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Exam Corner

Lower Limb & Spine Trauma

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- 1) The classification of pelvic injuries based on the stability of the pelvic ring is called:**
 - a) Young and Burgess classification
 - b) Letournel's classification
 - c) Tile's classification
 - d) Pipkin's classification
 - e) None of the above

- 2) The most common source of haemorrhage associated with pelvic injuries is the:**
 - a) Superior gluteal artery
 - b) Internal iliac artery
 - c) Internal iliac vein
 - d) External Iliac artery
 - e) Presacral venous plexus

- 3) The most common factor leading to reoperation of intertrochanteric femoral fractures is:**
 - a) Presence of posteromedial comminution
 - b) Reverse obliquity
 - c) Avascular necrosis
 - d) Non-union
 - e) Failure of the lateral wall

4) A "Hoffa" fracture is a:

- a) Proximal tibial fracture in the sagittal plane
- b) Proximal tibial fracture in the coronal plane
- c) Distal femoral fracture in the sagittal plane
- d) Distal femoral fracture in the coronal plane
- e) None of the above

5) Which of the following is incorrect regarding a "Maisonneuve" fracture?

- a) It is a subcapital fracture of the fibula
- b) It is caused by an external rotation injury
- c) It typically involves injury of the posterior tibiofibular ligament
- d) It is associated with an injury to the posterior malleolus in most cases
- e) It can be associated with injury to the lateral collateral ligament of the ankle

6) The incidence of avascular necrosis (AVN) associated with Hawkins's type II talar fractures is:

- a) 20-50 %
- b) 20-30%
- c) 10-20%
- d) 50-70%
- e) 70-90%

7) Which of the following is incorrect regarding Hawkins's sign?

- a) It is a radiolucency in the subchondral surface of the talus
- b) It is associated with AVN of the talus
- c) It appears at 6-8 weeks post injury
- d) It indicates good prognosis
- e) None of the above

8) Reoperation rate after fixation of bicondylar tibial plateau fractures for deep infection is around:

- a) 3%
- b) 5%
- c) 10%
- d) 15%
- e) 20%

9) Which of the following is incorrect regarding postoperative deep infection in pilon fractures?

- a) It has increased with the use of spanning external fixators
- b) It spreads from the superficial soft tissue to the bone
- c) It is related to the degree of bone comminution
- d) It is related to the surgical skills of the operating team
- e) It is increased in patients with open fractures

10) Which of the following is incorrect regarding peroneal tendon dislocation after calcaneal fractures?

- a) It is associated more with tongue-type fractures
- b) It can complicate more than 25% of intra-articular fractures
- c) It positively correlates with the Sanders classification grade
- d) Increased heel width can predispose to peroneal tendon dislocation
- e) Its diagnosis can be missed early because of severe oedema and pain

11) Combined lateral mass displacement of how many mm with standard radiographic magnification indicates transverse ligament rupture at the atlantoaxial level of the cervical spine?

- a) > 1 mm
- b) > 2 mm
- c) > 3 mm
- d) > 5 mm
- e) > 7 mm

12) Which of the following statements is false?

- a) Burst fracture of C1 is known as Jefferson fracture
- b) Traumatic spondylolisthesis of C2 is known as hangman fracture
- c) Anderson D-Alonso classification system describes odontoid fractures
- d) Powers ratio less than 1 indicates instability of the atlanto-axial junction
- e) ASIA C grade represents less than 3/5 motor score and incomplete sensory deficit.

13) A pseudosubluxation of the paediatric cervical spine where 40% or 4mm of subluxation occurs most commonly affects which of the following levels?

- a) C1 on C2
- b) C2 on C3
- c) C3 on C4
- d) C4 on C5
- e) C5 on C6

14) Which of the following syndromes is usually associated with penetrating injuries and 90% of cases recover the ability to walk?

- a) Central cord syndrome
- b) Anterior cord syndrome
- c) Posterior cord syndrome
- d) Brown Séquard syndrome
- e) Occipito-cervical dissociation

15) Which of the following is false about Central cord syndrome?

- a) Upper extremities are more affected than lower extremities
- b) Distal muscles are affected more than proximal muscles
- c) Sacral structures are the most peripheral in the lateral corticospinal tracts; cervical structures are more medial
- d) Typical mechanism is hyperflexion with pre existing canal stenosis
- e) The prognosis is good for the recovery of ambulation

16) In lower cervical spine injuries, which of the following statements is incorrect?

- a) Fractures that are primarily bony without ligamentous injury are usually treated with immobilization
- b) Fracture associated with neurological injury are inherently unstable
- c) Posterior ligamentous injury is usually treated with surgical stabilization
- d) According to the White and Punjabi—point system which is based on anatomic, radiographic, and neurologic criteria; less than 5 points is equivalent to instability
- e) Extension type injuries are more unstable than flexion type injuries

17) At what level do more than 50% of thoracic and lumbar spine traumatic fractures occur ?

- a) Upper thoracic spine
- b) Mid thoracic spine
- c) Lower thoracic upper lumbar spine
- d) Lower lumbar spine
- e) Lower lumbar upper sacral spine

18) What percentage of thoracic and lumbar spine fractures is associated with calcaneal fractures?

- a) 1 %
- b) 10%
- c) 25%
- d) 50%
- e) 75%

19) Which of the following is false?

- a) Unilateral facet dislocation is the most commonly missed cervical spine injury on plane radiographs
- b) Cervical spine injuries are more common in children < 8 years due to large head to body ratio
- c) Thoracolumbar injuries are more common in children > 8 yrs
- d) Gunshot spine fractures are typically unstable injuries
- e) Upper cervical injuries (C1 to C4) are more common than lower cervical spine injuries (C5 to C7)

20) Which of the following is false regarding spondylolisthesis?

- a) Low-grade disease (<50% slip) usually responds to nonoperative treatment consisting of activity modification and exercise
- b) Repair of the pars defect is indicated in young patients with slippage less than 10% and a pars defect at L5 or above
- c) Adolescents with a grade I slip may return to normal activities, including contact sports, once asymptomatic.
- d) Those with asymptomatic grade II spondylolisthesis are restricted from activities such as gymnastics or football.
- e) Risk factors for progression include young age at presentation, female gender and a slip angle of greater than 10 degrees

Answers:

1. Answer: c) Tile's classification. Marvin Tile has classified pelvic ring injuries based on the stability of the pelvic ring. Type A is completely stable, Type B is rotationally unstable but vertically stable and Type C is both rotationally and vertically unstable.
Reference: Tile, Marvin, Helfet, David L., Kellam, James F. and Vrahas, Mark. (2015). Fractures of the Pelvis and Acetabulum Two Volume Set, 4e, 11.
2. Answer: e) Presacral venous plexus.
Reference: Tile, Marvin, Helfet, David L., Kellam, James F. and Vrahas, Mark. (2015). Fractures of the Pelvis and Acetabulum Two Volume Set, 4e, 11.
3. Answer: e) Failure of the lateral wall. A previous study reported that 3% of patients with an intact lateral wall had required reoperation within 6 months compared with 22% of patients with a compromised lateral wall.
References:
 - 1) Palm H, Jacobsen S, Sonne-Holm S, et. al.: Integrity of the lateral femoral wall in intertrochanteric hip fractures: an important predictor of a reoperation. J Bone J Surg Am 2007; 89: pp. 470-475.
 - 2) Browner BD, Jupiter JB, Krettek C, Anderson PA. Skeletal Trauma: Basic science, Management and Reconstruction, 5th ed. Philadelphia: Elsevier Health Sciences; 2015.
4. Answer: d) Distal femoral fracture in the coronal plane.
Reference: Browner BD, Jupiter JB, Krettek C, Anderson PA. Skeletal Trauma: Basic science, Management and Reconstruction, 5th ed. Philadelphia: Elsevier Health Sciences; 2015.
5. Answer: c) It typically involves injury of the posterior tibiofibular ligament. Maisonneuve fractures are always associated with a syndesmotom injury that involves the anterior tibiofibular ligament and mostly the interosseous tibiofibular ligament. The posterior tibiofibular ligament is not necessarily injured, but a fracture of the posterior malleolus occurs in 80% of cases.
Reference: Bartoníček J, Rammelt S, Kašper S, Malík J, Tuček M. Pathoanatomy of Maisonneuve fracture based on radiologic and CT examination. Archives of Orthopaedic and Trauma Surgery 2018.
6. Answer: a) 20-50 %
Reference: Hawkins LG. Fractures of the neck of the talus. J Bone Joint Surg Am 1970; 52: pp. 991-1002.
7. Answer: b) It is associated with AVN of the talus. The Hawkins sign is the classic early indicator of talar body revascularization best seen on the AP and mortise views. It represents patchy subchondral osteoporosis, manifesting as a zone of relative radiolucency.
Reference: Browner BD, Jupiter JB, Krettek C, Anderson PA. Skeletal Trauma: Basic science, Management and Reconstruction, 5th ed. Philadelphia: Elsevier Health Sciences; 2015.

8. Answer: d) 15%. Infection is a major concern after surgical fixation of tibial plateau fractures (Type V and VI). The reoperation rate for deep infection is about 15%. Factors significantly associated with increased infection rates are: open fractures, fasciotomies for compartment syndrome, smoking, dual incision and the use of 2 plates.
Reference: Browner BD, Jupiter JB, Krettek C, Anderson PA. Skeletal Trauma: Basic science, Management and Reconstruction, 5th ed. Philadelphia: Elsevier Health Sciences; 2015.
9. Answer: a) It has increased with the use of spanning external fixators. Wound complications can be reduced by the use of staged protocols, which generally involve early spanning external fixation until the soft tissues recover, followed by delayed definitive fixation.
Reference: Browner BD, Jupiter JB, Krettek C, Anderson PA. Skeletal Trauma: Basic science, Management and Reconstruction, 5th ed. Philadelphia: Elsevier Health Sciences; 2015.
10. Answer: a) It is associated more with tongue-type fractures. Peroneal tendon dislocation is associated with joint-depression fractures.
Reference: Browner BD, Jupiter JB, Krettek C, Anderson PA. Skeletal Trauma: Basic science, Management and Reconstruction, 5th ed. Philadelphia: Elsevier Health Sciences; 2015.
11. Answer: e) >7 mm
Reference: Miller review of Orthopaedics, Sixth Edition, page 777
12. Answer: d) Powers ratio less than 1 indicates instability of the atlanto-axial junction
Reference: Miller review of Orthopaedics, Sixth Edition, page 777
13. Answer: b) C2 on C3 is the most common site of pseudosubluxation followed by C3 on C4. This is due to the horizontal nature of facet joints in paediatric patients especially at less than 8 years of age
Reference: Miller review of Orthopaedics, Sixth Edition, page 784
14. Answer: d) Brown Séquard syndrome. In Brown Séquard syndrome (spinal cord hemisection), the commonest mechanism is penetrating trauma. Clinically it manifests with motor function disruption on the side of the injury, while pain and temperature are affected on the contralateral side and 90% of patients recover the ability to walk.
Reference: Miller review of Orthopaedics, Sixth Edition, page 773
15. Answer: d) Typical mechanism is hyperflexion with pre existing canal stenosis. Central cord syndrome typically occurs in degenerate cervical spines with forced extension or hyperextension. The prognosis is good for the recovery of ambulation, but the patient is less likely to recover upper extremity function.
Reference: Miller review of Orthopaedics, Sixth Edition, page 773

16. Answer: e) Extension type injuries. Flexion type injuries tend to be more unstable than extension injuries. Reference: Miller review of Orthopaedics, Sixth Edition, page 779
17. Answer: c) Lower thoracic upper lumbar spine. Due to the increased mobility at T11 to L2, more than 50% of thoracic and lumbar spine fractures occur at this region.
Reference: Miller review of Orthopaedics, Sixth Edition, page 779
18. Answer: b) 10%. Thoracic and lumbar spine fractures are associated with calcaneal fractures in 10% of cases.
Reference: Miller review of Orthopaedics, Sixth Edition, page 779
19. Answer: d) Gunshot spine fractures are typically stable injuries and rarely require surgery. Patients with neurologic injury in cervical or thoracic spine do not benefit from operative decompression; lumbar deficits may benefit from bullet removal. Surgical indications include: acute lead intoxication, new-onset neurologic deficit, or intracanal copper bullet.
Reference: Miller review of Orthopaedics, Sixth Edition
20. Answer: b) Repair of the pars defect is indicated in young patients with slippage less than 10% and a pars defect at L4 or above. L5 radiculopathy is uncommon in children with low-grade slips and rarely if ever requires decompression.
Reference: Miller review of Orthopaedics, Sixth Edition