BDS4

Drugs in Dentistry 2

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Objectives

1- Drugs for medical emergencies
2-Rational use of the antibiotic
3-WHO's cancer pain ladder for adults
4-Bisphosphonate-related osteonecrosis of the jaw (BRONJ)

The current recommended drugs for medical emergencies are:

- Adrenaline, 1-ml ampoules of 1:1000 solution for intramuscular (i.m.) injection

- Aspirin, 300 mg dispersible tablets

- Glucagon, for i.m. injection of 1 mg

- Glyceryl trinitrate (GTN) spray, 400 µg per

• Midazolam buccal liquid, 10 mg/ml, or midazolam injection (as hydrochloride) 5 mg/ml 2-ml ampoules

• Oral glucose (there are several alternative forms, including non-diet fizzy drinks, glucose gel, powdered glucose and sugar lumps)

• Salbutamol inhaler, 100 μg per actuation

In addition, dental practices might wish to stock the following to aid the management of patients with mild allergic reactions:

- Cetirizine 10 mg tablets or oral solution (5 mg/5 ml)

- Chlorphenamine, 4 mg tablets or oral solution (2 mg/5 ml)

Rational use of the antibiotic

Prophylaxis or therapeutic

Concept of surgical prophylaxis in Oral and Maxillofacial Surgery

The decision to use prophylactic antibiotics in noninfected cases should also be based on whether patients have any significant medical risk factors that could adversely affect their humoral and cellular immune mechanisms

Concept of prophylactic antibiotic in UK

Prophylactic antibiotic to prevent the bacteraemia that accompanies tooth extraction is not recommend anymore in UK.

There is no consistent association between having an intervention, dental or non-dental, and the development of IE.

Regular tooth brushing almost certainly presents a greater risk of IE than a single dental procedure because of repetitive exposure to bacteremia with oral flora.

The clinical effectiveness of antibiotic prophylaxis is not proven.

Concept of prophylactic antibiotic in USA

1-Prosthetic cardiac valves, including homografts

2-History of infective endocarditis

3-Cardiac transplant with valve regurgitation due to a structurally abnormal valve

4-Unrepaired cyanotic congenital heart disease, including palliative shunts and conduits

5-Repaired congenital heart defect with residual shunts or valvular regurgitation

Dental Procedures

Prophylaxis is recommended for the patients that involve

1-Manipulation of gingival tissue or the periapical region of the teeth,

2-Perforation of the oral mucosa.

The antibiotic be given before the procedure. This is important because it allows the antibiotic to reach adequate blood levels.

If the patient is already taking antibiotics for another condition. The dentist can select an antibiotic from a different class than the one the patient is already taking. For example, if the patient is taking amoxicillin, the dentist should select clindamycin, azithromycin or clarithromycin for prophylaxis.

Concept of surgical prophylaxis in healthy patient

Most oral surgical procedures in general dental practice and in the clinical practice involves simple or complicated extraction of teeth, preprosthetic hard tissue. Clean procedures usually do not have risk of postprocedural infections.

Wound classification

Type of wound	Characteristic	Examples
Clean	Free from microorganisms	Heart surgery
Clean contaminated	Non-significant contamination and less than 6h elapsing until medical care	Biliary and gastric surgeries
Contaminated	Without local infection and more than 6h elapsing until medical care	Colon surgeries
Infected	Intense inflammatory reaction and frank infectious process	Appendicitis and colecistitis

Concept of surgical prophylaxis in healthy patient

Preoperative antibiotic prophylaxis for routine third molar surgery in medically fit patients is unwarranted. It was also found that a single dose of metronidazole was ineffective in preventing the development of dry socket. Antibiotic prophylaxis is not required or recommended

Concept of surgical prophylaxis in healthy patient

The use of prophylactic antibiotics prior to implant placement is controversial. A systematic review supports the use of 2 g amoxicillin as presurgical prophylaxis while a few other studies conclude that there is no added benefit. There is no evidence that implant failure is prevented by antibiotic usage

Surgical therapeutic antibiotic

1-Cellilitis and facial space infection
2-Systemic infection (fever, lymphadenopathy and trismus)
3-Congenital or acquired immunodeficiency
4-Patients on immunosuppressive medications
5-Diabetics with poor glycemic control
6-Patients with systemic immunocompromising disorders (e.g. rheumatoid arthritis, lupus erythematosus)
7-Patient in whom extensive and invasive procedures are planned
8- Prior to surgical procedures in patients at a significant risk for medication-related osteonecrosis of the jaw

Not for dental abscess

First drug of choice

Penicillin is still the gold standard in treating dental infections. Among the group of penicillins, penicillin V, amoxicillin, and amoxicillin and

clavulanate have been advocated for the treatment of sever odontogenic infections.

Co-amoxiclav is active against beta-lactamase-producing bacteria that are resistant to amoxicillin, and can be used to treat severe dental infection with spreading cellulitis or dental infection that has not responded to first-line antibacterial treatment.

Cholestatic jaundice can occur either during or shortly after the use of co-amoxiclav; Do not prescribe co-amoxiclav to patients who have hepatic dysfunction.

Metronidazole is effective against anaerobic bacteria. It can also be used as an adjunct to amoxicillin in patients with spreading infection or pyrexia.

Advise patient to avoid alcohol (metronidazole has a disulfiram-like reaction with alcohol). Do not prescribe metronidazole for patients taking warfarin

Second drug of choice

Patients who are allergic to penicillin should benefit from clindamycin; it is active against some oral anaerobes and facultative bacteria, and has the advantage of good bone penetration. However, increasing the dose may increase the possibility of serious side effects such as pseudomembranous colitis

Third drug of choice

Azithromycin or Clarithromycin

Pain management

- ✓ Pre-operatively
- ✓ Intra-operatively
- ✓ Post-operatively

Acute and chronic pain

Acute → **peripheral (**nociceptive)

Chronic → **peripheral or central (Neuropathic)**

Analgesics

Analgesics are classified as opioids and nonopioids, or narcotic and non-narcotic are used interchangeably.

NONOPIOID ANALGESICS

The nonopioid analgesics include acetaminophen (APAP) and the nonsteroidal anti-inflammatory drugs (NSAIDs).

Paracetamol

The maximum recommended daily dose of paracetamol (4 g for adults). Overdose with paracetamol is dangerous because it can cause hepatic damage.

The maximum recommended daily dose of ibuprofen 2.4 g.

Nonsteroidal anti-inflammatory drugs (NSAIDs)

Cyclooxygenase, or COX, is the enzyme which produces prostaglandins. Two forms of COX exist: COX-1, and COX-2. The COX-1 enzyme produces prostaglandins in the GI Tract. The prostaglandins formed act as a protective substance against the formation of gastrointestinal ulcers.

Nonsteroidal anti-inflammatory drugs (NSAIDs)

The traditional NSAIDs such as ibuprofen, naproxen, aspirin, and others inhibit the COX-1 enzyme thus diminishing the formation of the protective prostaglandins.

COX-2 selective inhibitor is celecoxib (Celebrex, Pfizer). Celecoxib has been approved for postextraction dental pain and therefore would be of benefit in dental implant procedures.

OPIOID ANALGESICS

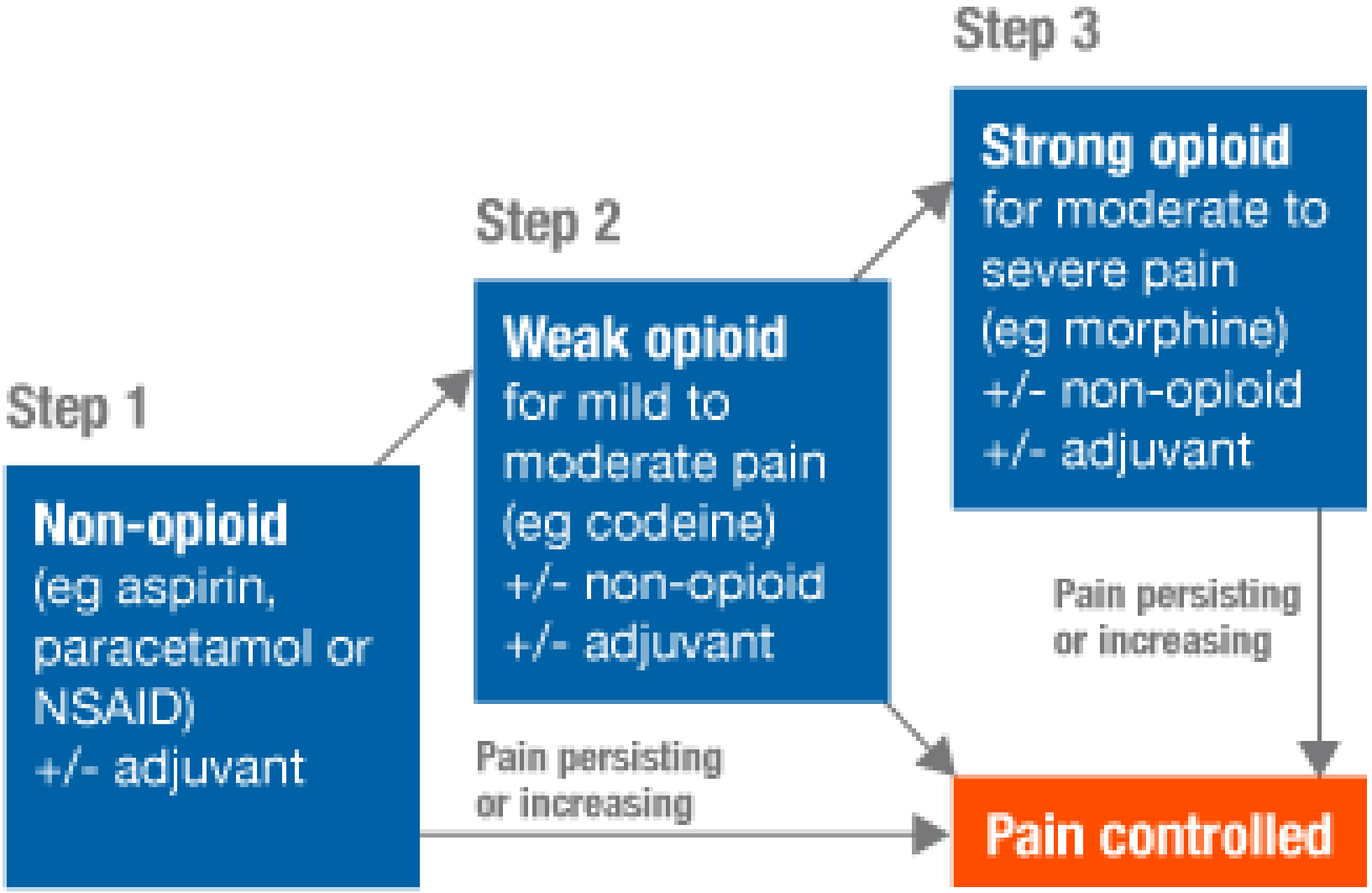
Actions and Effects

Opioids produce most of their therapeutic and adverse effects by acting as agonists at opioid receptors (mu and kappa receptors), while naloxone acts as an antagonist.

No antiinflammatory effect

OPIOID ANALGESICS

The most common and disturbing adverse effect is constipation followed by , respiratory depression and orthostatic hypotension.


Step 1
Non-opioid
(eg aspirin, paracetamol or NSAID)
+/- adjuvant
Step 2
Weak opioid
for mild to moderate pain
(eg codeine)
+/- non-opioid
+/- adjuvant
Step 3
Strong opioid
for moderate to severe pain
(eg morphine)
+/- non-opioid
+/- adjuvant
Pain persisting or increasing
Pain persisting or increasing
Pain controlled

Pharmacological Pain Management

Non-opioid Analgesics (1-3 or mild pain)

Examples include: Acetaminophen and nonsteroidal antinflammatory drugs such as Ibuprofen.

Weak Opiod analgesics (4-6 or moderate pain) Example: Codeine

Strong Opiod analgesics (7 or above, severe pain)

Examples: Morphine, Dilaudid

Adjuvant Medications: Drugs with indications other than pain which may be analgesic in specific circumstances. Examples include: Decadron, antidepressants, anticonvulsants, Alpha-2-Adrenergic Agonists (Clonidine), muscle relaxants (Baclofen)

Analgesic adjuncts

A variety of so-called “analgesic adjuncts” have proven efficacy for managing chronic pain.

Antidepressants
Anticonvulsants
Muscle Relaxant

Bisphosphonates-Mechanism of Action : Summary

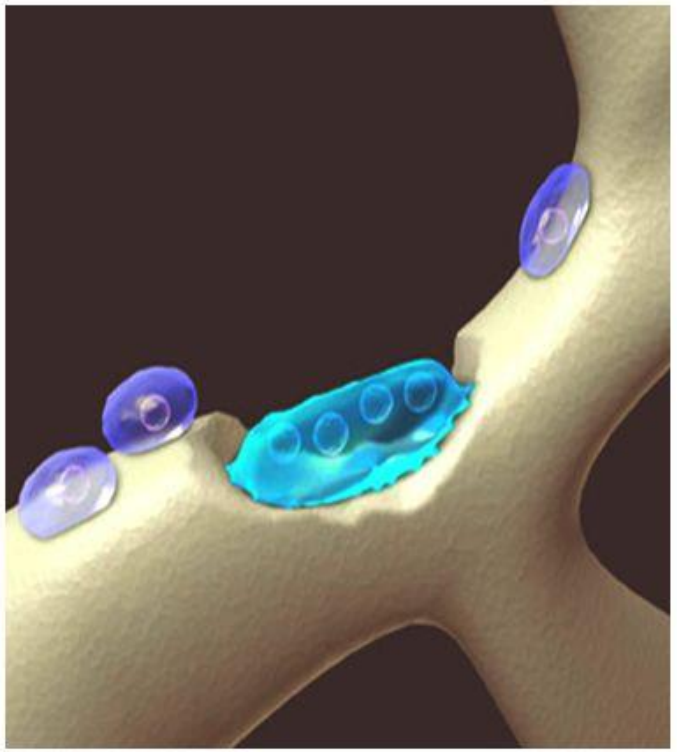
Inorganic pyrophosphates analogs

Affinity for hydroxyapatite crystals

Inhibitor of osteoclast activity

Bone resorption inhibition

Calcification inhibition



Bisphosphonates

Alendronic Acid

Etidronate

Pamidronate

Risedronate

Zoledronic Acid

Used to treat osteoporosis and related bone loss diseases — such as Pagets disease.

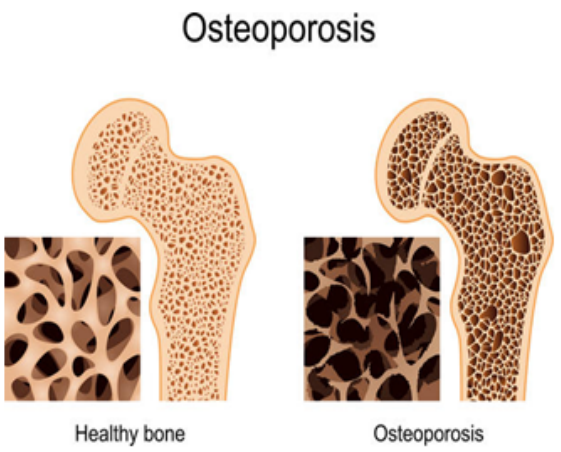
Osteoblasts create bone, while **osteoclasts** destroy bone.

Bisphosphonates encourage **osteoclasts** to undergo apoptosis, thereby slowing the rate of bone loss.

Bisphosphonates are **poorly absorbed** from the gut. Advised to be taken on an empty stomach — with a full glass of water - with the patient remaining upright for at least 30 minutes.

Alendronate, etidronate and risedronate are available for **oral use**, whereas pamidronate and zoledronic acid are available **intravenously**.

Pyrexia and flu-like symptoms tend to occur after the first intravenous use.



Generic name	Trade name	Clinical indication
Oral bisphosphonates		
1. Alendronate*	*Fosamax*	Treatment of osteoporosis and corticosteroid-induced osteoporosis, Paget's disease.
2. Risedronate*	*Actonel*	
3. Etidronate	*Didronel*	
4. Ibandronate*	*Bondronat, Bonviva*	
5. Clodronate	*Bonefos, Loron, Clasteon*	
6. Tiludronate	*Skelid*	
Intravenous bisphosphonates		
1. Pamidronate*	*Aredia*	Hypercalcaemia of malignancy, osteolytic lesions, Paget's disease, skeletal metastases, osteoporosis (at lower frequency and dose).
2. Zoledronate*	*Zometa, Aclasta*	
3. Clodronate	*Bonefos, Loron, Clasteon*	
4. Ibandronate*	*Bondronat, Bonviva*	

Risk Factors

Systemic Factors	Local Factors
-Potency of bisphosphonate -Length of bisphosphonate treatment -Race (usually Caucasians) -Age (usually >60) -Primary disease multiple myeloma >breast CA>other CA -Misc-steroid treatment, diabetes, smoking, alcohol, poor oral hygiene, concurrent chemo therapy	-Recent history of invasive dental surgery (dentoalveolar surgery i.e. exodontias, implants, periodontal surgery is 7x more likely to develop BRONJ) -Anatomy – tori, mylohyoid ridge, palatal tori -Concomitant oral disease – periodontal and dental abscesses are at a 7x increase for BRONJ