MFDS / MJDF · MEDICAL EMERGENCIES

Medical Emergencies at the Dental Office

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EXAM-DAY SUMMARY

everything on this page → detail in §§ overleaf

PREPAREDNESS → §1

- RCUK 2006, rev. Dec 2012 standards
- ≥ 2 people available whenever treatment planned
- All staff know their role; regular simulated drills
- ABCDE · kit standardised UK-wide · AED in all clinical areas
- History taking never delegated; questionnaire only valid if augmented by dentist's verbal history

EMERGENCY DRUGS → §2

- GTN spray 400 µg/dose · salbutamol 100 µg/actuation
- Adrenaline 1:1000 (1 mg/mL) · aspirin dispersible 300 mg
- Glucagon 1 mg · oral glucose · midazolam 10 mg buccal
- Oxygen · hydrocortisone 200 mg IV/IM · chlorphenamine 10 mg IV

EQUIPMENT → §2

- D cylinder = 340 L → 15 L/min for ~20 min; keep two
- Oropharyngeal airways sizes 1–4; adult + child masks
- Suction · spacer · glucometer · AED · single-use syringes
- Single use + latex free; check resus kit **weekly**

ASTHMA → §3

- Acute severe: RR >25, HR >110, can't finish a sentence
- Life-threatening: RR <8, HR <50, cyanosis, confusion — numbers invert
- 999 · O_2 15 L/min · **10 activations** salbutamol via large spacer, repeat q10 min
- No inhaler → IM hydrocortisone; status → 200 mg IV; then adrenaline **IM not IV**
- COPD → decrease oxygen

ANAPHYLAXIS → §4

- Histamine → laryngeal oedema, bronchospasm, vasodilatation ↓BP; adrenaline reverses all three
- Call help · **lie flat, raise legs** (unless breathing impaired) · IM adrenaline
- IM 1:1000, repeat at 5 min: adult & >12 y 500 µg (0.5 mL); 6–12 y 300 µg; <6 y 150 µg
- Site: vastus lateralis (or deltoid) · SpO_2 <92% = life-threatening

ANGINA & MI → §5

- Pain to left shoulder, arm, jaw; highest risk = unstable / nocturnal / recent admission
- GTN 0.5 mg SL tablet or 400 µg spray (better shelf life)
- No response after 3 min → probably MI
- 999 · comfortable position (breathless = sitting; faint = flat) · aspirin 300 mg chewed · O_2 15 L/min if cyanosed

SEIZURES → §6

- Higher risk: poor control, recent medication change; ask about last 3 seizures
- Tonic (rigid, cry, cyanosed) → clonic (jerking, tongue bitten) → post-ictal confusion
- >5 min = status epilepticus; hospital if status, high recurrence risk, first episode, hard to monitor
- Nothing in mouth · no airway adjunct · no restraint · recovery position after
- Buccal midazolam: adult/>10 y 10 mg · 5–10 y 7.5 mg · 1–5 y 5 mg; IV diazepam 10 mg

HYPOGLYCAEMIA → §7

- Insulin-treated at greatest risk; glucose <3.0 mmol/L (target 4–7)
- Conscious + safe swallow → oral glucose, repeat at 10–15 min
- Impaired → buccal gel and/or **glucagon 1 mg IM** (adult, child >8 y or >25 kg)
- Recheck at 10 min → ≥5.0 mmol/L; relapse → 100 mL 20% glucose IV
- Oral hypoglycaemic cause → hospital (long-acting)

SYNCOPE → §8

- Inadequate cerebral perfusion after emotional stress or pain
- Slow pulse + low BP + pallor, sweating, nausea
- Lay flat, raise legs, loosen clothing, O_2 15 L/min
- Fast pulse instead → think anaphylaxis / haemorrhage, not a faint

CHOKING & BLS → §9

- Wheeze = aspiration (lower); stridor = upper airway
- Conscious: encourage cough → 5 back blows → 5 abdominal thrusts
- Unconscious → CPR (compressions may dislodge it)
- Teeth/amalgam aspirated → hospital chest x-ray; symptomatic → emergency referral
- Slide algorithm is **paediatric**: 5 breaths, 15:2, 1 min CPR if alone. Adult = 30:2

BLEEDING DISORDERS → §10

- Platelets: FBC + bleeding time; need ≥100 000/µL before exodontia
- VWD: APTT high **and** bleeding time high — the double abnormality
- Haemophilia A = factor VIII, B = factor IX (Christmas); both high APTT, specialist centre, suspect HBV/HCV/HIV
- Factor VIII lifetime only 8 h → may need repeating
- Intrinsic → APTT · extrinsic → PT

ANTITHROMBOTICS → §10

- Aspirin = TXA_2 inhibitor; clopidogrel = ADP inhibitor — **don't stop** either, use local measures
- Warfarin: INR within 72 h, extract up to INR 4, one tooth per visit; antidote vit K (emergency: FFP)
- Heparin: APTT; antidote protamine sulphate; extract day after dialysis
- NOACs apixaban/dabigatran/rivaroxaban, t½ 12 h; don't stop for simple surgery

§1 Preparedness, risk assessment and the ABCDE approach

This lecture follows the Resuscitation Council (UK) document *Medical Emergencies and Resuscitation — Standards for Clinical Practice and Training for Dental Practitioners and Dental Care Professionals in General Dental Practice* (July 2006, revised December 2012). Its governing premise is that medical emergencies in dental practice are **rare but can happen at any time**, and that the difference between a good and a bad outcome is decided long before the patient collapses — by staffing, training and equipment.

> **KEY POINTS**
> If you employ, manage or lead a team you must ensure three things: arrangements for **at least two people** to be available to deal with a medical emergency whenever treatment is planned; that **every member of staff knows their role** if a patient collapses; and that everyone who might be involved is trained, prepared, and **practises together regularly in a simulated emergency** so they know exactly what to do.

1.1 The four standing requirements

Beyond the staffing and drill requirements, four things must be true of every dental practice:

- All dental practitioners and dental care professionals adopt the **ABCDE approach** to assessing the acutely sick patient.
- Specific emergency drugs and items of emergency medical equipment are ★**immediately available in all dental surgery premises**, and these are standardised throughout the UK.
- All clinical areas have **immediate access to an automated external defibrillator (AED)**.
- All practitioners and dental care professionals undergo training in cardiopulmonary resuscitation (CPR), basic airway management and the use of an AED.

Diagram 1 — The ABCDE approach to the acutely sick patient. It is worked strictly in order, and each problem is treated as it is found before moving on.

1.2 Medical risk assessment in general dental practice

Any patient can have a medical emergency during dental treatment — no history is reassuring enough to remove the possibility. What a medical and drug history does is enable the dental practitioner to identify patients at particular risk and to take measures that reduce the chance of a problem arising. Modifying the planned treatment, or referring to hospital, may be appropriate for some dental procedures in selected patients.

The lecture is emphatic about how that history is obtained. History taking **should not be delegated to another member of the dental team**, and patient-completed health questionnaires are ★**only acceptable if augmented by a verbal history taken by the dental practitioner**.

> **★ EXAM PEARL**
> The questionnaire point is a favourite because it has two halves and candidates remember only one. A written health questionnaire is not wrong — it is *insufficient on its own*. The examinable answer is that it must be supplemented by a verbal history taken personally by the dentist, not by a nurse or receptionist.

§2 The emergency drugs and equipment

The Resuscitation Council specifies a standardised minimum set of drugs and equipment that must be immediately available on every dental premises. Learn the list as a list — it is directly examinable, and each drug maps to one of the emergencies in the sections that follow.

Table 1 — Emergency drugs for general dental practice

Drug	Presentation and dose	Emergency
Glyceryl trinitrate (GTN) spray	400 micrograms per dose (Nitromac)	Angina
Salbutamol aerosol inhaler	100 micrograms per actuation (Ventolin)	Asthma
Adrenaline injection	1:1000, 1 mg/mL	Anaphylaxis
Aspirin, dispersible	300 mg	Myocardial infarction
Glucagon injection	1 mg (GlucaGen)	Hypoglycaemia — cannot swallow
Oral glucose	Solution, tablets, gel or powder	Hypoglycaemia — conscious
Midazolam	10 mg, buccal	Prolonged seizure
Oxygen	See equipment below	All hypoxic emergencies
Hydrocortisone	200 mg intravenously or intramuscularly	Anaphylaxis, severe asthma
Chlorphenamine	10 mg intravenously	Anaphylaxis (antihistamine)

The lecture slide writes this last drug as "chlorphinamine"; the correct spelling is chlorphenamine (Piriton).

2.1 Oxygen supply

A **portable oxygen cylinder of D size** with a pressure reduction valve and flowmeter is required. Cylinders should be of sufficient size to be easily portable but must also allow for adequate flow rates — for example **15 litres per minute** — until the arrival of an ambulance or until the patient fully recovers. A full D size cylinder contains ★**340 litres of oxygen, allowing 15 L/min for approximately 20 minutes**. Because a single cylinder may therefore run out during a prolonged emergency, **two such cylinders may be necessary** to ensure the supply does not fail.

2.2 Minimum equipment list

- Portable oxygen cylinder (D size) with pressure reduction valve and flowmeter
- Oxygen face mask
- Basic set of oropharyngeal airways, **sizes 1, 2, 3 and 4**
- Variety of well-fitting adult and child face masks
- Portable suction with appropriate suction catheters and tubing
- Single-use sterile syringes and needles
- A **spacer device** for inhaled bronchodilators
- Automated blood glucose measurement device
- Automated external defibrillator (AED)

> **CAUTION**
> Where possible **all emergency medical equipment should be single use and latex free** — latex gloves and equipment are themselves a recognised cause of anaphylaxis in the dental surgery. Checking of resuscitation equipment should ideally be **weekly**.

§3 Asthma and status asthmaticus

Bronchial asthma is **reversible bronchoconstriction causing wheezing and breathlessness**. The reversibility is what distinguishes it from chronic obstructive pulmonary disease and is why an inhaled bronchodilator is the first-line treatment.

3.1 Recognising severity

The lecture gives three findings that mark an acute severe attack: a respiratory rate greater than 25 per minute, tachycardia with a heart rate greater than 110 per minute, and a patient who **cannot complete one sentence in one breath**. That last sign needs no equipment and is the one you will use in the surgery. Judging the two numerical criteria in a child requires knowing what is normal for age.

Table 2 — Normal respiratory rate by age (breaths per minute)

Age	Respiratory rate
Under 1 year	30–40
1–2 years	25–35
2–5 years	25–30
5–12 years	20–25
Over 12 years	12–20

Table 3 — Acceptable ranges of heart rate (beats per minute)

Age	Heart rate
Infant (6 months)	120–160
Toddler (2 years)	90–140
Preschooler	80–110
School-age	75–100
Adolescent	60–90
Adult	60–100

Status asthmaticus is asthma which does not respond to treatment, and it carries the features of *life-threatening* asthma. The critical teaching point is that the numbers invert: the patient who was tachypnoeic and tachycardic becomes bradypnoeic and bradycardic as they exhaust.

Table 4 — Acute severe asthma versus life-threatening asthma (status asthmaticus)

	Acute severe	Life-threatening
Respiratory rate	Greater than 25/min	Less than 8/min, or cyanosis
Heart rate	Greater than 110/min (tachycardia)	Less than 50/min (bradycardia)
Speech	Cannot complete a sentence in one breath	Exhaustion, confusion, decreased conscious level
Response	Responds to bronchodilator	Does not respond to treatment

3.2 Management of an acute attack

1. **Call an ambulance (999).**
2. Give **oxygen at 15 litres per minute**.
3. Give ★**10 activations of the salbutamol inhaler using a large-volume spacer device**, repeated every 10 minutes if necessary until an ambulance arrives.
4. If an inhaler is unavailable, give intramuscular hydrocortisone.
5. If the bronchospasm is part of a more generalised **anaphylactic reaction** and there are life-threatening signs, give an **intramuscular injection of adrenaline**.
6. In a patient with COPD, decrease the amount of oxygen given.

For status asthmaticus the lecture escalates to: the inhaler, oxygen, and **200 mg intravenous hydrocortisone**; if the patient is still not responding, give **adrenaline intramuscularly, not intravenously**.

★ EXAM PEARL

The slide asks "IM not IV — why???" and leaves it to you. Intramuscular injection into a bulky muscle gives rapid but *controlled* absorption with a wide margin of safety. In a patient who still has a circulation, intravenous adrenaline produces an abrupt, unpredictable peak that can cause severe hypertension, tachyarrhythmia and myocardial ischaemia — it is reserved for specialists with continuous cardiac monitoring. **In general dental practice the route for adrenaline is always intramuscular.**

CAUTION

The instruction to reduce oxygen in COPD reflects the fact that some patients with chronic hypercapnia rely on hypoxic respiratory drive, and uncontrolled high-flow oxygen risks worsening carbon dioxide retention. Reduce it — do not withhold it. A hypoxic patient still needs oxygen.

3.3 Types of inhaler used in asthma

1. **Beta-2 adrenergic agonists**, such as salbutamol (Ventolin Evohaler, 100 micrograms per actuation, 200 metered actuations) — the reliever, and the one in the emergency kit.
2. **Corticosteroids**, such as budesonide (Miflonide 400 micrograms; written "milfonide" on the slide) — preventers, of no use in the acute attack.
3. **Antimuscarinic bronchodilators**, such as ipratropium bromide (Atrovent HFA).

§4 Anaphylaxis

Anaphylaxis is a **severe, life-threatening, generalised or systemic hypersensitivity reaction**. It is characterised by rapidly developing life-threatening **airway and/or breathing and/or circulation problems**, usually associated with skin and mucosal changes. Anaphylactic reactions in general dental practice may follow the administration of a drug, or contact with substances such as **latex in surgical gloves**.

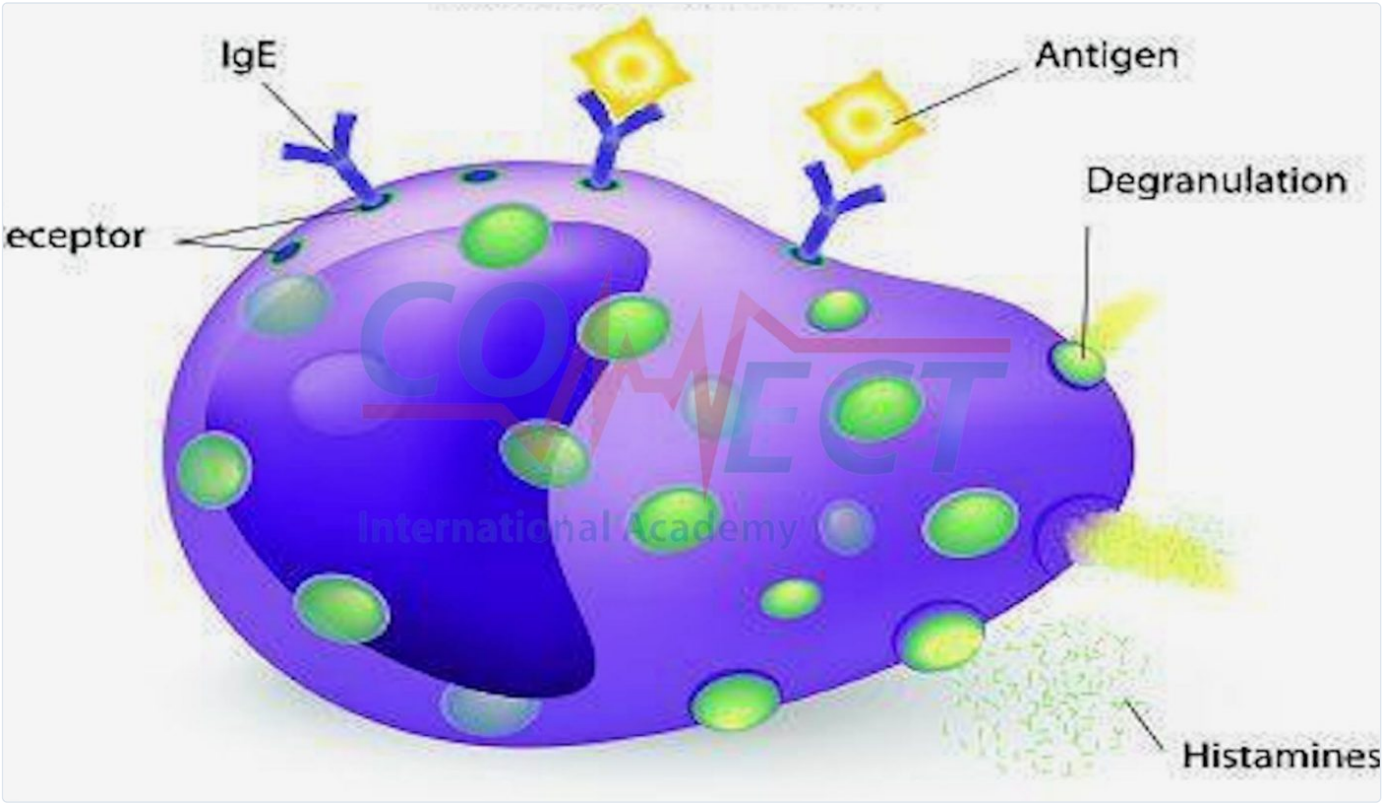

Fig. 1 — The underlying mechanism. IgE antibody is bound to receptors on the mast cell surface; when antigen binds the IgE, the cell degranulates and releases histamine. Every clinical feature of anaphylaxis follows from that release.

4.1 What histamine does, and how adrenaline undoes it

The lecture teaches anaphylaxis as a pair of mirror-image lists, and this is the most efficient way to hold it. Histamine produces the problem in three body systems; adrenaline reverses it in the same three.

Table 5 — The dangerous effects of histamine and the corresponding effects of adrenaline

	Histamine (the problem)	Adrenaline (the answer)
Airway	Increases capillary permeability, leading to collection of fluid in several areas, particularly the larynx, causing obstructing **laryngeal oedema**	Decreases oedema
Respiration	Causes **bronchospasm**, making respiration very difficult	Bronchodilatation
Circulation	Dilates blood vessels and decreases cardiac output, so **blood pressure falls**	Vasoconstriction; raises cardiac output
Miscellaneous	Skin rash, abdominal pain, vomiting, high temperature	—

The slides abbreviate cardiac output as "C.O.P".

4.2 Immediate management

1. **Reassure the patient** and keep them in the most comfortable position.
2. **Assess vital signs and give oxygen.**
3. Give the **medications**, and document what was given and when.
4. **Call the ambulance.**

The drugs used are **oxygen and adrenaline**, **cortisone** (hydrocortisone), an **antihistamine** (chlorphenamine) and a **salbutamol inhaler** if there is bronchospasm. Adrenaline is the only one of these that treats the anaphylaxis itself; the others are adjuncts and none of them should delay it.

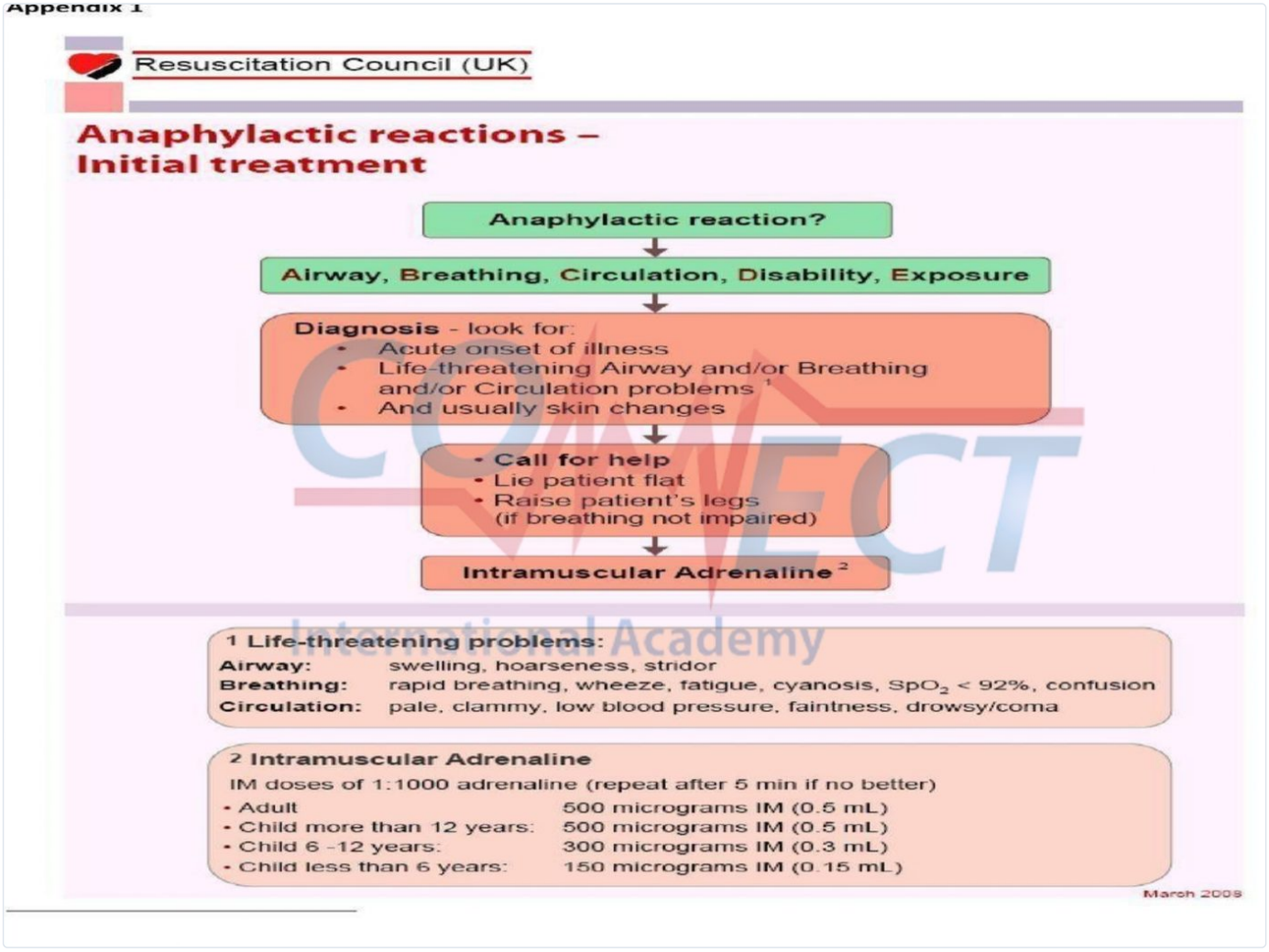

Fig. 2 — Resuscitation Council (UK) algorithm for the initial treatment of anaphylactic reactions. Note the sequence after diagnosis: *call for help, lie the patient flat, raise the legs (if breathing is not impaired), then intramuscular adrenaline.*

Table 6 — Intramuscular adrenaline doses, 1:1000 (repeat after 5 minutes if no better)

Patient	Dose	Volume
Adult	500 micrograms	0.5 mL
Child over 12 years	500 micrograms	0.5 mL
Child 6–12 years	300 micrograms	0.3 mL
Child under 6 years	150 micrograms	0.15 mL

The algorithm also defines what "life-threatening" means in each of the three systems, and these are the words to reach for in a written answer:

Airway

Swelling, hoarseness, stridor.

Breathing

Rapid breathing, wheeze, fatigue, cyanosis, SpO_2 less than 92%, confusion.

Circulation

Pale, clammy, low blood pressure, faintness, drowsy or coma.

4.3 Where to inject

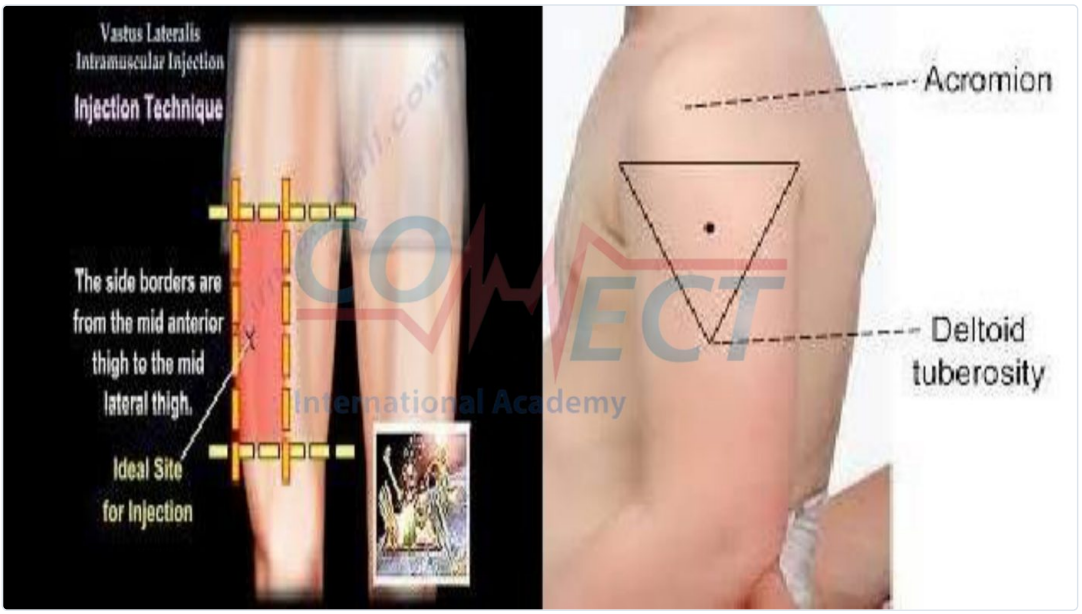

Fig. 3 — Sites for intramuscular injection. *Left:* vastus lateralis — the ideal site, its side borders running from the mid anterior thigh to the mid lateral thigh. *Right:* the deltoid, located within the triangle between the acromion above and the deltoid tuberosity below.

> ★ EXAM PEARL
>
> Two discriminators live here. First, **adrenaline is the only drug that reverses all three systems** — an answer that gives hydrocortisone or chlorphenamine first is wrong, however severe the case. Second, the patient is **laid flat with the legs raised**; sitting or standing an anaphylactic patient up has caused deaths from sudden loss of venous return, and the only exception is when breathing is impaired.

§5 Angina and myocardial infarction

Angina is **narrowing of a coronary artery causing chest pain radiating to the left shoulder, arm and jaw** — the jaw radiation being why some of these patients present first to a dentist. If episodes are precipitated by anxiety or stress, oral anxiolytic treatment may reduce the risk. The patients at **highest risk** in the dental chair are those with ★**unstable angina, nocturnal angina, or a recent history of hospital admission for angina**.

5.1 Managing an anginal attack

Give glyceryl trinitrate (GTN), either as **sublingual tablets of 0.5 mg** or as the **400 microgram spray** — the spray is preferred because it has a better shelf life. Then watch the clock: **if there is no response after 3 minutes, the patient has probably had a myocardial infarction**.

5.2 Initial management of myocardial infarction

1. **Call 999 immediately for an ambulance.**
2. Allow the patient to **rest in the position that feels most comfortable**. In the presence of breathlessness this is likely to be the sitting position; patients who faint or feel faint should be laid flat.
3. Give **aspirin as a single oral dose, crushed or chewed**. Ambulance staff and the receiving hospital must be told that aspirin has already been given.
4. **Reassure the patient** as far as possible to relieve further anxiety.
5. **High-flow oxygen** at 15 litres per minute may be administered if the patient is cyanosed (blue lips) or the conscious level deteriorates.

6. If the patient becomes unresponsive, always check for **signs of life** (breathing and circulation) and **start CPR** in the absence of signs of life or normal breathing.

> ★ EXAM PEARL
> The deck is internally inconsistent on the aspirin dose: the emergency drug list specifies **aspirin dispersible 300 mg**, while the myocardial infarction slide says 325 mg orally. **300 mg is the UK answer** and is what the Resuscitation Council and the dental emergency drug box specify; 325 mg is the American figure. Answer 300 mg unless the paper is explicitly US-based, and note that crushing or chewing matters as much as the number — it speeds absorption.

§6 Epileptic seizures

Patients with epilepsy will usually be able to give the dental practitioner a good guide to the control of their illness. The two factors that should alert you to a **higher risk** are ★**poor seizure control and a recent change in medication**. Enquiring about the timing of, and precipitating factors for, the **last three seizures** is a sensible risk precaution. Patients with epilepsy **must continue their normal dosage of anticonvulsant drugs** before attending for dental treatment.

6.1 Symptoms and signs — grand mal

1. There may be a brief warning or **aura**.
2. Sudden loss of consciousness: the patient becomes rigid, falls, may give a cry, and becomes cyanosed — the **tonic phase**.
3. After a few seconds there are jerking movements of the limbs and the tongue may be bitten — the **clonic phase**.
4. There may be frothing from the mouth and urinary incontinence.
5. The seizure typically lasts a few minutes; the patient may then become floppy but remain unconscious.
6. After a variable time the patient regains consciousness but may remain confused.
7. If the fit continues for ★**more than 5 minutes, status epilepticus** is said to be present.
8. Fitting may be a presenting sign of **hypoglycaemia** and should be considered in all patients, especially known diabetics and children.

6.2 Petit mal

Petit mal seizures are **absence seizures**, occurring **in children**, in which speech, attention and movement are arrested. There is no fall, no convulsion and no post-ictal phase — the episode may be mistaken for inattention.

6.3 Treatment during and after the fit

1. During a seizure, ensure that the patient **is not at risk of injury**, but make **no attempt to put anything in the mouth or between the teeth** — the belief that this protects the tongue is mistaken.
2. **Do not** attempt to insert an oropharyngeal airway or other airway adjunct while the patient is actively fitting, and **do not attempt to restrain convulsive movements**.
3. After convulsive movements have subsided, place the patient in the **recovery position** and reassess.
4. If the patient remains unresponsive, always check for signs of life (breathing and circulation) and start CPR in the absence of signs of life or normal breathing.
5. **Check the blood glucose level to exclude hypoglycaemia.**
6. Afterwards the patient may be confused (**post-ictal confusion**) and may need reassurance and sympathy.
7. The patient **should not be sent home until fully recovered**, and should be accompanied.
8. It may not always be necessary to seek medical attention or transfer to hospital, unless the convulsion was atypical, prolonged (or repeated), or if injury occurred.

> CAUTION
> The three "never do" items during an active seizure are the ones an examiner will test as a negative stem: **nothing in the mouth, no airway adjunct, no restraint.** An early blood glucose measurement is **essential in all actively fitting patients — including known epileptics**, because a hypoglycaemic fit in a known epileptic is easily and fatally misattributed.

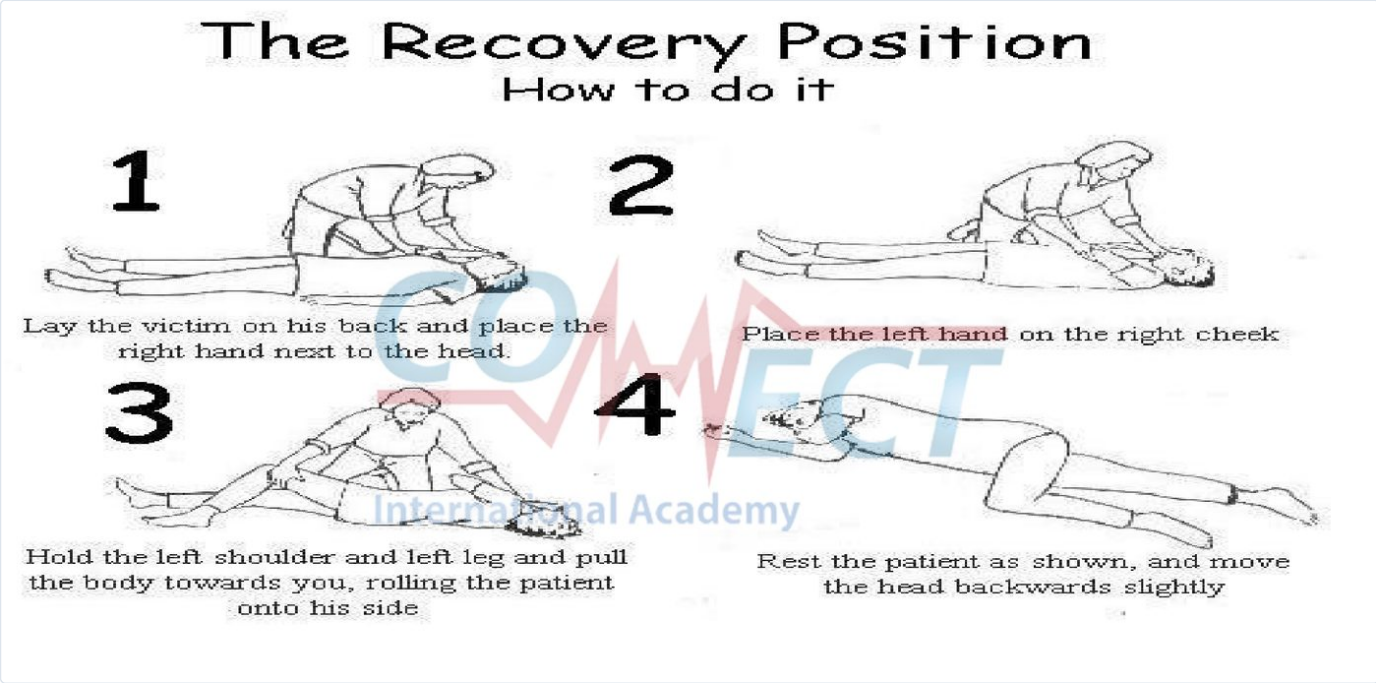

Fig. 4 — The recovery position. (1) Lay the victim on his back and place the right hand next to the head. (2) Place the left hand on the right cheek. (3) Hold the left shoulder and left leg and pull the body towards you, rolling the patient onto his side. (4) Rest the patient as shown and move the head backwards slightly.

6.4 When to send the patient to hospital

NICE guidelines suggest four indications for transfer:

1. **Status epilepticus.**
2. **High risk of recurrence.**
3. **First episode.**
4. **Difficulty monitoring the individual's condition.**

Prolonged seizures are dangerous and may cause severe, long-lasting cerebral damage to adults and children alike — which is the reason the five-minute rule matters.

6.5 Drug treatment of the prolonged or recurrent seizure

With prolonged or recurrent seizures, ambulance personnel will often administer **intravenous diazepam 10 mg**. If venous access cannot be obtained, **midazolam is given by the buccal route**. If a patient continues to fit after an ambulance has been called, emergency administration of midazolam might usefully be given while waiting for ambulance treatment — this is the drug that sits in the dental emergency box.

Table 7 — Buccal midazolam dosing for prolonged seizure

Patient	Single buccal dose
Adult	10 mg
Child above 10 years	10 mg
Child 5–10 years	7.5 mg
Child 1–5 years	5 mg

Buccolam is available as a 5 mg/mL solution for use in children up to 17 years old, and as 10 mg (2 mL) for adults. This **"off licence" use is justified in the emergency situation**. Oxygen is given alongside.

§7 Hypoglycaemia in the diabetic patient

Insulin-treated diabetics are those most likely to become hypoglycaemic whilst at the dental surgery. Diet- or tablet-controlled diabetics are at much lower risk. Diabetics with **poor control, or poor awareness of their hypoglycaemic episodes**, have a greater chance of developing problems — the second of these is the more dangerous, because the patient loses the warning symptoms that would normally prompt them to eat.

7.1 Symptoms and signs

The lecture defines hypoglycaemia as a **blood glucose below 3.0 mmol/L**, with the following features, listed here roughly in the order they appear as the glucose falls:

- Shaking and trembling; sweating; headache
- Difficulty in concentration, vagueness
- Slurring of speech
- Aggression and confusion
- Fitting and seizures
- Unconsciousness

The early warning signs the patient themselves notices are **shakiness or dizziness, headache, a fast pounding heart rate, and sweating or cold clammy skin**. On a fasting (on-waking) blood glucose scale, under 4 mmol/L is too low, **4–7 mmol/L is the healthy target**, and over 7 mmol/L is high.

> ★ EXAM PEARL
> Two thresholds coexist and candidates confuse them. **3.0 mmol/L** is the figure this lecture and the Resuscitation Council use to *define* hypoglycaemia; **4.0 mmol/L** is the level at which you *treat* ("four is the floor"), because the healthy target range starts at 4. And a third number sits at the other end of the episode: **re-check to 5.0 mmol/L or more** before you are satisfied. Three, four, five — definition, treatment threshold, recovery target.

7.2 Management

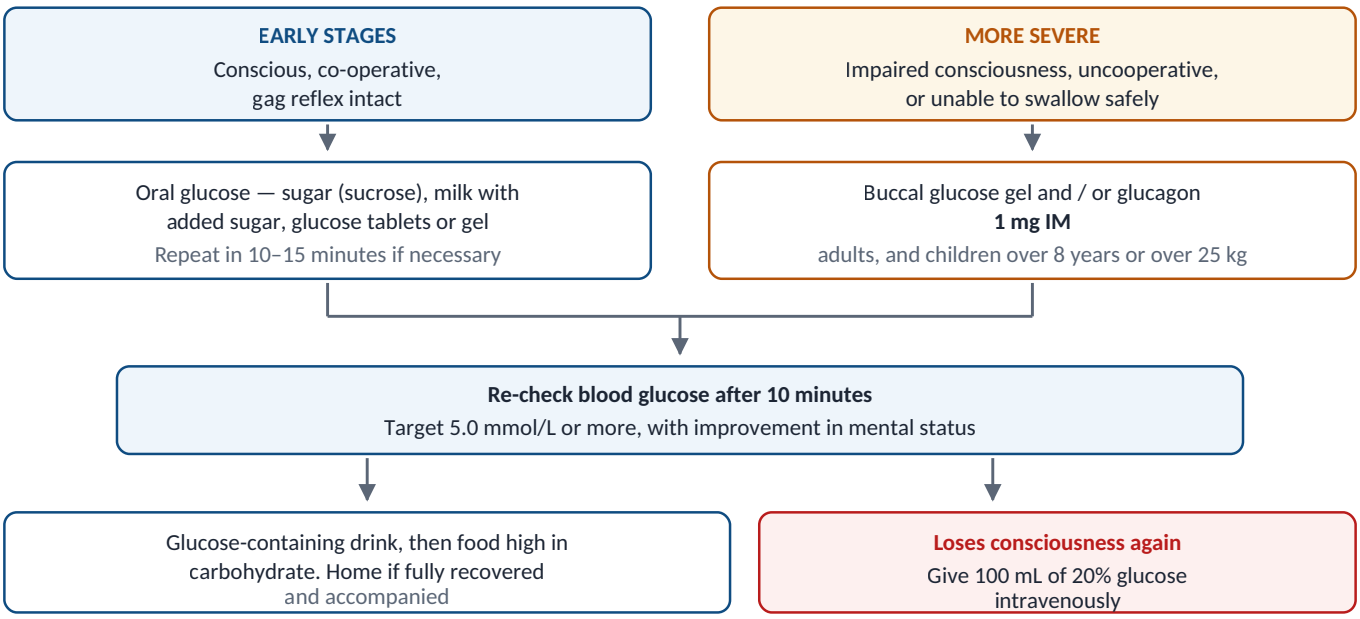

Diagram 2 — Management of hypoglycaemia in the dental surgery. The branch point is not how low the glucose is, but whether the patient can **safely swallow**.

> CAUTION
> **Patients whose hypoglycaemia was caused by an oral hypoglycaemic drug should be transferred to hospital**, because the hypoglycaemic effects of these drugs persist for many hours and the patient can relapse long after apparently recovering. This is the answer to the slide's question "can this happen to a patient with non-insulin dependent diabetes?" — yes, and it is in some ways more treacherous, because recovery in the chair does not mean the episode is over.

The corresponding lecture slide is cut off mid-sentence; the sentence is completed above from the Resuscitation Council source.

§8 Syncope

Syncope is the commonest medical emergency in dental practice. **Inadequate cerebral perfusion (and oxygenation) results in loss of consciousness.** This in turn may follow **emotional stress or pain**. Some patients are more prone to this and have a history of repeated faints — which is exactly why the medical history asks about it.

8.1 Symptoms and signs

1. The patient feels faint, dizzy or light-headed.
2. **Slow pulse rate.**
3. **Low blood pressure.**
4. Pallor and sweating.
5. Nausea and vomiting.
6. Loss of consciousness.

8.2 Treatment

- **Lay the patient flat as soon as possible and raise the legs** to improve venous return.
- **Loosen any tight clothing**, especially around the neck, and give **oxygen at 15 litres per minute**.
- If any patient becomes unresponsive, always check for signs of life (breathing, circulation) and start CPR in the absence of signs of life or normal breathing.

> ★ EXAM PEARL
> The pulse is the discriminator that examiners build questions around. Syncope gives a ★**slow pulse with low blood pressure** and recovers within seconds of lying flat with the legs raised. Anaphylaxis and haemorrhagic shock give a *fast*, weak pulse with low blood pressure and do *not* recover on being laid flat. A patient who does not come round promptly when supine has not simply fainted.

§9 Choking, aspiration and basic life support

Dental patients are unusually susceptible to choking, with the potential risk of aspiration. They may have **blood and secretions in their mouths for prolonged periods**; local anaesthesia may **diminish the normal protective pharyngeal reflexes**; and impression material or dental equipment is often within the oral cavity, posing additional risks. Good teamwork and careful attention to detail should prevent aspiration episodes and any risk of choking — this emergency is, more than any other in the lecture, one you cause.

9.1 Symptoms and signs

1. The patient may cough and splutter.
2. They may complain of difficulty breathing.
3. Breathing may become noisy, with **wheeze (usually aspiration)** or **stridor (usually upper airway obstruction)**.
4. They may develop **paradoxical** chest or abdominal movements.
5. They may become cyanosed and lose consciousness.

> ★ EXAM PEARL
> Noise localises the obstruction. **Stridor is inspiratory and upper airway** — the foreign body, or the oedematous larynx of anaphylaxis, is above the vocal cords. **Wheeze is expiratory and lower airway** — material has passed into the bronchial tree, or the patient is bronchospastic. Same patient, two very different next steps.

9.2 Treatment

1. In cases of **aspiration, allow the patient to cough vigorously** — a strong cough is a better airway clearance manoeuvre than anything you can do.
2. Symptomatic treatment of wheeze with a **salbutamol inhaler** may help, as for asthma.
3. If any **large pieces of foreign material have been aspirated**, for example teeth or dental amalgam, the patient should be referred to hospital for a ★**chest x-ray and possible removal**.
4. Where the patient is **symptomatic following aspiration** they should be referred to hospital **as an emergency**.
5. Encourage the patient to cough if conscious. If they are unable to cough but remain conscious, deliver **5 sharp back blows**; these can be followed by **5 abdominal thrusts** if the foreign body has not been dislodged.
6. If the patient becomes unconscious, **start CPR**. This will not only provide circulatory support — the pressure generated within the chest by performing chest compressions may itself help to dislodge the foreign body.

9.3 The basic life support sequence

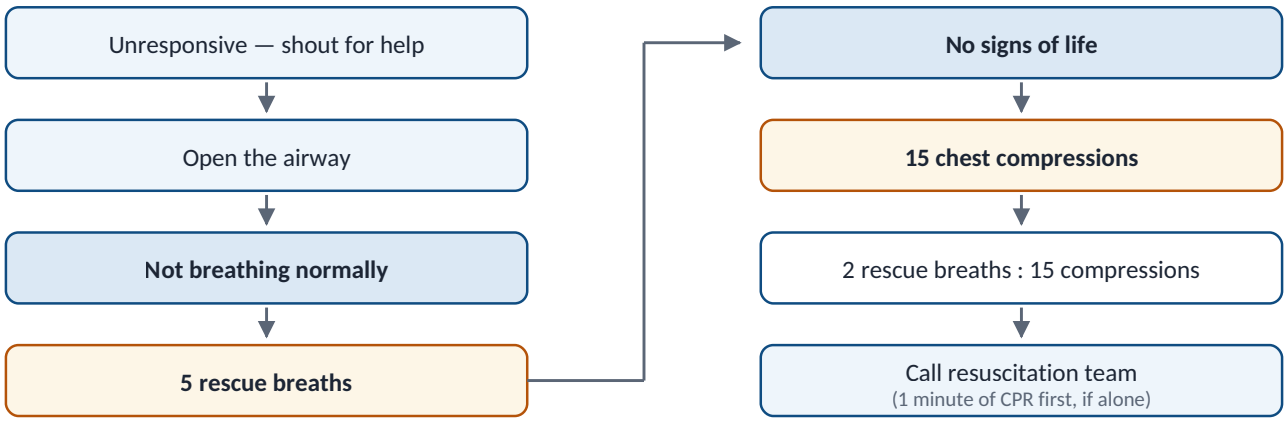

Diagram 3 — The basic life support algorithm given in the lecture. Note that this is the **paediatric** sequence: five initial rescue breaths, a 15:2 ratio, and one minute of CPR before leaving to summon help if you are alone.

> **CAUTION**
> The slide reproduces this algorithm without labelling it, and it is **not** the adult sequence. In an **adult** you do not give initial rescue breaths, the compression to ventilation ratio is ★**30:2**, and you call for help and fetch the AED *before* starting compressions. The paediatric sequence shown here — 5 rescue breaths, ★**15:2**, one minute of CPR before leaving a child alone — reflects the fact that paediatric arrest is usually **hypoxic in origin** rather than cardiac, so oxygenation comes first.

9.4 When to stop CPR

The lecture poses this question on a slide and answers it verbally; the slide itself is blank. Resuscitation is continued until one of the following applies:

- **Return of spontaneous circulation** — the patient shows signs of life, normal breathing, or purposeful movement.
- **Handover to a more advanced team** — the ambulance crew or resuscitation team takes over.
- **The rescuer becomes physically exhausted** and no one is available to take over.
- **A valid do-not-attempt-CPR decision or advance directive** comes to light.
- A doctor with the appropriate authority decides that **further efforts are futile**, or signs of irreversible death are present.

This list is not on the slide and should be checked against your own course material, as the exact wording varies between resuscitation councils.

§10 Bleeding disorders and antithrombotic drugs

The second half of the lecture has four stated objectives: to understand how **haemostasis** occurs, to discuss **haemostasis disorders**, to study the modes of action of **antiplatelet drugs and anticoagulants**, and to work out **how to manage our patient**. The bleeding disorders covered are **thrombocytopenia, thrombocythaemia, von Willebrand disease (VWD) and haemophilia**; the drug groups are **antiplatelets, anticoagulants and the novel oral anticoagulants (NOACs)**.

10.1 How bleeding stops naturally

Haemostasis has two arms. **Primary haemostasis** is the platelet response, producing a soft platelet plug within seconds. **Secondary haemostasis** is the coagulation cascade, converting that soft plug into a stable fibrin clot. Every disorder and every drug in this section acts on one arm or the other, and knowing which arm tells you which test to order.

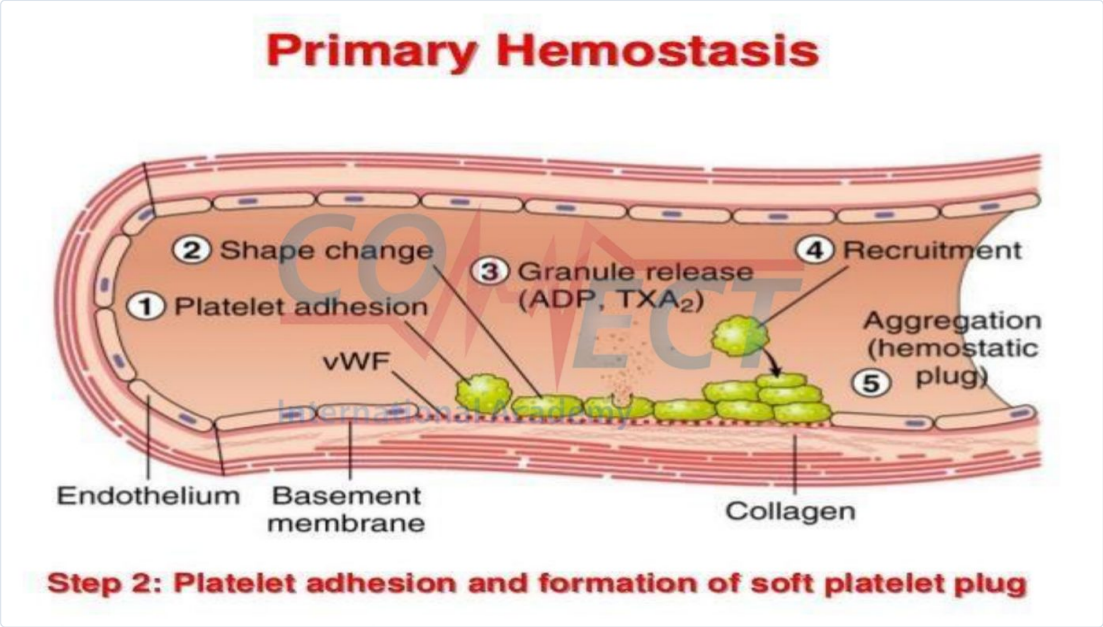

Fig. 5 — Primary haemostasis. (1) Platelet adhesion, mediated by von Willebrand factor (vWF) binding exposed collagen at the basement membrane; (2) shape change; (3) granule release of ADP and thromboxane A_2; (4) recruitment of further platelets; (5) aggregation into the soft haemostatic plug.

10.2 Disorders of haemostasis and their investigation

Platelet defects — thrombocytopenia and thrombocythaemia — are investigated with a full blood count (a low platelet count in thrombocytopenia) and the bleeding time, which is prolonged. ★**A minimum platelet count of 100 000 per microlitre is required before exodontia**, with local haemostatic measures.

Defects of von Willebrand factor prolong both the APTT and the bleeding time. In VWD, intravenous factor VIII is given before surgery and may need to be repeated, as its **lifetime is only 8 hours**; these patients are **better treated in hospital**.

Haemophilia A is a **factor VIII defect**, affecting males predominantly, treated at a specialist centre only with intravenous factor VIII before surgery, and gives a **high APTT**. **Haemophilia B**, or **Christmas disease**, is a **factor IX defect**, clinically identical to haemophilia A, managed by intravenous injection of factor IX, and also gives a high APTT. In both, historic exposure to pooled blood products means you should **suspect hepatitis B, hepatitis C or HIV**.

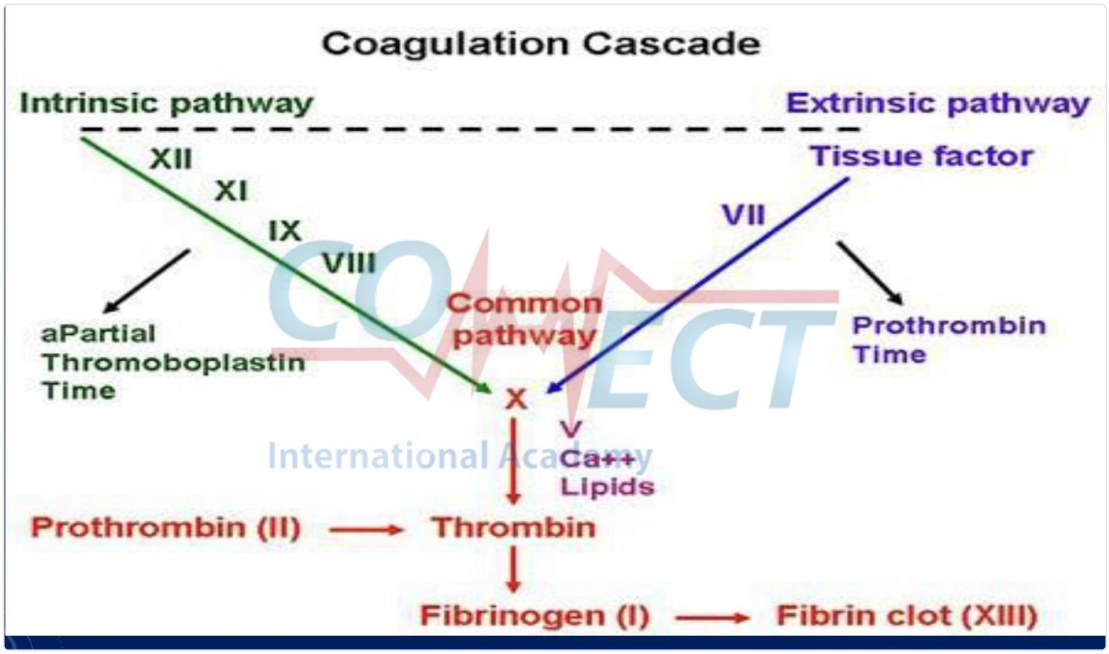

Fig. 6 — The coagulation cascade. The **intrinsic pathway** (XII, XI, IX, VIII) is measured by the **activated partial thromboplastin time (APTT)**; the **extrinsic pathway** (tissue factor, VII) by the **prothrombin time**. Both converge on factor X, which with V, calcium and lipids converts prothrombin (II) to thrombin, and fibrinogen (I) to a fibrin clot stabilised by factor XIII.

Table 8 — The four bleeding disorders at a glance

	Thrombocytopenia	VWD	Haemophilia A	Haemophilia B
Defect	Low platelet number	von Willebrand factor	Factor VIII	Factor IX (Christmas disease)
Arm of haemostasis	Primary	Primary (and secondary)	Secondary	Secondary
Tests	Full blood count (low platelets); bleeding time high	APTT high; bleeding time high	APTT high	APTT high
Dental management	Minimum 100 000/μL before exodontia, with local haemostatic measures	IV factor VIII before surgery, may need repeating (8 h lifetime); better treated in hospital	Specialist centre only; IV factor VIII before surgery	Specialist centre only; IV factor IX
Also consider	—	—	Suspect HBV, HCV or HIV	Suspect HBV, HCV or HIV

★ EXAM PEARL

One slide groups haemophilia A under "vWF defect / primary haemostasis disorders" alongside VWD, and a later slide correctly places it under secondary haemostasis. **Haemophilia A is a factor VIII deficiency and therefore a disorder of secondary haemostasis**; the association arises because vWF is the carrier protein for factor VIII, so VWD lowers factor VIII levels too. That is also why VWD is the one condition here with *both* a prolonged bleeding time and a prolonged APTT — and it is the discriminator most often examined.

Thrombocythaemia — a raised platelet count — is listed by the lecture among the bleeding disorders. Its predominant risk is in fact thrombotic; bleeding occurs only at very high counts, through an acquired von Willebrand-type defect.

10.3 Antiplatelet drugs, anticoagulants and NOACs

Aspirin is a **thromboxane A_2 inhibitor**; **clopidogrel** (written "Colpidogrel" on the slides) is an **ADP inhibitor**. **Warfarin** is a **vitamin K antagonist** given orally, whose effect remains for up to 3 days. **Heparin** is an **antithrombin activator** given intravenously or subcutaneously, whose effect remains for 8 hours; it is commonly used in patients on renal dialysis. The three **novel oral anticoagulants** are **apixaban, dabigatran and rivaroxaban**, with a half-life of 12 hours and no routine monitoring test.

CAUTION

Two points here have moved on since the lecture and are worth verifying against current guidance. **NOACs are no longer without antidotes**: idarucizumab reverses dabigatran and andexanet alfa reverses apixaban and rivaroxaban. And current SDCEP guidance for **dual antiplatelet therapy** is to treat *without* interrupting the drugs for most dental procedures, using local haemostatic measures and staged treatment — interrupting dual therapy after recent coronary stenting carries a real risk of stent thrombosis. The lecture's instruction to refer to the cardiologist is sound; the presumption that the answer will be to stop the clopidogrel is not.

★ EXAM PEARL

The warfarin numbers are the most reliably examined content in this section: ★**INR checked within 72 hours, extract if INR is below 4**, one tooth per visit, local haemostatic measures. The paired trap is the antidote question — vitamin K for warfarin but **protamine sulphate for heparin**, and fresh frozen plasma only as the emergency reversal when there is no time for vitamin K to work.

Table 9 — Antithrombotic drugs: monitoring, reversal and dental management

Drug	Mode of action	Test / antidote	Dental management
Aspirin	Thromboxane A_2 inhibitor	—	Extraction does **not** require stopping the drug; extract with local haemostatic measures
Clopidogrel	ADP inhibitor	—	Extraction does **not** require stopping the drug; extract with local haemostatic measures
Aspirin + clopidogrel	Dual antiplatelet	Check bleeding time	Lecture: refer to the patient's cardiologist to ask about stopping clopidogrel one week before exodontia
Warfarin	Vitamin K antagonist, oral; effect up to 3 days	Test **INR** within 72 hours. Antidote **vitamin K**; emergency antidote **fresh frozen plasma**	**Extract up to INR 4.** Heparin bridge before surgery; single tooth extraction per visit
Heparin	Antithrombin activator, IV or subcutaneous; effect 8 hours	Test **APTT**. Antidote **protamine sulphate** (works immediately)	In dialysis patients, **extract the day after dialysis**
NOACs (apixaban, dabigatran, rivaroxaban)	Direct factor Xa or thrombin inhibitors; half-life 12 hours	No routine test	Do **not** stop for abscess incision or simple surgery