

Diagnostic Imaging Pathways - Paediatric, Knee Pain

Population Covered By The Guidance

This pathway provides guidance on imaging children with knee pain.

Date reviewed: July 2017

Date of next review: July 2020

Published: September 2017

Quick User Guide

Move the mouse cursor over the **PINK** text boxes inside the flow chart to bring up a pop up box with salient points.

Clicking on the **PINK** text box will bring up the full text.

The relative radiation level (RRL) of each imaging investigation is displayed in the pop up box.

SYMBOL	RRL	EFFECTIVE DOSE RANGE
	None	0
	Minimal	< 1 millisieverts
	Low	1-5 mSv
	Medium	5-10 mSv
	High	>10 mSv

Pathway Diagram

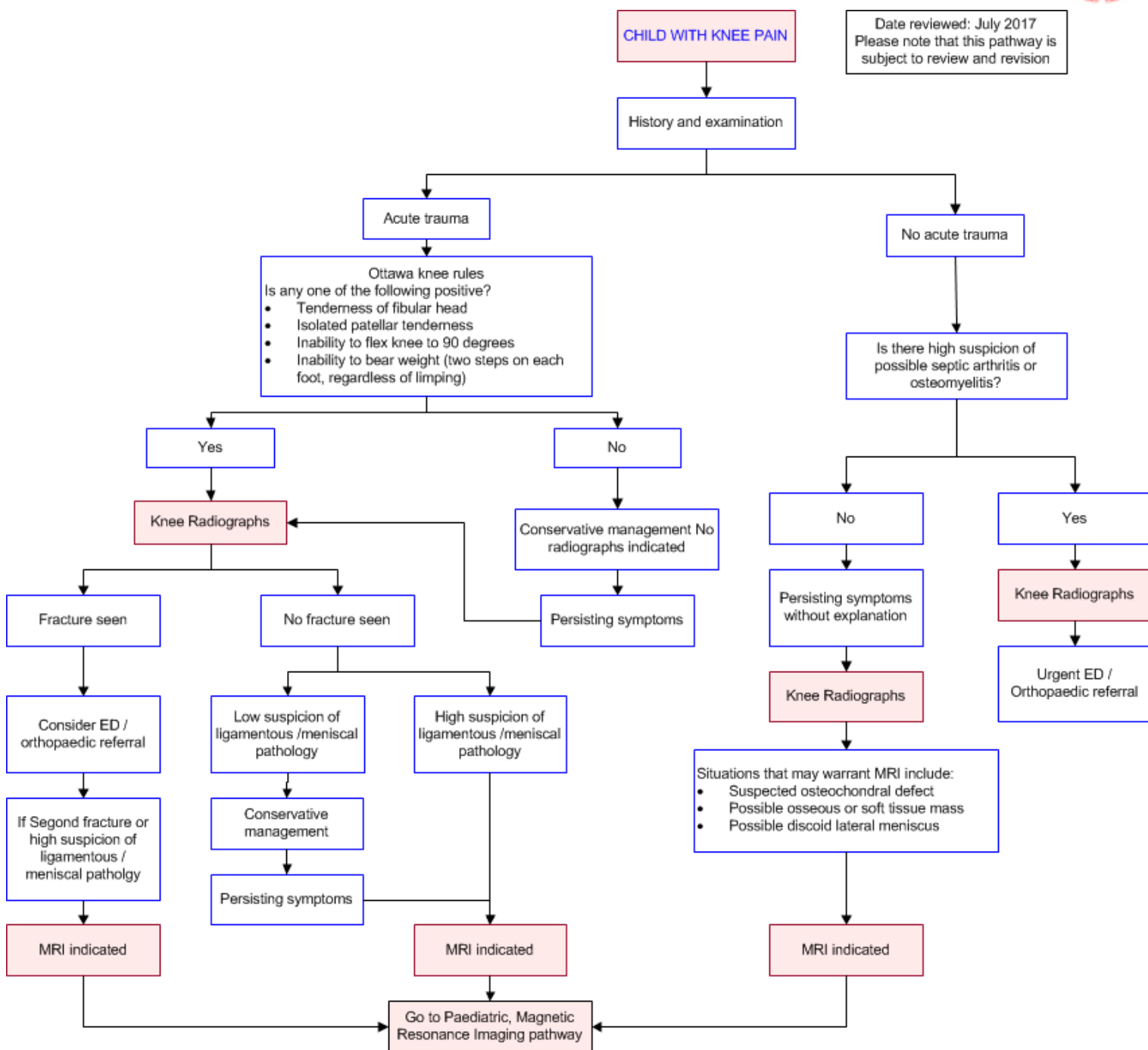


Image Gallery

Note: Images coming soon

Teaching Points

- Trauma to the paediatric knee is common and knee pain is the second most common paediatric musculoskeletal presentation to the emergency department



- Unrecognised fractures may result in permanent neurovascular deficit and growth disturbances
- Knee radiographs are one of the most common radiographs used to assess trauma in the ER. However it has the lowest yield for diagnosing clinically significant fractures
- Clinical decision rules such as the Ottawa Knee Rule (OKR) can be used to reduce the rate of unnecessary radiographs performed
- MRI is a valuable adjunct and has the potential to change management

Child with Knee pain

- Knee pain is a common complaint amongst children accounting for more than a third of paediatric musculoskeletal complaints [1, 2](#)
- A thorough history and examination should be performed including the characteristics of the pain, onset, location, duration, severity and radiation [1](#)

Knee Radiographs

- Plain radiography of the knee is the investigative mainstay for assessing knee injuries in children
- Interpretation is complicated by a number of issues [3, 4](#)
 - Relative radiolucency of the cartilaginous anatomy found in skeletally immature patients
 - Paediatric patients sustain different injuries compared to adults, particularly involving the physis
 - Low yield nature of knee radiographs for knee trauma, even in adults
- Clinical decision rules such as the Ottawa Knee Rule (OKR) can be used to reduce the rate of unnecessary radiographs performed. [1, 2](#) The OKR has been widely validated and investigated in adult populations, and shown to allow a relative reduction in use of radiography by around one third [5](#)
- Meta-analysis of their use in a paediatric population showed that the OKR had high sensitivity and adequate specificity for children over the age of 5. There was insufficient evidence for children under the age of 5 [4, 6](#)
- Advantages
 - Fast, readily accessible
 - Will identify obvious fractures and joint effusions
- Disadvantages
 - Ionising radiation – albeit small exposure
 - Majority of patients with acute knee injuries have soft tissue injury

Magnetic Resonance Imaging (MRI)

- The knee is one of the most commonly imaged joints by MRI in the paediatric population [7, 8](#)
- Magnetic resonance imaging has several advantages over other modalities
 - No ionising radiation [7](#)
 - Excellent soft tissue resolution, contrast & detail
 - MRI is able to evaluate injuries to the soft tissues, ligaments, menisci, epiphyses and bone contusions [4, 7, 9](#)
 - With improvements in MRI technology, accuracy of diagnosing paediatric meniscal and cruciate ligament tears is approaching that for adults. Studies suggest 92% sensitivity & 88% specificity for detecting anterior cruciate ligament (ACL) tears and

93-100% sensitivity and 87-95% specificity for meniscal injuries [4, 8, 10-12](#)

- Capable of multiplanar reconstructions
- MRI can affect management, although this has only been extensively investigated in adult patients so far
 - MRI has been shown to alter management in a proportion of adult patients with knee injuries [13](#)
 - Nikken et al performed two prospective studies on adult patients with acute knee injury without radiographic fracture. MRI imaging was found to shorten the time to diagnosis, reduce number of diagnostic procedures during follow-up, reduce medical costs & costs to society and improve quality of life in the first 6 weeks following injury [14, 15](#)
- Disadvantages include [7](#)
 - Cost
 - Limited access
 - The need for patient sedation/general anaesthesia in young children
 - A good understanding of normal skeletal development is required to avoid misdiagnosis
 - Some paediatric studies have shown MRI to be no more accurate in detecting ACL and meniscal tears than a knee examination performed by a skilled and experienced clinician [4](#)

References

Date of literature search: July 2017

References are graded from Level I to V according to the Oxford Centre for Evidence-Based Medicine, Levels of Evidence. [Download the document](#)

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Information from this website	Information from the Royal Australian and New Zealand College of Radiologists' website
<p>Consent to Procedure or Treatment</p> <p>Radiation Risks of X-rays and Scans</p> <p>Magnetic Resonance Imaging (MRI)</p> <p>Plain Radiography (X-ray)</p>	<p>Magnetic Resonance Imaging (MRI)</p> <p>Plain Radiography/X-rays</p> <p>Radiation Risk of Medical Imaging for Adults and Children</p> <p>Making Your Child's Test or Procedure Less Stressful</p>

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