Table B3. Summary of recommendations—adult ankle and foot disorders

Patient presentation	Recommendations
Adult with acute ankle and foot injury but negative findings on the OAR Consider radiographs only of patients excluded from the OAR: • Multiple injuries • Isolated skin injury • 10 d since injury • Obvious deformity of ankle or foot • Altered sensorium: cognitive or sensory impairment (neurologic deficit), head trauma, intoxicated	Radiographs not routinely indicated [B]
Adult with acute ankle and foot injury and positive findings on the OAR (a) Ankle (positive OAR) Radiographs required only if there is pain in the malleolar zone and any of these findings: • Bone tenderness of distal fibula along posterior edge or tip of lateral malleolus (distal 6cm) • Bone tenderness of distal tibia along posterior edge or tip of medial malleolus (distal 6 cm) • Inability to bear weight both immediately and in clinic Also consider taking ankle radiographs in: • Older patients with malleolar tenderness and pronounced soft tissue edema. • Presence of positive OAR foot findings	Ankle radiographs indicated [B] AP ankle, 20° medial oblique (mortise views) and lateral (include base of fifth metatarsal) Additional views [D]: Stress radiographs after fibular fracture helpful pre-operatively to determine deltoid ligament status in orthopedic setting. Special investigations [D] • MRI or CT appropriate in presence of significant pain and disability and negative radiographs • Fluoroscopic stress examination under anesthesia to assess ankle instability • NM for persisting symptoms to exclude stress fracture
(b) Foot (positive OAR) Radiograph required only if there is pain in the midfoot zone and any of these findings: • Bone tenderness of base of fifth metatarsal • Bone tenderness of navicular bone • Unable to bear weight both immediately and in clinic	Foot radiographs indicated [B] When feasible, weight-bearing foot AP, lateral, medial oblique views Comparison views (normal foot) may be helpful. Additional view: tangential view of calcaneus for heel trauma cases
Adult with acute toe injury Consider obtaining foot radiographs in presence of significant metatarsal pain (see OAR-Foot)	Radiographs indicated [GPP]: AP, oblique, and lateral views limited to the toes
Adult with chronic ankle and tarsal pain Specific indications for radiographs include: • Suspected osteochondral lesion/stress fracture • Suspected tendinopathy with possible inflammatory arthritis • Possible ankle instability. Single-leg jump test as clinical indicator of functional instability • Noninvestigated chronic ankle and tarsal pain • Multiple sites of degenerative joint disease as visualized on radiographs • Possible operative candidate	Radiographs indicated [D] AP ankle, lateral, medial oblique (mortise) views (Medial oblique view helps evaluate the talocalcaneal relationship and lateral malleolus.) Additional view: Stress radiographs may be considered, but little agreement exists as to which technique. Special investigations [D] MRI is the gold standard for musculoskeletal assessment if radiography is positive or if unrelieved by 4 wk of conservative care. • Contrast-enhanced, fat-suppressed, 3D, fast-gradient MRI may be useful in diagnosing synovitis and soft tissue impingement.
Specific clinical diagnoses	
1. Impingement syndromes Findings most strongly associated with abnormality at arthroscopy: • Anterolateral tenderness • Swelling • Pain on single-leg squatting • Pain on ankle dorsiflexion and eversion	Radiographs indicated [D] AP ankle, lateral and mortise views Special investigations [D] For all suspected impingement syndromes with positive radiographs or unrelieved by 4 wk of conservative care: • Contrast-enhanced, fat-suppressed, 3D, fast-gradient MRI may be indicated depending on pain severity and disability.

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Table B3 (continued)

Patient presentation	Recommendations
(a) Anterolateral impingement Clinical features: • Mechanism: inversion injury • Pain and localized tenderness in region of anteroinferior tibiofibular and/or anterior talofibular ligament • Positive impingement sign	Radiographs indicated [D] AP, lateral, and mortise ankle views Additional view: [D] Stress radiographs may be considered.
(b) Anterior impingement Clinical features: • Mechanism: supination or repeated dorsiflexion injury • Anterior pain • Painful and restricted dorsiflexion	Radiographs indicated [D] AP, lateral, and mortise ankle views
(c) Anteromedial impingement Clinical features: • Mechanism: inversion injury or ankle/talar fracture • Anteromedial pain and tenderness • Swelling • Pain and restriction on dorsiflexion and supination	Radiographs indicated [D] AP, lateral, and mortise ankle views
(d) Posterior impingement Clinical features: • Mechanism: impingement of os trigonum between talus and posterior tibia • Common in ballet dancers • Pain elicited with full weight-bearing in maximum plantar flexion, especially when os trigonum is present. • Tenderness behind lateral malleolus	Radiographs indicated [D] AP, lateral, and mortise ankle views Special investigations [D] MRI for os trigonum syndrome • Pain with passive plantar flexion
2. Peroneal tendinosis Clinical features: • Lateral hindfoot pain • Cavovalgus foot deformity • Frequently affected in RA	Radiographs not routinely indicated [D] Unless unrelieved by 4 wk of conservative care or patient has a suspected inflammatory arthritis Special investigations [D] MRI or US if there are signs of popping or clicking with foot eversion
3. Lateral premalleolar bursitis Clinical features: • Adventitious bursa develops after prolonged sitting with inverted and plantar flexed feet	Radiographs not routinely indicated [GPP] Special investigations [GPP] US if unrelieved by 4 wk of conservative care
4. Tarsal tunnel syndrome Clinical features: • Tingling pain and burning over the sole of the foot after prolonged standing or walking • Worse at night in some • Positive Tinel sign • Positive nerve compression test • 2-Point discrimination • Hypoesthesia on sole of foot • Rare weakness of toe flexion	Radiographs not routinely indicated [D] Special investigations [D] • US or MRI for nerve and other soft tissue visualization • CT for bony abnormalities • Sensory conduction velocity and distal motor latency useful for diagnosis and treatment progression
Adult with chronic foot pain	Radiographs generally indicated [C] Non–weight-bearing AP, lateral, medial, and lateral oblique views Additional views: • Lateral views for toes • Axial and lateromedial tangential views for sesamoid bones Special investigations [D] • NM, MRI, US, arthrography may be useful • Laboratory investigations (blood and synovial fluid) recommended
A. Hindfoot-Heel pain	Radiographs indicated [D] AP, lateral, and medial oblique views of the foot Additional views: tangential view of the calcaneus and lateral calcaneus view

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Patient presentation	Recommendations
	Special investigations [D] • MRI if unrelieved by 4 wk of conservative care or before referral for medical care or to podiatrist • Achilles enthesopathy: power Doppler sonography may show neovascularization, which may be the cause of pain.
Specific clinical diagnoses	
A1. Plantar fasciitis (PF) and calcaneal enthesophyte (spur) Clinical features: • PF is one of the most common soft tissue foot disorders • Hyperesthesia over the plantar fascia • Risk factors: ◦ Decreased ankle dorsiflexion (≤0°) ◦ Being on their feet most of working day ◦ Obesity (body mass index Ν30 kg/m^2)	Radiographs not routinely indicated except in young athlete [B] AP, lateral, and oblique views Special investigations [D] • US may be initial step for advanced imaging (readily available, highly sensitive, low-cost, and radiation-free). • Doppler/power US improves US value • US, MRI, and bone scan are more sensitive in showing inflammatory changes and thickening of the plantar aponeurosis in PF
A2. Sinus tarsi syndrome Clinical features: • Mechanism: inversion injury or inflammatory joint diseases • Lateral foot pain • Perceived foot instability • Tenderness of the sinus tarsi	Radiographs not initially indicated [D] Special investigations [D] MRI if unrelieved by 4 wk of conservative care: may be helpful for detecting subtle unilateral deformities
B. Midfoot pain (nontraumatic) Midfoot pain usually self-limiting. Differential diagnosis: • RA • Psoriatic arthritis • Reactive arthritis (Reiter disease) • Diabetic neuroarthropathy/Charcot joints • Gout • Diabetic infection	Radiographs indicated if unrelieved by 4 wk of conservative care or in suspected inflammatory arthritis [D] AP, medial oblique, and lateral views of the foot Additional views: weight-bearing ankle series may be useful Special investigations if radiography is positive or if unrelieved by 4 wk of conservative care [GPP] CT or MRI warranted in suspected or proven disease, but negative/equivocal radiographs
Specific clinical diagnoses	
B1. Acquired flat foot with posterior tibial tendon dysfunction/rupture Clinical features: • Medial ankle/foot pain initially • May lead to disabling weight bearing symptoms • Talonavicular subluxation • Difficulty or inability to perform single-limb heel rise • Weak resisted inversion of fully flexed foot	Radiographs indicated if unrelieved by 4 wk of conservative care or in suspected inflammatory arthritis [D] AP, medial oblique, and lateral foot radiographs Additional views: weight-bearing ankle series may be useful Special investigations [D] • MRI better at differential diagnosis of medial ankle/foot pain • US may be useful
B2. Navicular tuberosity pain and tenderness [148] Potential painful normal variants such as accessory navicular bone (4%-21% of the population) have been described. Painful fibro-osseous junction of the accessory bone	Radiographs indicated if unrelieved by 4 wk of conservative care [C] AP, medial oblique, and lateral foot views Special investigations [GPP] • MRI to differentiate accessory navicular from an avulsion fracture • NM may be useful to help identify or confirm site of pain.
B3. Complex regional pain syndrome Synonyms: • Reflex sympathetic dystrophy • Sudek's atrophy Clinical features: • Pain	Radiographs indicated [D] AP, lateral, and medial oblique views of the foot Special investigations [D] • MRI is useful in detecting numerous soft tissue and earlier bone and joint processes that are not depicted or as well characterized with other imaging modalities • 3-Phase NM scan recommended if radiograph is not diagnostic

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Patient presentation	Recommendations
• Tenderness • Swelling • Diminished motor function • Vasomotor and sudomotor instability	
C. Forefoot pain	Radiographs not routinely indicated unless unresponsive to 4 wk of conservative care or if inflammatory or infectious etiology suspected [B]
See recommendations for the following specific clinical diagnoses:	AP and lateral foot views
C1. Metatarsal bursitis C2. Morton neuroma C3. Stress fracture C4. Avascular necrosis (osteonecrosis) C5. Hallux rigidus and hallux valgus C6. Sesamoiditis	Special investigations [D] MRI useful in differential diagnosis of forefoot pain such as stress fracture, metatarsophalangeal synovitis, and intermetatarsal bursitis
C1. Metatarsal bursitis	Radiographs not routinely indicated unless unresponsive to 4 wk of conservative care, or if inflammatory or infectious etiology suspected [GPP] AP and lateral foot views Special investigations [GPP] MRI useful in differential diagnosis of forefoot pain
C2. Morton neuroma Clinical features: • Most commonly found in the 3-4 web space • Pain hyperesthesia or paresthesia radiation to the toes • Differential diagnosis from MTP arthritis may be difficult • Positive forefoot neuroma squeeze test	Radiographs indicated [C] AP, lateral, with or without oblique Special investigations [D] MRI
C3. Stress (fatigue or insufficiency) fracture Clinical features: Pain and tenderness present in the: • Second and third metatarsal • calcaneus • First metatarsal • medial sesamoid • Navicular	Radiographs indicated [D] AP and lateral foot views with or without medial oblique specific to the area of complaint Special investigations [C] • High-field MRI with fat suppression or inversion recovery protocol. As sensitive as NM • CT still uncertain; some centers use US
C4. Osteonecrosis of metatarsal head (Freiberg infraction) Clinical features: • Adolescent patient • Pain • Tenderness • Swelling • Limitation of movement at metatarsal head • Second or third head most commonly affected	Radiographs indicated [C] AP, lateral, with or without medial oblique of the foot Special investigations [C] MRI modality of choice to evaluate bone marrow changes in early stages
C5. Hallux rigidus and hallux valgus (first metatarsophalangeal joint)	Radiographs not routinely indicated unless unresponsive to 4 wk of conservative care [D] Lateral view most useful for dorsal osteophyte on the metatarsal head and possible osseous fragments Additional view: Weight-bearing series to quantify degree of valgus deformity
C6. Sesamoiditis Painful inflammatory condition caused by repetitive injury; reactive tendinitis, synovitis, or bursitis common	Radiographs not routinely indicated unless unresponsive to 4 wk of conservative care [D] Additional view: Lateromedial and tangenital views for sesamoid bones Special investigations [GPP] MRI to differentiate from turf toe