

FEx Net 2022 Collated SAQs:

Orthopaedics - Answers

1. Ankle
2. Back
3. Clavicle
4. C-spine
5. Elbow
6. Foot
7. Foot Drop
8. Forearm
9. Hand
10. Hand Infection
11. Hip
12. Knee
13. Leg
14. Paed Cspine
15. Paed Elbow
16. Pelvis
17. Red Elbow
18. Red Knee
19. Shoulder
20. Wrist

Question 1

A 23 year old woman presents having fallen 5m off a balcony. She has landed on her feet and is complaining of ankle pain.

What are the three indications for an ankle Xray as described by the Ottawa ankle rules (2 marks):

1. Bone tenderness along the distal 6cm of the posterior edge of the tibia or tip of the medial malleolus OR
2. Bone tenderness along the distal 6cm of the posterior edge of the fibula or tip of the lateral malleolus OR
3. An inability to bear weight both immediately and in the emergency department for four steps

In addition what are the three indications for a foot Xray as described by the Ottawa foot rules (2 marks):

- a. Bone tenderness at the base of the fifth metatarsal
- b. Bone tenderness at the navicular
- c. Inability to weight bear both immediately and in the emergency department for four steps

Describe two abnormalities in the Xrays attached (2 marks):

1. Minimally displaced anterior aspect distal tibia with intra-articular extension
2. Mortise irregularity laterally on AP film (accept Pilon #)

List four other injuries associated with falls from a height if landing on the feet (4 marks):

1. Calcaneus fracture
2. Vertical shear pelvic fractures
3. Thoracolumbar fractures
4. Retroperitoneal injuries
5. Intracranial injuries

Question 2 (15 marks)

A 65 year old woman presents to ED with lower back pain and normal observations. She has a history of type 2 diabetes but is otherwise well. There is no history of trauma.

i) List 6 historical features which may suggest serious pathology (6 marks)

- Bladder or bowel symptoms
- Weakness
- Sensory changes
- Fever
- Known Malignancy
- Weight Loss
- IVDU
- Thoracic back pain
- Night pain – increased likelihood of malignancy
- Steroid use
- History of Osteoporosis
- Recent invasive procedure to back – eg steroid injection / LP
- History of Spinal stenosis

ii) After taking your history you are concerned about possible cauda equina syndrome. List 4 examination findings which would support your diagnosis (4 marks)

- Urinary Retention
- Saddle Anaesthesia
- Loss of perianal sensation
- Loss of anal tone
- Leg Weakness
- Diminished reflexes
- Sensory Changes in the legs

iii) List the most important immediate investigation and the most important treatment if this condition is confirmed (2 marks)

- Investigation: urgent MRI
- Treatment: urgent surgical decompression (Neurosurg consultation probably acceptable)

iv) List the most common cause, and 2 other causes for cauda equina syndrome (3 marks)

- Large central disc prolapse / rupture
- Malignancy – tumour pressing on cord
- Spinal infection
- Epidural Haematoma
- Trauma
- Spinal stenosis

Question 3:

A 16 year old male presents after falling from his push-bike. He has a sore shoulder but no other injuries.

Describe the injury seen in the X-ray (1 marks)

- Fracture mid-shaft left clavicle
- Comminuted
- Displaced/shortened



List 4 complications for each of the types of clavicular injury in the table (4 marks)

Posterior sterno-clavicular dislocation	Mid-shaft clavicle fracture
Subclavian vessel injury	Non-union
Mediastinal compression	Mal-union/deformity
Pneumothorax	Vascular injury
Oesophageal injury	Gleno-humeral joint stiffness
Brachial plexus injury	Skin compromise/tenting

Tracheal injury	
Thoracic outlet syndrome	

3. List 3 absolute & 3 relative indications for operative fixation of mid-shaft clavicle fractures (3 marks)

Absolute	Relative
Open fracture	Comminution
Skin tenting/compromise	Shortening
Subclavian vein/artery compromise	Active/athletic patient
"Floating" shoulder	Poly-trauma
Neurological injury	Cosmesis

4. List 4 complications of ORIF for a displaced mid-shaft clavicle fracture (2 marks)

- Anaesthetic complications
- Complications of skin incision – e.g. patch of numb skin below incision, cosmesis of scar
- Hardware prominence causing irritation/cosmetic problems & requiring plate removal
- Neurovascular injury – subclavian vessel penetration or thrombosis
- Non-union
- Infection
- Pneumothorax
- Adhesive capsulitis

Question 4 (16 marks)

Describe 2 abnormal findings on this CT scan (2 marks)

Anterolisthesis (anterior displacement) of C4 on C5 without obvious fracture
Narrowing of vertebral foramen at this site

What is the likely diagnosis? (1 mark)

Bilateral facet joint dislocation

Name 5 unstable C spine fracture patterns (5 marks)

Atlantoaxial dislocation or dissociation
Jeffersons # (Burst C1)
Hangmans # (Bilateral pedicle C2)
Type 2 or 3 Odontoid Process #
Tear drop fracture
PLUS: Bilateral facet joint dislocation

Compare the clinical features of spinal and neurogenic shock (4 marks)

Spinal shock = neurological injury to spinal cord / initial period of cord 'confusion' that may overestimate degree of permanent neurological injury

Neurogenic shock = distributive shock due to lack of sympathetic tone

Spinal Shock	Neurogenic Shock
Arreflexia Flaccid paralysis	Bradycardia / Hypotension / Warm skin / Poikilothermia (which is usually hypothermia in a hospital bed)

Above what spinal level is neurogenic shock likely to occur? (1 mark)

Injury above T6

Describe the supportive care (and targets) in neurogenic shock (3 marks)

Supportive care: Immobilisation of injury / Analgesia / Antiemetics
Maintain MAP 85-90 with IV Fluid Hartmanns 1-2 L then noradrenaline infusion
Maintain normoxia / normoglycaemia / normothermia
IDC / pressure area care / VTE prophylaxis etc

Question 5 (15 marks)

A 7 year old boy presents to your ED with an injury to his right elbow after a fall. The elbow is obviously deformed and swollen.

- i. What are the immediate issues that need to be addressed (3 marks)

- Analgesia
- Is there neuro/vascular compromise? Time-frame to reduction?
- Splint / sling
- History, consider mechanism, consider NAI??

- ii. Describe the X-ray findings (3 marks)

AN XRAY IS SHOWN IN THE PROPS BOOKLET, PAGE 11

- Obvious dislocation of the elbow posteriorly and laterally
- On lateral view there is a small bony fragment above the epiphysis.
- Applying CRITOE you can deduce that there is a displaced fracture of the medial epicondyle (which should be ossified at 5 years). It is not the olecranon. AP view shows medial epicondyle 'missing'

iii. List 4 potential implications of this injury (4 marks)

- Neurovascular compromise. If present will need immediate reduction
- Difficulty in relocation in view of displaced medial epicondyle. Will need specialist input and likely OT regardless of ED management. Need for expert assistance – OT reduction preferable
- Long term issues – malunion, non-union, poor function, neurovascular impairment

iv. Describe the course of the ulnar nerve at the elbow (2 marks) and list the forearm and hand muscles potentially affected by ulnar nerve injury (3 marks)

- Arises from brachial plexus, descends down medial side of upper arm, passes posterior to medial epicondyle to enter forearm, pierces the two heads of FCU then descends alongside the ulna
- FCU and medial half of FDP, interossei, medial two lumbricals. Wrist flexion can occur but accompanied by abduction, impaired adduction at wrist, abnormal finger add/abduction

Question 6

1.

Lisfranc injury (1 mark)

- Widened space between first and second metatarsals indicating ligamentous disruption (1 mark) **CRITICAL 1 of these 2**

Laterally dislocated base second metatarsal with avulsion fractures (fracture/dislocation) (1 mark)

Transverse fracture first metatarsal mid-shaft (1 mark)

- Distracted

Oblique fracture neck 2nd metatarsal (1 mark)

Pass 3 of 5

2.

Vascular injury – dorsalis pedis

Foot compartment syndrome

Pass 2 of 2

3.

Analgesia

Short leg plaster

Elevation

Ice

Urgent orthopaedic involvement

Pass 4 of 5

Total pass 9/12 corrects to **7.5/10**

Question 7 (10 marks)

A 40 year old woman presents with symptoms of a common peroneal nerve injury of her left leg following an ankle sprain.

- i. Describe the sensory and motor disturbance features of a common peroneal nerve injury (4 marks)

- Sensory deficit
 - lateral leg below knee
 - dorsum foot
- Motor deficit
 - dorsiflexion ankle (foot drop) and great toe
 - eversion foot

- ii. Where is the commonest site of injury (1 mark)

- At the fibular head

- iii. List 4 general causes of common peroneal nerve injury other than high ankle sprain (4 marks)

- Fracture fibula
- Tight plaster leg involving knee
- Regular wear of high knee boots
- Prolonged coma or bed rest with pressure at knee
- Pneumatic compression
- Habitual leg crossing
- Total knee arthroplasty
- Proximal tibial osteotomy
- Leg squatting/crossing
- Endocrine/metabolic disorders: diabetes, alcoholism, thyrotoxicosis, vitamin B depletion
- Others...

iv. How is this peripheral nerve lesion differentiated from an L5 radiculopathy (1 mark)

-
- Inversion and plantar flexion should be preserved
 - Decreased or absent ankle reflex in radiculopathy

Question 8

1.

Galeazzi fracture (1 mark)

Radial fracture (1 mark)

- Transverse (1)
- Displaced medially (1)
- Displaced dorsally (1)
- Shortened (1)
- Volar / anterior angulation (1)

Distal radio-ulnar dislocation (1)

- Dorsal displacement ulna (1)

NOT QUALITY OF XR or MISSING ELBOW as that is not an abnormality

2.

Analgesia – IV morphine 2.5mg aliquots

Backslab long arm

Elevation arm

Orthopaedic referral for ORIF (must specify admission / ORIF, not just “ortho referral”)

Qualified reduction in ED – if NV involvement

Candidate number _____

Question 9

1. Describe this xray giving three (3) relevant findings.

3

Perilunate dislocation

Transscaphoid fracture

??? either a relatively negative (ie no radial fracture) or further explanation of there being a midcarpal posterior dislocation. (which is really a perilunate)

2. List 3 short term and 3 long term complications of this injury.

3

Short: median nerve injury, pressure necrosis of skin, compartment syndrome, pain, loss of function.

Long: carpal instability, avascular necrosis of proximal fragment of scaphoid, chronic pain, complex regional pain syndrome, osteoarthritis

3. Describe four (4) steps in your management.

4

Analgesia (IV narcotic)

Keep fasted until definitive procedure

Splint and orthopaedic referral

Urgent reduction (in OT, or ED (closed reduction may not be successful without ORIF).

(Acceptable alternative (careful and repeated neuro assessment for median nn)

Bare pass mark – 7/10

Question 10

1.

Wound over palmar aspect DIPJ

Erythema extending to thenar eminence

Oedema of index finger, extending to palmar space and thenar eminence

Flexion of index finger – consistent with tenosynovitis

2.

Infective Tenosynovitis (do not accept cellulitis)

3.

Imaging (USS) to exclude foreign body

Imaging USS to exclude soft tissue collection requiring drainage (tendon sheath abscess)

Wound swab m/c/s to guide therapy (ie identification of MRSA)

BSL to guide strict glycaemic control in diabetic with stress response

Others acceptable if well justified

4.

IV Antibiotics – Piperacillin/Tazobactam 4.5gm tds (diabetic)

Analgesia – titrated morphine 0.1mg/kg to 5mg, repeat to comfort

IV Fluids – age 14 – HR 90 – likely just maintenance fluid requirements – 125 mls/hr of crystalloid,
BSL will guide dextrose or non-dextrose containing

IV Insulin Infusion – daily dose /24 /hr to maintain euglycaemia

Immobilisation or elevation of affected limb – splinting

Orthopaedics/Hand Surgery for OT for drainage

Question 11 8/11

1

Right posterior hip dislocation

2

CT – acetabular fracture, femoral head fracture (femoral arterial injury OK if CTA)

MRI – sciatic nerve injury, capsule / labral tear

3

Sedate well

Stabilise pelvis

Hip flexed and adducted

Traction in this position

Question 12 (6 marks)

A 23 year old man comes to the ED after a direct blow to the right knee complaining of significant pain. His lateral knee Xray is below.



Please outline the abnormalities on this Xray (3 marks)

Comminuted fracture of patella
Haemarthrosis

Name 3 indications for operative fixation for this type of injury (3 marks)

Open fracture
Extensor mechanism not intact / unable to straight leg raise
Displaced fracture >2mm

Candidate Name: _____

Question 13 (10/14)

1.

Proximal fracture tibia minimally displaced

Proximal fibula fracture

Mid-shaft tibia+fibula fractures

- Comminuted
- Laterally angulated
- Slightly shortened
- Mildly laterally displaced

2.

Altered sensation below injury

Pale foot

Loss DP pulse

Tense muscle compartments

Cool foot

3.

Elevation

Remove any external compression (splints/slabs/bandages)

Analgesia

Immediate orthopaedic attendance for fasciotomy

Question 14

1.

Normal xray

- Pseudosubluxation C2/3 and C3/4
- Normal Swischuk line

2.

Neurological abnormalities

Inability to move neck

Severe prolonged pain despite analgesia and time

3.

Multiple vomits

Failure to return to GCS 15 at 2 hours

Signs of skull vault fracture (including large boggy haematoma)

Signs BOS fracture

Focal neurological abnormalities

Anterograde amnesia

Question 15 - DOUBLE - (23 marks)

i) (2 marks)

- **Supracondylar fracture (closed) 1 mark (mandatory)**
- Accept any of the following for 1 mark: fat pad sign / soft tissue swelling / dorsal angulation

ii) (6 marks)

	Ossification Centre	Age of Ossification
C	Capitellum	1
R	Radial Head	3
I	Internal (<i>medial</i>) Epicondyle	5
T	Trochlea	7
O	Olecranon	9
E	External (<i>lateral</i>) Epicondyle	11

iii) (2 marks)

- Ulnar n.
- Median n. (or Anterior interosseous n) - for 1 mark
- RADIAL NERVE LESS COMMON - not accepted

iv) (3 marks) - Will accept any analgesic that is used in the paediatric trauma setting as long as the route of administration and dose is correct.

Examples include but are not limited to:

Fentanyl IN or IV with correct dose (will only score 1)

Morphine IV

Oxycodone po

Codeine po etc

v) (10 marks)

	<i>Intra-muscular (i.m)</i>	<i>Intra-venous (i.v)</i>
<i>Initial dose</i>	<i>4-5 mg/kg</i>	<i>1.5-2 mg/kg</i>
<i>Top-up dose</i>	<i>2mg/kg (rarely needed)</i>	<i>0.5–1 mg/kg</i>
<i>Peak effect</i>	<i>5 min</i>	<i>1 min</i>
<i>Duration of action</i>	<i>20-30 min</i>	<i>5-10 min</i>
<i>2 Advantages Needed 1,2,3</i>	<i>IV not needed Longer effect No need for repeated doses</i>	<i>Ease of titration Shorter length of stay Lesser risk of emesis</i>

Question 16 (13 marks)

A 51 year old man is brought in by ambulance having fallen onto his back from 10 metres. He has no significant past medical history, and is on no medications.

His observations on arrival are:

GCS 15, P 110, SBP 70, RR 20, SaO₂ 99% 6L Hudson mask

- i. List the 3 most important findings on the portable pelvic Xray (3 marks)

AN XRAY IS SHOWN IN THE PROPS BOOKLET, PAGE 7

- Left sacral ala
- Superior and inferior left pubic ramus
- Disrupted PS
- Significant disruption of pelvic and obturator rings
- Pelvic binder in situ

- ii. What is the Young classification of injury (1 mark)

- Vertical shear

- iii. List 5 treatment priorities in this patient (5marks)

- Volume resuscitation – sensible, urgent O neg, should mention hypotensive resuscitation, no/minimal crystalloid, end points
- Immobilisation – pelvic splint, no movements
- Analgesia – sensible, probably ketamine, maybe opiates
- Seek and treat other sources of haemorrhage
- Early consultation with surgery, interventional radiology

- iv. Describe 4 essential elements of a massive transfusion protocol (4 marks)

- Early communication – blood bank, haematology
- Baseline lab investigations – FBP, coags, biochem
- Clinical triggers
- Product ratios 1:1:1
- Monitoring and treatment of complications – acidosis/coagulopathy/hypothermia/Ca
- Documentation
- QA – audit
- Others

Question 17

What factors should be covered in consent for this procedure (5 marks)

- Condition suspected/present
- Proposed procedure and what that involves
- Risks of doing procedure
- Risks of not doing procedure
- Alternative management options

Please interpret the results and give your provisional diagnosis (2 marks)

- Significantly elevated WCC 137,000 – high LR ($> +20$) for septic arthritis
- Urate crystals present – unlikely acute gout, more likely displaced from septic arthritis

Outline your management of this patient (3 marks)

- Analgesia: Paracetamol 1g PO QID / Oxycodone 5-10mg PO Q4H PRN

Question 18 :

A 57 year old male is referred in by his GP with a hot, tender, painful left knee.

His vitals are as follows

Pulse 96

BP 120/70

Temp 37.6

A.

List 5 diagnostic categories and one example of each as a cause for this hot red knee (5 marks)

	Diagnostic category	Examples
1	Septic	Staphylococcus, gonococcal, overlying cellulitis
2	Crystal,	Gout, pseudogout
3	Trauma	Iatrogenic- surgical/ injection, traumatic injury, fracture, CL rupture
4	Degenerative	OA
5	Reactive,	IBD, gonococcal, Reiter's,
6	Inflammatory	Rheumatoid, SLE, Psoriatic, (atypical for knee), Bursitis

2. List five investigations you might perform and one pro and con for each (5 marks)

	Investigation	Pro	Con
Bedside 1	BSL	Pick up undiagnosed DM as a risk factor	non specific for joint pathology
2	US	quick and easy, readily available in most ED, can detect effusion, may aid in aspiration	operator dependent, need equipment available- costs, possibly painful
3	UA	Might pick up DM, possible UTI	non specific for joint pathology
Lab 4	FBC	raised WCC may aid diagnosis, low WCC may diagnose neutropaenia	non specific for joint pathology, may be falsely reassuring

	Investigation	Pro	Con
5	EUC	raised creatinine may be found indicating concomitant renal disease as part of systemic disease DM, SLE. low Bicarbonate - acidosis in sepsis	non specific for joint pathology
6	Urate	Possibly raised in gout	non specific for joint pathology
7	CRP	Maybe very high supporting septic joint	non specific for joint pathology, may be falsely reassuring
8	ESR	maybe high supporting septic joint	non specific for joint pathology, may be falsely reassuring
9	Urethral swab	important if history suggestive, and for adequate treatment	non specific for joint pathology, take time to get result
10	Joint aspirate MCS including crystals	May give diagnosis for crystal or septic joint. Directs (antibiotic) therapy, can direct future preventative measures	Painful, risk of introducing infection, operator dependent
Imaging 11	Xray	May pick up fractures, effusion, changes (Rhe A, OA etc)	radiation, non specific for inflammatory conditions, may not pick up fractures
12	Formal US	NO radiation, Might pick up effusion, FB, ligamentous injury, bursitis	Availability, cost, may not give specific answer
13	CT	Can show occult fractures, direct operative Mx	expensive, radiation exposure, availability
14	MRI	Can show occult fractures/ ligamentous injury, no radiation	expensive, availability

Must mention Joint aspiration and MCS, otherwise cannot pass question - maximum 2/5

otherwise 0.5 each for pro and con for each, no mark for simply naming an Investigation/5

Question 19

1.

Anterior dislocation of right humeral head

Inferior dislocation of right humeral head

Hill-Sach's fracture

Greater tubercle displaced laterally

2.

Kocher's

Milch

Hippocratic

Spaso

Stimson

Scapular rotation

3.

anything reasonable, as long as it includes analgesia and sedation and in safe doses

Question 20

Please outline the abnormalities on this Xray (4 marks)

Extraarticular distal radius #

25% posterior displacement

45o dorsal angulation

Minimally displaced ulna styloid #

With the exception of neurovascular compromise, please outline 4 indications for closed reduction of this fracture type/pattern, include with specific targets (4 marks)

View	Measurement	Normal	Acceptable criteria
AP	Radial height	13mm	< 5mm shortening
	Radial inclination	23°	change < 5°
	Articular stepoff	congruous	< 2 mm stepoff
Lateral	Volar tilt	11°	dorsal angulation < 5° or within 20° of contralateral distal radius

You chose to perform a Biers block to facilitate closed reduction. Name 4 contraindications to performing this procedure (4 marks)

Allergy to local anaesthetic

BP >200

Methaemoglobinaemia

Cuff wont reliably fit (small child, morbidly obese)

Uncooperative patient (child, elderly) – judgement call

Lymphoedema / Reynauds / Peripheral vascular disease