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SCULLY'S ORAL AND MAXILLOFACIAL MEDICINE

THE BASIS OF DIAGNOSIS AND TREATMENT

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FOURTH EDITION

ELSEVIER

4th Edition

Scully's Oral and Maxillofacial Medicine

THE BASIS OF DIAGNOSIS AND TREATMENT

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PREFACE

We are pleased to have been invited to edit this fourth edition of one of the most popular textbooks in oral medicine. Professor Crispian Scully was an internationally known force in the development of oral medicine worldwide, and for his academic contributions at every level. This text has a particular place in the hearts and minds of students of oral medicine. Crispian Scully set out to deliver a book which was visual, practical, up to date and which summarised current thoughts on the diagnosis and, management. The third edition was laid out with each themed section in a different page colour for easy reference. We have tried to thoroughly update the book, yet be true to the basic concept of easy and enjoyable reading, with helpful summaries of each topic. Before the book was written, the publishers had the third edition peer reviewed and we have incorporated many of the changes suggested, adding in new material and leaving out some older material. We hope that the fourth edition of this highly successful book continues to offer readers with a systemized and objective approach to the practice of oral and maxillofacial medicine.

The book has been completely restructured with grouping of disorders into 7 themed section sections, with six new chapters not covered in the previous edition, combining of several of the short chapters in the third edition and with 30% of the figures being new or replacing older figures. Nevertheless, we have tried to remain true to the underlying principle of a visually attractive layout with as many examples of clinical conditions as allowed, yet with frequent text summaries of important diagnostic and management points. We have expanded sections on clinical features and management, including emerging therapies, as well as additional information on drug interactions and contraindications.

We have accepted that modern day students of oral medicine are unlikely to follow up long lists of references in textbooks. We have therefore included cardinal references only, particularly focussing on World Workshops of oral medicine reports, and Cochrane reviews of diagnosis and treatment of relevant conditions. It has become apparent to the world of oral medicine that outcomes of treatment both from the clinician's perspective and from the patient's perspective are now an essential part of the management of oral diseases. We have therefore included in this edition information on oral disease severity scores and patient reported outcomes which should be used for every patient.

This book presents a straightforward, accessible guide to the successful diagnosis and treatment of the most common and potentially serious disorders seen in oral medicine clinical practice. Maintaining a strong patient-centred approach throughout, the book also explores relevant systemic disorders and includes an updated recommended reading list. This clearly written book places a strong emphasis on practical issues and is beautifully illustrated with liberal use of tables, algorithms and clinical photographs.

Senior dental students, dental practitioners and trainees and practitioners in oral medicine, surgery and pathology in particular, will find this book to be both an excellent source of reference and a thoroughly practical guide for clinical diagnosis and contemporary non-surgical management of conditions affecting the oral and maxillofacial region.

We would like to thank Dr Parnyan Ashtari BDS, MPharm for her very helpful and important contributions to the chapters on drugs and drug reactions.

Thanks to Alison Taylor then of Elsevier, with whom the idea of this edition was nurtured and developed, to Anand K Jha of Elsevier, with whom we have had many interesting and useful conversations and the professional teams of copyeditors, typesetters and proofreaders who have all contributed to producing a revised text of which we hope that Crispian Scully would have been proud.

SJC, BC and JS, 2022

LEARNING OUTCOMES

"To study the phenomena of disease without books is to sail an uncharted sea, while to study books without patients is not to go to sea at all."
—Sir William Osler

This text will deal with oral and maxillofacial diseases and their medical management. It is intended that having read this book, the reader will be able to:

- Recognize the scope of oral and maxillofacial diseases and the importance of medical management in addition to the traditional dental focus of the discipline.
- Adopt a systematic approach to medical history taking that extends routine questions into certain relevant areas of enquiry that involve the body in general.
- Identify relevant follow-up questions that may further clarify the findings of the clinical examination and refocus the history.
- Examine patients and their oral lesions systematically and use the findings of specific features of the lesion and associated signs and symptoms, to start formulating differential diagnoses.
- Identify lesions and interpret the findings and develop a sense of the potential implications for the patient.
- Identify which sites may be affected by the presenting condition and what to look for at those sites.
- Understand the importance of recording disease severity for all conditions.
- Understand when clinical investigations are indicated, which are appropriate, and how to perform these investigations.
- Interpret the findings of routine clinical investigations (e.g. blood test results) and develop a sense of the potential implications for the patient.
- Identify a range of therapeutic options for the patient and understand the need for regular review and re-appraisal of the condition.
- Understand how treatment may impact, positively or negatively, upon the condition.
- Be able to record the clinical outcome of treatment using disease severity scoring.
- Advise the patient about the aetiology of oral lesions, and predisposing factors.
- Identify the need to refer for advice, investigations or treatment by dental, medical or surgical specialists.
- Recognize the importance of close liaison with colleagues in other disciplines, particularly imaging, medicine, pathology and surgery.

This book is dedicated to Professor Crispian Scully and to all those who enjoy the discipline of Oral Medicine. Professor Crispian Scully authored over 30 books in the field and his enthusiasm for every aspect of Oral Medicine increased awareness and understanding of the importance of the field internationally. Generations of students have benefited from his writings. Our editorship of this popular book fulfils a willing commitment to continue his work.

SECTION I

Fundamentals of Patient Management

1

Principles of Diagnosis: History

OUTLINE

INTRODUCTION

Diagnosis means 'through knowledge' and entails acquisition of data about the patient and their complaint using the senses (HOTS):

- Hearing/listening
- Observing/seeing
- Touching/feeling
- Smelling (sometimes) (Fig. 1.1).

The purpose of making a diagnosis is to be able to offer the most:

- Appropriate, effective and safe treatment
- Be able to offer a more accurate prognosis.

Diagnosis is made by the clinical examination, which comprises the:

- history (anamnesis) — this offers the diagnosis in approximately 80% of cases
- physical examination
- supplemented by investigations in some cases (standard or special).

Each is based on a thorough, methodical routine. Diagnosis most importantly involves a careful history; the patient will often deliver the diagnosis from the history, although the findings from examination and investigations can be helpful, as can reference to the literature and Internet. To state the obvious, it is difficult to diagnose a condition that is unknown to the diagnostician; thus extensive reading of recent literature, clinical experience and discussion with colleagues are continually needed, as well as an enquiring mind. Continuing education is essential. Sometimes the diagnosis can be made by observing pathognomonic features (e.g. in dentinogenesis imperfecta, in which the abnormally translucent brownish teeth are characteristic).

There are some subtypes of diagnosis, including:

- Pathological diagnosis: provided from the pathology results but combined with history and examination to give the presumptive diagnosis.
- Provisional (working) diagnosis: the more usually made diagnosis. This is an initial diagnosis from which further investigations can be planned.
- Presumptive diagnosis: made after due consideration of all facts from the history, examination and investigations.
- Differential diagnosis: the process of making a list of possible diagnoses by considering the similarities and differences between similar conditions.
- Diagnosis by exclusion: identification of a disease by excluding all other possible causes.
- Diagnosis made on the results of response to treatment. For example, the pain of trigeminal neuralgia may be atypical, and the diagnosis can sometimes be confirmed only by a positive response to the drug carbamazepine.

COMMUNICATING WITH THE PATIENT

Patients' attitudes to healthcare, the benefits and risks from examination, investigations and treatment and the extent to which they find adverse effects tolerable can differ markedly from assumptions of the clinicians. Effective healthcare communication incorporates not only medical and dental information but also sensitive discussion of the patients' emotional and social wellbeing, always being culturally sensitive and tailoring to the patient's ability to understand.

Patients have personal wishes, needs and concerns that demand the understanding and respect of the clinician. Involving patients as full partners in decisions about their treatment leads to better health outcomes. Healthcare should:

- provide respectful care
- meet the patient's personal, cultural and religious needs
- educate and inform on relevant health issues
- facilitate patients making their own choices
- respect those choices.

Communicating requires time, patience and expertise: language can be a huge barrier. One of the most obvious ways to

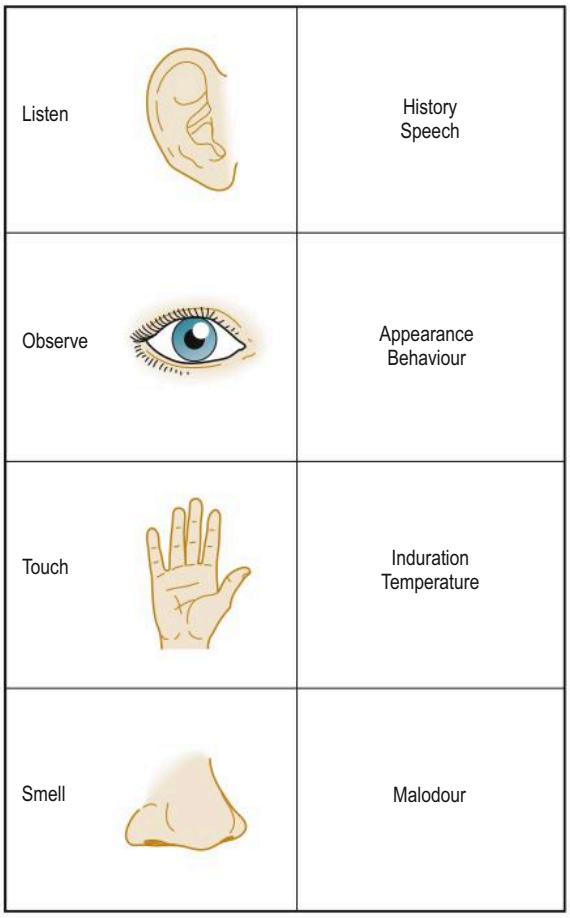

Fig. 1.1 The senses in diagnosis.

assist communication is to have material available in relevant different languages which is easily readable and understood.

Patient interviews are an opportunity to listen and ascertain the patient's feelings and concerns about healthcare and to explore what beliefs and practices are important to them. The clinician should use 'LEAPS':

- **L**isten
- **E**mpathise
- **A**sk
- **P**araphrase
- **S**ummarise.

The clinician should thereby endeavour to elicit the:

- patient's main problems
- patient's perceptions of their problems
- physical, emotional and social impact of their problems.

They should tailor information to what the patient wants to know, always checking patient understanding.

- Elicit the patient's reaction to information given.
- Determine how much the patient wants to participate in decision-making.
- Discuss management options.
- Greetings can 'make' or 'break' the professional relationship, especially if the patient is older and/or from a different culture. Key points to remember include to:
  - smile
  - speak clearly and directly, making eye contact as appropriate
  - greet using 'Good morning' or 'Good afternoon', or the greeting appropriate to their culture
  - never use the first name alone, except when requested. Ask the patient what they prefer to be called, but as a default and at the initial greeting, use their title and surname
  - say a few words to put the patient at ease
  - explain who you are and what you do, what is happening and what will happen
  - sensitively check whether the patient understands the conversation
  - be careful about touching
  - encourage the patient to establish a professional relationship.

For many people from non–Anglo-Saxon cultures, the customary greeting is a gesture other than the handshake. In addition, some may be uncomfortable shaking hands with a person of the opposite gender. Unless you are certain of their culture or religion, it is better to greet a patient with a handshake, seeing first if the person offers their hand, and then say 'Good morning/afternoon' and use their title followed by their last name.

Communication can thus be achieved through:

- active listening
- empathy
- appropriately using open questions
- frequently summarising
- clarifying where needed
- clearly explaining concepts
- checking patient's understanding
- checking patient's compliance with management recommendations.

Specific skills such as questioning styles, active listening, providing information and avoiding negative communication behaviours (e.g. inappropriate affect, the inappropriate use of closed questions or offering premature advice/reassurance) are crucial to success.

Avoid also the use of:

- technical terms and expressions
- abbreviations
- professional jargon
- abstract concepts
- colloquialisms
- idiomatic expressions
- slang
- metaphors
- euphemisms
- stereotype figures or symbols.

Breaking Bad News

Give any bad or unpleasant news tactfully and slowly, maintain confidentiality and check with the patient exactly who can be told about their condition, when and what they can be told.

A key healthcare professional (HCP) should be identified whom the patient can contact for further information and act

as an advocate. Most important is verbal interaction, but alternative information sources (e.g. written leaflets, computer systems, DVDs) can help.

HISTORY TAKING

The first contact with the patient is crucial to success, and there should be a courteous approach to the patient with a professional introduction and every effort to establish communication, rapport and trust, and make the patient feel the focus of the clinician's interest. History taking is part of the initial communication between the dentist and patient. It is important to adopt a professional appearance and manner, and introduce oneself clearly and courteously. The clinician should enquire early on as to the main complaint and relevant social aspects such as occupation. The patient will know if you care, well before they care if you know.

The clinician should encourage the patient to tell the story in their own words, and use methodical questioning to elucidate further details.

Perhaps not surprisingly, many patients are apprehensive when confronted by a clinician, and therefore they may be easily disturbed if, for example, the clinician appears indifferent or unsympathetic. This can result in barriers to effective communication, which will simply hinder the clinician.

Due cognisance must also always be taken of the age, cultural background, understanding and intelligence of the patient when taking the history. It is the clinician's responsibility to elicit an accurate history; if that necessitates finding an interpreter, for example, then the clinician must arrange this. The ability to take a comprehensive and relevant medical history is fundamental to being a competent clinician.

The history is best given in the patient's own words, although the clinician often needs to guide the patient and may use protocols to ensure collection of all relevant points. It is imperative to be clear as to the patient's main complaint and ascertain key clinical features such as date of onset, duration, severity, whether constant or intermittent, previous treatments and whether there has been a response to any. Sometimes there may be several complaints. Do not assume that they are all interlinked, and take a detailed history for each. Determine how much each complaint bothers the patient. It is pointless in giving treatment for a complaint where the patient only needed reassurance about the diagnosis and which did not bother him or her.

It is important to cover the following areas:

- general information (name, date of birth, gender, ethnic origin, place of residence, occupation)
- presenting complaint(s)
- history of each of the present complaints
- past medical history
- dental history
- family history
- social and cultural history including lifestyle habits (e.g. use of tobacco, alcohol, betel)
- patient expectations.

By the end of the history, the clinician should have an idea of the patient's concerns, have assessed the patient's current problems and also have drawn up a provisional or differential diagnosis.

PRESENTING COMPLAINT

The history taking commences by identifying the current complaint(s) (e.g. 'sore mouth'). The 'history of the present complaint' is then taken (for each if there are more than one).

HISTORY OF THE PRESENT COMPLAINT

This should cover aspects relevant to the particular main complaint, such as:

- date of onset
- duration
- location(s)
- aggravating and relieving factors
- investigations thus far
- treatment already received and their perceived effectiveness.

'Leading questions' (i.e. those which suggest the answer) should be avoided. 'Open questions', which do not suggest an answer, are preferred. The history should be directed by the complaint, and in most oral medicine patients, it is important to establish whether there are cutaneous, gastrointestinal, genital, ocular or joint problems or a history of fever. Some patients bring descriptions or diagrams (Fig. 1.2). Then a series of relevant questions should elicit the 'past or relevant medical history'.

PAST OR RELEVANT MEDICAL HISTORY

The medical history should be taken to elicit all matters relevant to the:

- diagnosis
- treatment
- prognosis.

As a double check on the verbal history, the use of preprinted, standardised, self-administered questionnaires may be helpful and may encourage more truthful responses to sensitive questions (Table 1.1).

There are a number of ways to take a good medical history, but all good clinicians have a systematic approach, from the history of the current complaints, then going through the body systems, current and past therapies for other medical complaints and previous illnesses.

The history should uncover, for example, medical history relevant to:

- Previous episodes of similar or related complaints.
- Other complaints that may be relevant. For example, in patients with mucosal disorders, it is important to ascertain whether there have been lesions affecting other mucosae (ocular or anogenital) or skin, hair or nails, gastrointestinal complaints or fever.
- Important to include are:
  - General symptoms, such as fever or weight loss.
  - Relevant symptoms related to body systems, such as:
    - nervous system (e.g. sensory loss)

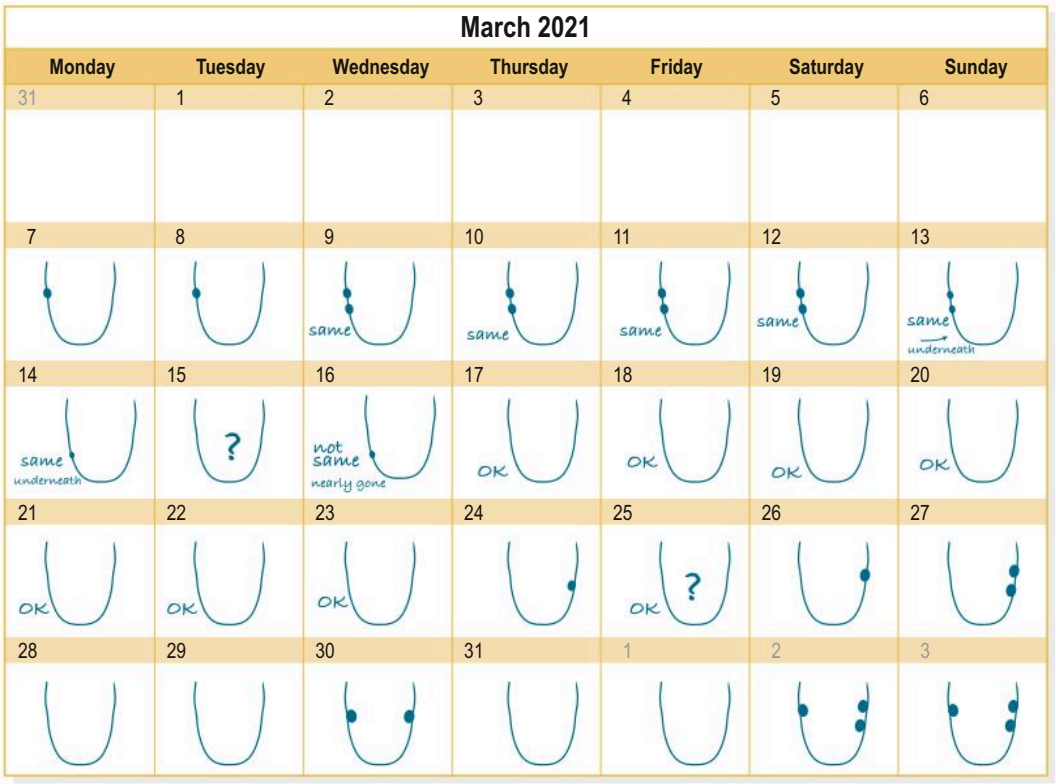

Fig. 1.2 Diary provided by patient showing recurrent tongue lesions.

TABLE 1.1 Systematic Recording of Relevant Medical History

System	Specific Problems	No	Yes
CVS	Heart disease, hypertension, angina, syncope		
	Cardiac surgery, endocarditis		
	Bleeding disorder, anticoagulants, anaemia		
RS	Asthma, bronchitis, TB, other chest disease, smoker		
SKIN	Rashes, eczema, lichen planus, pemphigus, pemphigoid		
GU	Renal, urinary tract or sexually shared disease		
	Pregnancy, menstrual problems		
GI/Liver	Coeliac disease, Crohn disease Ulcerative colitis		
	Hepatitis, other liver disease, jaundice		
CNS	CVE, multiple (disseminated) sclerosis, other neurological disease		
	Psychiatric problems, drug or alcohol abuse		
	Sight or hearing problems		
LMS	Bone, muscle or joint disease		
Endocrine	Diabetes, thyroid, other endocrine disease		
Allergy	Allergies — e.g. latex, aspirin, penicillin, plasters (Band-Aid)		
Drugs	Current or recent drugs/medical treatment		
Others	Previous operations, GA or serious illness		
	Other conditions (including congenital anomalies)		
	Family medical history		
	Born, residence or travel abroad		
	Pets		
	Infections (e.g. human immunodeficiency virus)		

CNS, Central nervous system; *CVS,* cardiovascular system; *GI,* gastrointestinal system; *GU,* genitourinary system; *LMS,* locomotor system; *RS,* respiratory system.

  - respiratory system (e.g. cough)
  - gastrointestinal disorders that may be associated with oral ulcers and other lesions
  - skin lesions (solitary or rashes), itch or discolourations, which are common symptoms of skin disease, and there are sometimes oral lesions
  - ocular problems or visual disturbance
  - anogenital lesions, such as ulcers or warts
  - psychiatric disorders, such as anxiety, depression and eating disorders, and drug abuse are relevant to orofacial conditions.
- Medical or surgical consultations, investigations and treatments, including radiotherapy.

- Current prescribed drugs (including self-medications and alternative medicines) because these may cause oral complaints or influence management. The British National Formulary (BNF) or equivalent is often indispensable because patients commonly misspell or do not know the names of drugs they are taking. Even though patients may have indicated drugs for specific conditions, it is always appropriate to ask separately about drug history.
- Complementary medicine and associated over-the-counter medicines.
- Previous illnesses.
- Hospitalisations and previous consultations.
- Operations.
- General anaesthetics.
- Specific medical problems that may influence operative procedures, particularly:
  - Allergies
  - bleeding tendency
  - cardiorespiratory problems
  - drug therapy such as anticoagulants or corticosteroids
  - endocrine disorders – especially diabetes
  - infectious diseases.

Patients may also carry formal warnings of certain conditions relevant to dental care. These may be written cards, smart cards (there are two kinds – memory cards and microprocessor cards) or MedicAlert-type bracelets or necklaces. These types of MedicAlert warning devices are recommended to be carried by anyone with:

- allergies to any drug or agent with the potential for causing a serious reaction
- chronic health problems, which might necessitate emergency treatment of a specific nature, such as diabetes, epilepsy, glaucoma or malignant hyperthermia
- the need to take regular medication, prosthesis, implants and conditions which might lead to difficulty in diagnosis during emergency care (e.g. long-term anticoagulants or long-term systemic corticosteroids).

Some patients bring quite precise written information which can be helpful (Fig. 1.3).

The Harley Street Clinic	Cystourethroscopy & Transurethral Prostatectomy OPERATION 08.02.2010
Clementine Churchill Hospital	Cystoscopy, ureteroscopic manipulation of calculus Insertion of Ureteric JJ Stent OPERATION 22.02.2014
Clementine Churchill Hospital	Removal of Ureteric JJ Stent 04.03.2014
Northwick Park Hospital	Lithotripsy ureteric calculus OPERATION 10.03.2014
The Harley Street Clinic	Cystourethroscopy Bladder biopsy & cystodiathermy urethral dilatation Excision left epididymal cyst OPERATION 16.05.2015
King Edward VII Hospital	Cystoscopy OPERATION 07.03.2016
The London Clinic	Laparoscopic cholecystectomy OPERATION 31.08.2016
King Edward VII Hospital	Cystoscopy OPERATION 09.06.2016
The London Clinic	Haemorrhoidectomy and sigmoidoscopy OPERATION 7.05.2020
Wimpole Street	Re: Blood pressure and Heart. Myocardial perfusion scan 18.10.2021
Princess Grace Hospital, Harley Street, London	Repair of right inguinal hernia using an open mesh technique. OPERATION 13.11.2021

Fig. 1.3 Part of medical history provided by patient: 7 hospitals, 9 operations and at least 15 procedures in 12 years!

A Medical History ABC

The medical history of dental patients should be directed to elicit any relevant systemic disease. For example, this may be achieved by an ABC:

- **Allergies or anaemia:** allergies can be a contraindication to use of materials such as latex. Anaemia: a reduction in haemoglobin level below the normal for age and gender can:
- be a contraindication to general anaesthesia
  - cause oral complications (i.e. candidosis, sore mouth, burning tongue, glossitis, ulcers, angular stomatitis).
- **Bleeding tendency:** a hazard to any surgical procedure, including some injections, and a contraindication to aspirin and some other nonsteroidal antiinflammatory drugs (NSAIDs).
- **Cardiorespiratory disease:** this may be a contraindication to general anaesthesia. Patients with various cardiac lesions are predisposed to develop endocarditis, which may be precipitated as a consequence of the bacteraemia associated with some forms of dental treatment. Cardiac patients may have a bleeding tendency because of anticoagulants. Oral lesions may be seen – such as calcium channel blocker—induced gingival swelling, or oral ulceration with nicorandil. NSAIDs and itraconazole are contraindicated in severe cardiac failure.
- **Drug use, allergies, recreational or abuse:** these may cause orofacial lesions or dryness, give an indication about underlying pathology or influence dental procedures or drug use. Drug allergies are a contraindication to the use of the responsible or related drugs. Drug abuse may give rise to behavioural problems and a risk of cross-infection. Corticosteroids absorbed systemically produce adrenocortical suppression. Such patients may not respond adequately to the stress of trauma, operation or infection, and stress may produce adrenal crisis and collapse.
- **Endocrine disease.**
  - Diabetes may cause:
    - the danger of hypoglycaemia if meals are interfered with
    - oral complications such as sialosis, dry mouth and periodontal breakdown.
  - Hyperparathyroidism may cause:
    - jaw radiolucencies/rarefaction
    - loss of lamina dura
    - giant cell granulomas (central)
    - hypercalcaemia and hyposalivation.
- **Fits and faints:** epilepsy and other causes of unconsciousness should be elicited before embarking on any procedures. Oral lesions may be seen, such as phenytoin-induced gingival swelling.
- **Gastrointestinal disorders** are relevant mainly because of possible vomiting with general anaesthesia, and possible oral manifestations.
- **Hospital admissions, attendances and operations:** this information often helps fill in gaps in the medical history and may be relevant if, for example, the patient has had a previous halothane anaesthetic or has had radiotherapy. Successful prior surgery in the absence of any serious post-operative haemorrhage also suggests the absence of any inherited bleeding tendency.
- **Infections:** the possibility of transmission of infection to patients or staff is ever present:
  - blood-borne infections: hepatitis B virus (HBV) and hepatitis C virus (HCV) and human immunodeficiency virus (HIV) are the main agents of concern
  - respiratory infections: current or very recent respiratory infections, such as coronaviruses, or tuberculosis, may be transmissible and a contraindication to general anaesthesia
  - sexually shared infections: imprecise diagnosis or empirical treatment serves only to spread these infections, as contact tracing is normally undertaken only on proven cases of sexually transmitted (venereal) disease.
- **Jaundice and liver disease:** these are important because of the associated bleeding tendency, drug intolerance and possible viral hepatitis and oral carcinoma.
- **Kidney disease:** this may cause a bleeding tendency and impaired drug excretion. The other main problems are in relation to the immunosuppression created following a kidney transplant, liability to neoplasia and gingival swelling from ciclosporin.
- **Likelihood of pregnancy:** because of the danger of abortion or teratogenicity, it is important during pregnancy, particularly the first trimester, to avoid or minimise exposure to drugs, radiography and infections. Pregnancy can influence some conditions such as recurrent aphthous stomatitis, pyogenic granulomas and Behçet syndrome and may produce gingivitis or epulides.
- **Malignant disease,** including those on radiotherapy or chemotherapy (where oral lesions may occur): malignant disease may underlie some oral complaints, such as pain or sensory changes, and can result in significant morbidity and even mortality. Oral complications are very common after cancer therapies.
- **Neuropsychiatric conditions:**
  - Mental health: there are many oral problems, and drug therapy may produce oral conditions, such as dry mouth.
  - Down syndrome: there are many oral problems, and cervical spine involvement may predispose to spinal cord damage during general anaesthesia.
- **Other relevant conditions:** every condition which is elicited from the medical history should be checked for relevance, but the following can be highly relevant, even though rare in most populations:
  - glucose-6-phosphate dehydrogenase deficiency is a contraindication to some drugs
  - hereditary angioedema: any dental trauma may result in oedema and a hazard to the airway
  - malignant hyperthermia (malignant hyperpyrexia): various general anaesthetics and other agents may be contraindicated
  - Primary generalised nodal osteoarthritis (PGNO) can be associated with hyposalivation and sialadenitis
  - porphyria: intravenous barbiturates, metronidazole and other agents may be contraindicated
  - suxamethonium sensitivity: suxamethonium is contraindicated.
- **Prosthesis and transplant patients:** patients after transplants may be at risk from infection, neoplasms and

iatrogenic problems, such as bleeding, gingival swelling or graft-versus-host disease (Chapter 34). Patients with transplants are also liable to present a number of complications to dental treatment – in particular the need for a corticosteroid cover, a liability to infection and a bleeding tendency.

There is no good evidence for infection of prosthetic joints arising from oral sepsis. However, if the orthopaedic surgeon wishes an antimicrobial cover, the dentist must consider the medicolegal implications. The complications of infection of ventriculoatrial valves are so serious that it may be reasonable to give an antimicrobial cover, if the responsible neurosurgeon so advises.

Patients with cardiac pacemakers and similar devices may be in danger in relation to the use of equipment which can interfere, such as magnetic resonance imaging (MRI), diathermy and electrosurgery.

- **Rheumatoid arthritis**: Sjögren syndrome is commonly associated with rheumatoid arthritis (RA), which can be part of the diagnosis. Cervical spine involvement may predispose to spinal cord damage if the neck is flexed during general anaesthesia.

DENTAL HISTORY

The dental history will give an idea of the:

- regularity of attendance for dental care
- attitude to dental professionals and to treatment
- recent relevant dental problems
- recent restorative treatment.

FAMILY HISTORY

This may reveal familial outbreaks of diseases such as contagious infections (e.g. hand, foot and mouth; tuberculosis) and hereditary problems, such as amelogenesis imperfecta, haemophilia or hereditary angioedema, and familial conditions, such as recurrent aphthous stomatitis or diabetes. Some

TABLE 1.2 Clinical Signs and Symptoms Which May Reflect Potentially Serious or Life-Threatening Connotations

Features	Comments
Abnormal blood vessels supplying a lump	May be malignancy
Actinic cheilitis (solar elastosis)	Potentially malignant
Angioedema	Potentially lethal through airway obstruction
Behçet syndrome	May cause thromboses of dural sinuses or vena cavae
Cancer	Potentially lethal
Dysphagia	May be malignancy
Erythema multiforme	Potentially lethal if Stevens–Johnson syndrome or toxic epidermal necrolysis (TEN)
Facial palsy	May be malignancy or cerebrovascular event
Extraction socket not healing	May be malignancy
Headache (see Chapter 45)	Severe and first time could indicate malignant hypertension, a tumour, abscess, haematoma. meningitis, metastases, giant cell arteritis or subarachnoid haemorrhage.
Human immunodeficiency virus (HIV) infection	Potentially serious but no longer lethal due to effectiveness of antiretroviral therapy
Indurated lesion	Firm infiltration beneath the mucosa may be malignant
Lesion fixed to deeper tissues	To deeper tissues or to overlying skin or mucosa may be malignant
Leukoplakia	Potentially malignant
Lichen planus	Potentially malignant
Lump	Especially if hard may be malignant
Lymph node enlargement	Especially if there is hardness in a lymph node or fixation. Enlarged cervical nodes in a patient with oral carcinoma may be caused by infection, reactive hyperplasia secondary to the tumour, or metastatic disease. Occasionally, a 'positive' lymph node is detected in the absence of any obvious primary tumour
Lymphoma	Potentially lethal
Numbness	May be malignancy
Pain	May be malignancy
Pemphigus	Used to be potentially lethal, but can be well controlled by therapy
Red lesion	Erythroplasia or erythroplakia may be malignant or potentially malignant
Red/white mixed lesion	Erythroleukoplakia may be malignant or potentially malignant
Submucous fibrosis	Potentially malignant
Syphilis	Used to be potentially lethal, but can be well controlled by therapy
Tooth mobility	Can be very rarely caused by malignancy
Tuberculosis (TB)	Potentially lethal
Ulcer	If persistent, with fissuring or raised exophytic margins may be malignant or chronic infection
Weight loss	May be malignancy or infection such as HIV or TB
White lesion, especially if irregular surface	Verrucous leukoplakia may be malignant or potentially malignant

diseases are more prevalent in certain ethnic groups (e.g. pemphigus in Jews and Asians; Behçet syndrome in people from Asia or the Mediterranean area).

SOCIAL AND CULTURAL HISTORY

The social history may reveal:

- whether the patient has a family or a partner – and the degree of support that can be anticipated
- information about the patient's attitudes to treatment (e.g. some patients may refuse operation, others may decline medication)
- information about the patient's residence, which can suggest the socioeconomic circumstances of the patient
- information about contacts with pets and other animals, which may be relevant to some infectious diseases, such as cat-scratch disease or toxoplasmosis
- whether the patient has travelled overseas, which may be relevant to some infectious diseases, such as tuberculosis, tropical diseases such as Leishmaniasis and deep mycoses such as histoplasmosis
- the patient's sexual history, which may be relevant to some infectious diseases, such as HIV, herpes simplex virus (HSV), human papillomavirus (HPV), hepatitis A virus (HAV), HBV, and HCV
- any occupational problems, which may be relevant to some disease, and access to care
- relevant habits (tobacco, alcohol, betel and recreational drug use) – for example, tobacco use underlies several oral diseases, including periodontal disease and cancer
- relevant hobbies, such as swimming in pools that may cause tooth erosion or scuba diving that may underlie temporomandibular pain
- information about the patient's culture and diet – may lead, for example, to vitamin deficiencies and glossitis or angular cheilitis (as in vitamin B_{12} deficiency in vegans)
- information about stress; several orofacial complaints are stress related or modulated by stress.

Standardised forms will help with the recording of data, the relevance of which can sometimes be surprising (see Table 1.1).

Patient expectations can only be assessed by polite enquiry. Each patient is an individual with their own specific thoughts and beliefs. Some cultures have medical understanding quite separate from that of Westernised medicine.

PROGNOSIS

Prognosis (from the Greek – literally, fore-knowing, foreseeing) is a medical term to describe the likely outcome of an illness. A number of conditions and lesions seen in oral medicine, especially cancer and pemphigus, can have potentially serious prognoses (Table 1.2), whilst others have potential to become malignant (e.g. leucoplakia). It is crucial that the appropriate information is clearly and compassionately communicated with the patient.

RECOMMENDED READING

Maguire P., Pitceathly C., 2002. Key communication skills and how to acquire them. BMJ. 325, 697–700.

Glick M., 2019. The relevance of oral health. J. Am. Dent. Assoc. 159 (8), 637–638.

2

Principles of Diagnosis: Examination

It is wise for clinicians to make themselves thoroughly aware of the wide variation in normal appearances of all sites of mucosa, which can be related to age, gender and racial origin. 'Until you appreciate the range of normal, you will be unable to detect the abnormal'.

John Hunter 1764

OUTLINE

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 printouts. Others may bring less meaningful drawings or histories. All these factors can help to 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.

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 **AVPU** scale (alert, verbal, pain, unresponsive) is a system by which a health care professional can measure and record a patient's level of consciousness.
- The temperature: the temperature is traditionally taken with a thermometer, but temperature-sensitive strips and sensors are now widely available. 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 greater than 37.8°C or a rectal or ear temperature greater than 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

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

Fig. 2.2 Sphygmomanometer.

- 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 to 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.

- 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 approximately 3 cm of skin visible at the antecubital fossa; palpate the radial pulse; inflate the cuff to approximately 200 to 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 approximately 120/80 mmHg, but these increase with age).

Fig. 2.3 Raynaud syndrome in scleroderma.

Respiration

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

Other Signs

- Weight: weight loss is seen mainly in starvation, malnutrition, eating disorders, cancer (termed cachexia), human immunodeficiency virus (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.
- Hands: conditions such as arthritis (mainly rheumatoid or osteoarthritis) (Figs. 2.3 and 2.4) and Raynaud phenomenon (Chapter 56; Fig. 2.3), which is seen in many connective tissue diseases, may be obvious. Note the temperature of the hands (cold in Raynauds). Disability, such as in cerebral palsy, may be obvious (Fig. 2.5).
- Movement: asymmetrical gait may indicate arthritis of hips or knees (osteo or rheumatoid).
- Feet: hallux valgus of big toes may indicate osteoarthritis and is associated with dry mouth
- 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:

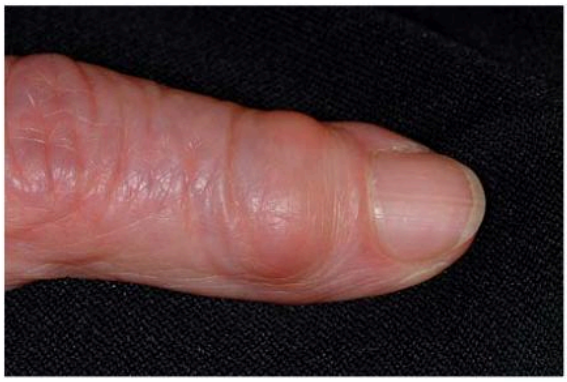

Fig. 2.4 Heberden nodes of osteoarthritis on interphalangeal joints of first and second fingers.

Fig. 2.5 Cerebral palsy.

- asymmetry
- 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. 2.6 Clubbing.

Fig. 2.7 Nail biting.

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

- redness, seen in trauma, eye diseases or Sjögren syndrome
- scarring, seen in trauma, infection or pemphigoid
- jaundice, seen mainly in the sclerae in liver disease
- exophthalmos (protruding eyes), seen mainly in Graves thyrotoxicosis
- corneal arcus which may be seen in hypercholesterolaemia. A thin, whitish circle around the iris can be a normal finding in old people and then termed arcus senilis.

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

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	Localised loss/thinning of epithelium which usually heals without scarring; can follow 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 localised 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 *atrophic* scar is thin and wrinkled A *hypertrophic* scar is elevated with excessive growth of fibrous tissue A *cribriform* 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 breach of the 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)

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 because 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. (Fig. 2.12d)

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.
- 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, (Fig. 2.12b) and if systemic disease is a possibility, then other nodes, liver and spleen should also be examined. Generalised lymphadenopathy with or without enlargement of other

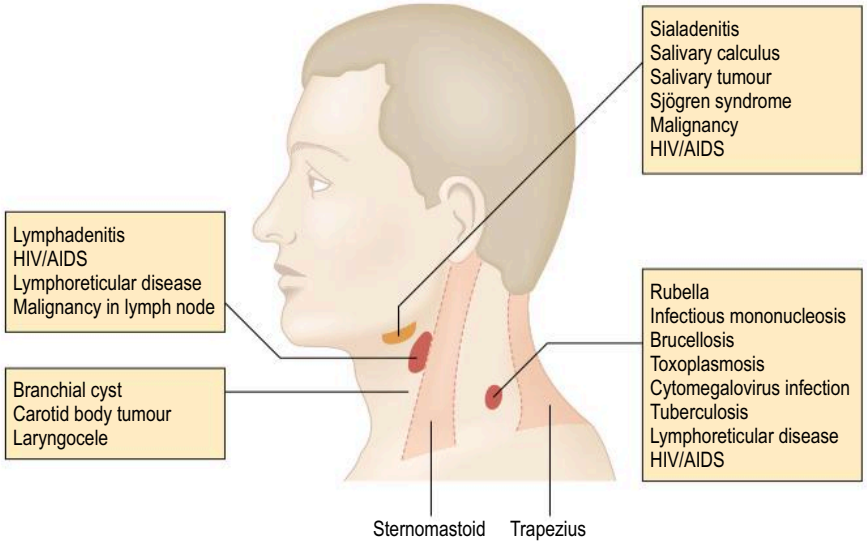

Fig. 2.8 Some causes of neck swelling.

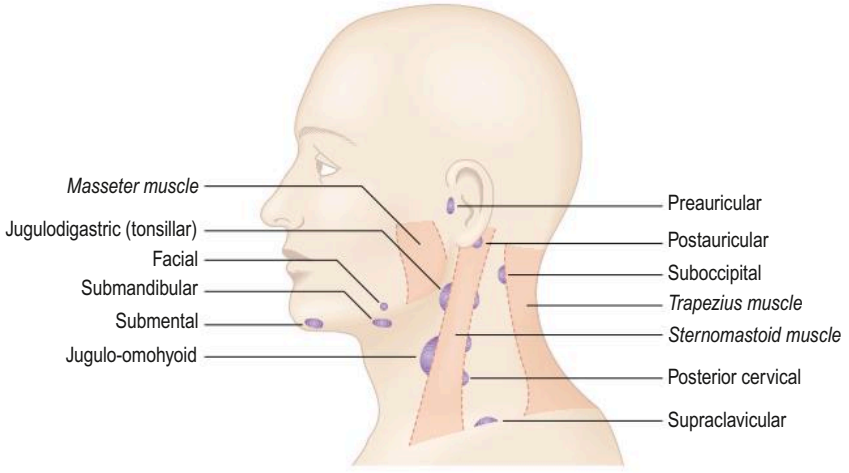

Fig. 2.9 Cervical lymph nodes: locations.

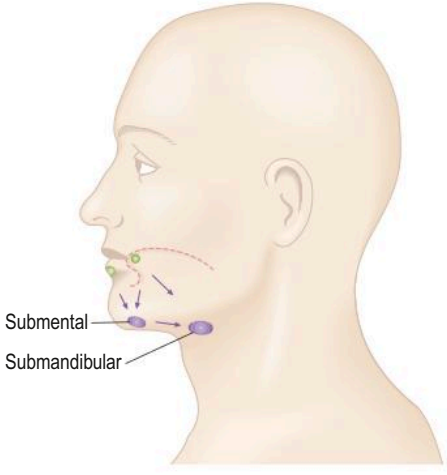

Fig. 2.10 Submental and submandibular lymph node drainage.

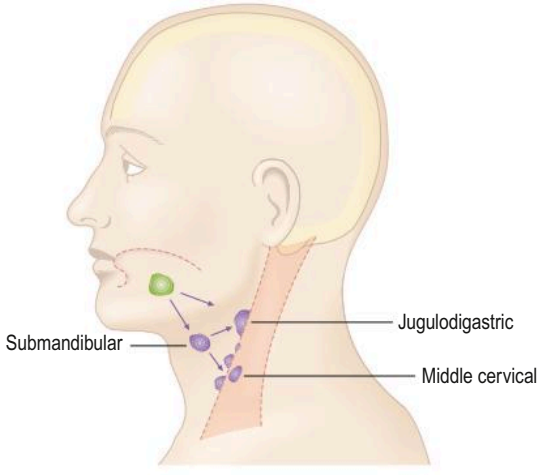

Fig. 2.11 Submandibular and deep cervical lymph node drainage.

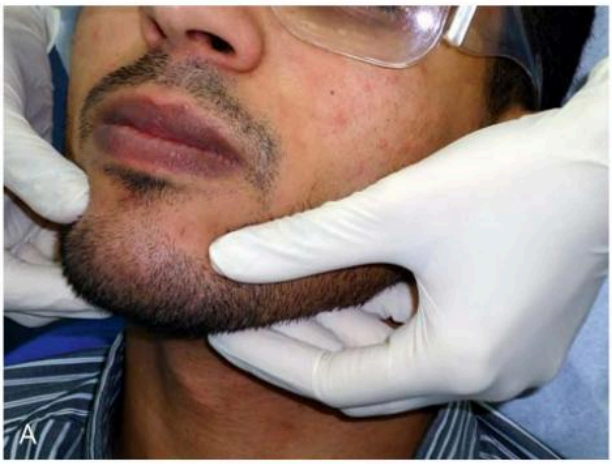

Fig. 2.12 Extra oral examination.

Fig. 2.12b

Fig. 2.12c

lymphoid tissue, such as liver and spleen (hepatosplenomegaly), suggests a systemic cause.

The temporomandibular joints (TMJs) and muscles of mastication should be examined and palpated (Fig. 2.12C). Although disorders that affect the TMJ often appear to be

Fig. 2.12d

TABLE 2.2 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 sterno-mastoid muscle
Ear, middle	Parotid
Over angle of mandible	Superficial cervical over upper part of sterno-mastoid 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

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 algometer to standardise 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 interincisal 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 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
- pain or tenderness
- evidence of salivary flow from salivary ducts
- saliva appearance
- evidence of oral dryness (The clinical oral dryness score (CODS) can be used and examines 10 sites/parameters in the mouth including mirror sticking to mucosa or tongue, no salivary pooling in the floor of mouth, loss of architecture of gingivae, depapillation of the tongue and uncleared food or epithelial debris). (See Chapter 20: Dry Mouth). Hyposalivation can be confirmed by sialometry (salivary flow rate).

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 characterised 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 because 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. Weakness might reflect an upper motor neuron lesion (central) or lower motor neuron lesion (peripheral).

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

- smile
- bare the teeth or purse the lips

TABLE 2.3 Cranial Nerve Nomenclature and Examination

Cranial Nerve			Findings in Lesions	Examination
I	Olfactory	Sensory	Impaired sense of smell for common odours (do not use ammonia)	Ask patient to identify smell (e.g. coffee/perfume)
II	Optic	Sensory	Visual acuity reduced using Snellen types ± ophthalmoscopy: nystagmus Visual fields by confrontation impaired Pupil responses may be impaired	Assess vision in each eye
III	Oculomotor	Motor	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	Check pupil constriction, eye movement
IV	Trochlear	Motor	Diplopia, particularly on looking down Strabismus (squint) No ptosis Pupil normal and normal reactivity	Assess ability to look downwards and inwards
V	Trigeminal	Both	Reduced sensation over face ± corneal reflex impaired ± taste sensation impaired Motor power of masticatory muscles reduced, with weakness on opening jaw; jaw jerk impaired Muscle wasting	Motor: assess patient's ability to clench jaw. Sensory: assess facial response to touch
VI	Abducens	Motor	Diplopia (double vision) Strabismus Lateral eye movements impaired to affected side	Check lateral deviation of eye
VII	Facial	Both	Impaired motor power of facial muscles on smiling, blowing out cheeks, showing teeth, etc. Corneal reflex reduced ± taste sensation impaired	Motor: assess ability to smile, frown, symmetry Sensory: check taste on anterior ⅔ of tongue
VIII	Vestibulocochlear	Sensory	Impaired hearing (tuning fork at 256 Hz) Impaired balance ± nystagmus ± tinnitus	Check balance, hearing
IX	Glosso pharyngeal	Both	Reduced gag reflex Deviation of uvula Reduced taste sensation Voice may have nasal tone	Motor: ask patient to swallow. Check gag reflex. Sensory: check taste on posterior ⅓ tongue
X	Vagus	Both	Reduced gag reflex Voice may be impaired	Check symmetry of soft palate and uvula
XI	Accessory	Motor	Motor power of trapezius and sternomastoid reduced	Ask patient to shrug shoulder against resistance
XII	Hypoglossal	Motor	Motor power of tongue impaired, with abnormal speech ± fasciculation, wasting, ipsilateral deviation on protrusion	Ask patient to stick out tongue

- 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).

Intraoral Examination

Most oral diseases have a local cause and can be recognised 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 for more than 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 pemphigoid, HIV, leukopenia or leukaemia.

Therefore, the examination 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 visualisation with a good source of light is essential (Fig. 2.13); magnifying loupes or microscope help 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). There have been many attempts to improve the visualisation of mucosal lesions, including the use of toluidine blue vital dye and fluorescence, where a light source is used to enhance the visualisation or to identify the optimal site for biopsy. These have not yet proven to be superior to conventional visual examination in terms of specificity or sensitivity. A review of currently available products showed insufficient evidence (Table 2.4). However, 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 vermilion 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 (see Fig. 2.14). Endogenous pigmentation may be present in those of African or Caribbean origin (Fig. 2.15)
- **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. Therefore, the lips feel slightly nodular and the labial arteries are readily felt.
- 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 may be 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.

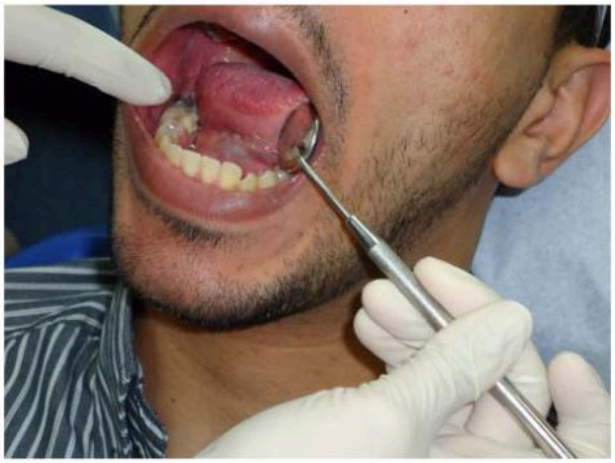

Fig. 2.13 Mouth examination.

Fig 2.14 Sebaceous glands in lips: Fordyce spots.

TABLE 2.4 Summary of Adjunct Methods for Earlier Detection of Potentially 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 moderate specificity 73%—92%	Many studies had methodological flaws
Light-based detection systems	Chemiluminescence	High sensitivity (77%—100%), but low specificity Combination with TB may have better specificity and positive predictive value	Few reliable studies have appeared More studies awaited, especially for precancer
	Tissue fluorescence imaging (VELscope®)	High sensitivity 97%—100% and high specificity 94%—100%	Promising
Exfoliative cytology	Brush biopsy	Moderate 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

Universal

Permanent dentition

1 2 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

- 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 (Chapter 18). 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.

Fig 2.15 Natural pigmentation of lips.

- 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'. This depresses the dorsum of the tongue, and using a mirror, this also permits inspection of the posterior tongue, tonsils and 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 'keratinised' attached gingivae (pale pink) is normally clearly demarcated from the non-keratinised alveolar mucosa (vascular) that runs into the vestibule or sulcus. 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 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.

Oral Disease Scoring Systems

These are now available for many oral mucosal diseases where the presence and severity of disease at each of 17 oral sites is summated to give a severity score (Fig. 2.16). The efficacy of treatment can be assessed by scoring the condition again after treatment. Disease severity scoring systems are tools which can help clinicians assess both the severity of the objective clinical findings as well as the subjective features of the disease, including its impact on patients' lives. There are three essential aspects that are important in defining 'the intensity of the disease': (a) clinical score measuring the level of inflammation, area and specific clinical features (e.g. ulceration); (b) subjective reporting of pain that disease is inflicting; and (c) a questionnaire relating to how the condition affects patients' functioning and their lives (i.e. oral health—related quality of life (OHRQoL)). There are now several validated and universally used tools for oral diseases which should be used at every patient visit.

ORAL DISEASE SEVERITY SCORING

The benefits of a scoring system for mucosal disease severity are that:

- they can indicate the severity of disease,
- they are needed to indicate the efficacy of any treatments,
- they may distinguish between or reveal subgroups of activity,
- they may assist in deciding to implement or withhold treatment,
- they are a routine clinical audit tool which can also be used for research.

Any such oral disease scoring systems (ODSSs) must be objective and reproducible, they should be easy to use and they should be widely applicable. Fortunately, such ODSS have been created and validated and in use for recurrent aphthous ulceration, OLP, pemphigus, mucous membrane pemphigoid, orofacial granulomatosis and dry mouth assessment.

Oral Disease Severity Score for OLP

The ODSS is a comprehensive oral scoring system previously validated for OLP and bullous diseases (Fig. 2.17). In the ODSS, the oral cavity is divided into 17 sites. These sites include outer and inner lips, buccal mucosae, soft and hard palates, oropharynx, floor of mouth and the gingivae in sextants.

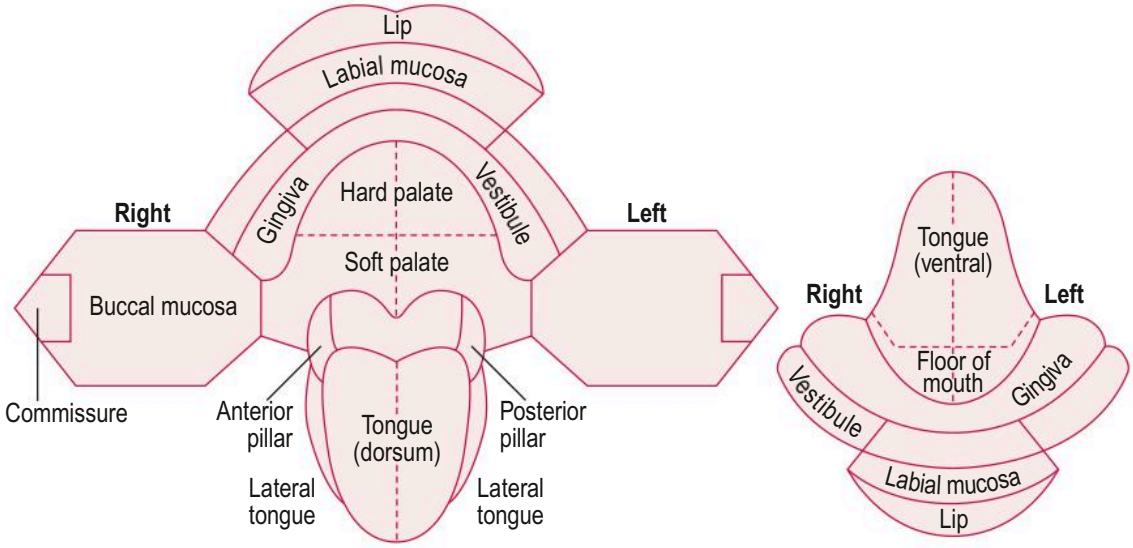

Fig. 2.16 Mouth chart.