

SELF-ASSESSMENT QUESTIONS

ORAL AND MAXILLOFACIAL SURGERY

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You are a casualty officer in the Accident and Emergency department. The following three patients require assessment.

Question 1

A 12 year old boy has been hit in the face with a hockey stick. His face is covered in blood and he has avulsed (knocked out) a front tooth (Figure 1). He has incised wounds on his nose and on the mucosa of his lip. His mother is holding a plastic container in which lies a tooth immersed in milk.



Figure 1. An intubated patient who is missing an anterior tooth.

- Are radiographs indicated? If so which ones?
- You will come across cases in which there are a number of avulsed teeth that cannot be accounted for. Are chest radiographs indicated in these cases?
- Which temporary storage mediums are appropriate to store teeth in?
- Should you re-implant the tooth?
- What if the patient had been 5 years old instead?
- Is there a possibility of an associated fracture?
- Is a course of antibiotics appropriate?

Question 2

A 20 year old male student presents with a large swelling in his right submandibular area. He had a filling placed in a lower right premolar tooth five days ago. This tooth had previously caused him no problems but some decay had been picked up on a routine radiograph taken a week before. After having the filling placed the tooth was very uncomfortable and he required painkillers. However, the pain got better after a couple of days. He started

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feeling unwell yesterday and the swelling began this morning and has enlarged quickly. He feels faint and the triage nurse has assessed his temperature as 38.8°C with an auricular probe. Figure 2 shows such a prominent submandibular swelling.



Figure 2. A prominent right sided submandibular swelling.

- What is the most likely diagnosis?
- What is the most effective first line analgesia for dental pain?
- What important surgical emergency must be considered before any other management is instigated?
- What are the most appropriate investigations?
- Is it appropriate to give oral antibiotics and advise him to see his dentist immediately or should you start an infusion of an intravenous antibiotic and contact the maxillofacial team on call.
- Which is the most appropriate antibiotic(s)?
- What structures are most at risk when performing incision and drainage in the submandibular area?

Question 3

Your final patient is a 68 year old lady who fell over 12 hours ago. She is not in much discomfort and has only come in at the insistence of her daughter. Looking at her from the end of the bed she has bilateral black eyes. She is holding a blood sodden handkerchief to her nose.

- Give at least three diagnoses would you consider?
- You sit down to talk to her about the events behind her injury. What important questions would you ask that may alert you to other problems?
- You ask her to remove her handkerchief and note that her nose is still bleeding slightly. What are your thoughts?
- This radiograph (Figure 3) was taken in the Emergency department and shows a classical 'tripod fracture' of the right zygomatic complex (arrowed). What are the symptoms and signs of this type of injury?

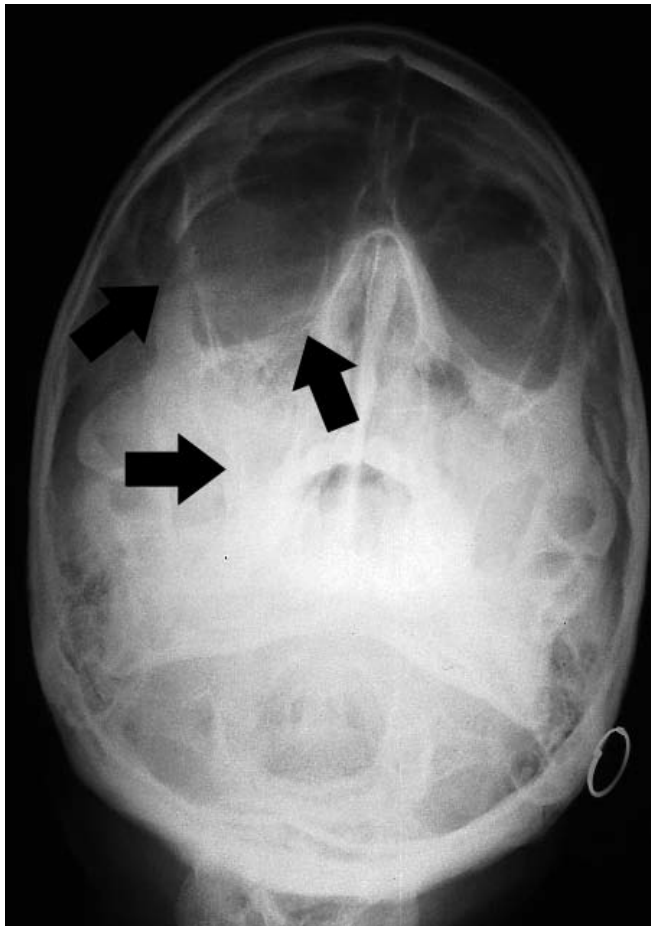


Figure 3. X-Ray showing a tripod fracture of the right zygomatic complex.

- e) Examination of the eye is an important component of the examination of this type of injury. It is commonly either missed or performed incorrectly. What is the minimum that needs to be performed by you as an F2 in Emergency Medicine?
- f) Name common signs of traumatic eye injuries?
- g) How are zygomatic complex fractures commonly treated?

Question 4

A 65 year old male presents to clinic with a long standing white patch in his mouth that has recently developed an ulcer in it (Figure 4). He had pointed out the white patch to his dentist a couple of years ago and had been reassured that it was benign in nature. His dentist had stressed that it was important to keep an eye on it and to come back for regular reviews. However the patient felt that as he had no teeth that this was only a way of getting him to come in again to pay for a check-up and hadn't attended since!



Figure 4. Intra-oral white patch.

- a) What is the differential diagnosis of a white patch such as this?
- b) You are suspicious that it is a cancer. What are the common types of cancer that present in the mouth?
- c) What are risk factors for oral cancer?
- d) Are there any other questions you might ask?
- e) What features would you look for on examination?
- f) On examination the ulcer has a raised margin and the tissues beneath it feel hard. You therefore feel that clinically it is highly likely that this is oral cancer. You feel that the patient should be referred to the local consultant in Oral and Maxillofacial surgery under the auspices of the two-week rule. What are the most likely investigations that would be performed in hospital?
- g) As you suspected the histopathological report demonstrates a low grade squamous cell carcinoma. What are the treatment options in cases such as this?

Answers to Self Assessment Questions

Question 1

- a) The first task should be to match up the teeth present in the container to the missing teeth. An Orthopantomogram (OPG) radiograph is helpful for those clinicians not comfortable with dental problems. It can help ascertain which teeth are missing and may show intruded teeth that are not actually avulsed but have been pushed into the maxilla or into the maxillary air sinus.
- b) If any doubt exists that a patient has aspirated a tooth or tooth fragment then a chest radiograph is indicated to exclude aspiration (A chest CT that has been done for other reasons will also suffice). This is particularly important in the unconscious patient with severe facial trauma where the missing teeth can be overlooked. In addition, the normal cough reflex is not present and aspiration of tooth fragments in unconscious patients is far more likely.
- c) Contact lens solutions are mainly composed of saline which is a good medium. Milk is less ideal, and water is a poor medium as it encourages apoptosis of the cells that surround the root of an avulsed tooth. These cells join the inorganic mineral of the tooth to the fibrous ligament that connects it to the alveolar bone of the jaw. The most important thing is to advise patients only to handle the crown of the avulsed tooth, as any mechanical damage to the root will damage this covering layer of cells, which is associated with rejection of any re-implanted tooth.
- d) You should re-implant the teeth correctly orientated, ideally after infiltrating around the tooth socket with local anaesthetic. It is important to do this as soon as possible as this is associated with a better long term prognosis. Gentle rinsing off the tooth with saline to clean of dirt can be done but it is important not to touch the root of the tooth.
- e) The answer is no. A patient of five years old has only primary (deciduous) teeth. You should not re-implant a deciduous tooth as in doing so you may damage the follicle of the growing adult (secondary) tooth beneath it. The adult tooth should erupt over the next 2 to 3 years.
- f) You should assess the patient for a possible facial fracture. However, a lot of the force will have been absorbed in avulsing the maxillary tooth.
- g) A broad spectrum antibiotic (usually amoxycillin) should be prescribed as the evidence shows it is associated with a

greater success rate of re-implantation. You should advise the patient to see their dentist as soon as possible. The dentist will splint the re-implanted tooth to the adjacent teeth and perform root canal treatment to remove the dead internal pulp. If you had access to an F2 in Maxillofacial Surgery they could splint the tooth temporarily by using composite resin and wire as shown (Figure 5), or take an impression of the area and construct a suck down splint.



Figure 5. Temporary splint for reimplanted tooth.

Question 2

- a) The answer is a collection of pus in the submandibular space. This is a very typical history of the development for a dental abscess secondary to placement of a filling. The filling itself inflamed the pulp of the tooth causing nerve pain. The pulp then becomes necrotic and the pain goes. Some days, months or even years later, bacteria invade the necrotic pulp and spread into the apical area causing a dental abscess. An infection of a lower premolar or molar tooth classically spreads to the submandibular space as their roots project below the mylohyoid muscle. Early signs of this infection can involve enlargement of the submandibular lymph nodes. A swelling of this size in conjunction with pyrexia indicates a severe spreading infection.
- b) Non Steroidal Anti Inflammatory Drugs (NSAIDs) have been shown to be most effective in the treatment of apical abscesses as the pain is inflammatory in origin. There is evidence that paracetamol taken in conjunction with the NSAID is more effective than an NSAID alone.
- c) Ludwig's angina is the term given to a bilateral submandibular and sublingual space infection. It is rare but can present rapidly secondary to a submandibular space infection and cause airway obstruction. A large neck swelling with the patient having difficulty in swallowing, breathing or talking indicates a surgical emergency. The patient should be admitted and given high dose intravenous antibiotics. The patient may need to be taken to theatres and intubated. A surgical airway is indicated if an endotracheal tube cannot be placed. Any infection should be drained and the tooth removed.
- d) An OPG radiograph will show all the teeth and may reveal an associated abscess. A prick test to obtain blood for assessment of blood glucose levels should be done to exclude diabetes. A full blood count to see the white cell count, and urea and electrolytes as a baseline and to check for dehydration, should be taken.
- e) This patient needs to be admitted under the care of the Maxillofacial Surgery team, intravenous antibiotics started and the patient kept hydrated with intravenous fluids.
- f) Augmentin is the most common antibiotic used for severe oral infections. An alternative is to use Amoxicillin and Metronidazole. For patients allergic to penicillin Cefuroxime and Metronidazole are used. The abscess must be drained. This may be performed through an external incision but extraction of the causative tooth often produces adequate drainage through the extraction socket without having to make a skin incision. The ideal situation would be to incise and drain the abscess and send the patient back to their dentist for root canal treatment of the causative tooth as it would allow the patient to retain it. However, it is difficult to keep teeth with large spreading facial abscesses as the tooth may act as a source of re-infection.
- g) The mandibular branch of the facial nerve, and facial artery and vein cross the submandibular space. The abscess will have pushed these structures out of the way of the point of fluctuation. The incision should preferably be made at the point of fluctuation. However, making the incision 2cm below the lower border of the mandible and blunt dissecting into the abscess will avoid these structures as well. The patient should be warned of a very small risk of bleeding or nerve damage. The function of the nerve post operatively is best determined by asking the patient to smile and looking for possible asymmetric drooping of the lower lip.

Question 3

- a) Immediate diagnoses you should consider include:
- Unilateral zygoma (zygomatic complex) fracture with bilateral periorbital ecchymosis.
 - A nasal fracture.
 - Le Fort fracture (II or III) - these high impact facial injuries are rarely confused with more minor fractures. They would be an immediate consideration in a more severe presentation.
 - Bilateral fractured zygomatic arches or zygomatic complexes (very rare) unless blows from 2 different directions.
 - Naso- ethmoidal complex fracture.
 - Severe bruising - the level of bruising often bears little relation to the underlying injury.
 - Bilateral orbital bruising may not necessarily mean the patient has sustained a facial fracture.
 - An orbital floor or medial wall fracture.
- b) Important questions you would ask that may alert you to other problems include:
- Was it a fall? Loss of consciousness should alert you to a possible medical aetiology such as drug induced, cardiac problems, or a stroke causing her fall. An informant history from her daughter is invaluable.
 - Has she sustained any other injuries apart from her face? She has been most reluctant to attend for treatment and it is quite possible that she has sustained another injury that she doesn't want to bother you with.
- c) Reasons why the nose is still bleeding include:
- Bleeding from Little's area - the most common cause of epistaxis.
 - Coagulopathy - 300,000 people in the UK are on anticoagulants.
 - She keeps blowing his nose disrupting the clot.
 - Cerebrospinal fluid leak (CSF) - is seen in Le Fort I or II fractures. The classical 'tramline' appearance of clear fluid streaking over blood is rarely seen so you must have a high index of suspicion. CSF contains glucose so a positive stix test is indicative of Le Fort II or III fractures.

- d) Classical signs and symptoms associated with zygomatic complex fractures include:
- Infraorbital paraesthesia as the infraorbital nerve is in the line of orbital floor and zygomatic complex fractures.
 - Blurred or double vision - this may indicate a third nerve injury (diplopia) or optic nerve injury (reduced visual acuity) or an orbital floor fracture.
 - Flattening over the cheek region. However, she may have previously looked that way, especially if she has already sustained a facial injury in the past.
 - Difficulty opening her mouth if the coronoid process of the mandible impinges on the displaced inner aspect of the zygomatic arch.
 - Tenderness or a palpable step at the zygomatico frontal suture, infra orbital margin or intra orally over the buttress region above the first molar tooth.
 - Change in the occlusion (bite) - this question is commonly missed and the patient themselves may not realise it.
 - Lateral subconjunctival haemorrhage with no posterior margin.
 - Blood from the nose due to bleeding into the maxillary sinus.
- e) Minimum eye examination in this type of injury would involve:
- Visual acuity with a Snellen chart.
 - Assess range of eye movements.
 - Look for enophthalmus.
 - Direct and consensual pupillary reflexes.
 - Fundoscopy.
- f) Common signs of traumatic eye injuries are.
- Subconjunctival haemorrhage (discussed above).
 - Chemosis (swelling of conjunctiva).
 - Restriction of ocular movement.
 - Hyphema (blood in anterior chamber).
 - Traumatic mydriasis (dilation of pupil).
- g) Zygomatic fracture treatment options include:
- Stable non displaced fractures do not require surgical treatment.
 - Simple displaced fractures may only require elevation.
 - Complex or markedly displaced fractures require open reduction and fixation with miniplates.
 - All patients should not blow their nose for two weeks after a zygomatic complex fracture as this may cause surgical emphysema. There is still some contention regarding whether all patients should be sent home from the Emergency Department on oral antibiotics. The only patients requiring antibiotics are those with fractures compound to skin, where surgical emphysema is present, those who are medically compromised (HIV, diabetic), those with a history of chronic sinusitis and those who will have open reduction performed. The overuse of antibiotic prescribing causes more allergic reactions, and has implications for adverse effects in individual patients as well as increasing antimicrobial resistance within the community.

Question 4

- a) The most important diagnoses to consider include:
- Oral cancer.
 - Denture induced traumatic ulceration.
 - Lichen planus.
 - Keratosis.
 - Leukoplakia.
- It is very tempting for patients without any teeth to stop attending their dental check-ups but it is important to stress to them that oral cancers often present in an asymptomatic

manner and only by regular surveillance can they be picked up early. Poorly fitting dentures can produce horrible ulceration that may seem to scream neoplasia in the untrained eye so an immediate dental assessment is mandatory.

Lichen planus is found in the mouth in approximately 10% of the population. It is rarely symptomatic and is rarely associated with cutaneous manifestation. Patients with old amalgam restorations occasionally present with lesions that appear similar to lichen planus (a lichenoid reaction) which sometimes improve after replacement of the restoration.

Keratosis is classically found along the cheek in line with the teeth or on the edge of the tongue. It is benign in nature and can sometimes respond to smoothing of a particularly sharp tooth.

Leukoplakia literally means a 'white plaque' and is a clinical description rather than a histological diagnosis. It is the most common reason for biopsies inside the mouth and nearly all are benign in nature. Many authors now suggest that the most appropriate management for these lesions is surveillance alone with clinical photography and regular follow up. Warning signs in such lesions include ulceration or red speckling.

- b) 97% of cancers that present in the mouth are squamous cell carcinoma (SCC). They classically present as an indurated ulcer on the side of the tongue or the floor of the mouth. The remaining 3% are salivary gland tumours which are predominantly pleomorphic salivary adenomas.
- c) Risk factors for SCC can be subdivided into those that are fixed and those that are potentially modifiable. Fixed risk factors include increasing age and a previous family history. Modifiable risk factors include alcohol, smoking and exposure to specific carcinogens through work.
- d) The patient should be asked how long the ulcer has been present as one that has remained unchanged for longer than 3 months is unlikely to be malignant. It should be remembered that lesions can change and a small number of lesions with established benign diagnoses such as lichen planus may become malignant. Restriction in tongue movements or difficulty in swallowing may herald local muscle invasion. Oral cancer is rarely painful until very late but occasionally it may present as an area of dyesthesia.
- It is important to ask about symptoms of secondaries and the general manifestations of malignant disease. The patient should also be asked about recent weight loss, fatigue and loss of appetite.
- e) Oral SCC classically presents as an area of ulceration on the side of the tongue or floor of the mouth. The whole of the mouth should be examined with gloves, a tongue spatula and a bright light source. Oral SCC will metastasise to local lymph nodes in the neck in a relatively predictable manner. An appropriate examination would include palpating along the internal jugular vein (found anterior and deep to sternocleidomastoid) for vertical chain nodes, and the submental, submandibular, buccal, parotid and occipital areas for horizontal chain nodes.

- f) The most important investigation would be an immediate incisional biopsy of the suspected area for histological analysis. This would be followed up with haematological investigations such as FBC (possible anaemia), U and E (oral cancer patients are often dehydrated) and LFTs (possible alcoholic cirrhosis). A CXR would be appropriate in this patient and as you are already confident of your diagnosis it would be correct to arrange an MRI to image regional nodes for staging purposes.

g) Both surgery and radiotherapy are used in the treatment of oral cancer, either separately or in conjunction with one another. Currently chemotherapy is not a recognised treatment modality. Surgery invariably involves local excision of the lesion and possibly a neck dissection depending on the staging. Many patients go on to have the excision site reconstructed at the time of surgery with vascularised flaps and bone grafts. Patients should be made as fit a possible as

possible prior to surgery including maximizing their nutritional requirements.

Radiotherapy is used on its own for smaller oral cancers, post operatively for larger cancers, for those with incomplete excision and for palliation. Patients should undergo a full dental assessment prior to the commencement of radiotherapy and all teeth of doubtful long term prognosis should be extracted.