DIPLOMA OF PRIMARY CARE DENTISTRY

-RCSI-

PART – 1

CLINICAL SKILLS

PART 7: THERAPEUTICS RELEVANT TO DENTISTRY

❖ DENTAL THERAPEUTICS:

⇒ Prescribing in general dental practice:

 Good prescribing:

ω Avoid abbreviations and write drug names legibly, using the generic name whenever possible.

ω Always describe the strength and quantity to be dispensed.

ω When describing doses, use the units' micrograms, milligrams, or millilitres when possible.

ω Do not abbreviate the term microgram or unit (when prescribing insulin) as these are easily misinterpreted.

 Controlled drugs:

- Each prescription must show the name and address of the patient, and the form, strength, dose, and total quantity of the drug to be dispensed, in both words and figures.
- When writing in general practice, the prescription must also incorporate the phrase 'for dental treatment only'.

 Prescribing in the elderly:

- Doses may need adjustment and are often substantially lower than for adults (often 50% lower).

 Prescribing for children:

- Children differ markedly from adults in their response to drugs, especially in the neonatal period when all doses should be calculated in relation to body weight.
- Older children can usually be prescribed for in age ranges, usually up to 1yr, 1–6yrs, and 6–12yrs.

Table 14.1 Dose and route abbreviations

Dose		Route	
od	once a day	IM	intramuscular
mane	in the morning	INH	inhalation
nocte	at night	IV	intravenous
bd	twice daily	NEB	nebulization
tds	three times daily	PO	by mouth
qds	four time daily	PR	per rectum
prn	as required	PV	per vagina
		SC	subcutaneous
		SUB	sublingual
		TOP	topical

Analgesics in general dental practice:

1. **Aspirin**:

- Used in mild to moderate pain, it is also a potent antipyretic, which should not be used in children <12 2yrs (due to the rare but serious risk of Reye syndrome).
- Avoid in bleeding diathesis, gastrointestinal ulceration, and concurrent anticoagulant therapy.
- Ask about aspirin allergy, particularly in asthmatics.
- Often causes transient gut irritation (as do all NSAIDs).
- Dose: 300–900mg 4–6-hourly PO.
- **Maximum 4g per day.**
- Topical salicylate gels are now C/I in those aged <16yrs.

2. **Ibuprofen:**

- Popularly used for mild to moderate pain; has a moderate antipyretic action.
- Risks and side effects are similar to those of aspirin but less irritant to the gut.
- **Dose: 300–600mg qds PO.**

3. **Paracetamol:**

- Similar in analgesic efficacy to aspirin but has no anti-inflammatory action and is a moderate antipyretic.
- Does not cause gastric irritation or interfere with bleeding times.
- Overdosage can lead to liver failure.
- **Dose: 1000mg 6-hourly PO** (maximum dose 4g/24h in adults).

4. **Carbamazepine**
5. **Opioid analgesics:**
   - The opioids act centrally to alter the perception of pain but have no anti-inflammatory properties.
   - They are of value for severe pain of visceral origin, post-operatively (acting partly by sedation), and in terminal care.
   - However, they all depress respiratory function and interfere with the pupillary response and are C/I in head injury.
   - All opioids cause cough suppression, urinary retention, nausea, constipation by a d ecreasedmin gut motility, and tolerance and dependence.
   - The risk of addiction is greatly overstated when these drugs are used for short-term post-operative analgesia and in the terminal care context.
   - Fear of creating drug dependence should never cause to withhold adequate analgesia.

Anti-inflammatory drugs:

- These are among the groups of drugs that may be either analgesics or co-analgesics (drugs which are not analgesic in themselves but may aid pain relief either directly or indirectly).
- The two major groups are the NSAIDs and the corticosteroids.
- Steroids are used in various forms, topical, oral, intralesional, and paren□teral, and all have uses in dentistry.

❖ Topical steroids:

- Hydrocortisone mucoadhesive buccal tablets 2.5mg lozenges dissolved in the mouth qds.
- Benzydamine: A topically active NSAID.
  - ◊ Used as a spray or mouthwash to decrease pain from inflammatory mucosal conditions.
  - ◊ 0.15% benzydamine hydrochloride mouthwash or spray, 4–8 sprays every 1.5–3h or 15mL gargle every 1.5–3h.
  - ◊ Can dilute with an equal amount of water if stinging, not usually required for >7 days.

- Betamethasone: Prepared as a 0.5mg betamethasone phosphate soluble tablet dissolved in 20mL water. Rinse around mouth qds, don't swallow.
- Hydrocortisone: 1% and oxytetracycline 3% Ointment is a useful Rx for aphthae and related conditions seen in hospital.

❖ Intralesional steroids:

- Triamcinolone acetonide 1mL (40mg) injected into lesion.
- Needs LA.
- Used in granulomatous cheilitis, intractable lichen planus, keloid scars, and painful postsurgical trigger spots.

❖ Systemic steroids:

- Main indication is prophylaxis in those with actual or potential adrenocortical suppression.
- Occasionally used in erosive lichen planus, severe aphthae, Behçet's disease, or arteritis.

→ Hydrocortisone sodium succinate:

- This is used for prophylaxis; dose 100mg IM 30min pre-operatively.
- Doubts exist about the need for this unless the patient has demonstrated adrenocortical insufficiency (short Synacthen® test).

→ Prednisolone:

- 10–20mg PO as enteric-coated tablets given with food.
- Regimen dependent on the condition treated.

→ Methylprednisolone:

- 2–40mg daily by mouth, 10–500mg IM/IV.
- Various regimens described for control of oedema, post major surgery.

→ Dexamethasone (4mg/mL.):

- Various regimens described for control of oedema, post-surgery.

❖ **Other immunosuppressants:**

→ Azathioprine and thalidomide: These are sometimes used in specialist centres. Topical tacrolimus in carboxymethylcellulose base is used for erosive lichen planus.

Antidepressants:

- This is another group of drugs which can be used as co-analgesics.
- In conditions such as atypical facial pain they may be used as the sole 'analgesic'.
- There has been considerable debate about the potential interactions between the commonest antidepressants, the tricyclics, and the monoamine oxidase inhibitors (MAOIs), and adrenaline contained in LA (which constitutes the most commonly professionally administered drug anywhere).
- To date, there is no clinical evidence of dangerous interactions between the adrenaline in LA preparations commonly used in dentistry and the tricyclics or the MAOIs.

  - Amitriptyline also used for neuropathic pain.
  - Dosulepin
  - Nortriptyline
  - Selective serotonin re-uptake inhibitors (SSRIs)

Antiemetics:

- The common indication is the control of post-operative nausea and vomiting, which may be due to the procedure, anaesthetic, post-operative analgesia, or blood in the stomach.
- Prochlorperazine
- Metoclopramide
- Domperidone
- Ondansetron
- Cyclizine

Anxiolytics, sedatives, hypnotics, and tranquillizers:

◊ The short-term control of fear and anxiety associated with dental Rx is an entirely appropriate use of the benzodiazepines.
◊ It should not be confused with the long-term control of anxiety which is rife with problems of dependence and drug withdrawal.
◊ A benzodiazepine may also be a valuable adjunct in the management of TMD, where it acts as both a muscle relaxant and an anxiolytic.

A. Benzodiazepine:

◊ Like all benzodiazepines, it can cause respiratory depression, therefore patients should be warned not to drive or operate machinery while on this drug.
◊ Dose for anxiety/TMD: 2mg tds, maximum 30mg in divided daily doses.
◊ Dose for sedation with LA: 5–10mg PO 1–2h before procedure.
◊ Paradoxical disinhibition may occur in children and its use in those <16 years is not advised.
◊ Diazepam in lipid emulsion (Diazemuls) has traditionally been used in status epilepticus

B. Midazolam:

◊ This is a water-soluble benzodiazepine of about double the potency of diazepam.
◊ Its main use is in IV sedation.
◊ Midazolam may be given in an oromucosal solution form (or the IV preparation) by buccal topical administration.
◊ Also, popular as a paediatric sedative for suture removal.
◊ Dose for sedation: slow IV initially 2–3.5mg 5–10min before procedure at 2mg/min, increase in 1mg steps if required.
◊ Usually total dose 3.5–5mg/ Maximum 7.5mg per course.

Antibiotics:

→ When prescribing, consider:

a. The patient
b. The likely organisms
c. The best drug.

→ Patients influence choice, in that they may be allergic to various drugs, have hepatic or renal impairment, be immunocompromised, be unable to swallow, be pregnant or breastfeeding, or taking an oral contraceptive; consider also the age and severity of the infection.

→ The infecting organism should ideally be isolated, cultured, and its sensitivity to antibiotics determined, but this is only feasible in hospital practice.

→ In reality, most infections are treated blind, therefore it is essential to know the common infecting organisms in your field, and their sensitivities.

a. Amoxicillin:

- This has a broad spectrum like ampicillin but is better absorbed and achieves higher tissue concentrations.
- Dose: 500mg tds PO.
- Both ampicillin and amoxicillin cause a maculopapular rash in patients with glandular fever, lymphatic leukaemia, or possibly HIV infection (this is not true penicillin allergy).
- Amoxicillin was the drug of choice in prophylaxis against infective endocarditis.
- May interfere with the action of oral contraceptives.
- All penicillins decrease excretion of methotrexate, therefore, increase risk of toxicity.

b. Tetracycline:

- One of a group of broad-spectrum antibiotics with a problem of increase bacterial resistance.
- It is likely to promote opportunistic infection with Candida albicans, particularly when used topically, as has been recommended for the Rx of aphthae.
- Other problems are the deposition of tetracyclines in growing bone and teeth, causing staining and hypoplasia (therefore avoid in children 24h).
- Dose: up to 5mg/kg monitored use local guidelines.

c. Erythromycin:

- A similar spectrum to penicillin, but bacteriostatic.
- Active against penicillinase-producing organisms.
- Formerly an alternative to amoxicillin for endocarditis prophylaxis (clindamycin).
- Nausea is a major problem.
- Dose: 250–500mg qds PO/IV.

d. Oral cephalosporins:

- Of little value in dental practice, but cefalexin 250mg qds or 500mg bd PO and cefradine 250–500mg qds PO are prescribable.

e. Clindamycin:

- Should be used cautiously in the management of dental infections, due to the risk of antibiotic-induced colitis.
- Useful in staphylococcal osteomyelitis in conjunction with metronidazole (which inhibits overgrowth with Clostridium difficile).
- Has replaced erythromycin for single-dose prophylaxis of infective endocarditis.
- Dose: 150mg qds.

f. Metronidazole:

- An anaerobicidal drug, and as such effective in many acute dental and oral infections.
- Classical dose for NUG is 200mg tds PO for 3 days.
- For other anaerobic infections is more often used as 400mg bd/ tds (depending on severity) PO. Available as tablets, IV infusion, or suppository.
- Main problem is severe nausea and vomiting if taken in conjunction with alcohol (disulfiram reaction).
- It is not effective against aerobic bacteria.

g. Co-amoxiclav:

- Co-amoxiclav is amoxicillin plus clavulanic acid.
- The latter destroys beta-lactamase (penicillinase) and hence widens the range of amoxicillin to include the commonest cause of resistance in infections of the head and neck.
- Dose: 375mg or 625mg (same amount of clavulanic acid but double amoxicillin) tds PO or 600–1200mg tds IV.
- Problems as for amoxicillin.

h. Vancomycin:

- A unique bactericidal antibiotic.
- Two main uses are orally in the Rx of antibiotic-induced colitis (125mg qds 10 days PO), and for prophylaxis of patients at high risk from infective endocarditis.
- Ototoxic, nephrotoxic, prone to cause phlebitis at infusion sites, and makes people feel generally unwell, therefore, not to be used lightly.

Antifungal and antiviral drugs:

➲ Antifungals:

- Nystatin:
  - Available as mixture.
  - Dose: 100,000 units qds using 1mL of the mixture and holding it in the mouth before swallowing.
- Miconazole:
  - This is a useful drug, particularly in management of angular cheilitis, as it is active against streptococci, staphylococci, and Candida.
  - Miconazole oral gel 24mg/mL is of use in chronic mucocutaneous and chronic hyperplastic candidosis.
  - Dose: 2.5mL qds 20mg/g gel.
  - Miconazole cream is used topically for angular cheilitis.
- Fluconazole:
  - Available in both PO and IV formulations for severe mucosal candidosis in both normal and immunocompromised patients as a second-line treatment to topical preparations.
  - Avoid in pregnancy.
  - Dose: 50mg od PO for 7–14 days.
  - There are recognized potentially serious interactions between miconazole, fluconazole, and related drugs and antibacterials, anticoagulants, antidiabetics, antiepileptics, antihistamines, anxiolytics, cisapride, ciclosporin, and theophylline.

Antivirals:

- Most viral infections are treated symptomatically.
- Herpes labialis is the viral condition most often seen and treated by dentists.

- Aciclovir Active against herpes simplex and zoster; relatively non-toxic and can be given systemically or topically. Dose: herpes labialis: apply 5% aciclovir cream to site of prodromal or early lesion 4-hourly for 5 days; herpetic stomatitis: 200mg PO (400mg in immunocompromised) five times daily for 5 days; herpes zoster: 800mg PO five times daily for 7 days.

Oral anticoagulants and antiplatelets:

1. Warfarin:

- ◊ Many regions' oral and maxillofacial surgery routine practice is to perform extractions as normal for patients on warfarin with an INR 4 should be referred to their anticoagulant clinic or physician.
- ◊ Patients requiring multiple extractions or with other significant co-morbidities should be seen in an area which can provide a higher level of care.
- ◊ Local haemostatic measures should be taken to achieve haemostasis following extractions, such as packing the socket with oxidized cellulose and suturing gingivae with local pressure.

2. Novel oral anticoagulants (NOACs):

- ◊ While warfarin is still one of the most widely used anticoagulants, there is now a group of newer oral anticoagulants including dabigatran (direct inhibitor of thrombin, a coagulation factor), apixaban, and rivaroxaban (inhibit factor Xa of the coagulation cascade).
- ◊ Monitoring is not normally required for these newer drugs and an INR pre-treatment is not required.
- ◊ However, as with warfarin, local measures should still be taken to achieve haemostasis.
- ◊ Patients taking a NOAC undergoing a dental procedure with a higher risk of bleeding complications may be advised to miss (apixaban/dabigatran) or delay (rivaroxaban) their morning dose on the day of treatment.

3. Antiplatelets:

- ◊ Two new-generation antiplatelet drugs include prasugrel and ticagrelor, both alternatives to clopidogrel.
- ◊ It is advised that treatment is completed without interrupting antiplatelet medication.
- ◊ Local guidelines should always be consulted and if unsure the patient's GMP or specialist should be contacted for advice.

⇒ Precautions:

- Consultation with GMP or specialist.
- If time-limited course of medication, delay non-urgent, invasive procedures until no longer taking the medication.
- Stage treatment, starting with a single extraction.

- Treat early in the day and week (allowing time for management of prolonged bleeding).
- Atraumatic technique.
- Local measures for haemostasis (suture, oxidized cellulose pack, pressure).
- Provide verbal and written post-treatment advice and emergency contact details.

Bisphosphonates:

- These are a range of drugs which act on osteoclasts and reduce the rate of bone turnover.
- They bind to hydroxyapatite and their effect is extremely long term (up to 10yrs).
- They are an important group of drugs in the prophylaxis and treatment of osteoporosis, steroid-induced osteoporosis, Paget's disease, bone metastases (particularly breast, myeloma, and prostate), and hypercalcaemia of malignancy.
- They come in differing degrees of potency, non-nitrogen-containing oral preparations being the least potent and nitrogen-containing IV preparations being the most potent.
- Bisphosphonate-related osteonecrosis of the jaws (BRONJ aka BRON aka anti-resorptive-related osteonecrosis of the jaws (ARONJ)) is a condition where alveolar bone is exposed in the mouth in patients taking these drugs.
- Prevention is the most useful management strategy and all patients prior to starting bisphosphonates should have optimum dental health established such that it is highly unlikely they will ever need to have a tooth removed in the future.
- The nearest comparable approach is in the prevention of osteoradionecrosis.

⇒ **Denosumab:** is a human monoclonal antibody that inhibits osteoclast formation, function, and survival.

- It is used in the treatment of osteoporosis, bone metastasis, and a number of other conditions that result in increased bone turnover.
- It is only available in IV form and is considered a million times more potent than etidronate.
- Denosumab and other non-bisphosphonate drugs such as anti-angiogenic drugs bevacizumab, sunitinib, and aflibercept still have the potential to cause bone necrosis.
- This is known as 'medication-related osteonecrosis of the jaw' or 'MRONJ'.

Table 14.2 Bisphosphonate preparations currently available and their relative potency

	Primary indication	Nitrogen containing	Dose	Relative potency
Disodium etidronate	Paget's disease	No	5mg/kg Daily for 6 months	1
Sodium clodronate	Myeloma Bone metastases (breast)	No	1600mg Daily	10
Tiludronic acid	Paget's disease	No	400mg daily For 3 months	50
Alendronic acid	Osteoporosis	Yes	10mg/day 70mg/week	1000
Risedronate sodium	Osteoporosis	Yes	5mg/day 35mg/week	1000
Ibandronic acid	Osteoporosis Bone metastases	Yes	150mg PO/month 3mg IV/3-monthly 50mg PO od 6mg IV/3-weekly	1000
Disodium pamidronate	Bone metastases	Yes	90mg/3 weeks	1000–5000
Zoledronic acid	Bone metastases	Yes	4mg/3 weeks	10,000+

Miscellaneous:

- Several drugs not fitting into any specific category are important in managing oral and dental disease.
- These include the following:

1. Carbamazepine:

- Primarily an antiepileptic drug which is of considerable value in the management of trigeminal and glosso-pharyngeal neuralgia.
- C/I in those sensitive to the drug, patients with atrioventricular conduction defects, porphyria, and should be used with extreme caution in patients on MAOIs, who are pregnant, or who have liver failure.
- May interfere with the oral contraceptive.
- Common unwanted effects are gastrointestinal disturbances, dizziness, and visual disturbances.
- Rarely, rashes may occur, as can leucopenia.
- Maximum 1600mg daily in divided doses.
- It is important to be sure of your diagnosis before starting patients on long-term carbamazepine.

2. Vitamins:

- There is no indication for first-line Rx with vitamins in dental practice.
- Although it can occur in the elderly and alcoholics, these people should be fully investigated and not treated empirically.
- Severe gingival swelling, stomatitis, glossitis, or pain should be fully investigated before using vitamin supplements.

3. Artificial saliva:

- Valuable adjunct in the management of xerostomia, especially after radiotherapy and in Sjögren syndrome.
- A slightly viscous, inert fluid which may have a number of additives, such as antimicrobial preservatives, fluoride, flavouring, etc.
- Useful preparations are Glandosane® and Saliva Orthana®, aerosol sprays sprayed sublingually 4–6 times per day. The latter contains fluoride.

4. **Topical anaesthetics**:
   - Two main uses:
     a. For preparation of a site prior to injection, e.g. of LA. Lidocaine 5% ointment or spray is the most useful. Flavoured benzocaine pastes are available in some countries.
     b. EMLA® and tetracaine (Ametop®) can be used on mucosa.

5. **Fluoride supplementation**

6. **Retinoids**:
   - These are used in some centres to manage erosive lichen planus and leucoplakia; they have proved disappointing.

Contraindications of common drugs:

Table 14.3 Contraindications of common drugs

Common drugs with relative C/Is in renal disease	Common drugs with relative C/Is in liver failure
Aspirin	Aciclovir (↓ dose)
All benzodiazepines	All penicillins (↓ dose)
All opioids	All opioids
All sedatives	Amphotericin
All antihistamines	Cephalosporins (↓ dose)
All NSAIDs	Co-trimoxazole (↓ dose)
Erythromycin	Benzodiazepines (↓ dose)
Metronidazole (↓ dose)	NSAIDs
Paracetamol	Tetracyclines
Tetracyclines	
Fexofenadine	
Common drugs with relative C/Is in pregnancy	**Common drugs with relative C/Is in breastfeeding**
Aspirin	Antihistamines
Benzodiazepines	Aspirin
Carbamazepine	Benzodiazepines
All opioids	Carbamazepine
Co-trimoxazole	Co-trimoxazole
NSAIDs	Metronidazole
Metronidazole	Tetracyclines
Tetracyclines	

Emergency drugs:

Table 14.4 Emergency drugs

Oxygen	Cylinder size D (3401) or E (6801) plus reducing valve, flow meter, tubing, and oxygen mask
Adrenaline	1mg in 1mL (1:1000) solution (IM injection)
Hydrocortisone sodium succinate	100mg powder, plus 2mL water for injection (IM injection)
Chlorphenamine maleate	10mg in 1mL solution (IM injection)
Glucagon	1mg powder, plus 1mL water for injection (IM injection)
Glucose or sugar	Drink, tablets, or gel (PO administration)
Salbutamol inhaler	0.1mg per dose (INH administration)
Glyceryl trinitrate	0.5mg tablets (rarely kept as has short shelf-life) or 0.4mg per dose spray (sublingual administration)
Aspirin	300mg tablets (PO administration)
Midazolam	10mg in 2mL solution (IV/IM injection)