

# Filling in the Gaps

## Facilitator Notes

This course has been put together for Dental Core Trainees (DCTs) working in Oral and Maxillofacial Surgery (OMFS) for the first time. Although most trainees receive an induction and are given further teaching throughout their training, the content of these sessions is often very OMFS-centric. Although it is of course important for trainees in OMFS to learn about things like managing facial fractures, and how to assess facial swellings, there is another category of knowledge which is often overlooked.

The day-to-day workings of the hospital, the roles of the many members of the clinical team, and the meanings of the jargon-heavy language and myriad acronyms are all totally new to OMFS DCTs. Feeling overwhelmed by not understanding the system can be really prohibitive to using and building upon the OMFS knowledge that DCTs have. Hence, the idea of this course is to fill in the gaps in their knowledge that aren't covered in existing teaching programmes.

Small-group sessions to equip DCTs with this information and support their transition to being hospital clinicians have so far been very successful, and the attendees have reported that they feel they have helped them to feel more confident at work. Limiting these sessions to the DCTs at one hospital, taught by another clinician at the same hospital, allows the attendees to feel comfortable to participate and share difficult experiences they've had, and allows the facilitator to tailor the sessions to the specific work environment at their hospital.

The aims of this course are to give new DCTs in OMFS:

- A safe space in which to ask questions and reflect on difficult experiences
- Understanding of the way the hospital works, and their role within it
- Practical tips for their clinical work
- A baseline understanding of the common medical conditions they are likely to come across in their patients

These aims will be achieved through the following objectives:

- Sessions should be planned for new DCTs from the start of their new jobs, approximately once per week, for around an hour per session. Ideally these should be arranged locally; only DCTs who work together at one hospital unit should attend. This is so that the attendees feel comfortable and are not worried about being judged by peers they don't know.
- The facilitator should be somebody dentally-qualified, with at least one year of OMFS experience, and experience of working in OMFS at that particular unit. The person should not be more senior than around junior registrar level. Senior clinicians have much knowledge to impart, but these sessions are designed to be delivered by somebody the DCTs can relate to, who has been in their position recently. Somebody in this category will help make the attendees comfortable, and will also be well placed to offer them tips for undertaking their specific job role.
- The sessions can be held either in person or online. If they are held online, the DCTs should have their cameras on as this should be interactive teaching.
- The content of the sessions should be tailored to the group, and their learning needs. A lesson plan is included for 15 sessions, but this plan can be adapted; sessions can be rearranged, or even removed if the DCTs feel any topics have already been sufficiently covered through other

means. Furthermore, facilitators are encouraged to add in sessions if the DCTs request extra topics, or to do a long debrief on a difficult scenario they've faced at work.

- Sessions can be delivered with the use of a PowerPoint presentation if the facilitators wish, but it is not necessary. Session notes should be distributed to participants following the end of each session.
- Each session should start by asking the DCTs to share any stories, questions, or difficult situations that they might have found, relating to the topic in question. These should be revisited at the end of each session, and the DCTs encouraged to answer their own questions using their new knowledge. Facilitators might also share stories from their own time as a DCT.
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- Feedback for the facilitator can be collected at the end of every session

## Session Titles

1. Introduction to the Hospital and ED
2. Clinical Procedures
3. Inpatient Care
4. Radiology
5. Sepsis
6. Diabetes
7. Cardiology and Dental Assessments
8. Head Injuries and Falls
9. Antithrombotic Drugs
10. Managing Bleeding
11. Anaemia
12. Kidney Disease
13. Liver Disease
14. Interpreting Blood Results
15. Impaired Swallow

## Session Plans

Below are some notes for conducting each of the planned sessions. The notes for the earlier sessions are more detailed, as they include points which are often assumed as baseline knowledge, but have been highlighted by recent DCTs as things they didn't know when they first started. The later sessions are more general, and so the notes are more of a prompt.

### 1. Introduction to the Hospital and ED

By the end of this session, DCTs should have a good understanding of:

- o The meanings of the most common terms used when talking about hospital care
- o The structure of the A&E department
- o The admission process
- o The different stages at which patients might be referred to OMFS
- o The roles of different clinicians in A&E
- o How to take referrals and how to respond to unclear referrals

Plan:

- Start with introductions and gaining an idea of the DCTs experiences so far.

- Outline the course aims and objectives.
- Follow the below structure, but check understanding and invite questions after every point.
- Ask the DCTs what they understand by the terms “inpatient”, “outpatient” and “admit/admitted”. Explain that in hospital patients must “belong” to a location as an outpatient (including ED) or an inpatient. They must also “belong” to a specialty, and the specialty a patient is “under” are the team who are responsible for their care.
- Explain the meaning of a referral. That it’s important to establish whether the person is asking you to provide a quick opinion/intervention for a patient who otherwise has ongoing care with another team, or whether they are expecting you to take full ownership of the patient.
- Outline a patient’s journey through ED, with specific references to your own hospital. For example, the front door -> triage -> resus/majors/minors/GP unit/ENP unit, depending on what you have locally. Give an example of the route a patient with a dental abscess would usually take, including when they’d get bloods and imaging etc.
- Briefly outline the roles of the following clinicians:
  - o Nurses - sisters and matrons are senior nurses
  - o HCAs
  - o Doctors - FY1, SHOs including FY2 and core trainees, registrars, consultants
  - o ANPs or ENPs – nurses with additional skills and training who have extended job roles, e.g. ENPs seeing their own patients in ED
- Explain the ED clock system, and how it relates to the motivations of ED staff. This means that everybody is working together to get patients seen as quickly as possible, but also that sometimes ED will try to speed things along by referring before they have adequate information or when the patient still has other outstanding issues. Highlight the importance of updating the ED nurses with changes/decisions/requests for your patients.
- Explain briefly what is needed as part of admitting a patient in your hospital, inc. asking the ED nurses to request a bed, writing up a drug chart and ensuring the patient’s notes are written so that ED can hand over to the ward why that person is in hospital and what they need.
- Explain the term “discharge”, and what is meant by a discharge summary (both ED and inpatient). Explain briefly how they are completed in your hospital. Explain that they need to include a brief summary of what has happened to the patient during their stay, and outline any instructions/requests that need to be passed on to the GP.
- Finish by reassuring the DCTs that it’s entirely normal to experience imposter syndrome when starting your first job in OMFS, but that they absolutely have the knowledge and skills to be safe clinicians. It’s usually the new environment that gets overwhelming

## 2. Clinical Procedures

By the end of this session, DCTs should have a good understanding of:

- o The most common procedures undertaken whilst on call in OMFS
- o How to carry out suturing
- o How to carry out incision and drainage of an abscess
- o Where to find the equipment for the above procedures

Plan:

(As for all sessions, check understanding and invite questions after each section)

For each of the following, discuss the indications and technique – include tips on patient positioning, and any suggestions you have for performing the procedure on children or nervous patients. Encourage DCTs to list the equipment they think might be needed, by thinking through the procedure logically in order. Supplement their suggestions where needed. Ensure that they know where each item can be found in your hospital, and what to do/where to look if anything seems to have run out.

- Incision and drainage of an intra-oral abscess
- Incision and drainage of a skin abscess
- Suturing of lacerations
- Splinting in dental trauma

Remember to consider different settings for the above procedures at your hospital, e.g., adult and paed ED.

### 3. Inpatient Care

By the end of this session, DCTs should have a good understanding of:

- VTE risk assessments
- Prescribing fluids for inpatients
- Analgesia and the pain ladder
- Prescribing patients' regular medications, and other commonly prescribed drugs
- How to interact with the wider hospital team to provide good inpatient care

Plan:

(As for all sessions, check understanding and invite questions after each section)

- Explain the role of VTE assessments, and that they are a way for us to assess each patient's risk so that we can follow the trust's policy for mitigating the risk. Explain that the form talks about patient factors and admission-related factors. Prompt the DCTs to suggest any risk factors they know for VTE, and any methods they know for reducing this risk. Explain how the form also asks about any contraindications to these methods.

- Talk through how the process of VTE assessment is completed in your hospital, and what VTE prophylaxis is usually given, including the brand and doses of LMWH.

- Ask about the DCTs understanding of IV fluids, and when they are indicated. Discuss the difference between maintenance fluids and fluid resuscitation. Outline the consequences of fluid overload, and the importance of responsible prescribing. Direct DCTs to NICE guidelines on fluid requirements, +/- any trust guidelines. Offer some examples of different OMFS patients and ask the DCTs to suggest whether or not they should have fluids prescribed and what they would prescribe, e.g.:

1. An unwell patient with a dental abscess who hasn't been eating or drinking for a few days
2. A well patient who is admitted for eye obs following an orbital floor repair that finished late in the day
3. A patient admitted with a mandible fracture who's planned for ORIF in the morning

- Explain that as OMFS DCTs they are treated as doctors in that they are allowed to prescribe the full spectrum of drugs in hospital. This is on the basis that they are safe clinicians who understand the importance of prescription accuracy, and so it is expected that they will look things up in the BNF, and ask for appropriate help if they are ever unsure regarding prescribing. Senior OMFS clinicians can be helpful, but so can ward pharmacists, and even the patient and their relatives.
- Explain that when a patient is admitted, all their regular medications need to be prescribed for them to have while they are in hospital, unless there is a new contraindication. You should always seek senior help before stopping a patient's regular medication. If the patient can tell you their medications and doses, or provide a list/prescription, we generally take their word for it and prescribe everything on the list. Sometimes prescription medications can be checked through the electronic patient record.
- Ask the DCTs to share what types of analgesia they know, and whether they have heard of the pain ladder. Explain the pain ladder, and that patients should always be managed on the minimum amount of analgesia needed to adequately control their pain, which means prescribing in a way that means there are options for if their pain increases or decreases. Outline how this can be done.
- Explain that many hospital specialties are grouped into medical or surgical. Explain that the med reg is on-call representing the whole of medicine. Available for referrals and advice but very busy, so important to be prepared with all the relevant info/results if asking them questions.
- Discuss the importance of being clear when you ask questions, especially by phone. Give examples of good and bad introductions and ask them to identify differences between the two. E.g., phoning the lab to check a patient's results. "Hi, I'm calling about some results. Shall I give you the hospital number?" vs "Hello, my name's Rachel, I'm one of the maxfax SHOs. Would you be able to help me by confirming a patient's results, please? I can give you her details."

#### 4. Radiology

By the end of this session, DCTs should have a good understanding of:

- o The types of imaging commonly used in OMFS, and the uses of each
- o The role of a radiologist
- o The process of "vetting" scans
- o How to talk to a radiologist about imaging

Plan:

(As for all sessions, check understanding and invite questions after each section)

- Ask the DCTs which types of imaging they are aware of already. For each of the following types of imaging, highlight what sort of information it can offer and what clinical questions it can answer. Discuss what is meant by a clinical question that can be answered by imaging, e.g. "Is there a fracture?", "Is there a collection?", "What is the 3D relationship of this injury to the surrounding structures?":
  - o OPG
  - o PA mandible
  - o XR facial bones (2 views)
  - o CT
  - o MRI
- Give a couple of examples of patients and ask the DCTs to suggest what would be the most appropriate imaging. E.g.:

- A patient who has been punched in the face. He has no eye signs, but bruising and possibly a step over his left zygoma. (XR facial bones – to assess for # zygoma)
- A patient who has been hit in the face. She has bruising around her left eye, and pain and diplopia on upwards gaze (CT – plain films not adequate for assessing orbital fractures. 3D view needed for planning if surgery indicated).
- A patient who has a large submandibular swelling, with voice changes difficulty swallowing her saliva. She has a raised floor of mouth. (CT – to ascertain the location and extent of any collection, and assess the patency of the patient's airway).

- Discuss the role of the radiologist, and how to communicate with them at your hospital. Is it in person or over the phone?

- Explain the meaning of vetting/protocolling (or whatever else it may be called!). That low radiation images like plain films can be requested by any doctor, but that higher radiation scans (like CT) or expensive/resource-heavy scans (like MRI) need to be approved by a radiologist, whose job it is to determine whether the type of image you have requested is appropriate for this patient, and for answering the specific question you are trying to answer. Explain the need to provide sufficient clinical information in your request for the radiologist to make their decision.

- Explain that if a scan is requested routinely the request will be added to the bottom of the radiologist's list, and so will automatically be approved/rejected by the radiologist when they reach that point on their list, but if the scan is needed in the next day or so we need to ask the radiologist to approve it sooner, by contacting them. Advise of the process of this in your hospital.

- Ask the DCTs if they would like to share any difficult experiences they've had so far with imaging, and whether they have learnt anything today which would have helped with that. Ask if they still have any unanswered questions.

## 5. Sepsis

By the end of this session, DCTs should have a good understanding of:

- The pathophysiology of sepsis and shock
- The signs and symptoms of sepsis, and how they relate to its pathophysiology
- The initial management of sepsis
- How to look for the cause when a patient has sepsis of unknown origin

Plan:

(As for all sessions, check understanding and invite questions after each section)

- Start by asking the DCTs what they understand by sepsis. Encourage any correct answers. They might use the word "shock". If they do, move on to the next point. If they don't, ask if they have heard the phrase "septic shock", then move on to the next point.

- Ask the DCTs "what is shock?":

- When the blood pressure is too low, so blood isn't properly perfusing the vital organs
- Could be due to:
  - Blood loss, so not enough blood left in the body (**hypovolaemic shock**)
  - Heart not pumping effectively, e.g., in a cardiac arrest (**cardiogenic shock**)
  - Extreme vasodilation and intravascular depletion caused by capillaries leaking fluid out into the tissues (**distributive shock**). Some examples of this are **anaphylactic shock** and **septic shock**.

- Ask the DCTs if there is less fluid within the blood vessels, how might that affect the blood pressure? Prompt them to think about what the heart could do to try to maintain the blood pressure the body needs? Will the rate go up or down? And if the blood volume continues to drop, even if the heart rate is high, what will eventually happen to the blood pressure?
- If the body is working hard to try to fight an infection, what is the person's temperature likely to do?
- If the blood pressure is low, that means less blood will get to the tissues of the body. What does blood normally deliver to the tissues? Have the DCTs heard of "lactate" before? If not, outside the context of medicine, when might we say somebody would get build up of lactic acid? (Anaerobic respiration). Explain that the principle is the same as when you go for a run; your body has to work so hard that its energy demand is higher than the oxygen supply, so it respire anaerobically and makes lactic acid. This builds up briefly, but usually you stop exercising and breathe in more oxygen, so the body has chance to correct it.
- In sepsis (or any kind of shock), insufficient oxygen is getting to the body's tissues, so they have to respire anaerobically just to be able to function normally. Unlike going for a run, this process doesn't suddenly stop, so the lactate builds up as a toxin in the body. It also causes acidosis – low pH. This means the body can't work as well.
- The kidneys would normally correct an acidosis, but they're also getting less blood so they can't work as well. If the kidneys are getting less blood, what else might we notice clinically? (Low urine output). This also means other toxins (along with lactic acid) can build up in the blood
- If there are toxins in the blood, plus hypoperfusion of the brain, what else might that cause? (Confusion/low GCS)
- Eventually, if the heart muscle doesn't get enough blood supply it will stop beating, and the person will die.

### How should we respond to sepsis? The sepsis 6!

Ask if any of the DCTs can name any of them. Now they understand sepsis, ask them to reiterate why measuring urine output and lactate are good indicators of how sick a person is. For each, explain why and how it is done:

1. Out = Urine. Measure and monitor urine output, as it's a good indicator of how well the kidneys are working, and will improve as the patient gets better.
2. Out = Lactate. Check the lactate by doing a venous blood gas (VBG). A good indicator of how oxygen-deprived the tissues are.
3. Out = Blood cultures. Results won't be available for use yet, but they need to be taken before any antibiotics are given, so that the microbiology lab can still detect any bacteria in the blood. In a few days they will be able to confirm any bacteria present and which antibiotics will work best against them.
4. In = Antibiotics. Broad spectrum antibiotics are given until we know which ones are best for the specific infection the patient has. The trust has a policy outlining which ones should be used.
5. In = Fluids. Usually, 500ml of normal saline given stat (as quickly as possible), also called a fluid challenge. You're challenging to see if the blood pressure will come up, so that the tissues are better perfused
6. In = Oxygen. As all the tissues are oxygen starved, it's important to make sure any blood that does get to them is as oxygen rich as possible, so give high flow oxygen through a non-rebreathe mask, provided the patient is awake and breathing.

Don't forget to ask for help! Outline who is available to help in your hospital, e.g., CCOT, senior OMFS colleagues

- Outline the role and steps of a septic screen. Explain that it is a systematic assessment to identify the cause of new signs of sepsis, if the cause isn't already known:

- o **Skin:** Check all the skin, look for infected wounds etc
- o **Devices:** Check all indwelling lines and devices for signs of infection: cannulas, catheters, stomas, surgical drains, any vascular access ports etc
- o **Chest:** Auscultate for crackles (or make sure somebody who knows how has done it!), get a chest x-ray, if they're coughing up sputum send it to the lab for microscopy, culture, and sensitivity (MC&S)
- o **Abdomen:** Palpate the abdomen to check for pain, ask about vomiting/nausea/bowel movements. If any abnormal stool, send for MC&S
- o **Urine:** Monitor urine output, observe if the urine is cloudy/bloody/smelly, or any other signs/symptoms of a UTI. Send urine for MC&S

## 6. Diabetes

By the end of this session, DCTs should have a good understanding of:

- o The two main types of diabetes mellitus
- o The different medical emergencies that can arise in diabetics
- o How diabetic control is affected by infection and injury in the OMFS setting

Plan:

(As for all sessions, check understanding and invite questions after each section)

- Start by explaining that it's important to understand that glucose is constantly released into the blood, so blood glucose (referred to as BM) doesn't only rise after eating. Eating temporarily raises BM, but the body uses insulin to take the glucose out of the blood to store it in muscle and liver cells. It is released throughout the day to maintain the BM; glucagon is the hormone that releases the glucose.

Insulin = sugar into cells, BM drops. Glucagon = sugar out of cells into blood, BM rises.

- Whenever BM drops, more glucagon is produced (and less insulin), so that BM rises. The body maintains this balance itself, normally.

- Glucose is also released in response to cortisol, the main stress hormone, as the body's response to stress is to prepare for fight/flight.

- Recap the differences between type 1 and type 2 diabetes mellitus, including the fact that T1DM is always treated with insulin, whereas T2DM can be treated with a range of drugs +/- insulin

### Hypoglycaemia

- Ask the DCTs what is meant by hypoglycaemia (BM low enough to cause symptoms – below 4). Normally if BM drops the body will release glucagon to bring it back up, so how does hypoglycaemia happen? If patients are taking exogenous (from outside the body) insulin, or using a medication which artificially makes the body increase insulin production, e.g., gliclazide. Too much insulin = hypoglycaemia. Ask the DCTs if they know the emergency management of hypoglycaemia (oral glucose/IM glucagon/IV glucose depending on the situation).

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### Diabetic Ketoacidosis (DKA)

- Briefly outline DKA. Main points: very high sugars causing fast onset, usually precipitated by something e.g. forgetting insulin, being ill (remember the cortisol! Illness = stress = cortisol = increase in BM! Diabetics should follow Sick Day Rules to increase their insulin if they're ill). The important point for OMFS juniors is to be aware of the risk, check BM and ketones, and escalate to seniors/medics if signs of DKA.

### HHS

- Briefly outline hyperglycaemic hyperosmolar syndrome (HHS). Main points: moderately high sugars over a sustained period of time, slower onset, often in poorly-controlled diabetics, can also be precipitated by being ill (remember the cortisol! Illness = stress = cortisol = increase in BM!) The important point for OMFS juniors is to be aware of the risk, check BM, and escalate to seniors/medics if signs of HHNS.

- Explain that DKA and HHNS would definitely require management plans from the medics, or even for them to take over the care. But if there is an infection then treating the infection is part of the treatment for controlling high BMs.

- Discuss how inpatient management of diabetic patients is done at your trust. Are there separate drug charts for insulin prescribing? Important to make sure that long-acting insulin is \*always\* prescribed as usual. If patients are starving pre-operatively, they might need to be put on a variable rate insulin infusion. Explain that this mimics the body's own natural balance of sugars and insulin, but can be complicated to prescribe. Always ask for help with prescribing insulin if unsure.

- Remind the DCTs that dexamethasone is sometimes used by OMFS to reduce inflammation. Ask the DCTs if they know what kind of drug dexamethasone is. Once you establish that it's a steroid (like cortisol!), ask the DCTS to work out how it's likely to impact BM. Therefore, we should be wary of prescribing dexamethasone in diabetic patients.

## 7. Cardiology and Dental Assessments

By the end of this session, DCTs should have a good understanding of:

- o The disease mechanism of infective endocarditis, and how dental disease is a risk factor
- o The consequences of an embolism from different areas of the heart
- o The role of dental assessments for patients awaiting heart surgery

### Plan:

(As for all sessions, check understanding and invite questions after each section)

- Start by asking the DCTs what they remember of Virchow's triad. Help them if they can't remember. (Endothelial damage, stasis/abnormal flow, hypercoagulability). With these points in mind, ask them to suggest ways that heart surgery makes a thrombus more likely post-op (endothelial injury at the surgical site, hypercoagulability initially because the blood clots more readily after an injury, possibly turbulent flow if a replacement valve is not 100% perfect).

- Ask the DCTs what they know about the stages of progression in the development of a thrombus, and how it can become a thromboembolism (platelets aggregate at site of endothelial damage, clotting factors lead to formation of fibrin strands to make a more stable clot = thrombus. If it breaks off and travels in the blood it becomes a thromboembolism).

- As a side note, ask the DCTs to think about where a clot from the right heart would go, and what would be the consequences? (Lung -> PE, not so bad if small. Issues if big). For the left heart (out into the aorta, could go to the brain -> stroke, bad!)

- In patients who need heart surgery, thromboembolism is a concern, but there's also a separate problem of infective endocarditis, which can be caused by dental bacteria. Explain that disrupting the oral biome leads to a bacteraemia (increased levels of bacteria in the blood). Infective endocarditis happens when a forming thrombus becomes infected (from a bacteraemia), so it produces growths called vegetations. These can damage the internal surface of the heart. Because the tissue of the heart valves doesn't have a blood supply, it can't repair itself.

- Ask the DCTs what can happen if the heart valves don't work properly. Essentially the heart can't work efficiently. Can cause fever, tiredness etc and can lead to needing further heart surgery to replace valves.

- IE can happen in lots of heart conditions, but there is a particular risk intra- and post-operatively for patients undergoing heart surgery. Cardiac surgeons aim to reduce this risk by making sure patients are "dentally fit" prior to surgery. This generally means that they have no active apical disease or teeth which are likely to need extraction soon, as having an extraction would disturb the oral bacteria and cause a bacteraemia.

- In an ideal world these patients would all have full control of any periodontal disease before having their surgery, but that usually isn't possible, especially if you work in a DGH with no dental hospital. Often, it's a case of going to see the patient on the ward, and assessing them (along with an OPG) to determine whether there are any teeth which require extraction. Explain how this process works in your hospital, and whether OMFS then arrange the extractions.

## 8. Head Injuries and Falls

By the end of this session, DCTs should have a good understanding of:

- o Falls as a cause of maxillofacial injuries
- o What to look at beyond facial injuries when assessing somebody who's fallen
- o The basics of traumatic head injuries

Plan:

(As for all sessions, check understanding and invite questions after each section)

- Ask the DCTs to list some reasons a person might fall to the floor. Suggest these can be split into two categories; a collapse (e.g., due to a faint, heart attack, seizure, other loss of consciousness etc) vs a fall (e.g., due to tripping over a paving stone, being assaulted, falling due to lack of balance or poor coordination, having numb feet etc)

- Explain that it's always important to establish the circumstances of a fall. The patient might have other injuries or an underlying condition that would be better managed by the appropriate specialty than by OMFS. Explain the importance of establishing this at the point of taking a referral, to make sure you aren't accepting responsibility for a patient who still needs investigations for other issues. E.g., for a patient who tripped walking the dog and fractured their mandible; "Any other injuries at all? Arms and legs okay?". If the story is that the patient collapsed, and ED tell you they just fainted, it's sometimes worth saying you'll go to see the patient but you won't accept the referral/take over the care until you've seen them.

### Assessing a Post-Fall Patient

- Are their obs normal now? Does their story sound like a faint? Sometimes the patient's story will indicate that maybe something else is wrong, e.g., they're still feeling very unwell and hypotensive

(turned out to have a massive PE), or they blacked out at the wheel and crashed their car (turned out he'd had a heart attack). Feel free to use your own examples here!

- Advise that if you see an elderly person who has fallen, it's worth asking them if they've fallen before. If they are falling lots, you can ask in the discharge summary for the GP to refer them to "falls clinic." It's a really useful outpatient service that can do an assessment and help come up with solutions to reduce their risk of falls. Ask the DCTs to list some medical conditions which could make falls more likely (E.g., diabetes, Parkinson's, dementia, vertigo, being on antihypertensives, anaemia, arthritis, and other foot disorders etc)

- Ask the DCTs what they understand by the phrase "head injury." Discuss the different ways the brain can be injured; bleeds, contusions, concussions. Ask the DCTs to list features of a history which would make them suspicious for a head injury. How can it be investigated further (full neurological assessment, CT – this should be done by ED of course, but it's good to be aware of the process)

## 9. Antithrombotic Drugs

By the end of this session, DCTs should have a good understanding of:

- o The basic principles of the clotting cascade
- o The main categories of antithrombotic drugs
- o The implications of these drugs for OMFS patients

Plan:

(As for all sessions, check understanding and invite questions after each section). There are some diagrams of a simplified version of the clotting cascade provided at the end of this document (Appendix 1). These may be used if the facilitator wishes.

- Ask the DCTs to recap what they know about how a clot forms (covered briefly in session 7; endothelial injury -> vasoconstriction -> platelet plug -> fibrin strands).

- Clotting factors are what leads to fibrin strands. The reason they happen in a cascade is that it allows the body to very rapidly get from a small amount of clotting factors to a large amount of fibrin. It works as a chain reaction; each step activates the next step. The active form of a factor is called the "a" version, so Factor XIIa activates Factor XI into XIa, which turns factor IX into IXa and so on (the numbers aren't in a great order!). One of the most important steps, as illustrated in the diagram, is the production of factor Xa.

- Illustrate this idea that each unit of factor activates a several units of the next step, which means that the number of units in each step increases exponentially. You could say it's like calling 5 friends to help with something, and they each call 5 friends, who each call 5 friends, who each call 5 friends etc. You end up with lots of people very quickly!

- Explain that antithrombotic drugs have to disrupt part of that pathway to reduce clotting. That can either be anti-platelet mechanism, or anti-coagulant (essentially anti-part of the clotting cascade).

- For each of the following medications, discuss the mechanism of action, common indications, and your hospital/department's guidelines for stopping it prior to common OMFS procedures. Remember to explain the reason that antiplatelets have a longer duration of action than DOACs, for example:

- o Vit K antagonists: Warfarin
- o New antiplatelets – Clopidogrel, ticagrelor

- DOACs – Point out that the names give you a clue – RivaroXaban, apiXaban and edoXaban are all factor X<sub>a</sub> inhibitors. DabigaTran is a Thrombin inhibitor (that one is admittedly a bit more of a stretch).
- Heparin – Normal or LMWH (the drug name enoxaparin and the brand names inhixa and clexane also tell us that those are factor X<sub>a</sub> inhibitors)

## 10. Managing Bleeding

By the end of this session, DCTs should have a good understanding of:

- The different sources of bleeding that OMFS juniors may need to manage
- How good preparation can make achieving haemostasis easier
- How to use the materials at our disposal to their maximum potential

Plan:

(As for all sessions, check understanding and invite questions after each section)

- Start by asking the DCTs to think of sources of bleeding OMFS might be asked to control (E.g., skin edges, vessels, oral soft tissues, bone (such as in extraction sockets).
- Ask them to suggest the different methods they know that are available for achieving haemostasis, how they work, and where they're available in your hospital (E.g., theatres only, ED, MOS clinics). Aim to cover all of the following:
  - Pressure with damp gauze
  - Sutures (either to close wound edges, to apply pressure, or to tie off vessels)
  - Bipolar
  - Monopolar
  - Surgicel (or other brand of absorbable haemostatic dressing)
  - Topical tranexamic acid
  - Oral/IV tranexamic acid
- Ask the DCTs how they would prepare for suturing a skin wound on somebody they've been told is on anticoagulants, and/or is bleeding heavily? Think about getting tranexamic acid and lots of gauze ready in advance, in case it starts bleeding more when you move the tissue around. When would you consider placing a compression bandage over the wound after suturing, to reduce the risk of haematoma formation?
- Talk the DCTs through the process of treating somebody who has presented from practice with a bleeding extraction socket. If it has been packed/sutured already but is still bleeding, it hasn't worked so needs to be done again. Explain which materials you would use, how you would position the patient, and any other tips you have for doing this alone in A&E.
- Reinforce the importance of investigating systemic causes of unusually persistent bleeding. Clotting screen, check INR if on warfarin etc

## 11. Anaemia

By the end of this session, DCTs should have a good understanding of:

- The different types of anaemia
- The signs, symptoms, and management of anaemia

- o Blood transfusions

#### Plan:

(As for all sessions, check understanding and invite questions after each section)

- Ask the DCTs to briefly recap the roles of red blood cells and haemoglobin. Discuss together the symptoms of anaemia in general (tiredness, pallor, SOB, dizziness, weakness etc)
- For each of the following categories of anaemia, briefly discuss the pathophysiology, and any relevance to OMFS:

Iron deficiency anaemia (inc caused by bleeding)

Nutritional deficiency anaemias – B12 and folate

Haemoglobinopathies – Sickle cell and thalassaemia. Explain that sickle cell crisis can be precipitated by stress, inc dental infection, so removal of an infected tooth is often part of their treatment. Also policy to screen for thalassaemia +/- sickle cell pre-operatively in some trusts. What are your trust's guidelines?

Infectious causes – e.g., malaria, HIV etc

- Ask the DCTs when they might need to check for anaemia in an OMFS patient, and how they would do so. (Always check Hb in patients who attend ED after having bleeding. Make sure to reinforce that patients can and have died from bleeding from dental sockets!)
- Discuss the indications for and process for arranging a blood transfusion, including the principle that there are many layers of precautions to avoid giving mismatched blood products. There are still risks of blood transfusions.

## 12. Kidney Disease

By the end of this session, DCTs should have a good understanding of:

- o The functions of the kidney
- o The impact of renal disease on the body
- o The basics of AKI and CKD

#### Plan:

(As for all sessions, check understanding and invite questions after each section)

- Ask the DCTs what they know about what the kidneys do. Discuss the following functions, and the consequences of each one being impaired:

- o Fluid balance
- o Salt/electrolyte balance
- o pH balance
- o Excrete toxins
- o Convert vitamin D into usable form of calcium
- o Produce EPO

- Briefly discuss possible causes of decline in kidney function, including:

- o Scar tissue - can be formed after an infection, or from long-term damage (e.g., diabetes, hypertension)

- Genetic problems e.g., fibrosis
  - Dehydration (could be due to low intake or fluid loss e.g., vomiting. Kidneys get clogged with proteins etc)
  - Poor perfusion (Low blood pressure, e.g., due to infection, dehydration, infarction)
  - Physiological decline with age
- Ask the DCTs which tests we have to look at kidney function and explain why these tests are useful (U&E, particularly eGFR, plus urinalysis)
- Briefly summarise AKI and CKD, and why preventing AKI in hospitals is important
- Ask the DCTs to list ways we might be able to prevent AKI. Discuss all the following:
- Keep patients well hydrated. Enteral fluids are best (easiest for body to regulate fluid balance) but IV fluids if needed
  - Maintain good blood pressure (again, by hydration)
  - Be aware of diabetics and the elderly
  - If somebody is unwell, consider doing a urine dip
  - Avoid medications which will make it worse
- Raise the point that certain medications need to be adjusted or stopped in renal disease. Ask where we can find out if a medication needs to be changed in renal disease (The BNF). Ask if the DCTs know of any categories of medications which might need to be avoided for people with reduced renal function. Discuss the following:
- NSAIDs - reduce blood flow to kidney
  - Long-acting opiates (e.g., MR morphine) - metabolites build up
  - Statins - increased risk of rhabdomyolysis
  - DOACs - Can accumulate and increase risk of bleeding, if renally excreted
  - Diuretics - Can make low blood pressure worse
  - Antihypertensives (e.g., ACEi, ARB, Ca<sup>2+</sup> channel blocker, beta blockers) - make hypotension worse
  - Metformin (If GFR <30) - risk of hypo and lactic acidosis
  - Certain antibiotics, e.g., co-amoxiclav
- Ask the DCTs to consider when we might want to involve other specialties regarding an OMFS patient's renal function:
- If any abnormal eGFR, mention it in the notes to the GP. They might want to repeat bloods to check has resolved. Either way they should have it in their records.
  - If somebody has a significantly low GFR, or a low GFR and you're worried about them, it's reasonable to ask the medics for advice.

### 13. Liver Disease

By the end of this session, DCTs should have a good understanding of:

- The functions the liver normally carries out
- How liver function can become impaired
- The consequences of reduced hepatic function

## Plan:

(As for all sessions, check understanding and invite questions after each section)

- Ask the DCTs what they know about the role of the liver. Discuss the following functions:
  - o Filter blood from the digestive tract (via the hepatic portal vein) which contains nutrients, before it goes back into the main circulation
  - o Metabolise and break down toxins
  - o Produce clotting factors
  - o Produce bile (digestive enzymes) to be secreted back into the digestive system
  
- List the following risk factors for liver disease
  - o Alcohol
  - o Obesity/metabolic syndrome
  - o Viral hepatitis
  - o Genetic syndromes e.g., haemochromatosis
  
- Explain the disease process of the liver:
  - o Normal liver at first
  - o Fatty liver (starts to accumulate fatty deposits) – can be screened for with special tests, but usually asymptomatic
  - o Steatohepatitis (fatty and now also inflamed) – can cause pain, raised liver enzymes (ALT and AST) and impaired synthetic function (so reduced production of clotting factors)
  - o Cirrhosis (chronic inflammation leads to fibrosis and scarring, which physically restricts the liver by forming tight bands around it)
  
- Explain the sequelae of liver disease in the rest of the body:
  - o Physical build-up of pressure in the hepatic portal vein due to fibrosis (portal hypertension)
  - o This means the blood has to find alternative paths, and causes dilated veins in the lower oesophagus (oesophageal varices) and abnormal venous malformations in the skin (spider naevi)
  - o Fluid also leaves the blood and sits inside the peritoneum, around the organs (ascites)
  - o Reduced ability to metabolise toxins - things like bilirubin can build up in the blood, leading to jaundice
  - o Drugs can more easily reach toxic levels because they build up in the blood (e.g., paracetamol)
  - o Production of clotting factors is impaired, so patients bleed more easily
  
- Discuss the significance of liver disease in OMFS:
  - o Oesophageal variceal bleeding can be mistaken for bleeding from the mouth
  - o Patients with impaired clotting can spontaneously bleed from their gingivae, especially if they have gingivitis already
  - o If patients have known liver disease, check the BNF before prescribing and adjust if there is advice for prescription in hepatic impairment
  - o Paracetamol overdose can cause an acute rise in ALT or AST. An alcohol level of >1000 IU/L is said to be severe hepatotoxicity
  - o The main use of LFTs in OMFS is to assess clotting function

## 14. Interpreting Blood Results

By the end of this session, DCTs should have a good understanding of:

- The most common blood tests ordered in hospitals
- How to interpret blood tests
- How to respond to abnormal results

Plan:

(As for all sessions, check understanding and invite questions after each section)

- For each of the following tests, discuss when you might need to request and/or interpret them for OMFS patients, and what the different results can mean:

- FBC – inc RBC, Hb, WBC, neutrophils
- CRP
- U&E
- LFTs
- Clotting screen
- Bone profile – including phosphate, which is needed to check for refeeding syndrome (covered in session 15)
- ESR – giant cell arteritis is a differential diagnosis for facial pain
- Group and save
- HbA1C
- Blood cultures
- VBG – including lactate, ketones, glucose, pH

## 15. Impaired Swallow

By the end of this session, DCTs should have a good understanding of:

- How a swallow can become impaired
- The significance of impaired swallowing
- Alternative methods of feeding
- Refeeding syndrome

Plan:

(As for all sessions, check understanding and invite questions after each section)

- Ask the DCTs to list any causes of reduced swallow that they can think of. Discuss all the following:

- Physical inability to make a seal (e.g., palatal or lip defect)
- Congenital neurological conditions (e.g., cerebral palsy)
- New neurological defects (e.g., stroke, brain tumour, dementia, Parkinson's)
- Physical obstruction (oropharyngeal or oesophageal tumours, pharyngeal pouch, scarring from radiotherapy/infection/chronic GORD)
- Conditions affecting muscular ability to push down food (radiotherapy, achalasia, scleroderma)
- Dry mouth (all causes of xerostomia)
- Old age (swallowing gets weaker with age generally)
- Complication of head and neck surgery



- Explain the options for assessing a patient's swallow in hospital, and discuss which ones are commonly used in your department:

- o Assessment by Speech and Language Therapists (SLT/SaLT) on swallowing water, viscous fluid e.g., yoghurt, and soft solids e.g., fruit/cake
- o If needed can also use video fluoroscopy – dye swallowed and patient imaged whilst trying to swallow. Good at identifying the location of a problem
- o Flexible nasendoscopy or orogastroduodenoscopy (OGD) to identify anatomical abnormalities

- Ask the DCTs to think about what might be the consequences of a poor swallow:

- Poor nutrition if patients struggle to eat and drink
- Aspiration pneumonia if patients accidentally inhale food/drink/saliva (incidentally, aspiration pneumonia can be much worse if saliva is heavily colonised by bacteria due to poor oral hygiene, which is why oral care on the wards is so important. The NHS has a programme called Mouth Care Matters which is trying to improve this. Good opportunity for DCTs to get involved and undertake a local audit/Q!!)

- Explain that if somebody's swallow is compromised, we need to recognise it early and do a proper SLT assessment so that if it's not safe for them to have oral intake they can be fed in an alternative way

- Ask the DCTs what alternative methods of feeding they know that can be used if somebody can't swallow oral food. Discuss the following:

- o NG tube – tube placed through nose into stomach. Used for liquid feed, fluids, and medications. Not very comfortable long term, and difficult for patients to manage themselves at home
- o PEG (Percutaneous Endoscopic Gastrostomy) – Tube inserted via endoscope, from stomach out to skin. Used for liquid feed, fluids, and medications. Involves a surgical procedure, so used for longer term situations. Patients can easily be educated to manage them at home.
- o RIG (Radiologically-Inserted Gastrostomy) – Tube inserted via x-ray, from skin in to stomach. Used for liquid feed, fluids, and medications. Involves a surgical procedure, so used for longer term situations. Patients can easily be educated to manage them at home.

- What other treatment can help people with impaired swallows?

- o Nutritional assessment – need to make sure not malnourished. Don't forget refeeding syndrome!
- o Medication – PPIs etc to help with GORD
- o Saliva replacement
- o Dilation therapy to widen narrowing

- Ask the DCTs if they've heard of refeeding syndrome, and what they know by the term. Explain how it comes about:

- o Vitamins and minerals are used by the body as co-transporters in the process of absorbing and transporting nutrients within the body (e.g., potassium is driven into cells alongside glucose when insulin moves it out of the blood)
- o When a person doesn't eat (or doesn't eat properly) for around 5 days or more, the body isn't receiving any new glucose, but it has to find ways to maintain blood glucose levels to stay alive. Once it uses up its glycogen stores, it starts to break down proteins into amino acids and fats into fatty acids for the body to use as alternative fuels, and these processes use up vitamins and minerals as co-transporters.
- o When the body is finally given food (refeeding), the influx of glucose increases insulin levels, and insulin drives potassium into cells. Glycogenesis (making new glycogen) uses up phosphate and magnesium, calcium is also used up as a transporter, and sodium and water are driven into cells.

The overall result is massive depletion of electrolytes and water in the blood (causes severe dehydration).

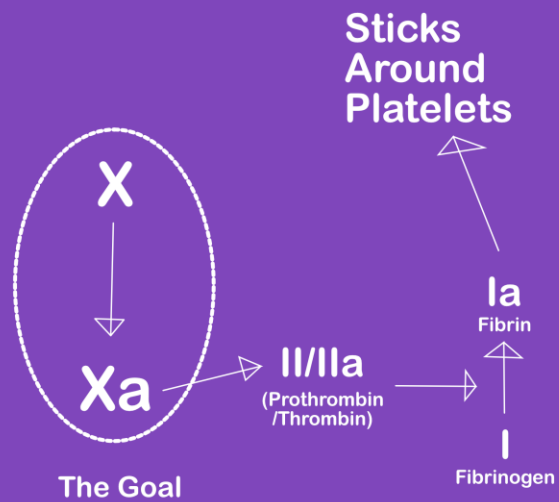
- How do we reduce the risk of refeeding syndrome?

- Identification of at-risk patients
- Pre-feeding electrolyte levels to be checked
- Feeding regime prescribed by specialist dietician
- Fluid balance monitoring, and resuscitation as needed
- Monitoring of electrolytes throughout feeding (K<sup>+</sup>, Na<sup>+</sup>, Ca<sup>2+</sup>, PO<sub>4</sub><sup>3-</sup>, Mg<sup>2+</sup>)
- Giving supplementary electrolytes and vit B/thiamine

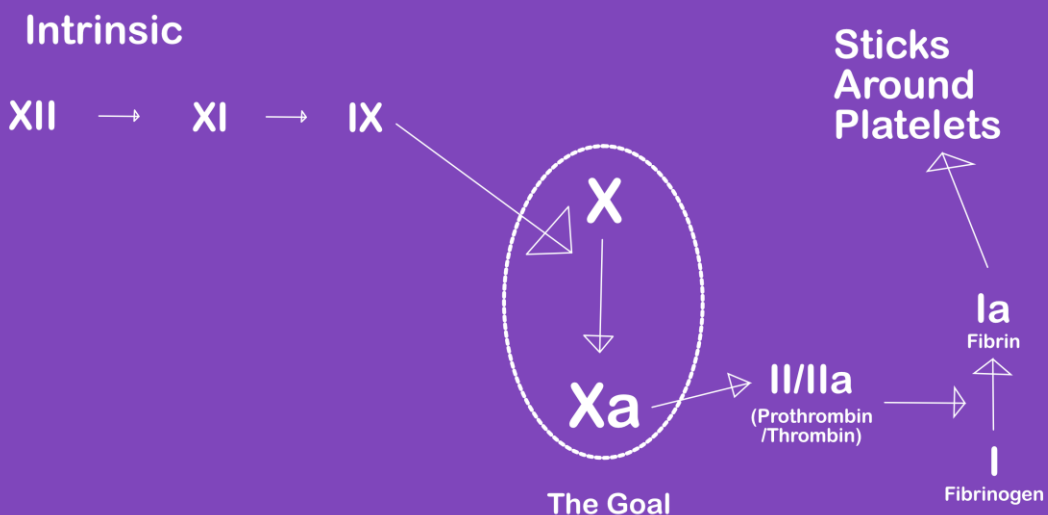
Appendix 1. Simplified diagrams of the clotting cascade



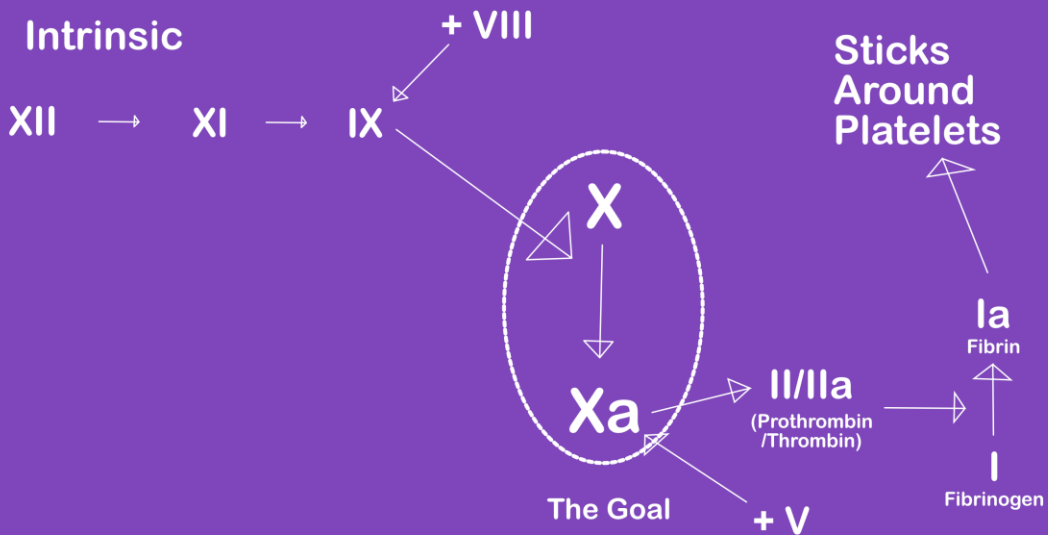
# The Clotting Cascade



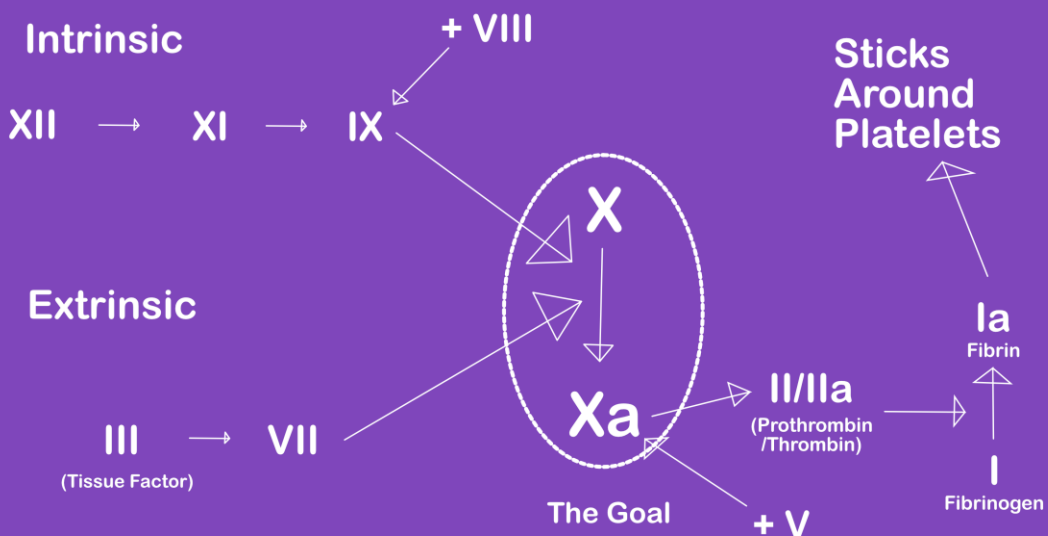
# The Clotting Cascade



# The Clotting Cascade



# The Clotting Cascade



Appendix 2. Diagram representing warfarin bridging with LMWH, where X is when a procedure would be scheduled

