suggests a systemic cause.

The temporomandibular joints (TMJ) and muscles of mastication should be examined and palpated. Although disorders that affect the TMJ often appear to be unilateral, the joint should not be viewed in isolation, but always considered along with its opposite joint, as part of the stomatognathic system. Some practitioners palpate using a pressure

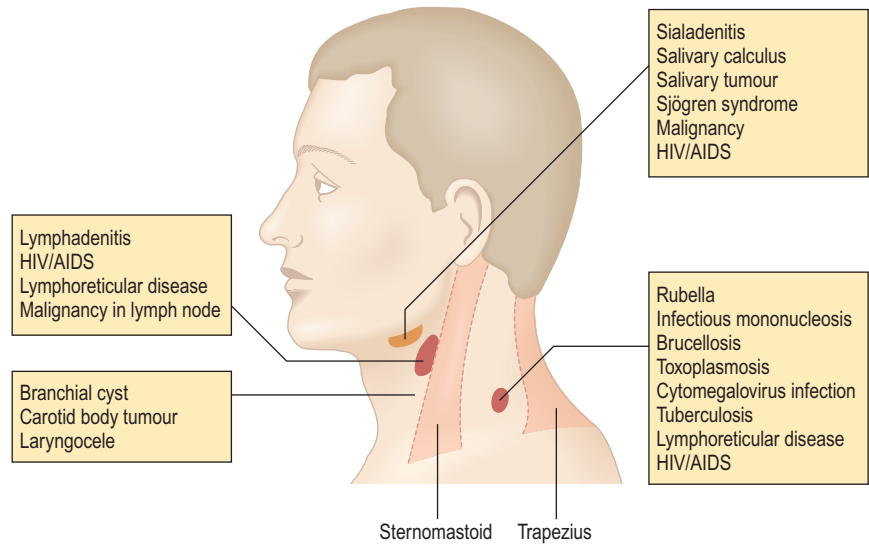


Fig. 2.8 Some causes of neck swelling

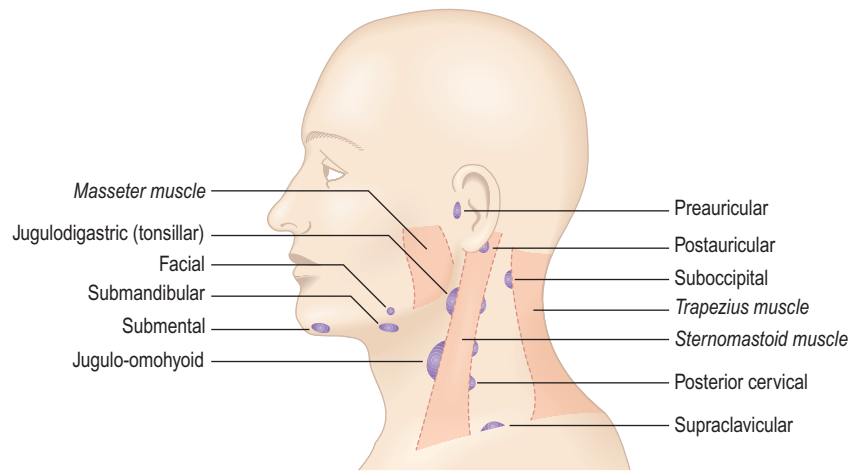


Fig. 2.9 Cervical lymph nodes: Locations

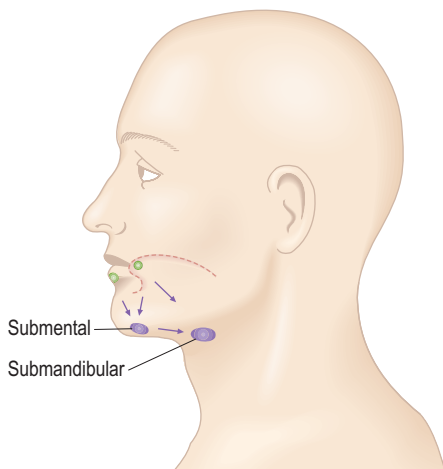


Fig. 2.10 Submental and submandibular lymph node drainage

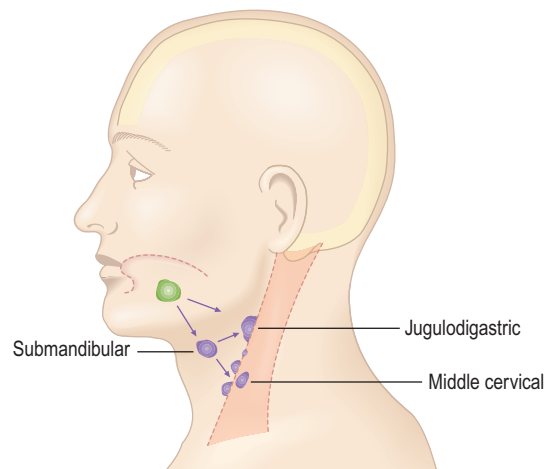


Fig. 2.11 Submandibular and deep cervical lymph node drainage



Fig. 2.12 Extra oral examination

algometer to standardize the force used, and undertake range-of-movement (ROM) measurements. The area should be examined by inspecting:

- Facial symmetry, for evidence of enlarged masseter muscles (masseteric hypertrophy) suggestive of clenching or bruxism. A bruxchecker can help confirm bruxism.
- Mandibular opening and closing paths, noting any noises or deviations.
- Mandibular opening extent, measuring the inter-incisal distance at maximum mouth opening.
- Lateral excursions, measuring the amount achievable.
- Joint noises, by listening (a stethoscope placed over the joint can help).
- Both condyles, by palpating them, via the external auditory meatus, to detect tenderness posteriorly, and by using a single finger placed over the joints in front of the ears, to detect pain, abnormal movements or clicking within the joint.
- Masticatory muscles on both sides, noting tenderness or hypertrophy:
 - Masseters, by intraoral–extraoral compression between finger and thumb. Palpate the masseter bimanually by placing a finger of one hand intraorally and the index and middle fingers of the other hand on the cheek over the masseter over the lower mandibular ramus.

- Temporalis, by direct palpation of the temporal region and by asking the patient to clench the teeth. Palpate the insertion of the temporalis tendon intraorally along the anterior border of the ascending mandibular ramus.
- Lateral pterygoid (lower head), by placing a little finger up behind the maxillary tuberosity (tenderness is the ‘pterygoid sign’). Examine it indirectly by asking the patient to open the jaw against resistance and to move the jaw to one side while applying a gentle resistance force.
- Medial pterygoid muscle, intraorally lingually to the mandibular ramus.
- The dentition and occlusion. This may require monitoring of study models on a semi or fully adjustable articulator. Note particularly missing premolars or molars, and attrition.
- The mucosa. Note particularly occlusal lines and scalloping of the tongue margins, which may indicate bruxism and tongue pressure.

Examine the jaws. There is a wide normal individual variation in morphology of the face. Most individuals have facial asymmetry but of a degree that cannot be regarded as abnormal. Maxillary, mandibular or zygomatic deformities or lumps may be more reliably confirmed by inspection from above (maxillae/zygomas) or behind (mandible). The jaws should be palpated to detect swelling or tenderness. Maxillary air sinuses

Table 2.2 The cervical lymph nodes and their main drainage areas

Area	Draining lymph nodes
Scalp, temporal region	Superficial parotid (pre-auricular)
Scalp, posterior region	Occipital
Scalp, parietal region	Mastoid
Ear, external	Superficial cervical over upper part of sternomastoid muscle
Ear, middle	Parotid
Over angle of mandible	Superficial cervical over upper part of sternomastoid muscle
Medial part of frontal region, medial eyelids, skin of nose	Submandibular
Lateral part of frontal region, lateral part of eyelids	Parotid
Cheek	Submandibular
Upper lip	Submandibular
Lower lip	Submental
Lower lip, lateral part	Submandibular
Mandibular gingivae	Submandibular
Maxillary teeth	Deep cervical
Maxillary gingivae	Deep cervical
Tongue tip	Submental
Tongue, anterior two-thirds	Submandibular, some midline cross-over of lymphatic drainage
Tongue, posterior third	Deep cervical
Tongue ventrum	Deep cervical
Floor of mouth	Submandibular
Palate, hard	Deep cervical
Palate, soft	Retropharyngeal and deep cervical
Tonsil	Jugulodigastric

can be examined by palpation for tenderness over the maxillary antrum, which may indicate sinus infection. Transillumination or endoscopy can be helpful. The major salivary glands should be inspected and palpated (parotids and submandibulars) for:

- symmetry
- evidence of enlargement
- evidence of salivary flow from salivary ducts
- evidence of the normal salivary pooling in the floor of mouth
- saliva appearance
- evidence of oral dryness (food residues; lipstick on teeth, scarce saliva, mirror sticks to mucosa), sialometry (salivary flow rate) shows hyposalivation.

Salivary glands are palpated in the following way:

- Parotid glands are palpated by using fingers placed over the glands in front of the ears, to detect pain or swelling. Early enlargement of the parotid gland is characterized by outward deflection of the lower part of the ear lobe, which is best observed by looking at the patient from behind. This sign may allow distinction from simple obesity. Swelling of the parotid sometimes causes trismus. Swellings may affect the whole or part of a gland, or tenderness may be elicited. The parotid duct (Stensen duct) is most readily palpated with the jaws clenched firmly, since it runs horizontally across the upper masseter where it can be gently rolled; the duct opens at a papilla on the buccal mucosa opposite the upper molars.
- The submandibular gland is best palpated bimanually with a finger of one hand in the floor of the mouth lingual to the lower molar teeth, and a finger of the other hand placed over the submandibular triangle. The submandibular duct (Wharton duct) runs anteromedially across the floor of the mouth to open at the side of the lingual fraenum.

Examine the cranial nerves (**Table 2.3**). In particular, facial movement should be tested and facial sensation determined. Facial symmetry is best seen as the patient is talking. Movement of the mouth as the patient speaks is important, especially when they allow themselves the luxury of some emotional expression. Examination of the upper face (around the eyes and forehead) is carried out in the following way:

- If the patient is asked to close their eyes any paralysis (palsy) may become obvious, with the affected eyelid failing to close and the globe turning up so that only the white of the eye is showing (Bell sign).
- Weakness of orbicularis oculi muscles with sufficient strength to close the eye can be compared with the normal side by asking the patient to close the eyes tight and observing the degree of force required to part the eyelids.
- If the patient is asked to wrinkle the forehead, weakness can be detected by the difference between the two sides.

The lower face (around the mouth) is best examined by asking the patient to:

- smile
- bare the teeth or purse the lips
- blow out the cheeks or whistle.

The cranial nerves can be examined further:

- Facial sensation: progressive lesions affecting the sensory part of the trigeminal nerve initially result in a diminishing response to light touch (cotton wool or air spray) and pin-prick (gently pricking the skin with a sterile pin or needle without drawing blood), and later there is complete anaesthesia.
- The corneal reflex: this depends on the integrity of the trigeminal and facial nerves, either of which if defective will give a negative response. This is tested by gently touching the cornea with a wisp of cotton wool twisted to a point. Normally, this procedure causes a blink but, if the cornea is anaesthetic (or if there is facial palsy), no blink follows, provided that the patient does not actually see the cotton wool. If the patient complains of complete facial or hemifacial anaesthesia, but the corneal reflex is retained or there is apparent anaesthesia over the angle of the mandible (an area not innervated by the trigeminal nerve), then the symptoms are probably functional (non-organic).

Table 2.3 Cranial nerve nomenclature and examination

Cranial nerve		Findings in lesions
I	Olfactory	Impaired sense of smell for common odours (do not use ammonia)
II	Optic	Visual acuity reduced using Snellen types \pm ophthalmoscopy: nystagmus Visual fields by confrontation impaired Pupil responses may be impaired
III	Oculomotor	Diplopia; strabismus; eye looks down and laterally ('down and out') Eye movements impaired Ptosis (drooping eyelid) Pupil dilated Pupil reactions: direct reflex impaired, but consensual reflex intact
IV	Trochlear	Diplopia, particularly on looking down Strabismus (squint) No ptosis Pupil normal and normal reactivity
V	Trigeminal	Reduced sensation over face \pm corneal reflex impaired \pm taste sensation impaired Motor power of masticatory muscles reduced, with weakness on opening jaw; jaw jerk impaired Muscle wasting
VI	Abducens	Diplopia (double vision) Strabismus Lateral eye movements impaired to affected side
VII	Facial	Impaired motor power of facial muscles on smiling, blowing out cheeks, showing teeth, etc. Corneal reflex reduced \pm taste sensation impaired
VIII	Vestibulocochlear	Impaired hearing (tuning fork at 256 Hz) Impaired balance \pm nystagmus \pm tinnitus
IX	Glossopharyngeal	Reduced gag reflex Deviation of uvula Reduced taste sensation Voice may have nasal tone
X	Vagus	Reduced gag reflex Voice may be impaired
XI	Accessory	Motor power of trapezius and sternomastoid reduced
XII	Hypoglossal	Motor power of tongue impaired, with abnormal speech \pm fasciculation, wasting, ipsilateral deviation on protrusion

Intraoral examination

Most oral diseases have a local cause and can be recognized fairly readily. Even those that are life-threatening, such as oral cancer in particular, can be detected at an exceedingly early stage. However, even now, oral cancer is sometimes overlooked at examination, and the delay between the onset of symptoms of oral cancer and the institution of definitive treatment still often exceeds 6 months. The same story applies to pemphigus – another potentially lethal disease that presents in the mouth. Any lesion persisting over 3 weeks should be taken seriously.

Many systemic diseases, particularly infections and diseases of the blood, gastrointestinal tract and skin, also cause oral signs or symptoms that may constitute the main complaint, particularly, for example, in some patients with HIV, leukopenia or leukaemia.

The examination, therefore, should be conducted in a systematic fashion to ensure that all areas are included. If the patient wears any removable prostheses or appliances, these should be removed in the first instance, although it may be necessary later to replace the appliance to assess its fit, function and relationship to any lesion.

Complete visualization with a good source of light is essential (**Fig. 2.13**); magnifying loupes or microscope help

**Fig. 2.13** Mouth examination

enormously. All mucosal surfaces should be examined, starting away from the location of any known lesions or the focus of complaint, and lesions recorded on a diagram (Fig. 2.14).

Attempts to improve the visualization of mucosal lesions include the use of toluidine blue vital dye, and fluorescence visualization, where a light source is used to enhance the visualization or to identify the optimal site for biopsy have not proven superior to conventional visual examination in terms of specificity or sensitivity. A review of currently available products showed insufficient evidence (Table 2.4):

- that commercial devices based on autofluorescence enhance visual detection beyond a conventional visual and tactile examination
- that commercially available devices based on tissue reflectance enhance visual detection beyond a conventional visual and tactile examination.

Although these aids may have their limitations, developments in this field such as narrow band imaging (NBI) and others must

surely offer hope for the future. Until then, conventional oral examination remains the gold standard.

The lips should first be inspected. The labial mucosa, buccal mucosa, floor of the mouth and ventrum of the tongue, dorsal surface of the tongue, hard and soft palates, gingivae and teeth should then be examined in sequence (Box 2.1):

- Lips: features, such as cyanosis, are seen mainly in the lips in cardiac or respiratory disease; angular cheilitis is seen mainly in oral candidosis or iron or vitamin deficiencies. Many adults have a few yellowish pinhead-sized papules in the vermillion border (particularly of the upper lip) and at the commissures; these are usually ectopic sebaceous glands (Fordyce spots), and may be numerous, especially as age advances.
- Labial mucosa normally appears moist with a fairly prominent vascular arcade. Examination is facilitated if the mouth is gently closed at this stage, so that the lips can then be everted to examine the mucosa. In the lower lip, the many minor salivary glands, which are often exuding mucus, are easily visible. The lips, therefore, feel slightly nodular and the labial arteries are readily felt.

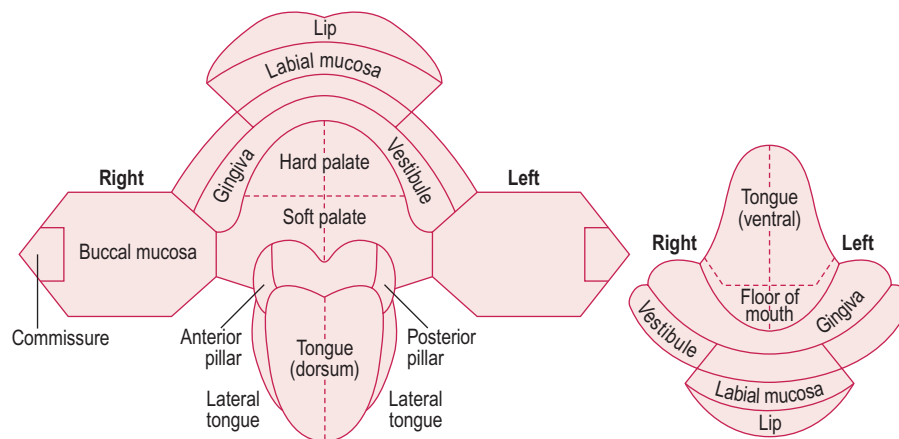


Fig. 2.14 Mouth chart

Table 2.4 Attempts at aids for earlier detection of sinister lesions

Basis	Product	Sensitivity/specificity	Comment
Vital dye	Toluidine blue (TB) (tolonium chloride)	High sensitivity 93–97% for identifying oral squamous cell carcinomas and specificity 73–92%	Many studies had methodological flaws
Light-based detection systems	Chemiluminescence (Vizilite®. Zila Pharmaceuticals, Phoenix, Arizona, USA)	High sensitivity (100%), but low specificity (0–14.2%) and low positive predictive value Combination with TB (Vizilite Plus®) may have better specificity and positive predictive value	Few reliable studies have appeared
	Chemiluminescence (Microlux/DL®. AdDent Inc., Danbury, Connecticut, USA)	Sensitivity and specificity for the detection of oral cancer and precancer are 77% and 70% respectively	More studies awaited
	Tissue fluorescence imaging (VELscope® Visually Enhanced Lesion Scope. LED Dental Inc., White Rock, British Columbia, Canada)	Sensitivity 97–100% and specificity 94–100%	
Exfoliative cytology	Brush biopsy (OralCDx® Laboratories Inc., Suffern, New York, USA)	Sensitivity for detection of abnormal cells 52–100% and specificity 29–100%	Scalpel biopsy usually preferred

BOX 2.1 The more commonly used tooth notations**Palmer****Permanent dentition**

Upper
87654321 | 12345678
Right Left
87654321 | 12345678
Lower

Deciduous dentition (anonymous classification)

EDCBA | ABCDE
EDCBA | ABCDE

Haderup**Permanent dentition**

(8+)(7+)(6+)(5+)(4+)(3+)(2+)(1+) | (+1)(+2)(+3)(+4)(+5)(+6)(+7)(+8)
(8-)(7-)(6-)(5-)(4-)(3-)(2-)(1-) | (-1)(-2)(-3)(-4)(-5)(-6)(-7)(-8)

Deciduous dentition

(50+)(40+)(30+)(20+)(10+) | (+01)(+02)(+03)(+04)(+05)
(50-)(40-)(30-)(20-)(10-) | (-01)(-02)(-03)(-04)(-05)

Universal**Permanent dentition**

12 3 4 5 6 7 8 | 9 10 11 12 13 14 15 16
32 31 30 29 28 27 26 25 | 24 23 22 21 20 19 18 17

Deciduous dentition

A B C D E | F G H I J
T S R Q P | O N M L K

Fédération Dentaire Internationale (two-digit)**Permanent dentition**

18 17 16 15 14 13 12 11 | 21 22 23 24 25 26 27 28
48 47 46 45 44 43 42 41 | 31 32 33 34 35 36 37 38

Deciduous dentition

55 54 53 52 51 | 61 62 63 64 65
85 84 83 82 81 | 71 72 73 74 75

- Cheek (buccal) mucosa is readily inspected if the mouth is held half open. The vascular pattern and minor salivary glands so prominent in the labial mucosa are not obvious in the buccal mucosa, but Fordyce spots may be conspicuous, particularly near the commissures and retromolar regions in adults and there may be a faint horizontal white line where the teeth meet (linea alba). Place the surface of a dental mirror against the buccal mucosa; it should slide and lift off easily but, if it adheres to the mucosa, then there is probably hyposalivation.
- The floor of the mouth and the ventrum of the tongue are best examined by asking the patient to push the tongue first into the palate and then into each cheek in turn. This raises for inspection the floor of the mouth – an area where tumours may start (the coffin or graveyard area of the mouth). Its posterior part is the most difficult area to examine well and

one where lesions are most easily missed. During this part of the examination the quantity and consistency of saliva should be assessed. Examine for the pooling of saliva in the floor of the mouth; normally there is a pool of saliva.

- The dorsum of the tongue is best inspected by protrusion, when it can be held with gauze. The anterior two-thirds is embryologically and anatomically distinct from the posterior third, and separated by a dozen or so large circumvallate papillae. The anterior two-thirds is coated with many filiform, but relatively few fungiform papillae. Behind the circumvallate papillae, the tongue contains several large lymphoid masses (lingual tonsil) and the foliate papillae lie on the lateral borders posteriorly. These are often mistaken for tumours. The tongue may be fissured (scrotal), but this is a developmental anomaly. A healthy child's tongue is rarely coated, but a mild coating is not uncommon in healthy adults. The voluntary tongue movements and sense of taste should be formally tested (Ch. 22). Abnormalities of tongue movement (neurological or muscular disease) may be obvious from dysarthria (abnormal speech) or involuntary movements, and any fibrillation or wasting should be noted. Hypoglossal palsy may lead to deviation of the tongue towards the affected side on protrusion.
- The palate and fauces consist of an anterior hard palate and posterior soft palate, and the tonsillar area and oropharynx. The mucosa of the hard palate is firmly bound down as a mucoperiosteum (similar to the gingivae) and with no obvious vascular arcades. Ridges (rugae) are present anteriorly on either side of the incisive papilla that overlies the incisive foramen. Bony lumps in the posterior centre of the vault of the hard palate are usually tori (torus palatinus). Patients may complain of a lump distal to the upper molars that they think is an unerupted tooth, but the pterygoid hamulus or tuberosity is usually responsible for this complaint. The soft palate and fauces may show a faint vascular arcade. Just posterior to the junction with the hard palate is a conglomeration of minor salivary glands. This region is often also yellowish. The palate should be inspected and movements examined when the patient says 'Aah'. Using a mirror, this also permits inspection of the posterior tongue, tonsils, oropharynx, and can even offer a glimpse of the larynx. Glossopharyngeal palsy may lead to uvula deviation to the contralateral side. Bifid uvula may signify a submucous cleft palate.
- Gingivae in health are firm, pale pink, with a stippled surface, and have sharp gingival papillae reaching up between the adjacent teeth to the tooth contact point. Look for gingival deformity, redness, swelling, or bleeding on gently probing the gingival margin. The 'keratinized' attached gingivae (pale pink) is normally clearly demarcated from the non-keratinized alveolar mucosa (vascular) that runs into the vestibule or sulcus. A Basic Periodontal Examination (BPE) may be helpful. Bands of tissue, which may contain muscle attachments, run centrally from the labial mucosa onto the alveolar mucosa and from the buccal mucosa in the premolar region onto the alveolar mucosa (fraenae).
- Teeth: the dentition should be checked to make sure that the expected complement of teeth is present for the patient's age. Extra teeth (supernumerary teeth) or deficiency of teeth (partial loss – hypodontia or oligodontia – or

complete loss (anodontia)) can be features of many syndromes, but teeth are far more frequently missing because they are unerupted, impacted or lost as a result of caries or periodontal disease. The teeth should be fully examined for signs of disease, either malformations, such as hypoplasia or abnormal colour, or acquired disorders such as dental caries, staining, tooth surface loss

or fractures. The laser fluorescence device DIAGNOdent may help caries detection. Apex locators, such as Propex (third generation) and Raypex-4 (fourth generation), may help define root fractures. The occlusion of the teeth should also be checked; it may show attrition or may be disturbed, as in some jaw fractures or dislocation of the mandibular condyles.

FURTHER READING

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