Simple roentgenology of the appendicular skeleton was the very beginning of the development of medical imaging and plain radiography of joints is still important in many circumstances. The development of newer modalities, particularly ultrasound and MRI, has radically changed the investigation and management of many clinical problems in the non-axial skeletal system and medical imaging is more commonly used to help assess musculoskeletal problems. Tendons, ligaments, articular and fibrocartilage are all prone to deteriorate with normal (and sometimes extraordinary) use. The relevance of the pathoanatomical changes which can now be demonstrated by sophisticated imaging requires careful clinical assessment.

In all circumstances addressing and answering the clinical question is a major focus.

The choice of one modality or the other is often related to local resources and past experience and training. However there are some strengths and weaknesses inherent in both US and MRI.

Ultrasound, a deceptively simple technique has great advantages for superficial structures with excellent spatial and contrast resolution. This is particularly the case with tendons, ligaments and peripheral nerves. The technique is adaptable and it is often easy to compare with the corresponding opposite side structure. Because of the real-time nature of this technique it is dynamic allowing assessment of many physiological actions while imaging key structures, as well as facilitating many percutaneous procedures. The targeted, focused approach can also be the problem with a “keyhole” view which is difficult to independently assess or orient and leads to a greater dependency on the operator. On occasion there are significant technical limitations and artifacts to be appreciated or worked around. The cost of the equipment is significantly less than for MR. Personnel involved need to be attuned to the problem and pathoanatomy to produce the key images — a similar but less critical situation exists in MR scanning.

Magnetic Resonance imaging continues to develop and approach volume acquisition techniques similar to CT scanning. The larger field of view and demonstration of a range structures with good contrast in the appendicular musculoskeletal system allows a perspective which is easier to orient. Spatial resolution is excellent and less affected by depth of the tissues. Retrospective review of a well-performed and documented MR study is feasible and often performed. The technique is based on complex physics and subject to many artifacts, including post-operative metal artifact – which cannot always be overcome. The problems inherent in using a strong magnetic field and the relatively confined space of the MR scanner bore may interfere with or preclude imaging. The average study is longer than an Ultrasound study.

These issues will be discussed with illustrative examples from a range of appendicular joints and related structures.
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