

Vikas Khanduja

The FRCS (Tr & Orth) examination has three components: MCQs, Vivas and Clinical Examination. The Vivas are further divided into four sections comprising Basic Science, Adult Pathology, Hands and Children's Orthopaedics and Trauma. The Clinical Examination section is divided into Upper and Lower Limb cases. The aim of this section in the Journal is to focus specifically on the trainees preparing for the exam and to cater to all the sections of the exam every month. The vision is to complete the cycle of all relevant exam topics (as per the syllabus) in four years.

Advisor:

Mr David Jones

Contributors:

Mr Henry Budd

Mr Malin Wijeratna

MCQs – Basic Sciences – Single Best Answer

1. Which of the following structures is at risk of injury while carrying out a posterior approach to the hip joint?

Answer: c. The sciatic nerve.

The sciatic nerve is at risk when performing a posterior approach to the hip joint. The incidence of damage to the nerve ranges from 0.3% to 3.7% and the risk is potentially increased in cases with a past history of developmental dysplasia of the hip, post-traumatic arthritis and limb lengthening.

2. Which one of the following has the highest osteogenic potential?

Answer: a. Cancellous autograft.

Osteogenic cells include primitive mesenchymal cells, osteoblasts and osteoclasts. Cancellous autograft has excellent osteogenic potential and revascularises and incorporates rapidly.

3. Which of the following can lead to an increase in physeal growth?

Answer: b. Division of sympathetic nerve supply.

Division of the sympathetic nerve supply to the physis can result in unrestricted vasodilatation and hyperaemia leading to an increase in physeal growth. Other conditions that contribute to localised physeal hyperaemia and potentially accelerated physeal activity include adjacent infection, neoplasia, arteriovenous malformations and dyspituitarism.

4. Which of the following is NOT a feature of an ideal routine screening test?

Answer: c. Low incidence of disease.

The disease being screened must have an incidence high enough to allow screening.

5. A laceration of the radial nerve high in the axilla interferes with all of the following functions, except:

Answer: a. Pronation of the forearm.

Pronation of the forearm results from contraction of the pronator teres and the pronator quadratus, which are innervated by the median nerve.

Vivas

Adult Pathology

A 38-year-old man presents to you with a 6-week history of pain in his left groin. There is no history of trauma. This is his radiograph (Fig. 1).



Fig. 1

1. What do you see?

Answer: A skeletally mature patient showing increased density and with cyst formation in the femoral head suggestive of avascular necrosis of the femoral head.

2. What further information would you want from this gentleman on history?

Answer: Further information required would be history of steroid use, alcohol abuse and whether he has had any radiotherapy. Also it is essential to rule out sickle-cell disease, storage disorders, Gaucher's disease and decompression sickness.

3. What further investigations would you request if any?

Answer: MRI scan

4. How would you stage this?

Answer:

Staging described by Ficat¹

0—Pre-clinical

1—Pre-radiographic

2—Pre-collapse

3—Collapse

4—Osteoarthritis

5. What treatment options would you offer?

Answer: Treatment options for this stage include bisphosphonates, core decompression and vascularised fibular grafting.

6. What is the prognosis?

Answer: Results are encouraging for stage 2 disease. However, for stage 3 disease, there is a 70% to 80% chance of collapse of the femoral head after three years.

Trauma

A 22-year-old lady is involved in a RTA and sustains this injury (Figs 2 and 3).

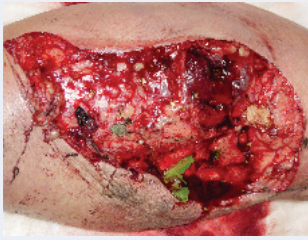


Fig. 2



Fig. 3

- 1. Describe the clinical photograph and the radiograph.**
Answer: Photograph: Degloving injury to the leg with foreign matter and debris visible in the wound associated with significant skin loss.
Radiograph: Displaced transverse fracture of the tibia and fibula at the junction of the middle and distal thirds. Inadequate radiograph.
- 2. How would you classify this fracture?**
Answer: Gustillo and Anderson IIIb²;
Grade I: Puncture wound ≤ 1 cm with minimal contamination.
Grade II: Laceration of > 1 cm with moderate soft-tissue damage and crushing; bone coverage adequate and comminution is minimal.
Grade IIIA: Extensive soft-tissue damage, often due to high velocity with a severe crushing component. Massively comminuted fractures and severely contaminated fractures are included in this subtype.
Grade IIIB: Extensive soft-tissue damage with periosteal stripping requiring soft-tissue cover (plastic surgery input)
Grade IIIC: Arterial injury requiring repair.
- 3. What is the significance of the classification system?**
Answer: Prevalance of nonunion and wound infection increases with higher grading.
- 4. What initial management steps would you take in A & E?**
Answer: Advanced trauma life support resuscitation. Analgesia, wound swab, photograph, early broad spectrum intravenous antibiotics (Cephalosporins - first generation combined with aminoglycosides. Farm yard injuries—add Penicillin), tetanus prophylaxis, irrigate to remove gross contamination, macroscopic debris, splint limb and plan for theatre.
- 5. How would you like to treat this injury definitively?**
Answer: Definitive treatment – surgery to include thorough debridement and external/internal fixation (intramedullary nailing) if possible and wound cover. Surgery to be planned in consultation with plastic surgeon.

- 6. What is the expected outcome?**

Answer: There would be 9% to 55% chance of infection.³

Hands

A 64-year-old man presents with a history of a deformity of his little finger, which has been increasing over the last 8 months (Fig. 4).

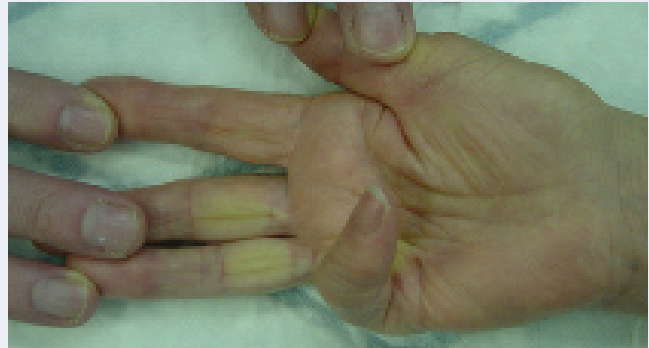


Fig. 4

- 1. What do you see in the clinical photograph?**
Answer: Dupuytren's contracture. Flexion contracture of metacarpophalangeal and proximal interphalangeal joints, isolated to the little finger.
- 2. What other conditions are associated with this disorder?**
Answer: Dupuytren's contracture is associated with tobacco and alcohol use, diabetes, epilepsy, hyperlipidemia, chronic pulmonary disease, tuberculosis and HIV/AIDS.
- 3. How would you stage the disease in the clinical photograph?**
Answer: Stage 3 disease: one finger disease with metacarpophalangeal and interphalangeal joint involvement.
- 4. How would you treat this condition at this stage?**
Answer: Fasciectomy.
- 5. How would you counsel the patient pre-operatively?**
Answer: Inform the patient of the largely unsuccessful conservative management of the disease and that the mainstay of treatment is surgery ranging from percutaneous needle fasciotomy to fasciectomy and dermofasciectomy. Counsel patient regarding potential complications and that post-operative management includes hand therapy with splinting for six weeks.
- 6. What are the possible complications of this procedure? (Fig. 5)**
Answer: Complications of this procedure include infection, haematoma, neurovascular damage, recurrence and finger



Fig. 5

loss.⁴

Basic Science

1. What is this material and where is it commonly used in orthopaedic surgery? (Fig. 6)

Answer: Polyethylene, commonly used as a bearing surface for joint replacements.



Fig. 6

2. What is the usual mode of wear for this material?

Answer: Third-body wear.

3. How is it manufactured?

Answer: Addition polymerisation occurs when a free radical is added to a monomer that contains a double carbon bond. The free radical breaks the carbon bond and occupies one of the bonding sites. This results in one carbon having a free bonding site, which then proceeds to react with another free radical, and the reaction progresses.

4. How can one alter the properties of this material to improve its wear characteristics?

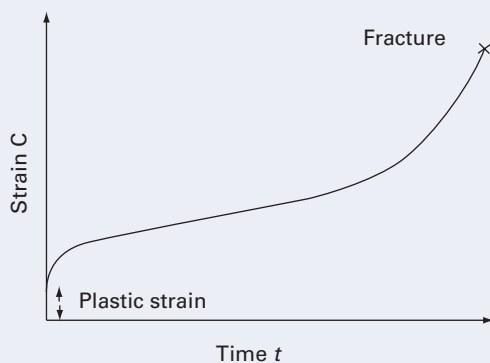
Answer: The wear of polyethylene can be altered by increasing the cross-linking of the polyethylene molecules by irradiating the material.

5. What do you understand by the terms Creep and Stress Relaxation?

Answer: *Creep* is a time-dependant deformation in response to a constant load. *Stress relaxation* is a time-dependant decrease in load required to maintain a material at a constant strain.

6. Could you explain these terms graphically?

Answer: These terms would be graphically explained as⁵:



Children's Orthopaedics

1. What is the likely diagnosis? (Fig. 7)

Answer: Congenital talipes equinovarus (club foot).



Fig. 7

2. What are the deformities in this condition?

Answer: Forefoot adductus and supination; hindfoot equinus and varus. Talar neck deformity (medial and plantar deviation) with medial rotation of the calcaneum and medial displacement of navicular and cuboid.

The deformities in this condition can be remembered by the mnemonic CAVE⁶:

Cavus (midfoot)
Adductus (forefoot)
Varus (hindfoot)
Equinus (hindfoot)

3. How are they usually corrected and in what order?

Answer: The disorder is normally corrected by the Ponseti method of cast manipulation using the head of the talus as a fulcrum. Cavus is corrected first by dorsiflexing the first ray. With the cavus corrected the forefoot is abducted and the heel goes into valgus by the coupling on the subtalar joint. Finally the equinus is corrected. Serial casts are changed weekly. Residual equinus requires tendo Achillis release in the majority of patients.

4. What is the likely diagnosis and what is the inheritance pattern? (Figs 8a and 8b)

Answer: *Diagnosis:* Distal arthrogryposis. *Inheritance pattern:* Autosomal dominant.⁶



Fig. 8a



Fig. 8b

5. What is this deformity? (Figs 9a and 9b)

Answer: Rocker-bottom foot because of over-manipulation of the club foot. Os calcis and talus are parallel unlike a congenital vertical talus wherein they are convergent.

6. What is the likely diagnosis and how do you think it has occurred? (Fig. 10)



Fig. 9a



Fig. 9b

Answer: Overcorrected club foot with a dorsal bunion. Hind foot is in calcaneus because of the slack tendo Achillis and the great toe flexes to compensate along with the unopposed action of the tendo Achillis.

7. How would you manage this condition?

Answer: With a lapidus procedure.

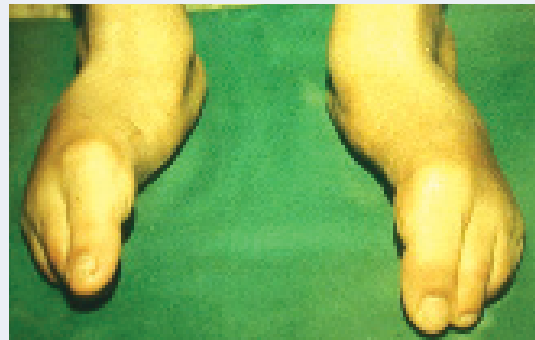


Fig. 10

References

1. **Ficat R.** Idiopathic bone necrosis of the femoral head; early diagnosis and treatment. *J Bone Joint Surg [Br]* 1985;67-B:3-9.
2. **Gustilo RB, Anderson JT.** Prevention of infection in the treatment of one thousand and twenty-five open fractures of long bones: retrospective and prospective analyses. *J Bone Joint Surg [Am]* 1976;58-A:453-8.
3. **Sorger JI, Kirk PG, Ruhnke CJ, et al.** Once daily, high dose versus divided, low dose gentamicin for open fractures. *Clin Orthop* 1999;366:197-204.
4. **Hayton, MJ, Gray, ICM.** Dupuytren's contracture: a review. *Curr Orthop* 2003;17:1-7
5. **Ramachandran M.** *Basic orthopaedic sciences: the stanmore guide.* London: Hodder Arnold, 2007:149-50,161
6. **Miller MD.** *Review of orthopaedics.* Fifth ed. Philadelphia: Saunders Elsevier, 2008:236-7