

Imaging and Painful Joints: Which Technology is Most Appropriate?

Although conventional radiology is often used as the first-line imaging modality in the evaluation of the painful joint, other technologies such as ultrasonography, computed tomography (CT) and magnetic resonance imaging (MRI) may provide more useful information for the clinician in certain settings. It is of course important to note that the relationship between pain and imaging-detected structural pathology is not always well understood.

The hand is a common site of musculoskeletal pain. The relatively wide acoustic windows available for finger joints and tendons make it particularly appropriate for ultrasound examination, since they permit careful depiction of critical details for rheumatologic investigation. In early inflammatory arthritis, ultrasonography has been shown to be a sensitive tool for detecting synovitis and bone erosions in small joints and sub-clinical synovitis in patients with chronic rheumatoid arthritis. It is also useful in identifying the underlying pathology responsible for clinical scenarios such as “sausage digit” and carpal tunnel syndrome. Until recently, one of the major concerns in the use of ultrasonography was reader skill in correct placement of the probe. However the advent of three-dimensional (3D) ultrasound technology allows independent readers to view images identical to that which is seen by the person performing the examination, thus minimizing the potential for discordance in image interpretation.

Although radiology is the first-line imaging technology for detecting bone trauma and characterizing arthritis of the knee joint, X-rays don't show joint space narrowing, synovitis, or intraosseous inflammation, nor are they able to distinguish between effusion and synovitis. CT is useful for discriminating bone detail. Combined with arthrography, it can detect meniscal injury or display the surface detail of articular cartilage. MRI can detect intra-articular injury, including osteochondral, bone or ligament injury. Ultrasonography of the knee can show bursae, meniscal tears and cysts, and synovitis.

A variety of degenerative shoulder disorders – including osteoarthritis of the humeroscapular and acromioclavicular joints, tendon lesions of the rotator cuff, bursitis, and frozen shoulder are seen by rheumatologists. However, newer techniques including arthrosonography, CT, and MRI may also have a place in diagnosis. Ultrasonography and MRI have the advantage of demonstrating soft tissue abnormalities and are therefore often superior to conventional shoulder radiographs.

To some extent, all of these technologies have a role in assessing patients with joint pain. Successful imaging relies on clinicians understanding the strengths and weaknesses of each option.

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