GOVERNMENT OF WESTERN AUSTRALIA

North Metropolitan Health Service
Sir Charles Gairdner Osborne Park Health Care Group

Lower Limb fractures, Quick reference

All open injuries and/or injuries with neurovascular compromise need discussion with appropriate team (orthopaedics or plastics)
Consider any non-weight bearing patient at high risk of DVT for prophylactic anti-coagulation after discussion with haematology

Foot Ankle Lower leg Knee

1

Proximal base of 5th Metatarsal fractures- Zone 1
Immobilisation: Darco shoe, weight bear as tolerated.
Follow up: GP follow up, provide patient with information leaflet

2

Mid base of 5th Metatarsal fractures- Zone 2
- Intra-articular

Immobilisation: Cam boot, weight bear as tolerated.
Follow up: Ortho OPD

3

Distal base of 5th Metatarsal fractures- Zone 3
Immobilisation: Cam boot, weight bear as tolerated.
Follow up: Ortho OPD

4

Base of 5th MT fractures zones
- Zone 1
- Zone 2
- Zone 3

5

Dancer fractures of 5th Metatarsal
- Twisting injury mechanism
- Long oblique fracture of the shaft of the 5th metatarsal

Immobilisation: Darco shoe, weight bear as tolerated.
Follow up: Ortho OPD

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Uncomplicated Metatarsal fractures
- Undisplaced single or multiple fractures

Immobilisation: Darco shoe, weight bear as tolerated.
Follow up: Ortho OPD
Red flag: Check for widened 1st-2nd metatarsal base space on xray (potential Lisfranc injury).

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Complicated Metatarsal fractures
- Displaced single or multiple fractures

Discuss with orthos for management if unstable
Immobilisation: Darco shoe, weight bear as tolerated.
Follow up: Ortho OPD
Red flag: Check for widened 1st-2nd metatarsal base space on xray (potential Lisfranc injury).

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Lisfranc fracture/injury
- Unstable injury
- Key xray findings: widened 1st-2nd metatarsal base space, fleck sign on 1st metatarsal space, dorsal displacement of the proximal base of the 1st-2nd metatarsals, discontinuity of a line drawn from the medial base of the 2nd metatarsal to the medial side of the middle cuneiform
- Require weight bearing with comparison xray views
- Require CT scan for operative management but if no bony injury they may require an MRI in ortho outpatient clinic

Always discuss with orthos for management-stable versus unstable
Immobilisation: Cam boot if stable, weight bear as tolerated. Below knee backslab in unstable, non-weight bearing crutches.
Follow up: Ortho OPD

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Achilles tendon injury
- Look at the angle of declination of the foot in comparison to the contralateral side
- Feel for a palpable gap
- Simmonds/Thompson test positive (squeeze test)- full rupture

Discuss with orthos full ruptures to arrange USS as outpatient+-repair
Immobilisation: Equina backslab (plantar flexion) and non-weight bearing crutches.
Follow up: Ortho OPD
Red flag: Elderly patient with diabetes, patients taking immunosuppresants or patients with osteopaenia may require and xray of the ankle to rule out a calcaneal tuberosity fracture

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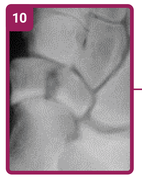

Tarsals fractures
- Stress or traumatic
- Displaced or undisplaced

Discuss with orthos usually conservative treatment on cam boot
Immobilisation: Cam boot, non-weight bearing crutches.
Follow up: Ortho OPD

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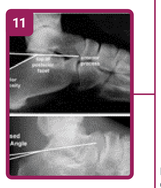

Calcaneum fractures
- Usually axial loading injuries, falls from height or MVI, risk of associated tibial plateau and lumbar spine injuries
- Check anterior process on xray
- Check for achilles tendon injury-Simmonds/ Thompson test (squeeze test)
- Check Bohler angle on xray (normal 20-40°)
- Stress and undisplaced fractures usually treated conservatively
- Displaced and intra-articular fractures need ortho consult+-CT scan

Immobilisation: Cam boot, non-weight bearing crutches.
Follow up: Ortho OPD

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Talar fractures
- Talar neck fractures are associated with high-energy injuries. Forced dorsiflexion with axial loading
- All fractures to be discussed with orthos, high incidence of avascular necrosis, non-union/ malunion, osteonecrosis and arthritis.
- Probably need CT scan for ORIF

Immobilisation: Below knee backslab, non-weight bearing crutches.
Follow up: Ortho OPD

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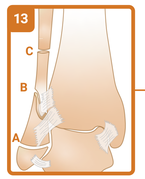

Weber classification fractures
A. Below syndesmosis
B. Level of syndesmosis
C. Above level of syndesmosis

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Weber A undisplaced fractures
- If significantly displaced, ankle mortise involvement or talar shift: discuss with orthos

Immobilisation: Cam boot, weight bear as tolerated.
Follow up: Ortho OPD

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Weber B undisplaced fractures
- If significantly displaced, ankle mortise involvement or talar shift: discuss with orthos may require reduction

Immobilisation: Cam boot and weight bear as tolerated crutches.
Follow up: Ortho OPD

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Weber C fractures
- Order an xray of tibia & fibula to rule out head of fibula fracture

Discuss with orthos about ORIF
Immobilisation: Below knee backslab and non-weight bearing crutches.
Follow up: Ortho OPD

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Ankle avulsion fragments
- Those injuries are considered and treated as ligamentous injuries
- RICE, analgesia + NSAIDs for 48hrs

Immobilisation: Sports ankle brace for support & recovery. Weight bear as tolerated. Grade 3 ligamentous injuries may require cam boot and crutches as severe laxity
Follow up: GP follow up as required. Grade 3 injuries require physio/ortho OPD follow up for further assessment

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Medial Malleolus fractures
- Always xray the knee to look for a proximal fibula # and rule out Maisonneuve #
- Check for talar shift on xray
- If displaced or talar shift, unstable injury consult the ortho team

Immobilisation: Undisplaced, cam boot and non-weight bearing crutches. If displaced, below knee backslab and non-weight bearing crutches
Follow up: Ortho OPD

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Maisonneuve fractures
- External rotation force to ankle with transmission of the force through the interosseous membrane
- Syndesmosis breached, unstable injury
- If displaced reduce in ED
- Consult ortho team for ORIF and further management

Immobilisation: Below knee backslab and non-weight bearing crutches
Follow up: Ortho OPD

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Isolated proximal fibula fracture
- High fibular fractures are usually associated with a complex injury-do an ankle xray to rule out a Maisonneuve fracture
- Isolated proximal fibula fractures are usually caused by minor trauma but rarely occur in isolation. Watch out for ligamentous and neurovascular structures rather than the bone itself
- Check for stability of knee and ankle. Consider further imaging if instability is suspected

Immobilisation: after tubigrip/sports knee brace and weight bearing as tolerated with crutches.
Follow up: Ortho OPD

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Complicated Ankle fractures
- Bimalleolar fractures
- Trimalleolar fractures
- Tallar shift displacement fractures
- Fractures dislocations

Discuss with orthos regarding ORIF. Reduce in ED if displaced
Immobilisation: Below knee resting backslab, non-weight bearing crutches.
Follow up: Ortho OPD

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Undisplaced Tibial Shaft fractures
- < 5 degrees varus-valgus angulation
- < 10 degrees anterior/posterior angulation
- > 50% cortical apposition
- < 1 cm shortening
- < 10 degrees rotational malalignment

Immobilisation: Above knee backslab, non-weight bearing crutches.
Follow up: Ortho OPD

23

Complicated Tibial Shaft fractures
- > 5 degrees varus-valgus angulation
- > 10 degrees anterior/posterior angulation
- < 50% cortical apposition
- > 1 cm shortening
- > 10 degrees rotational malalignment

Discuss with orthos about ORIF
Immobilisation: Above knee resting backslab, non-weight bearing crutches.
Follow up: Ortho OPD

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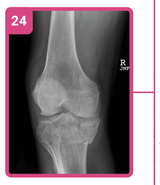

Tibial Plateau fractures- Type I-III
- Lateral split fractures-Schatzker type I (young)
- Lateral split-depressed fractures-Schatzker type II (most common)
- Lateral pure depression fractures-Schatzker type III (old)

Discuss with orthos regarding management, they may want early mobilization with a hinged knee brace (limited availability in ED) or ORIF for unstable ones- note red flags
Immobilisation: Richards splint for 1-2 weeks, non-weight bearing crutches for 6-8 weeks.
Follow up: Ortho OPD
Red flags: Articular depression >5-10mm, condylar widening > 5mm, varus/valgus instability > 10° may need ORIF

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Tibial Plateau fractures- Type IV-VI
- Medial plateau fractures-Schatzker type IV (unstable)
- Bicondylar fractures-Schatzker type V (unstable)
- Metaphyseal-diaphyseal disassociation-Schatzker type VI (very unstable)

Discuss with orthos regarding management +- ORIF
Immobilisation: Long richard's splint, non-weight bearing crutches.
Follow up: Ortho OPD

26

Uncomplicated Patellar fractures
- Vertical patellar fractures
- Undisplaced transverse patellar fractures
- Check if patient can straight leg raise-if unable discuss with orthos

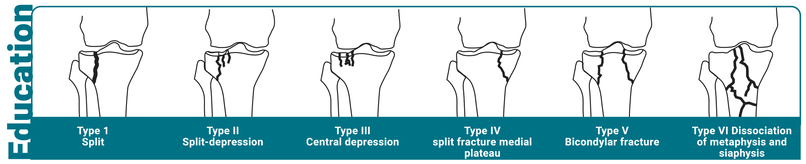
Immobilisation: Richards splint, full weight bearing.
Follow up: Ortho OPD
Red flag: Inability to straight leg raise-extensor mechanism disruption needs repairing

27

Complicated Patellar fractures
- Displaced transverse patellar fracture
- Inability to straight leg raise with any patellar fracture

Discuss with orthos regarding ORIF
Immobilisation: Richards splint, full weight bearing.
Follow up: Ortho OPD
Red flag: Unable to straight leg raise-extensor mechanism disruption needs repairing

Education



Treatment and intervention

Darco shoe
- Multiple sizes for males/ females
- Kept in store cupboard in corridor near triage door

1 5 6 7

Cam boot application
- Measure the sole of the foot and add 1-2cm
- Measure the sole of the cam boot to select the appropriate size.
- Open velcro straps and remove excess padding
- Place the heel firmly down the back of the cam boot
- Place padding over the foot strap and fasten velcro straps
- Remove by pulling paper strips off each side of cam boot

2 3 8 10 11 14 15 17 18

Achilles equina bacslab
- Available in fast track stores room out of hours

9

Below knee
- Make sure ankle position is at 90° flexion

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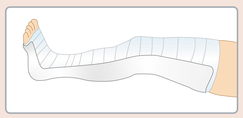

Above knee backslab
- 20-30° knee flexion
- 90° ankle dorsiflexion

22 23

Richards splint
- Two options: short and long-need to be fitted to your patient to start with (one size fits all –need to be altered with the Velcro straps to the patella cut out sections for your patient measurements)
- Lie patient with the affected knee flat
- Open the brace out flat and remove patella cut out sections
- Position main part behind knee with widest part of the brace at the thigh and position each side section in line with the patella cut-out section before your secure it to the main splint with the Velcro straps
- Wrap the brace around the leg
- Secure by pulling the Velcro bands around, thread through the buckles and press down to fasten comfortably

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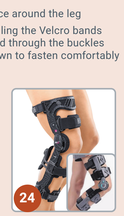

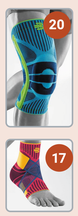

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