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Limb Trauma and Distal Neurovascular Assessment

Practical 01 / Skills laboratory simulation

Aim

Record distal perfusion and nerve function before and after an initial limb-trauma intervention.

Principle

Fracture, dislocation or swelling can threaten blood supply or nerve function. A precise baseline identifies changes after immobilisation or transfer.

Materials and Requirements

- Limb trauma model, observation cards and splint
- Structured neurovascular record

Procedure

1. Address life-threatening injuries and obtain help. Inspect limb alignment, skin, wounds and swelling without unnecessary movement.
2. Check initial stability, mechanism, time and immediate risks before assessing the limb. Expose the area safely, compare side and inspect for wound, swelling and deformity.
3. Compare distal pulse, capillary refill, colour and temperature with the other side. Record time and any limitation.
4. Locate the expected distal pulses and compare with the unaffected side. Check perfusion signs together and record clock time and activity or dressing conditions for the reading.

Continue with step 5 on the next page.

Procedure Continued

Limb Trauma and Distal Neurovascular Assessment

5. Assess motor actions and light touch in relevant nerve territories if safe. Document each finding and distinguish pain-limited testing.
6. Check one representative motor action and sensory area for each relevant distal nerve. Record specific motor or sensory deficit and any movement limited by pain.
7. Apply model immobilisation, then repeat perfusion and nerve checks. Recognise findings suggesting urgent vascular compromise or compartment syndrome.
8. Reassess after simulated splinting or transfer and compare with baseline. Seek urgent review for increasing pain or a new sensory, motor or perfusion change, even when pulses remain present.
9. Communicate before and after findings with times and any deterioration.
10. Communicate mechanism, site, skin status and documented before-and-after findings. Report priority and who is accepting care or reviewing a deficit.

Precautions

- Avoid repeated manipulation or testing that risks aggravating injury.
- Recheck circulation and sensation promptly after immobilisation.

Observations and Interpretation

Limb Trauma and Distal Neurovascular Assessment

Observations and Record

Item	What to record	What it tells you
Limb injury	Side, site, skin and deformity	Defines injury context
Perfusion	Pulse, refill, colour and temperature	Checks distal blood supply
Function	Documented motor and sensory actions before and after	Detects a new deficit

Worked Example

The splinted limb remains warm, but pain increases and new sensory change is reported. The distal pulse can still be felt.

Result and Interpretation

Escalate for urgent assessment of possible compartment syndrome or another complication. A palpable distal pulse can persist early.

Viva Questions and Answers

Why record the time of the neurovascular exam?

It links a change to injury progression or an intervention.

Is an open fracture always associated with a large wound?

A small wound may communicate with the fracture and must be assessed.

Splinting Plaster and Reduction Teamwork

Practical 02 / Skills laboratory simulation

Aim

Prepare a temporary splint and explain the checks and roles surrounding reduction and immobilisation.

Principle

Proper padding and stabilisation limit movement and protect skin. Reduction requires an authorised team, appropriate monitoring and documented before and after findings.

Materials and Requirements

- Limb model, padded splint and training plaster or immobiliser
- Mock reduction checklist and discharge instruction card

Procedure

1. Confirm the injury, side, explanation and simulated consent. Check distal neurovascular status and prepare padding and equipment.
2. Verify the case side, indication, relief plan, consent and baseline circulation and nerve findings. Check the trainer splint size, padding, materials and available supervision.
3. Demonstrate a supported temporary splint on the model according to the injury and station guide. Protect pressure points and avoid constriction.
4. Support the model limb during placement, pad pressure areas and use the approved fit and securement method. Ensure the team can still check visible distal circulation.
5. State the team roles for analgesia, procedural safety, monitoring and reduction. Participate in the training sequence assigned by the instructor.

Continue with step 6 on the next page.

Procedure Continued

Splinting Plaster and Reduction Teamwork

6. Clarify who leads the simulated reduction, controls analgesia and monitors the patient. Rehearse preparation and assistance on the model and record any reason to pause.
7. Reassess distal perfusion and sensation. Review the simulated post-procedure imaging and confirm the next plan.
8. Compare pulses, refill, skin and sensation or movement before and after the model intervention. Record time and use the supplied images to assess position with the instructor.
9. Use teach-back about increasing pain, numbness, discolouration or swelling and the agreed return plan.
10. Explain return signs, immediate contact route and follow-up appointment to the actor. Check teach-back and record completion, illustrations and changed neurovascular findings.

Precautions

- Use approved models. Faculty directs reduction and plaster technique.
- Avoid hot plaster preparation or tight circumferential wrapping.

Observations and Interpretation

Splinting Plaster and Reduction Teamwork

Observations and Record

Item	What to record	What it tells you
Preparation	Injury, side and baseline findings	Reduces wrong-site and missed-deficit risk
Splint	Padding, support and securement	Protects tissues and reduces motion
Follow-up	Repeat observations and written return advice	Detects and prevents delays

Worked Example

After temporary model splinting, the case card shows slower refill and new tingling. The student immediately alerts the instructor and reassesses the dressing and limb.

Result and Interpretation

A new neurovascular finding is time-critical. Continue checks and any readjustment with the responsible team.

Viva Questions and Answers

Why pad bony prominences?

To reduce local pressure and protect skin.

What belongs in a post-reduction note?

Procedure, alignment assessment, neurovascular findings before and after and follow-up.

Fracture Radiograph and Healing Review

Practical 03 / Report and data interpretation

Aim

Describe a fracture on orthogonal images and compare serial radiographs for healing or complications.

Principle

Site, fracture pattern, displacement and alignment help standardise reporting. Healing assessment combines serial imaging and clinical examination.

Materials and Requirements

- Anonymised or schematic radiographs with side and dates
- Case timeline and radiograph reporting worksheet

Procedure

1. Verify identity, side, region, views and date. Check whether the appropriate neighbouring joints are included for the injury.
2. Confirm side marker, projection, region and dates, then place AP and lateral views together if available. Note projections or nearby joints that are unavailable.
3. Examine cortical lines in both views. Describe bone, segment, fracture direction and whether it extends to the articular surface.
4. Trace each visible cortex and compare the apparent break in another projection. Describe bone, segment, fracture line, articular involvement and associated alignment.

Continue with step 5 on the next page.

Procedure Continued

Fracture Radiograph and Healing Review

5. Describe displacement, direction of the distal fragment, angulation, shortening and comminution if present. Record relevant dislocation.
6. Describe direction using distal relative to proximal fragment, with angulation, translation and shortening where supported. Identify adjacent joint incongruity or dislocation.
7. Compare alignment and bridging callus with earlier images. Assess pain, function and signs of infection in the case record.
8. Review serial views in proper order for alignment, callus, fracture line or hardware changes. Compare with pain, function, wound or infection evidence from the same dates.
9. Give a concise impression including any concerning findings that need review.
10. Present a concise initial or follow-up impression with the most important complication or limitation. Communicate concerning alignment or a new clinical deficit promptly.

Precautions

- Avoid assigning an injury from an unlabelled or incomplete image.
- Escalate displaced fractures with current neurovascular change.

Observations and Interpretation

Fracture Radiograph and Healing Review

Observations and Record

Item	What to record	What it tells you
Fracture anatomy	Bone, segment, pattern and joint involvement	Standardises description
Alignment	Translation, angle, shortening and dislocation	Supports treatment review
Serial change	Callus, alignment, hardware and symptoms	Supports healing assessment

Worked Example

Two views show a distal radius fracture with dorsal angulation of the distal fragment. The lateral view clarifies a finding that was subtle on the AP image.

Result and Interpretation

Describe the direction clearly and correlate with clinical neurovascular findings. Compare studies at follow-up for alignment and healing.

Viva Questions and Answers

How do you describe displacement?

State the direction of the distal fragment relative to the proximal fragment.

Can one unchanged radiograph establish non-union?

Diagnosis requires the time course, serial findings and clinical context.

Joint Examination Gait and Lower Back Assessment

Practical 04 / Supervised clinical examination

Aim

Examine a lower-limb joint and gait, and identify neurological and other red flags in back pain.

Principle

Comparing sides and active and passive motion helps localise a problem. A focused neurological assessment is important when symptoms suggest root or cord involvement.

Materials and Requirements

- Examination couch, supervised patient or model and goniometer
- Gait pathway and examination form

Procedure

1. Ask about pain, stiffness, injury, swelling, daily function and systemic symptoms. For back pain ask about weakness, bladder or bowel change and altered saddle sensation.
2. Ask about trajectory, pain site, morning stiffness, swelling, systemic illness and activity limits. For a spinal case seek acute neurological or sphincter concerns before routine testing.
3. Inspect posture and alignment and observe gait when safe. Note aids and compare muscle bulk.
4. Observe posture, standing alignment and gait only when safe. Note stance time, symmetry, aids and guarding and compare skin changes or muscle bulk.

Continue with step 5 on the next page.

Procedure Continued

Joint Examination Gait and Lower Back Assessment

5. Palpate appropriate landmarks and assess active then passive movement within comfort. Measure range when useful.
6. Use a look, feel and move sequence. Compare landmark tenderness and effusion signs and measure selected active and passive ranges within comfort using the same method on both sides.
7. Use targeted joint or neurological tests under supervision and record laterality, pain and strength.
8. Choose special tests targeted to the history and the supervisor's scope. For back pain assess appropriate limb motor, sensory and reflex findings and record inability to test.
9. Summarise the likely site, functional impact and any urgent referral indication.
10. Give the site, functional impact and findings supporting the likely pattern. Escalate a new significant neurological deficit or red-flag back pain presentation through the emergency pathway.

Precautions

- Support patients at risk of falling and avoid forcing painful movement.
- Escalate acute neurological compromise promptly.

Observations and Interpretation

Joint Examination Gait and Lower Back Assessment

Observations and Record

Item	What to record	What it tells you
Gait and function	Stance, step pattern and aids	Shows impairment in use
Joint	Swelling, tenderness and movement ranges	Localises the main limitation
Neurology and red flags	Motor, sensory or sphincter findings	Identifies urgent concerns

Worked Example

A patient with knee pain has an antalgic gait, mild effusion and painful flexion. In a separate back-pain case there is new urinary retention and saddle sensory loss.

Result and Interpretation

Document joint findings and resolve the knee differential in supervision. The spinal red flags require immediate assessment.

Viva Questions and Answers

What is an antalgic gait?

A gait with reduced stance time on the painful limb.

Why compare active and passive range?

The comparison helps distinguish pain or muscle limitation from restriction within the joint.

Hot Joint and Bone Infection Case

Practical 05 / Clinical or documentation case

Aim

Recognise a possible joint or bone infection and rehearse the supervised diagnostic workflow.

Principle

An acutely painful swollen joint with restricted movement may be septic. Relevant samples, obtained by the clinical team, help distinguish infection from other inflammation.

Materials and Requirements

- Fictional symptom and observations chart, radiograph and laboratory reports
- Joint model and laboratory collection labels

Procedure

1. Record onset, fever, trauma, previous joint disease, medicines, recent surgery and immune risks. Review stability and whether the patient can bear weight.
2. Clarify symptom timing, fever, recent infection or procedure, immune risks and ability to use the limb. Identify vital abnormalities and call the supervising team early for a concerning case.
3. Compare swelling, warmth and movement. Avoid repeated painful testing and check adjacent sites when indicated.
4. Compare sides for redness, warmth, swelling and movement. Record ability to bear weight and carefully note discomfort during limited examination, alongside the site of maximal findings.

Continue with step 5 on the next page.

Procedure Continued

Hot Joint and Bone Infection Case

5. Identify septic joint or osteomyelitis as possibilities in the appropriate case. Discuss blood tests, imaging and urgent referral.
6. Review the clinical and supplied laboratory or imaging data together. Explain what would distinguish joint involvement from nearby bone or soft-tissue disease and what review is urgent.
7. Observe a faculty model aspiration setup. Rehearse verification, sample labelling and the joint fluid requests for cells, crystals and microbiology when indicated.
8. On the taught model observe sampling verification and labelling by exact joint, side and time. Identify which results belong to cell count, crystals and microbiology and the consequences of delay.
9. Give a concise handover and state which results need urgent communication.
10. Present acuity, vital observations, examination, leading concern and any pending result. Confirm who will act promptly on a concerning clinical finding or critical report.

Precautions

- Joint aspiration is a faculty-led simulation or supervised clinical procedure.
- Do not delay assessment for complete results when infection is suspected.

Observations and Interpretation

Hot Joint and Bone Infection Case

Observations and Record

Item	What to record	What it tells you
History and stability	Fever, onset and relevant risk factors	Determines urgency
Examination	Joint and adjacent findings	Supports localisation
Sample and tests	Site, timing and requested analyses	Strengthens interpretation

Worked Example

A child with fever refuses to bear weight and has marked pain on passive hip movement in the case. The team is informed promptly.

Result and Interpretation

Septic joint or nearby bone infection needs urgent assessment. Use clinical and imaging findings and authorised sampling to guide management.

Viva Questions and Answers

Can crystals alone exclude infection?

Crystals and infection can coexist. Interpret cultures and clinical findings.

Why label the exact joint and side?

It links the result to the correct anatomical source.

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