

Joint Relocation Techniques

Introduction

- **W**ash hands, **I**ntroduce self, ask **P**atient's name and DOB, **E**xplain procedure, risks and get consent
- Review **X-rays** before **and** after (AP + lateral) to determine pattern of dislocation/confirm re-location and exclude any fractures (don't manipulate if fractures present unless confident it is the correct course of action)
- Examine **neurovascular status** before **and** after (and document it!) i.e. temp, pulses, cap refill, sensation, motor
 - Before: if vascular compromise present, perform immediate reduction and reassessment (emergency)
 - After: if a neurovascular deficit is present, urgent surgical exploration may be required
- Give the patient **analgesia**, options:
 - Systemic analgesia e.g. Entonox, morphine IV
 - Sedation e.g. midazolam
 - Local nerve block
- Note:
 - The below techniques are often successful due to continued traction (few minutes) relaxing muscles around joint, which allows the joint to re-locate itself
 - 'Anterior/posterior/medial/lateral' dislocation refers to the position of the **distal** bone (with respect to the proximal bone)
 - All patients should be followed up in fracture clinic#
 - Give crutches if required

Shoulder

- Look for specific associated fractures
 - Hill-Sachs lesion – compression fracture of humerus
 - Bankart lesion – some of glenoid breaks off
 - Avulsion fracture of supraspinatus origin
- Examine **axillary nerve** sensation (over lateral deltoid)
- Use Entonox and/or morphine for analgesia
- Technique depends on pattern of dislocation
 - **Anterior** (95% of causes, usually due to fall causing external rotation) → any technique below
 - **Posterior** (common in epileptic fit; humeral head looks like a light bulb on X-ray) → easy – pull arm gently forwards and externally rotate it
 - **Inferior** (arm above head) → must dislocate to the anterior position first (then use the anterior techniques)
- **Aftercare** = broad arm sling or polysling for 3 weeks

Kocher's technique (leverage)

- Most commonly used
- **Slow** external rotation of shoulder to 90° (to relax subscapularis) – *stop if reduction is achieved*
- Adduct the shoulder (to bring the elbow across the chest)
- Internally rotate the shoulder (to bring the patient's hand over their opposite shoulder)
- Risk = humeral head fracture

Modified Milch technique (leverage)

- From in front of patient, place fingers over shoulder and steady displaced humeral head with thumb in axilla
- With the other hand folding the patient's wrist, abduct and externally rotate arm
- When full abduction reached, press harder with thumb to push humeral head back into position

Stimson's hanging technique (traction)

- Patient lies prone on a bed
- Affected arm is allowed to hang freely off side of bed (4kg weight may also be used)
- Takes 4 hours and may require benzodiazepines to relax muscle spasm

Hippocratic technique (traction)

- With patient lying on bed supine (or on floor), doctor's heel is gently placed in axilla
- This acts as a fulcrum while their arm is adducted
- Risk ++ = nerve damage

Elbow

- Usually dislocates *posteriorly* from fall on outstretched hand
- Examine **ulnar nerve**, **median nerve** and **brachial artery**
- Requires sedation

- **Aftercare** = collar and cuff sling for 2 weeks

Longitudinal pull

- Elbow at slight flexion
- One person secures the patient's upper arm with both hands facing distally, with the thumbs on the olecranon
- A second person pulls on the 3 long fingers
- The first person can then use their thumbs to press the olecranon back into position if reduction is not achieved with traction alone

Finger joints

- Almost always dislocate *posteriorly* due to hyperextension injuries
- Remove any rings!
- Use a digital nerve block for analgesia
- **Aftercare** = buddy taping for 2 weeks and high arm sling, advise patient swelling will reduce over 2 weeks and never completely subside (rings may need to be resized)

Longitudinal pull

- Assistant applies counter traction to forearm
- Use non-dominant hand's thumb and index finger to grasp the phalanx proximal to the dislocated joint and apply counter traction
- Use dominant hand to apply and maintain firm axial traction to the phalanx distal to the joint
- Gently hyper-extend the joint (exaggerate original injury)
- While maintaining traction and hyper-extension, use the non-dominant hand's thumb to apply pressure to the dorsal aspect to the base of the dislocated phalanx to push back into place

Hip

- Usually dislocates *posteriorly* due to anterior force on femur (e.g. due to car accident)
- The hip will usually be slightly flexed, adducted and internally rotated
- Associated fractures are common (exclude acetabular rim fracture)
- Examine sciatic nerve function (compromised in 10-20%) in posterior dislocation
- Requires sedation minimum, but typically require reduction under general anaesthesia
- If reduction is not easy, open reduction is needed to avoid sciatic nerve damage
- **Aftercare** = bedrest for 2-3 weeks

Technique

- Complete muscle relaxation is key to success
- With patient lying on a low bed, the assistant should stabilise the pelvis (on the side of the dislocation) from above
- Flex knee and hip to 90°
- Apply upward traction to hip (you can use your knee as a lever by resting your shin on the side of the bed with your knee in the patient's popliteal fossa and flex their knee over yours)
- While applying traction, manipulate the leg slightly to the opposite direction to where it is (i.e. correct adduction and internal rotation)

Knee

- Rare
- Usually dislocates *anteriorly* due to trauma (all ligaments will be torn)
- Popliteal vessels compromised 50% of the time – ankle-brachial pressure index should be performed and a CT angiogram is often required
- Examine the peroneal nerve and tibial nerve function
- Often requires open reduction due to significant neurovascular damage risk (if not, requires sedation)
- Risk of compartment syndrome
- **Aftercare** = above knee backslab for 6 weeks

Technique

- Traction and pressure over displaced tibia

Patella

- Usually dislocates laterally
- Pre-procedure x-ray not required
- Use Entonox for analgesia

- **Aftercare** = cylinder cast for 2-3 weeks

Technique

- Stand on the lateral side of the patient
- Flex their knee to relax quadriceps (e.g. over side of bed)
- Lift and push patella anteromedially using both thumbs
- Ask assistant to gently extend patient's knee while you are doing this

Ankle

- Rare without a bimalleolar/trimalleolar fracture
- Should be manipulated even in presence of a fractures
- Requires sedation
- **Aftercare** = below knee backslab for 6 weeks; however, these are unstable fractures and usually need surgical fixation – they should be immobilised in mean time

Technique

- Ensure assistant who can plaster is ready to do so
- Patient's knee flexed over examination table (or them lying in bed if more practical)
- Ask assistant to apply stockinette and webril
- Grasping their hindfoot, apply traction as if you are 'taking their shoes off', in order:
 1. Correct posterior subluxation by lifting heel anteriorly
 2. Correct external rotation
 3. Correct abduction
- Ensure the ankle is held in the correct position while above/below knee backslab is applied – *note it is a very unstable fracture and will fall out of place with gravity if not supported properly*
 - Ensure ab/adduction is correct (i.e. ankle is in line with lower leg)
 - Ensure posterior subluxation is correct (hold ball of foot anteriorly or hold foot up with great toe to ensure heel is in line with back of shin and ankle is at 90°)
 - Tweak the external rotation of ankle to match other side (look at position of the toe in line with the knee)