

Dental Emergencies

Ven Woo
Ken Lin

Disclaimer

- This talk is aimed to give a practical approach to cases seen in the Oral & Maxillofacial Surgery extraction clinics and potentially in future practice for graduating dentists.
- As accurate as possible (backed by literature) but please do not only rely on this lecture for your exams.
- Contents of the lecture are based on our clinical experience and what we were taught. There may be some discrepancies among preferences and approaches to treatment compared to other clinicians. There are multiple ways to do things.
- The authors of this talk do not accept any responsibility or liability relating to the use of this information.

Lecture Overview

Dental Emergencies

- Odontogenic infections/facial swellings
- Dentoalveolar injury/facial fractures
- Bleeding

Odontogenic infections

Odontogenic infections

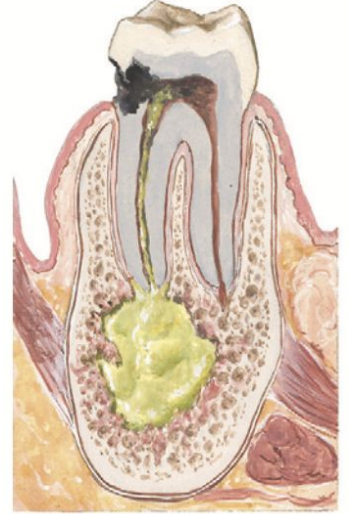
Definitions

- Abscess: Localised collection of pus
- Cellulitis: Spread of infection into the connective tissues

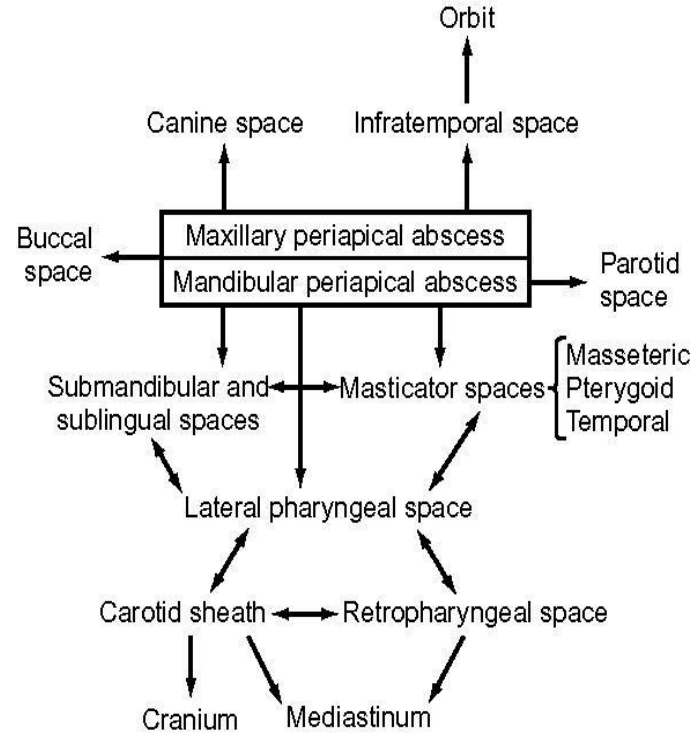
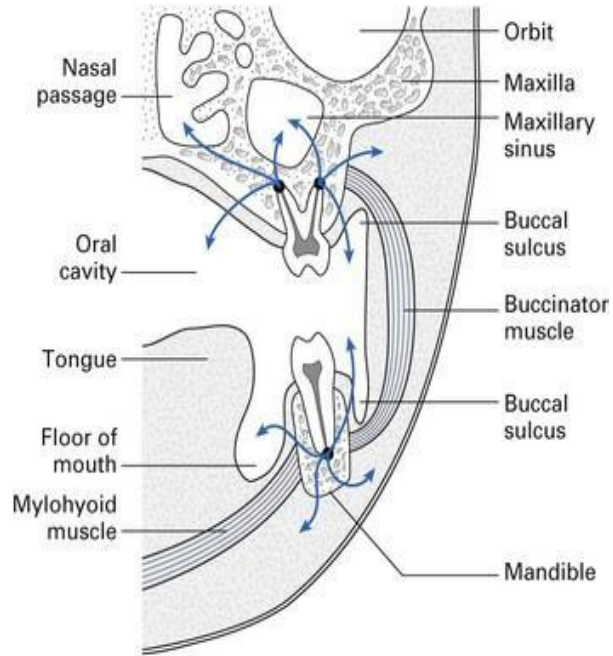


General principles of odontogenic infections

- Path of least resistance
 - Where the infection spread depends on thickness of bone and muscle/fascial attachments that direct it to various spaces
- Remove source of infection (tooth)
 - Extraction
 - Endodontic treatment
- Incise and drain any abscess
 - “Never let the sun set on pus”
 - When draining abscesses like canine space, vestibular space, palatal space, incise straight down to bone through periosteum
- Broad spectrum antibiotics
 - Augmentin or cefalexin +- metronidazole (unless you have culture and sensitivity)
- Trismus
 - Important indicator of which space the infection is involving



Anatomical spaces



Vestibular space infections

Gingival abscess

- Infection around the buccal sulcus or gingiva
- Often directly adjacent to the infected tooth

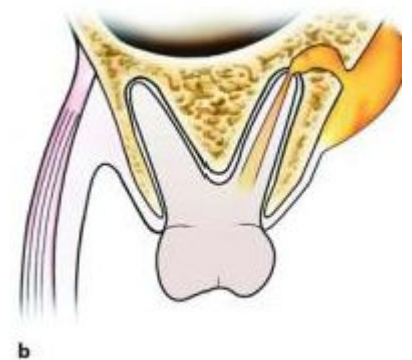


Canine space infections

- Swelling over upper lip/ala
- Obliteration of naso-labial fold
- Swelling of labial sulcus
- Can spread towards eye -> closing of eyelids, periorbital oedema
- Paraesthesia of the infraorbital nerve

Palatal space infections

- Swelling on hard palate adjacent to infected tooth



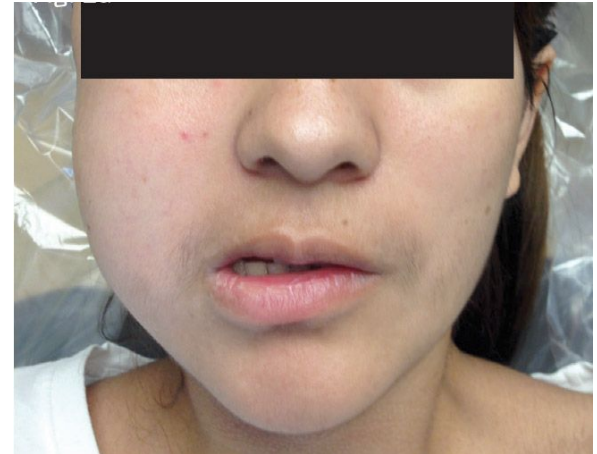
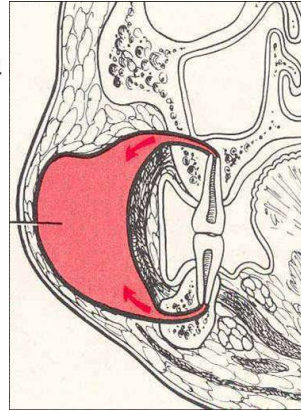
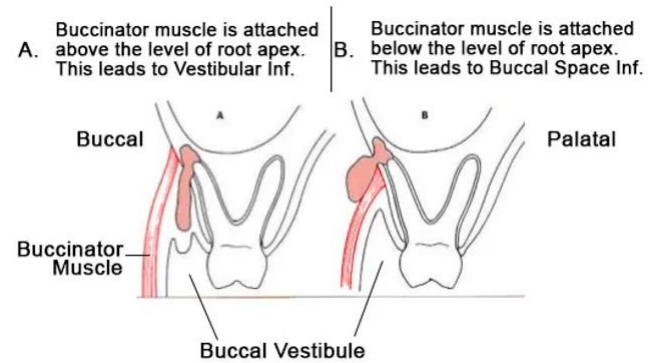
Buccal space infections

Key boundaries

- Infection lies between the buccinator muscle and connective tissue

Clinical features

- Swelling over the cheeks extraorally
- Trismus*



Buccal space vs submandibular space infections

- Can look similar
 - Can feel similar to submandibular space infections (ie. unable to palpable inferior border of mandible)
- However, very rarely and only in severe cases will buccal swellings extend into the submandibular space
- Key question to ask:
 - Where did the swelling originally begin?
 - Are you able to palpate the lower border of the mandible?
- Often require radiological assessment to distinguish
 - CT scan

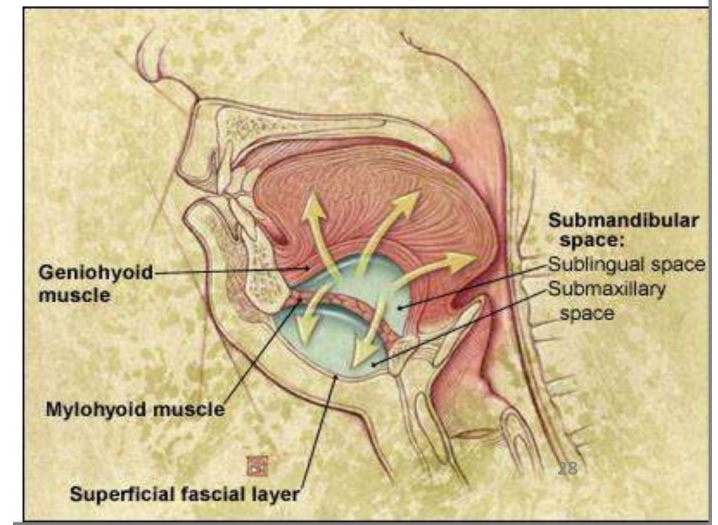
Sublingual space infections

Key boundaries

- Mylohyoid muscle (above)
- Oral mucosa

Clinical features

- Swelling on floor of mouth
- Elevation of tongue
- Difficulty protruding tongue
- Drooling
- Odynophagia +/- dysphagia



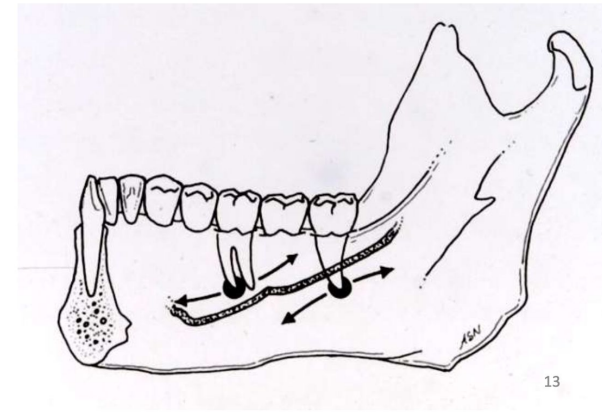
Submandibular space infections

Key boundaries

- Investing layer of the deep cervical fascia
- Posterior belly of the digastric muscle
- Anterior belly of the digastric muscle
- Mylohyoid muscle (below)
- Inferior border of the mandible

Clinical features

- Swelling over submandibular region
- Blunting of the inferior border of the mandible -> unable to palpate inferior border
- May have trismus but not always in isolated submandibular space infections
- Potential medical emergency -> Can spread to submental, sublingual, parapharyngeal spaces -> airway compromise
- Odynophagia +/- dysphagia



Submental space infections

Key boundaries

- Anterior belly of the digastric muscle bilaterally
- Mylohyoid muscle
- Investing layer of the deep cervical fascia
- Inferior border of the mandible

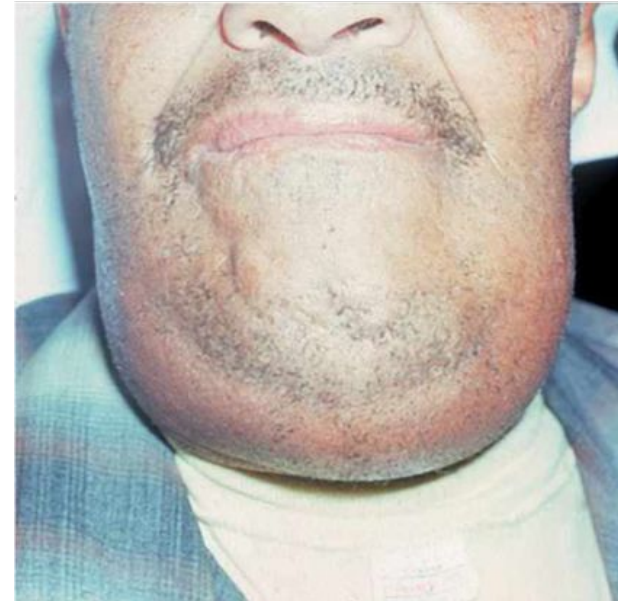
Clinical features

- Swelling under the chin
- No trismus



Ludwig's Angina

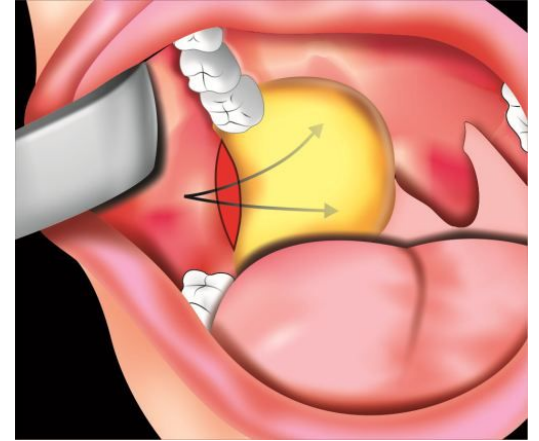
- **MEDICAL EMERGENCY**
- Bilateral cellulitis of the submental, submandibular and sublingual spaces
- Clinical features
 - Swelling of floor of mouth, neck and elevation of tongue
 - Drooling due to difficulty swallowing
 - Stridor/dysphagia with accompanying odynophagia
- Risk of airway obstruction secondary to oedema pushing the tongue posteriorly blocking the airway + spread to parapharyngeal space
- Management
 - Hospital admission ASAP
 - Airway management
 - Aggressive antibiotic tx
 - Remove cause of infection - extraction
 - Decompress swelling - Incision and drainage
 - Typically require ICU admission



Parapharyngeal space infections

Clinical features

- Trismus ++
- May not always see extraoral swelling clinically
- Intraorally:
 - Fullness of the soft palate
 - Deviation of uvula to the contralateral side
- Odynophagia +/- dysphagia



Assessment of odontogenic infections

- Primary survey
- HxPC
 - When swelling started, where it first started
 - Systemic symptoms
 - Fevers, sweats, chills
 - Nausea, vomiting
 - Pain on swallowing
 - Difficulty swallowing
 - Questions about vision for canine space
- MHx
- Examination
 - Vitals
 - Trismus
 - Extraoral
 - Site of swelling
 - Firm, fluctuant
 - Cellulitis
 - Spaces involved
 - Intraoral
 - Site of swelling
 - Which tooth?
 - Uvula midline?
 - Tongue elevated?
 - FOM?
- Investigations
 - OPG
 - Bloods

Management of odontogenic infections

Vestibular/palatal/canine space

- Incision intraorally, directly over swelling and down to bone

Buccal space

- Incision buccal mucosa and blunt dissection through buccinator muscle

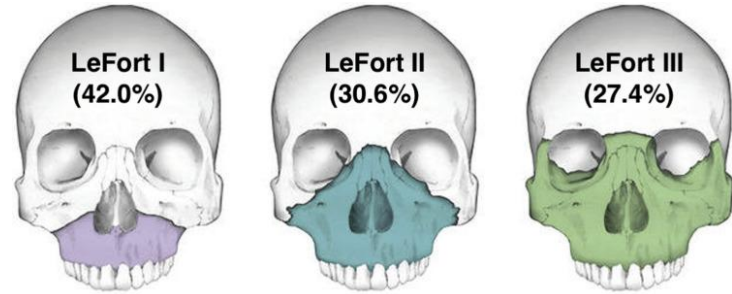
Sublingual/submental/submandibular/parapharyngeal space

- Refer to OMS/Tertiary hospital for urgent management in OT

Facial/dentoalveolar fractures

Facial Fractures: Maxilla

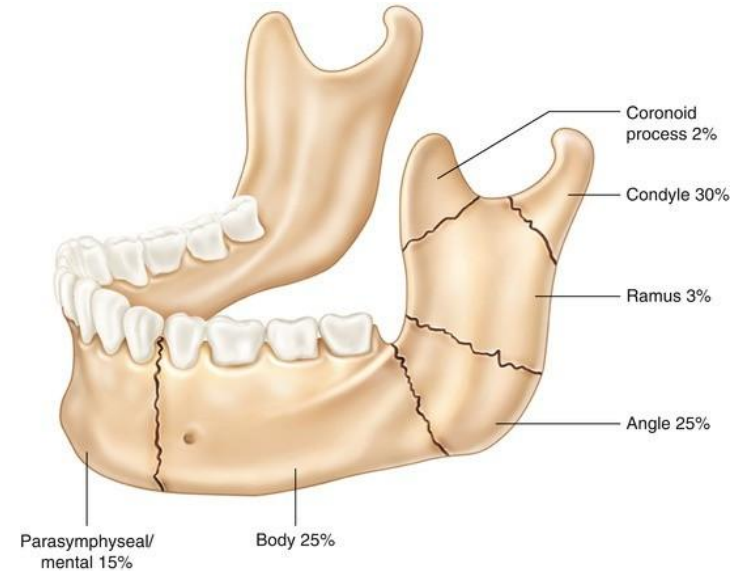
- History
 - Mechanism of injury
- Examination
 - Symmetrical facial swelling
 - Bilateral periorbital ecchymosis
 - Bilateral subconjunctival/periorbital haemorrhages
 - Flattening and elongation of the midface
 - Malocclusion
 - Infraorbital nerve paraesthesia
- Investigations
 - CT



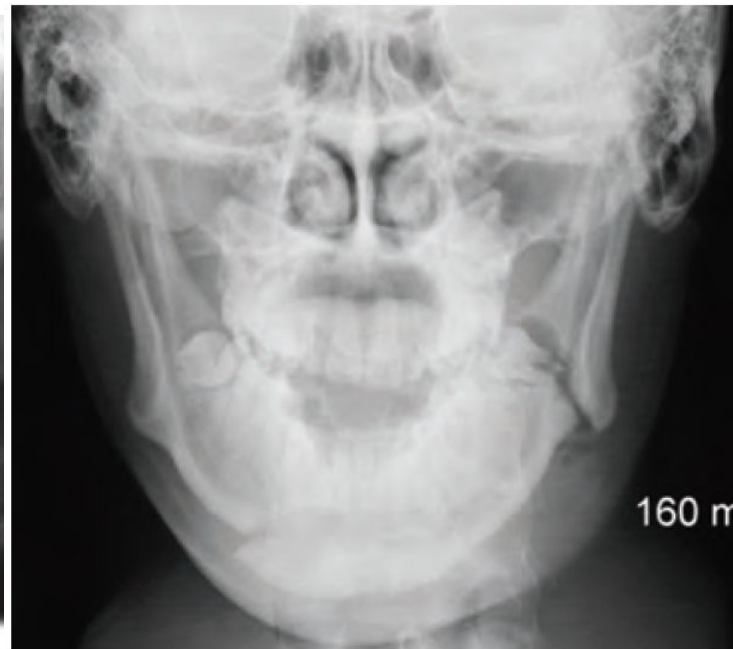
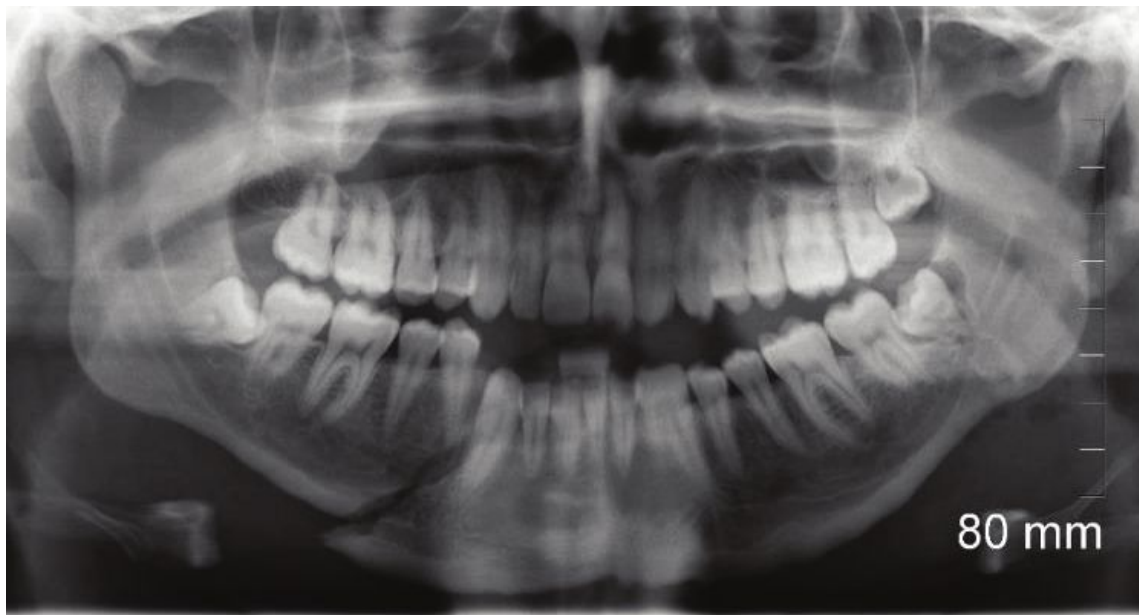
- Fracture pattern:
 - Le Fort I – floating palate
 - Le Fort II – floating maxilla
 - Le Forte III – floating face

Facial Fractures: Mandible

- History
 - Mechanism of injury
- Examination findings
 - Pain and swelling over fracture site(s)
 - Intra-oral: gingival lacerations, buccal and sublingual haematomas, bleeding from EAC if condylar injury present
 - **Malocclusion** – step in the occlusal plane. May have wide displacement between teeth. **May have active bleeding from fracture site**
 - Mobile dento-osseous segments
 - Paraesthesia in distribution of the inferior alveolar nerve (lower lip and chin)
- Investigations
 - CT or OPG + PA mandible



Mandible fractures



Dentoalveolar trauma

Subluxation







Extrusion

Lateral luxation

Intrusion

Avulsion

Alveolar fracture

Injury	Clinical findings		Management	Removal of splint
Subluxation	<ul style="list-style-type: none"> Mobile tooth but not displaced 		<ul style="list-style-type: none"> Normally no tx required May require splinting if excessive mobility or tender when occluding Splint 2 weeks 	2 weeks if splinted
Extrusion	<ul style="list-style-type: none"> Increased mobility Appears overerupted 		<ul style="list-style-type: none"> Reposition tooth by gently pushing back into socket Splint 2 weeks unless alveolar fracture 	2 weeks
Lateral luxation	<ul style="list-style-type: none"> Displaced palatally/lingually or labially Usually associated alveolar fracture Frequently immobile as it is "locked" in bone 		<ul style="list-style-type: none"> Reposition tooth with digital pressure from locked position Splint for 4 weeks 	4 weeks
Intrusion	<ul style="list-style-type: none"> Displaced axially into alveolar bone Commonly immobile 		<ul style="list-style-type: none"> Incomplete root formation <ul style="list-style-type: none"> Allow for re-eruption without intervention Complete root formation <ul style="list-style-type: none"> If intruded >3mm, digital reposition If <3mm, allow for re-eruption without intervention 	4 weeks
Avulsion	<ul style="list-style-type: none"> Missing tooth in socket 		<ul style="list-style-type: none"> Replant into socket with light digital pressure Splint for 2 weeks 	2 weeks
Alveolar fracture	<ul style="list-style-type: none"> Mobility/displacement of an entire segment of alveolar bone Displacement often with multiple teeth involved 		<ul style="list-style-type: none"> Reposition displaced segment Splint for 4 weeks Suture any gingival lacerations 	4 Weeks

Bleeding

Increased bleeding risk

Increased bleeding risk may result from either the presence of bleeding condition or use of medications that affect physiological haemostatic process

Bleeding conditions can be either acquired or congenital

Haemostasis

Primary haemostasis: formation of platelet plug from the interaction between von Willebrand factor and injured endothelium

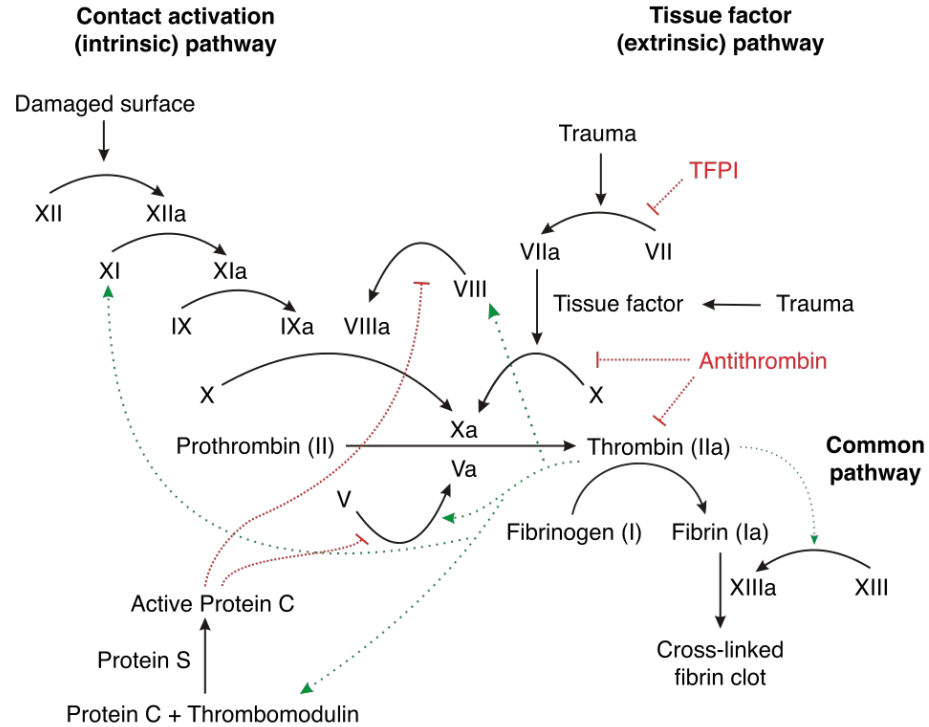
Secondary haemostasis: activation of coagulation factors to form a fibrin mesh to stabilise the platelet plug

Tertiary haemostasis: fibrinolysis is activated to dissolve the platelet plug and return the normal architecture of the endothelium, smooth endothelial lining and normal lumen size.

Phases of haemostatic process:

1. Endothelial injury and formation of platelet plug
2. Propagation of clotting process by the coagulation cascade
3. Termination of clotting by antithrombotic control mechanisms
4. Removal of clot by fibrinolysis

Clotting Cascade



Bleeding conditions

Acquired

- Vitamin K deficiency
- Liver failure
- Thrombocytopenia

Congenital

- Von Willebrand disease (vWD)
- Haemophilia A, B
- Idiopathic thrombocytopenic purpura
- Factor V deficiency
- Factor X deficiency

Conditions mentioned require involvement of a haematologist prior to any dentoalveolar surgery, these patients may be better treated at a specialist service centre

Refer to a specialist service with both haematology and OMFS (tertiary hospital) to allow for coordinated care of the patient and pre-op optimisation

Medications

Antiplatelets

- GPIIb/IIIa inhibitors
 - Abciximab
 - Tirofiban
- ADP inhibitors
 - Clopidogrel
 - Ticagrelor
- COX inhibitors
 - Aspirin

Be aware that patients can be on dual antiplatelets!

Anticoagulants

- Vitamin K antagonist
 - Warfarin
- Direct factor IIa antagonist
 - Dabigatran
- Direct factor Xa antagonist
 - Apixaban
 - Rivaroxaban

Haemostatic agents

LA infiltration

Suturing

Gauze pressure +/- impregnation

Cellulose

Gelatin foam

Thrombin

Fibrin

Tranexamic (TXA) mouthwash

Calcium alginate

Bone wax

Haemostatic agents

Brand name	Material	Mechanism of action
Spongostan/Gelfoam	Gelatin sponge	Acts as a scaffold for formation of blood clot. Absorbs blood or fluid up to 40 times its weight, and it expands up to 200 percent in its dimensions.
Surgicel	Cellulose	Cellulose, oxidized regenerated is saturated with blood at the bleeding site and swells into a brownish or black gelatinous mass which aids in the formation of a clot.
Bone wax	Beeswax	Controls bleeding by acting as an impenetrable mechanical barrier at the site of bleeding.
TXA	Antifibrinolytic Synthetic derivative of lysine	Reversible competitive inhibitor to the lysine receptor found on plasminogen. The binding of this receptor prevents plasmin from binding to and ultimately stabilizing the fibrin matrix.
Silver nitrate		Chemical cauterisation of blood vessels

Management of patients on antiplatelets

Use of antiplatelets: prevention of stroke and ischaemic cardiovascular disease

Do not cease prior to dentoalveolar surgery – associated risk for the underlying medical indication exceeds any benefit of the reduction of intraoperative bleeding

Level of bleeding readily controlled with local haemostatic agents

Management of patients on warfarin

INR is used as a surrogate marker of a patient's coagulation function while on warfarin

Warfarin has a narrow therapeutic range, and varies significantly between patients

Effects of warfarin on coagulation is highly susceptible to interactions with other drugs or systemic medical conditions that can affect liver function

INR should be checked 24 hours prior to any dental extractions

- Aim is INR < 4

Need to employ local haemostatic measures: pack and suture, direct pressure with gauze soaked in TXA for 30 minutes post-extraction, use of TXA mouthwash TDS for 3-5 days postoperative

Management of patients on DOACs

Do not require blood monitoring as anticoagulant effect is predictable across individuals taking the same dose of medication

Use the same protocol as for patients who are taking warfarin

- Minor dentoalveolar surgery – do not cease anticoagulant medication, use of local haemostatic measures
- Major dentoalveolar surgery – consult with medical practitioner or refer to OMFS

Clinical considerations

Need to recognise in workup prior to surgery

- MHx is imperative!

If there is suspicion of major or uncontrollable haemorrhage during a dentoalveolar procedure, the patient must be promptly transferred to a tertiary or specialist setting for management

Blood test

Consider limiting the number of teeth extracted in a single appointment to three or fewer

Pack and suture for all patients with an increased bleeding risk and ensure haemostasis achieved prior to D/C

- Pack haemostatic agent in socket only - do not need to overfill
- Suture across the socket - cruciate/figure-of-eight

Clinical considerations



Postoperative bleeding

Primary haemorrhage:

Bleeding that occurs during the intraoperative period.

Reactionary haemorrhage:

Takes place within 24 to 48 hours postoperatively, where the patient's BP normalises once intraoperative hypotension and vasoconstriction have reversed.

Secondary haemorrhage:

Occurs between 7 to 10 days postoperatively. Often occurs due to postoperative infection that causes erosion of the blood vessels.

Assessment of postoperative bleeding

1. Primary survey - ABCDE
2. Take detailed history
 - a. Medical conditions and/or medications susceptible to postoperative bleeding
 - b. When the extractions was done?
3. Examination
 - a. How much bleeding - quantify
 - i. Slow ooze
 - ii. Arterial bleed
 - iii. Venous bleed
 - b. Where is the bleeding
 - i. Which tooth socket? Multiple sockets?
 - ii. From gingiva?

Management of post-op bleeding

1. LA infiltration around socket with adrenaline if no contraindications
2. Suction and remove existing blood clot
3. Re-assess bleeding source
4. Pack socket with appropriate material
 - a. Ensure packing sits below gingiva level and no extruding out of socket
5. Suture tight with cross mattress or cruciate interrupted sutures
 - a. +/- Tranexamic acid mouthwash or soaked gauze + pressure
6. Pressure with gauze
7. **NO RINSING OR SPITTING**

Take home messages

- “Never let the sun set on pus”
- Always try to remove the source of infection if able to
- Sublingual, submandibular, submental space infections require urgent referral to tertiary centre or specialist
- Always pack and suture for all patients with increased risk of bleeding