**Audit of adequacy of the large joints magnetic resonance imaging**

**Descriptor:**

An audit to evaluate the adequacy and optimise coverage and imaging planes of MRI of the large joints

**Background:**

MRI is the preferred method to examine internal derangement of the joints. Routine MRI examination of the large joints typically includes image series acquired in the axial, coronal and sagittal planes; some of which may be obliquely acquired. It is vital to cover the important anatomical structures adequately to ensure valid and complete assessment of pathology.

The European Society of Musculoskeletal Radiology (ESSR) [1] and American College of Radiology (ACR) [2-7] have published guidelines on the MRI image planes and proper anatomical coverage.

## The Cycle

**The standard:**

Joint

Coverage

Imaging Planes

Shoulder

- Axial: From above acromioclavicular joint to below axillary pouch

- Oblique coronal: From coracoid process and include entire humeral head

- Oblique sagittal: From lateral deltoid to scapular body

- Oblique coronal: parallel to supraspinatus tendon

- Oblique sagittal: perpendicular to the supraspinatus tendon

Elbow

- Axial: From above epicondyles to below radial tuberosity

- Coronal: include entire elbow, skin to skin

- Sagittal: include entire elbow, skin to skin

- Coronal: parallel to intercondylar line

- Sagittal: perpendicular to intercondylar line

Wrist

- Axial: include 3 cm proximal to radiocarpal joint, to 1 cm distal to carpometacarpal joints

- Coronal: oriented between radial and ulnar styloid processes

- Sagittal: perpendicular to coronals

Hip

- Axial: from anterior inferior iliac spine to lesser trochanter

- Coronal whole pelvis: from sacroiliac joints to symphysis pubis

- Coronal hip: from anterior to posterior acetabular columns

- Sagittal: from medial acetabular wall to greater trochanter

Knee

- Axial: include patella and fibular head

- Coronal: from patella to 2cm posterior to femoral condyles

- Sagittal: include collateral ligaments

- Axial: parallel to knee joint line

- Coronal: parallel to posterior aspects of femoral condyles

- Sagittal: parallel to medial aspect of lateral condyle

Ankle

- Axial: perpendicular to tibia

- Coronal: parallel to intermalleolar axis

- Sagittal: perpendicular to intermalleolar axis

**Target:**

100% readable image series with no or mild movement’s artefacts

100% adequate coverage

100% correct imaging planes

## Assess local practice

**Indicators:**

Percentage of examinations with adequate coverage

Percentage of examinations with adequate imaging planes

Percentage of examinations with readable image series with no or mild movement’s artefacts

**Data items to be collected:**

1. List of patients referred for large joint MRI

2. Date of MRI scan

3. For each MRI, document whether:

* Coverage adequate
* Imaging planes correct
* Image series readable, with no or mild movement’s artefacts. (Auditors should be able to decide If All series of a scan are readable, within the expertise of a general radiologist. For example, they are able to appropriately comment on, within the limits of a routine MR scan, on: shoulder glenoid labrum, rotator cuff tendons; elbow collateral ligaments and common tendons; wrist triangular fibrocartilage, tendons and median nerve; hip labrum, ligamentum teres, capsular ligaments and adjacent tendons; knee cruciate ligaments and menisci; and ankle collateral ligaments and the adjacent tendons).

**Suggested number:**

60 consecutive MRI examinations during the past 6 months (if comparing results over two or more sites, data should be collected during the same time period).

**Suggestions for change if target not met:**

1. Present findings at departmental meeting

2. Arrange MR radiographers’ education session

3. Consider reauditing

**Resources:**

- Data can be collected and analysed using an Excel sheet

- PACS and CRIS record access

- 10 hours for data collection and analysis

**References:**

* 1. European Society of Skeletal Radiology Sports Sub-committee. Guidelines for MR Imaging of Sports Injuries, 2016. <https://www.essr.org/subcommittees/sports/>
  2. ACR–SPR–SSR Practice Parameter for the Performance and Interpretation of Magnetic Resonance Imaging (MRI) of the Shoulder, 2020. <https://www.acr.org/-/media/ACR/Files/Practice-Parameters/MR-Shoulder.pdf>
  3. ACR–SPR–SSR Practice Parameter for the Performance and Interpretation of Magnetic Resonance Imaging (MRI) of the Elbow, 2021. <https://www.acr.org/-/media/ACR/Files/Practice-Parameters/mr-elbow.pdf>
  4. ACR–SPR–SSR Practice Parameter for the Performance and Interpretation of Magnetic Resonance Imaging (MRI) of the Wrist, 2017. <https://www.acr.org/-/media/ACR/Files/Practice-Parameters/MR-Wrist.pdf>
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  6. ACR–SPR–SSR Practice Parameter for the Performance and Interpretation of Magnetic Resonance Imaging (MRI) of the Knee, 2020. <https://www.acr.org/-/media/ACR/Files/Practice-Parameters/MR-Knee.pdf>
  7. ACR–SPR–SSR Practice Parameter for the Performance and Interpretation of Magnetic Resonance Imaging (MRI) of the Ankle and Hind Foot, 2021. <https://www.acr.org/-/media/ACR/Files/Practice-Parameters/MR-AnkleHindFoot.pdf>

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**Published Date:**

Friday 21 January 2022

**Last Reviewed:**

Friday 17 December 2021