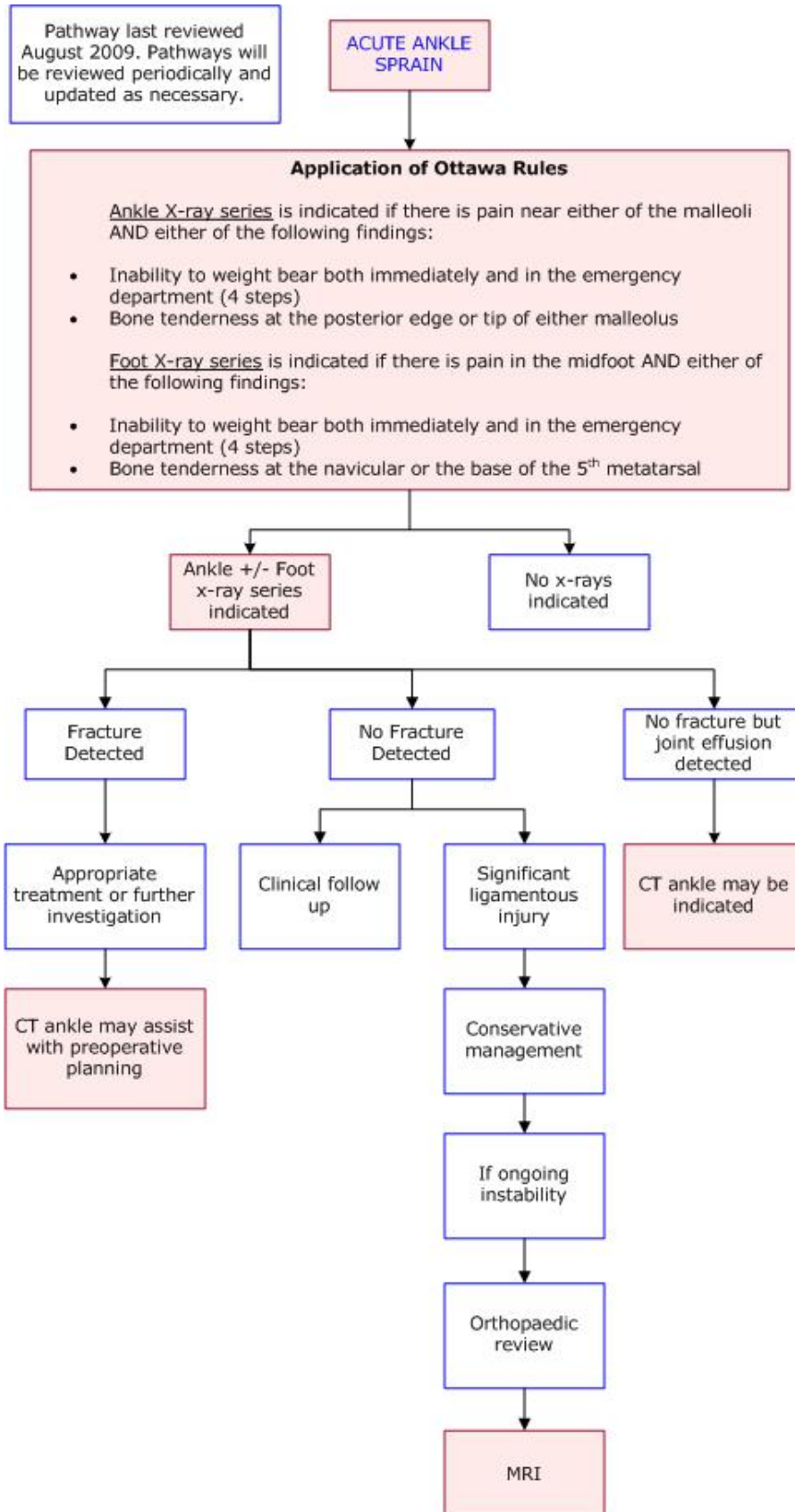




# DIAGNOSTIC IMAGING PATHWAYS

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## OTTAWA ANKLE RULES

- Clinical decision rules to determine the need for ankle and foot radiographs after an acute ankle injury. [1](#)
- These rules were refined and validated prospectively on 453 patients. [2](#)
- Implementation of the rules resulted in a decrease in the use of ankle radiography by 28% and foot radiography by 14% without affecting the incidence of fracture detection. [3](#)
- The Ottawa Ankle Rules have also been prospectively applied in several other studies [7-12](#) and in all but one [7](#) have resulted in a significant reduction in the use of ankle and foot radiographs (19-34%) without missing any clinically significant fractures.

## PLAIN RADIOGRAPHY OF THE ANKLE AND FOOT

- An ankle x-ray series usually consists of AP, lateral and mortise views. The fifth metatarsal distal to the tuberosity should be seen in at least one projection.
- The presence of an ankle effusion is best appreciated on the lateral view and is an important finding because it increases the likelihood of an occult fracture.
- In one study the presence of an ankle effusion correlated with the presence of an occult fracture in between 35% and 85% of patients, depending on the actual size of the effusion. [4](#)
- A foot x-ray series usually consists of AP, oblique and lateral views.

## COMPUTED TOMOGRAPHY

- Should be considered if there is ongoing suspicion of a fracture despite a negative radiograph.
- May be useful with chronic post-traumatic residual ankle pain in the presence of normal plain x-rays. [5](#)
- Fractures of the lateral process of the talus are negative with up to 40% of plain radiographs. They are most common in snowboarders and should be suspected when there is a history of inversion with dorsiflexion, together with tenderness over the lateral aspect of the talus. [6](#)

## ULTRASOUND

- For detection of lateral ankle ligamentous rupture, ultrasound has a sensitivity of 85% and specificity of 94%. [14](#)
- Most cases of suspected ligamentous injury will not require imaging as conservative management is appropriate for most acute injuries.
- Sonographic appearances of ligamentous injury include: [13,14,21](#)
  - Hypoechoic thickening of the ligament with incomplete tears.
  - With complete ligamentous rupture, the hyperechoic ligament has a wavy contour

- Advantages compared to MRI: [13](#)
  - Direct correlation of sonographic findings with patient symptoms and rapid comparison of the asymptomatic ankle.
  - Wide availability of ultrasound equipment.
  - Lower cost compared to MRI
  - More rapid examination than standard MRI examination.
- Limitations: [13](#)
  - Unknown correlation of findings with clinical outcome
  - Operator dependent
  - Structures immediately superficial to the bony cortex may be difficult to assess.

## MAGNETIC RESONANCE IMAGING

- Detects complete lateral ankle ligament rupture with a sensitivity of 50-74% and specificity of 100%. [15](#)
- MRI of the ankle for ligamentous injury is not performed routinely as most injuries heal with sufficient strength to maintain joint stability and findings do not consistently correlate with clinical outcome. [16-18](#)
- The only indication for primary surgical repair of the acutely torn ligament may be in high-performance athletes. [16,17](#)
- Appearance of ligamentous injury on MRI include: [16,17,19,20](#)
  - Irregular ligamentous thickening with occasional increased signal intensity within partially torn ligaments
  - Discontinuity of the ligament with ligamentous stumps, heterogenous appearance, and fluid signal bridging the defect characterise completely ruptured ligaments
  - Non specific findings of ligamentous injury include soft tissue oedema or haemorrhage, joint effusion, extravasation of joint fluid outside the capsule and bone bruising.
- Advantages of MRI: [15-17](#)
  - Superior soft tissue resolution and tissue characterisation
  - Less operator dependent compared to ultrasound
- Limitations: [15-18](#)
  - Higher cost compared to ultrasound and stress radiography
  - Longer examination times
  - Inability to predict clinical outcome

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