4 Treatment

Our universal aim should be to treat every patient as we would wish our families, or indeed ourselves, to be treated.

C Noyek

INTRODUCTION

Many of the conditions seen in oral and maxillofacial medicine practice have systemic manifestations, or they may be seen in patients with medical problems. It is crucial, therefore, always to collaborate closely with the medical and any other attendants in the care of the patient, as well as fully discussing issues with the patient. Clinical risk management concedes that there is an inherent risk in all health-care processes including treatments. This must be discussed with the patient, and informed consent obtained. Risk management should be considered before starting, during, and after treatment. Good communication skills are needed to allow clinicians to show empathy and to provide disclosure. Risk management after an adverse reaction includes skills in acknowledging bad outcomes or error and freedom to say 'sorry' as defined by 'apology laws'.

Some patients have conditions that are amenable to care in a primary care setting, or shared care with a specialist, but those patients who have severe disease, multisystem disease, or who require very sophisticated investigations, medications (see Ch. 5) or therapies are best managed by a specialist and often more than one medical/surgical specialist. Indeed, some orofacial conditions involve not only the mouth but also other mucosae (anogenital, ocular, pharyngeal, etc.), skin, other organs, mental health issues, or complex hospital-based therapies such as medical oncology, and so multi-disciplinary teams can often offer optimal healthcare.

QUALITY OF LIFE (QOL)

QoL is a concept encompassing many aspects, not only wealth, employment and housing, but also physical and mental health, recreation, leisure and social belonging and in healthcare, QoL is often seen in terms of how it is negatively affected, on an individual level, in a chronic debilitating illness such as cancer. Health related quality of life (HRQoL) is a subset of QoL, involving:

- physical functioning
- psychological functioning
- social interaction, and disease
- treatment related symptoms.

QoL can be assessed by interview or patient-completed 'instruments' (questionnaires) which include the:

- visual analogue scale (VAS)
- hospital anxiety and depression scale (HADS)
- short-form McGill pain questionnaire (SFMPQ)
- health related QoL questionnaire (HRQoL)
- oral health impact profile (OHIP-14)
- chronic oral mucosal diseases questionnaire (COMDQ).

EVIDENCE BASED MEDICINE AND TREATMENT

Few treatments available for patients with oral and maxillofacial medical problems have yet been rigorously studied in the disorders in question. The evidence base that guides the use of therapeutic agents in these conditions is therefore very limited. Ethically, this presents a complex challenge. It is difficult to decline care for a patient on the basis that there is no evidence-base. Rather it is essential to offer treatment to patients, and this is clearly the case even where the evidence base is limited, but clinicians must be aware of the danger of inappropriate or over-treatment.

PSYCHOLOGICAL AND SOCIOLOGICAL ASPECTS OF TREATMENT

Treatment is much more than the simple use of a drug or the performance of a procedure; an holistic approach involving the whole psychology of the patient is important. Remember always that patients know whether the clinician cares, well before they care whether the clinician knows all the answers.

Many orofacial conditions are chronic and have no cure, and for a few disorders the prognosis is poor or, fortunately rarely, the condition may even be lethal. Therefore, compassion and patient education and participation are important. Empowering patients allows them to take control of their lives and decisions affecting their wellbeing. Such education and reassurance is always helpful; a supportive and understanding clinician is invariably welcomed by the patient, their partner and family.

It is thus important to:

- do no harm
- manage the patient as a whole, in the context of their individual perceptions, aspirations, general health and social setting

- offer hope - not all conditions can be cured, but most can be controlled or at least ameliorated. General improvements in oral and systemic health also help control symptoms in several other orofacial disorders
- work with the patient and family, and involve the patient in all decisions. Discuss the condition, diagnosis and possible therapies with the patient (and possibly partner and family, provided the patient consents)
- warn of possible consequences (good and bad) of treatment or of no treatment
- obtain express informed consent before any invasive procedure
- offer advice on what patients themselves can do for their problems, including support from family, partners and friends, as well as care groups.

PROVIDING INFORMATION ABOUT TREATMENT

Information about financial issues and the impact of treatment on ability to work, function physically, relationships and quality of life, support from other bodies (e.g. alcohol, smoking or other drug support groups), disease support groups (e.g. cancer help groups or the pemphigus support groups, Sjögren Syndrome Society, etc.) or other information sources (e.g. patient information sheets, the internet) can be helpful. Many drugs used for oral conditions are used 'off-label' and this must be understood by, and agreed with, the patient (Ch. 5).

LIFESTYLE CHANGES

There is no doubt that certain lifestyle habits, such as the use of tobacco products, areca nut products, recreational drugs and alcoholic beverages, should be discouraged, especially in patients with oral mucosal diseases. Indeed, sometimes, the cessation of these habits may lead to resolution of the condition. Diet and/or oral hygiene may also benefit from improvement.

PREVENTIVE CARE

DENTAL BACTERIAL PLAQUE CONTROL

Dental staff should ensure the patient has appropriate oral health education, and maintains particularly good oral hygiene, since the limited evidence available suggests that good plaque control helps the resolution of some lesions as well as gingivitis.

The most important devices in oral hygiene are floss and a toothbrush; many are effective but:

- soft toothbrushes and silica-based toothpastes are least abrasive
- powered toothbrushes may assist oral hygiene especially in those with impaired manual dexterity
- interspace and other toothbrushes can access areas difficult to clean.

Toothpastes are available that offer tooth whitening, plaque control, desensitization, calculus (tartar) control, tooth remineralization and malodour control and some combine all facets (**Table 4.1**).

Antiplaque mouthwashes are commonly used to reduce infection and malodours, particularly if the patient is immunocompromised. Many mouthwashes have only a transient antiseptic activity (**Table 4.2**), but:

- Chlorhexidine digluconate is the most widely used antiplaque agent and is active, especially against Gram-negative rods, it helps control plaque and periodontal disease and has some anticaries and antifungal activity. It has good substantivity (ability to bind to hard and soft tissues and be released over a long period), but binds tannins and thus can cause dental staining if the patient drinks coffee, tea or red wine. Rarely, it causes other adverse effects, including:
  - overgrowth of enterobacteria (e.g. in leukaemic patients)
  - mucosal desquamation
  - hypersensitivity or anaphylaxis
  - salivary gland pain or swelling.
- Triclosan is a chlorinated bisphenol with some substantivity and a broad spectrum of antibacterial activity, and a significant antiplaque effect, without staining the teeth.
- Phenolics, such as Listerine, have some antiplaque effect and do not stain teeth, but have low substantivity.
- Oxygenating mouthwashes may have a place in the control of anaerobic infections, such as necrotizing gingivitis.
- Sanguinarine is marketed for activity against bacterial plaque and malodour, but with low activity in these respects. A toxic alkaloid extracted from some plants, including Bloodroot (*Sanguinaria canadensis*), Mexican Prickly Poppy (*Argemone mexicana*), *Chelidonium majus*, and *Macleaya cordata*, it has, however, also been incriminated in some oral white lesions.

CARIES PREVENTION

A low cariogenicity diet is important (see below). Fluoride is also helpful for anticariogenic activity, especially useful for patients with dry mouth (**Table 4.3**). Fluorides may be usefully applied in the dental office, and daily at home (1% sodium fluoride gels or 0.4% stannous fluoride gels). Young children may need fluoride supplements if their water supply has a low fluoride content. Amorphous calcium phosphate (ACP) may also help. Chewing gum may stimulate salivation and help caries prevention and reduce malodour.

DIET

A healthy balanced diet is indicated to help resolution of oral conditions. In particular:

- Many mucosal lesions are aggravated by irritants, such as tobacco and alcohol, and these also decrease salivary flow and should thus be avoided.
- A softish diet, avoiding toast and potato crisps, spices and acids, such as in tomatoes and citric fruits and drinks, may be indicated whilst a patient has a sore mouth. Foods that can be eaten, however, include:
  - milk and other dairy products, low-fat only
  - cooked, canned, or frozen vegetables
  - cooked or canned fruit with the skin and seeds removed, such as applesauce or canned peaches

Table 4.1 Active principles in toothpastes (dentifrices)

Anticaries	Antibacterials	Anti-hypersensitivity	Anti-tartar	Whiteners	Anti-malodour	Others
Amine fluorides Calcium phosphate Calcium pyrophosphate Calcium trimetaphosphate Nicomethanol fluorhydrate Potassium fluoride Sodium fluoride (NaF) 1450-1500 ppm (< 600 ppm in child paste) Sodium monofluorophosphate (NA_2 $FP0_3$) Stannous fluoride Xylitol	Chlorhexidine Fluorides Hexetidine Hydrogen peroxide Plant extracts Potassium peroxydiphosphate Sanguinarine Siliglycol Sodium bicarbonate Stannous pyrophosphate Triclosan Urea peroxide Xylitol Zinc chloride Zinc citrate Zinc trihydrate	Formaldehyde Potassium citrate Potassium chloride Potassium nitrate Sodium citrate Sodium fluoride Stannous fluoride Strontium chloride hexahydrate Strontium fluoride	Azocycloheptane diphosphonate Gantrez acid (Polyvinyl methyl ether and maleic acid copolymer) Potassium pyrophosphate Zinc chloride Zinc citrate	Benzalkonium chloride Calcium carbonate Calcium phosphates Carboxymethyl cellulose Citroxaine Pentasodium triphosphate Potassium tetra pyrophosphate Sodium benzoate Sodium bicarbonate Sodium tripolyphosphate	Chlorhexidine Triclosan Zinc chloride Zinc citrate	Enoxolone Essential oils Keratin Panthenol Permethol Provitamin B5 Tocopherol Vitamin E

Table 4.2 Some mouthwashes with significant antimicrobial activity

Agent	Dose	Comments*
Chlorhexidine gluconate	0.12–0.2% aqueous mouthwash, rinse for 1 min twice daily. Also 0.5–1.0% gel or spray	A cationic chlorinated bisbiguanide with significant antiplaque and antifungal activity and oral retention; traces can still be found in saliva after 24 h May stain teeth or tissues if patient drinks tea, coffee or red wine
Triclosan	0.03% mouthwash, rinse for 1 min twice daily	A non-ionic chlorinated bisphenolic antiseptic with moderate antiplaque and antifungal activity, but less retention in mouth than chlorhexidine More effective against plaque when with copolymer or zinc citrate
Cetylpyridinium chloride	0.05% mouthwash used twice daily	A quaternary ammonium compound with antiplaque activity, but less than chlorhexidine May stain teeth and cause oral burning sensation or ulceration

*All occasionally may cause mucosal irritation.

Table 4.3 Regime for caries prevention

Eliminate active caries	Restorative dental care
Preventive measures	Patient education Dietary modification Fluorides: 1.23% acidulated fluoride or 2% neutral fluoride gels in 4-min tray applications 4 times daily over 4 weeks; or home fluoride applications by gels or rinses Amorphous calcium phosphate (ACP) Xylitol chewing gum; chew for 5 min 5 times daily Chlorhexidine mouthwashes; 0.2% used twice daily for 1 min
Examine at 3 monthly recall appointments	Reinforce preventive message Monitor restorations Monitor cariogenic micro-organisms (*Streptococcus mutans* testing)

- breads, and pasta made with refined white flour
- refined hot cereals, such as oatmeal and cream of wheat
- lean, tender meats, such as poultry, whitefish, and shellfish that are steamed, baked, or grilled
- creamy peanut butter
- pudding and custard
- eggs
- tofu
- soup, especially broth
- tea.

In persons with dry mouth, pureed non-irritant foods and cool moist fruits, such as melon, are helpful, and patients should consider:

- Eating a soft, high protein moist diet.
- Substituting moist fish, eggs or cheese for red meat.
- Taking food and drinks lukewarm rather than hot.
- Soaking bread and/or rolls in milk or sauces.
- Eating moistened casseroles and meats with gravies, sauces, soups and stews.
- Using sour cream, and half cream as sauce bases (adds calories).
- Blending food and drink.
- Eating yogurt, fresh fruit, powdered milk.
- Eating fruit smoothies/slushies.
- Drinking milk shakes.
- Drinking soy or rice milk.
- Avoiding dry foods (bread, dry meat, pastries, toast and crackers, snack foods that are dry and salty).
- Avoiding citric foods, juices such as tomato, orange, grapefruit based products and sauces.
- Avoiding fizzy sodas and sparkling water.

Although vitamin and iron deficiencies are not common, supplements may be required if the diet is lacking.

SYMPTOMATIC CARE

Specific therapies are not available for all conditions, and the best that can then be offered is the control of symptoms; this is called symptomatic treatment. Attention should be directed to relieving the following (Table 4.4):

- Pain and discomfort: antipyretics/analgesics, such as paracetamol, help relieve pain and a soft diet may help. In mucositis, potent analgesics such as opioids or buprenorphin

Table 4.4 Topical agents that may help reduce pain from mucosal lesions

Agent	Use
Benzydamine hydrochloride	Rinse or spray every 1.5–3 h
Lidocaine	Topical solution or gel may ease pain
Carboxymethylcellulose	Paste or powder used after meals to protect area

may be indicated (see Chs 5 and 54). Erosive or ulcerative lesions can be protected with Orabase or Zilactin. Soft diet and topical agents, such as topical local anaesthetics (e.g. lidocaine) or 0.1% benzydamine mouth rinse or spray, may help symptomatically. Benzocaine should be avoided because of possible hypersensitivity and induction of methaemoglobinaemia. Methaemoglobin (MetHb) reduces the oxygen-carrying ability of erythrocytes and can lead to cyanosis with grey or blue-coloured skin, lips, or nail beds; dyspnoea; fatigue; confusion; headache; nausea; and change in pulse rate within minutes or 1–2 h after the first or several uses of benzocaine. In rare severe cases, methaemoglobinaemia can progress to coma and even to death.

- Fever: paracetamol helps relieve fever and adequate fluid intake is important.
- Malodour (Ch. 9).
- Anxiety: patient information is an important aspect in management and goes a long way to relieve anxiety, but there may need to be reassurance, and sometimes recourse to mild anxiolytics, such as diazepam 2.5 mg or temazepam 5 mg.

SURGERY

This can range from the simple excision of a lump such as a papilloma, to removal of a tooth, or to resection of a malignant neoplasm. Referral to a surgeon may be indicated.

- All surgery is invasive.
- Scalpel, laser or electrosurgery are widely available.
- Only an operator adequately skilled in a procedure should perform it.

OTHER LESS-INVASIVE OR NON-INVASIVE TREATMENTS

These include:

- cryotherapy
- soft laser therapy
- photodynamic therapy (PDT)
- appliances (e.g. splints, tissue conditioning).

DRUG TREATMENT

In UK, registered dentists are legally entitled to prescribe from the entirety of the *British National Formulary* (BNF) and *BNF for Children* (BNFC), but within the National Health Service (NHS) dental prescribing is restricted to those drugs contained within the 'List of Dental Preparations' in the *Dental Practitioners Formulary* (DPF). The National Prescriptions Centre offers guidance (www.npc.co.uk).

The BNF, published by the British Medical Association and the Royal Pharmaceutical Society of Great Britain, includes the DPF is a valuable source of information and advice on therapy. The BNF is revised twice yearly, and only the current issue should be consulted; it is available on the internet. Hand-held devices, such as PDAs can have software such as Epocrates, which holds comprehensive drug data.

Drugs do not necessarily have predictable effects: patients vary in their responses by virtue of various intrinsic or extrinsic factors (**Table 4.5**).

Table 4.5 Some factors influencing drug responses

Intrinsic	Extrinsic
Genetic	Alcohol
Absorption	Climate
Distribution	Culture
Metabolism	Diet
Excretion	Drug compliance
Body weight	Smoking
Enzyme polymorphisms	Stress
Height	Sunlight exposure
Race	
Gender	
Physiological	
Body weight	
Age	
Cardiovascular function	
Diseases	
Height	
Renal function	
Liver function	

Also, always remember the following:

- Avoid any drug if the patient is allergic to it.
- Use the safest drugs; virtually all drugs can have some adverse effects.
- Use only drugs with which you are totally familiar and use their generic (non-proprietary) drug names.
- Check that the prescription is legible, the drug doses, contraindications, interactions and adverse reactions.
- Warn the patient of, and discuss, possible adverse effects or interactions.
- Reduce drug doses for children, older patients and those suffering from liver or kidney disease.
- Consider the possibility of altered drug metabolism. For example:
  - Han Chinese or other Asians with the HLA allele *B*1502* may develop Stevens–Johnson syndrome (Ch. 56) and toxic epidermal necrolysis (Ch. 57) after exposure to carbamazepine or phenytoin
  - Thiopurine methyltransferase or thiopurine S-methyltransferase (TPMT) is an enzyme that metabolizes thiopurines such as azathioprine and 6-mercaptopurine (6MP). Patients who may need these drugs should first have their TMPT activity assayed as patients with low activity (10% prevalence) or absent activity (prevalence 0.3%) are at a heightened risk of drug-induced bone marrow failure.
  - The cytochrome P450 system of enzymes (CYP isoenzymes) in the gastrointestinal mucosa and liver metabolizes many drugs, and various isoenzymes metabolize drugs by oxidation, typically reducing their effect. CYP isoenzymes may have different activities between individuals and ethnic groups; this increases, for example, the activity of some anxiolytics such as diazepam (up to 6% of whites, but up to 23% of Asians are sensitive to diazepam). Antidepressants and analgesics may also be affected. Alcohol and smoking can affect CYP.

    Some drugs, for example erythromycin, inhibit CYP leading to the reduced ability to metabolize drugs, such as ciclosporin.

Grapefruit juice and Seville oranges contain flavenoids that can inhibit CYP and thus increase the activity of, for example, ciclosporin and some protease inhibitors.

Some over-the-counter (OTC) herbal preparations, such as St John's Wort, can induce CYP; they can thus reduce the effect of protease inhibitors, antidepressants, warfarin, anticonvulsants and the contraceptive pill:

- CYP2C9 influences phenytoin and warfarin effects
- CYP2C19 affects diazepam and citalopram
- CYP2D6 affects codeine.

- Avoid drug use in pregnancy and breast feeding, where possible.
- Avoid aspirin for children under 12 years of age, because of the risk of Reye syndrome (Ch. 56), patients with cardiac failure, those with peptic ulcers, or those with bleeding tendencies such as haemophilia or thrombocytopenia and in those taking anticoagulant drugs, since it exacerbates bleeding.
- Avoid NSAIDs in patients with cardiac failure, those with peptic ulcers, or those with bleeding tendencies such as haemophilia or thrombocytopenia and in those taking anticoagulant drugs, since they exacerbate bleeding.
- Avoid metronidazole, azole antifungals and some other antimicrobials in patients on warfarin, since they displace it from plasma proteins and increase bleeding.
- Avoid itraconazole in cardiac failure, as it can exacerbate it.
- Avoid tetracyclines in children under 8 years, pregnancy or breastfeeding, as they can cause tooth discolouration.
- Avoid macrolides (azithromycin, clarithromycin, erythromycin) in people with cardiac disease, as they can cause arrhythmias.
- Avoid intramuscular injections in patients with bleeding tendencies, such as haemophilia or thrombocytopenia, and in those taking anticoagulant drugs, as haematomas can result, and take care with surgery.
- Take care if surgery will involve bone in patients who have been on bisphosphonates, as osteochemonecrosis can result, or in patients who have been irradiated in the head and necks (osteoradionecrosis can arise).

PRESCRIBING FOR CHILDREN

- Doses of all drugs are much lower for children than for adults; always check against the recommended dose per unit body weight (**Table 4.6**).
- Some drugs are contraindicated (e.g. tetracyclines are contraindicated under the age of 7–8 years; also, aspirin is contraindicated in all children under 12 years old) (**Table 4.7**).
- Oral preparations are invariably preferable to injectable drugs.

Table 4.6 Rough guide for prescribing for children

Age of child (years)	Percentage of adult drug dose
1	25
6	50
12	75

Table 4.7 Drugs to avoid in children

Drug to avoid	Comments
Aspirin	May cause Reye syndrome in <12 year olds
Ciprofloxacin	Musculoskeletal damage
Diazepam	Paradoxical reactions
Ibuprofen	Gastrointestinal bleeding; cardiac damage
Nasal decongestants	Tachyphylaxis
Promethazine	Paradoxical reactions in <2 year olds
Sugar-containing medications	May cause caries/obesity
Tetracyclines	Tooth staining in <8 year olds

PRESCRIBING IN PREGNANCY AND DURING BREASTFEEDING

Because of the danger of damage to the foetus, all drugs should be avoided in pregnancy or where pregnancy is possible, unless their use is essential. In particular avoid tetracyclines, which stain teeth, and retinoids and thalidomide, which are teratogenic. The prescriber, patient and pharmacy must comply with regulations in terms of thalidomide: every prescription must be accompanied by a 'prescription authorization form'.

PRESCRIBING FOR THE OLDER PATIENT

- A number of drugs should be avoided for the older patient (**Box 4.1**), notably many drugs affecting the CNS and some NSAIDs.
- Lower drug doses are almost invariably indicated because even in apparently healthy older people, there are changes in body water:fat ratios, and reduced liver and kidney drug clearance, along with increased sensitivity to many drugs. Particular care should be taken when there is the possibility of renal or hepatic dysfunction; this will necessitate substantially reduced drug doses.
- Compliance may be poor.

DRUGS AND FOOD ABSORPTION

Most oral drugs are best given with or after food. However, oral drugs that should be given at least 30 min before food, since their absorption is otherwise delayed, include:

- aspirin
- erythromycin

BOX 4.1 Drugs to avoid in older patients (Beers criteria)

- Amitriptyline
- Benzodiazepines
- Chlorphenamine
- Doxepine
- Imipramine
- Indometacin
- Meperidine
- Naproxen
- Piroxicam
- Pentazocine
- Promethazine
- Propoxyphene

- paracetamol
- penicillins (including ampicillin and amoxicillin)
- rifampicin
- tetracyclines (except doxycycline).

Grapefruit juice disturbs the absorption and metabolism of some drugs and, therefore, should be avoided by persons taking:

- ciclosporin,
- calcium channel blockers (e.g. nifedipine)
- terfenadine.

PRESCRIBING IN DIFFERENT CULTURES

Some key concerns for different groups of patients are set out in **Table 4.8**.

Alcohol (ethanol) is used widely in pharmaceutical formulations as an antimicrobial preservative or as a solvent and may be unacceptable to Muslims and some other patients.

Gelatin is made of protein derived from animal bones, cartilage, tendons and other tissues, such as pigskin. The other most commonly used agents of animal derivation are insulin, heparin and haemostatic agents, such as blood coagulation factors and topical agents. Such products may be contraindicated for use on religious or cultural grounds.

Some artificial saliva preparations contain animal mucin, which may be unacceptable on religious grounds to some Muslims, Hindus, Jews and Rastafarians. Products containing carboxymethylcellulose may then be preferred.

Most oral healthcare products are licensed only as 'cosmetics', which are less rigorously tested than pharmacological products, although they must still be labelled with all active and inactive ingredients. Toothpastes fall into this category. Some oral healthcare products are licensed as pharmacological products and because they must be labelled with all ingredients – active and inactive – this readily affords the opportunity to avoid certain religious and ethnic group restrictions. Some mouthwashes contain colourants or excipients that may be animal derivatives and many contain alcohol, which may raise objections on religious grounds, although the objections are not always well-founded, when the religious rules are consulted. Some toothpastes may contain 'glycerin', manufactured synthetically or derived from animal fat, and this may not be included in the ingredients. Oral healthcare products that might contain animal derivatives could include some:

- analgesics
- antimicrobials
- bone fillers
- colourants
- drug capsules
- emulsifiers
- haemostatic materials
- polishing (bristle) brushes
- prophylaxis pastes
- toothpastes
- waxes.

Table 4.8 Main concerns about drugs and healthcare products for certain groups of patients

Groups	Main concerns
Buddhist	Animal and genetically modified (GM) products
Catholics	GM derivatives and those developed by foetal experimentation
Jehovah's witnesses	Not able to accept food and products that may contain blood or blood derivatives
Hindus	Gelatin-containing products, animal products and alcohol
Jains	Strict vegetarians, but will not eat root vegetables. Some patients, particularly those who follow vegan or vegetarian diets, may object to the use of animals to meet the needs of humans.
Muslims	Porcine and bovine derivatives, alcohol, non-Halal animal derivatives, E numbers derived from porcine products, and emulsifiers derived from animals
Jews	Products derived not only from pork, but also from any animal that had not been slaughtered according to Jewish law (Kosher). Devout Jews may wish to avoid alcohol
Sikhs	Beef and its derivatives

Use of healthcare products and consumables produced through exploitation of animal, if production has involved cruelty to animals or animal research, or exploitation of resource-poor or otherwise disadvantaged people may upset some people.
From Scully C, Wilson N 2005 Culturally sensitive oral healthcare. Quintessence Publications.

ADVERSE REACTIONS TO DRUGS

No drug should be used unless there are good indications since almost any drug may produce unwanted or unexpected adverse reactions (side-effects). Some produce oral adverse reactions. The true incidence of adverse drug reactions is often not known, and many adverse reactions are probably not, at present, recognized as drug-related.

A full medical history should always be taken and questions should be asked specifically about drug use (including over-the-counter preparations) and adverse drug reactions, since the medical status may influence the choice of drugs used. G6PD deficiency must be excluded before using dapsone. TPMT must be assayed before azathioprine use. HLA-B1502 testing is necessary before carbamazepine use. Polypharmacy should be avoided and practitioners should use only drugs with which they are familiar.

Patients should be warned if serious adverse reactions are liable to occur (e.g. systemic corticosteroids), and provided with the appropriate warning card to carry.

After injections, there is always a small chance that anaphylactic shock or a vasovagal attack may occur.

ORAL USE OF DRUGS

The oral route is generally the preferred route for drug administration.

SUBCUTANEOUS INJECTION OF DRUGS

Subcutaneous injections can be given into a skin fold, pinched up over the anterior abdominal wall or anterior thigh, with

vertical insertion of a 25 G (orange hub) needle and are used for injection of drugs such as:

- insulin
- heparin
- opiate analgesics.

INTRAMUSCULAR INJECTION OF DRUGS

This is used to obtain a more rapid effect than a subcutaneous injection, or where intravenous injection is impractical or carries a greater risk of anaphylactic or cardiac stimulant reaction. A 23 G (blue hub) needle is used. Intramuscular (i.m.) injection is used for:

- epinephrine (adrenaline) in the emergency treatment of anaphylactic shock or cardiac arrest
- glucagon, in the emergency treatment of hypoglycaemia
- antipsychotics (e.g. chlorpromazine, haloperidol) in the emergency treatment of acute psychoses
- midazolam or diazepam in the management of epileptic fit (buccal midazolam is superseding this)
- antimicrobials.

Adverse effects of intramuscular injections include the following:

- pain
- bruising, due to local haematoma formation. Intramuscular injections are contraindicated in patients with bleeding tendencies (e.g. haemophilia or induced by anticoagulant therapy)
- nerve damage, which may lead to paralysis, especially in bleeding disorders. This risk is minimized by using either the side of the thigh, or the upper, outer quadrant of the gluteus maximus muscle in the buttock or the deltoid muscle in the upper, outer arm
- collapse, usually due to a faint
- anaphylactic shock, especially after injections with antimicrobials, such as penicillins. The patient should be observed for 30 min after the injection, with facilities for resuscitation available.

INTRAVENOUS INJECTION OF DRUGS

Intravenous (i.v.) injection is used to achieve a rapid effect in emergencies, for example:

- epinephrine (adrenaline) in the management of cardiac arrest only
- diazepam in the management of status epilepticus
- heparin in the management of acute pulmonary embolism.

I.V. infusion through an indwelling catheter is used:

- when administration by other routes is not possible (e.g. blood transfusion, or fresh frozen plasma or coagulation factor concentrates)
- for hydration with intravenous fluids (e.g. saline or dextrose) when oral intake of fluids is not possible (e.g. unconsciousness or semiconsciousness, impaired swallowing (e.g. after stroke), vomiting, or fasting prior to surgery or other procedures)
- for antimicrobial treatment of severe infections or prophylaxis when using, for example, vancomycin.

Veins preferred for i.v. injections are those in the antecubital fossa, the preferred sites for infusions are the forearm or dorsal hand veins (which allow joint mobility). Note that:

- following insertion of the needle (usually 21 G (green hub) or 23 G (blue hub)) or catheter, the fact that the needle is in a vein and not elsewhere should be confirmed by aspiration of blood and by the absence of local pain or swelling on injection or infusion of a small amount of the material to be administered
- intravenous catheters should be taped in place, and sterile precautions (and rotation of catheter sites) observed to minimize the risk of local thrombosis and sepsis
- when prolonged IV access is required (e.g. in treatment of endocarditis or malnutrition), a central venous catheter can be inserted (under full sterile conditions) into the internal jugular or subclavian veins. Such Hickman lines (central catheters) are also useful in monitoring central venous pressure and fluid replacement in circulatory shock.
- The patient should be observed for 30 min after the injection, with facilities for resuscitation available.

REFERRAL TO A SPECIALIST

Referral may be indicated when the practitioner is faced with:

- a complicated or serious diagnosis (especially cancer, HIV infection, pemphigus, Behçet syndrome)
- a doubtful diagnosis
- a patient who has extraoral lesions or other indications of possible systemic disease
- a situation where investigations are required, but not possible or appropriate to carry out in general practice
- a situation where therapy may not be straightforward and may require potent agents
- a situation where drug use needs to be monitored with laboratory or other testing (e.g. for liver functional disturbances)
- a patient who needs access to an informed opinion or care outside normal working hours.

Should referral be required, it should always be in writing, giving a concise background to the referral (**Fig. 4.1**), including:

- patient's last name, first name(s), date of birth, full address and telephone, mobile phone, fax and e-mail where possible; primary care medical practitioner's name, address and telephone, fax and e-mail
- referring clinician's name, address, telephone, fax and e-mail
- referral urgency (real or perceived), reason, relevant history and findings
- provisional diagnosis
- treatment already offered
- relevant medical, dental and social history
- any special needs such as transport or translator.

PATIENT REFERRAL FORM (to be completed by referring CLINICIAN)

1. PATIENT

LAST Name: ..... First Name(s) .....

Date of Birth: ..... Address: .....

.....

Postcode: .....

Telephone: (Home) ..... (Work) .....

(Mobile) ..... (Fax) .....

Gender: M/F ..... Hospital No. (if known) .....

2. REFERRING CLINICIAN

Name: ..... Telephone No.: .....

Address: .....

..... Postcode: .....

Fax: ..... E-mail: .....

3. REFERRAL

Urgency with which you wish patient to be seen: if possible

Immediately ☐ within: 2 weeks ☐ within: 3 months ☐

Patient's main complaint .....

Purpose of referral: ..... for advice only ☐ for advice and care ☐

Comments .....

.....

4. HISTORY

Dental Specify ..... No ☐ Yes ☐

Medical: does the patient have

	No	Yes		No	Yes		No	Yes
Allergies			Bleeding tendency			Medication		
Heart problems			Diabetes			Any other problem		

Detail .....

.....

Other (Specify) .....

.....

Please enclose other relevant information such as medication, radiographs, study casts, lab results (if available)

.....

Date: ..... Signature of Referer: .....

Fig. 4.1 Referral form

FURTHER READING

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