

Guidelines for basic MRI of suspected bone and soft tissue tumours

The Scandinavian Sarcoma Group 2012

It is recommended that imaging of suspected tumours should be done on a high-field system (minimum 1.0 Tesla).

The following sequences are recommended as a *minimum*. Additional sequences should be done according to local preferences.

1. Coronal STIR sequence with large FOV, in bone tumours preferably covering two joints.
2. Axial spin echo T1-weighted sequence (without fat saturation).
3. Axial fast/turbo spin echo T2-weighted sequence (without fat saturation) with identical slice thickness and coverage as for the T1-weighted sequence.

If a tumour is discovered, the above protocol is in many cases sufficient for evaluation, and further imaging is not necessary. The STIR sequence is used for detection of high signaling changes such as tumours, inflammation and hemorrhage. The T1-weighted sequence is invaluable for characterization of lipomatous lesions. The T2-weighted sequence is used in conjunction with the T1-weighted sequence for tumour characterization, and to evaluate fascia planes important for surgery.

The following tumours should be referred to an Orthopaedic Tumour Center:

1. All deep-seated tumours (situated beneath the muscle fascia).
2. All subcutaneous tumours larger than 5 cm.
3. All suspected malignant bone and soft tissue tumours, irrespective of size.

Further imaging with intravenous Gadolinium contrast medium is of value in cases of:

1. Uncertainty if a lesion is myxomatous or purely cystic.
2. Hemorrhage where an underlying soft tissue tumour may be suspected.
3. Equivocal findings.

Myxomatous tumours are often misinterpreted as benign findings due to their similarity to cysts. Intravenous Gadolinium contrast medium helps clarify this issue. Malignant soft tissue tumours are often the reason for hemorrhage in unusual locations and may be difficult to identify even with Gadolinium contrast medium.

The imaging protocol should in these cases consist of as a *minimum*:

1. Axial spin echo T1-weighted sequence, with identical imaging parameters as a pre-contrast sequence. If fat saturation is used, a pre-contrast fat saturated sequence is thus needed.
2. If needed for further anatomic evaluation, a sagittal spin echo T1-weighted sequence with fat saturation may be performed.

It is recommended to abstain from further imaging with Gadolinium contrast medium in cases of:

1. Purely lipomatous tumours – low signal on STIR sequence, high signal on T1-weighted sequence without fat saturation.
2. No tumour identified on the initial three scan sequences.