Psoriatic arthritis (PsA) has historically been considered a milder rheumatic disease not yielding significant clinical damage. However, recent studies have shown that PsA can be deforming and debilitating and that joint damage can be severe. In a study of 220 patients with PsA, Gladman et al. found deformity, radiological damage, or both, in more than five joints in about 16% of the patients. Approximately 67% of the patients had erosive joint disease. Although there may be clinical improvement after treatment with anti-inflammatory agents, there is progressive joint damage as measured by radiographic changes. As discussed in the article on treatment of PsA with biological response modifiers elsewhere in this supplement, it is now known that anti-TNF therapy can substantially inhibit joint destruction as measured radiographically. Thus, it is important to be able to assess joint damage accurately by radiographic and other imaging techniques in order to intervene with appropriate therapy. Further, a need for reliable imaging approaches arises when trying to establish a diagnosis of PsA, in order to distinguish it from other arthritides, as well as to help establish extent of disease. The radiographic features of PsA and role of imaging modalities other than x-ray are reviewed here. Specific methods for radiographic assessment of joints, particularly in the context of clinical trials, are reviewed in this supplement by van der Heijde et al. The reader is also referred to other recent reviews of imaging in rheumatic disease and spondyloarthropathy.

**Radiographic Features of PsA**

Characteristic radiographic features of PsA include joint erosions, joint space narrowing, bony proliferation including periarticular and shaft periostitis, osteolysis including "pencil in cup" deformity and acro-osteolysis, ankylosis, spur formation, and spondylitis. Imaging modalities, including ultrasound, bone scanning, and magnetic resonance imaging may help in both diagnosis and follow up of patients with PsA. These new imaging techniques will with validation help detect early changes in the peripheral joints, the periarticular tissues, and the spinal structures in patients with PsA.

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**Ultrasoundography**

Musculoskeletal ultrasound has been used for several years to assess joint pathology and may have utility in assessing disease activity in patients with inflammatory joint disease including PsA. The use of high frequency transducers (10 MHz or more) provides excellent tissue resolution. Ultrasound can be used to assess synovial tissue, joint effusions, erosions, and in conjunction with Doppler interrogation, a qualitative measure of hyperaemia, which may be

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**Abbreviations:** PsA, psoriatic arthritis; RA, rheumatoid arthritis
an indirect sign of inflammation. Doppler may also be an important tool in assessing tenosynovitis and more specific features of PsA such as enthesitis. Enthesitis at Achilles' tendon is identified by ultrasonography in a much higher frequency than on clinical examination in patients with psoriasis and PsA. However, the sonographic findings are non-specific, as they may occur in patients with osteoarthritis and RA as well as in patients with PsA. It will therefore be important to correlate these qualitative features with histopathology. Ultrasonography may be a useful tool in the assessment of dactylitis.

SCINTIGRAPHY
Bone scintigraphy has been used widely in the past, but is now being supplanted with ultrasound and magnetic resonance imaging (MRI) techniques. It has been somewhat useful in detecting inflammatory changes, especially in situations where the radiograph is normal. However, it lacks specificity. Occasionally sacroilitis and enthesal inflammation can be identified with scintigraphy.

COMPUTED TOMOGRAPHY
Computed tomography (CT) may be useful in assessing elements of spine disease, but has little role in assessment of peripheral joints. It has been shown to be similarly accurate in assessment of erosions in sacroiliac joints when compared to MRI but is not as effective in distinguishing synovial inflammation. It also may be used to help guide sacroiliac joint injection.

MRI
Structural damage has been a major outcome measure in patients with RA and PsA and has traditionally been measured using scoring methods applied to plain film radiography. An international Outcome Measures in Rheumatology Clinical Trials (OMERACT) MRI in RA working group has been developing a scoring system to assess synovitis, bone oedema, and erosions in hands and wrists that would satisfy the OMERACT filter. Since patients with PsA share many of the same clinical features as patients with RA, this MRI scoring system might also be a potential outcome measure in patients with PsA. MRI may have the advantage of detecting some of these features earlier than plain radiography. This is important in that response to treatment and disease activity may be measured before structural damage occurs. MRI was recently used to measure synovial vascularity in the RA wrist following initiation of therapy, an approach that is currently being employed in a current PsA trial with antitumour necrosis factor therapy (anti-TNF) therapy (P Mease, personal communication).

In a study of infliximab in PsA, MRI was used to detect changes in inflammatory activity as measured by a significant reduction in gadolinium uptake following treatment. However, similar to ultrasound, since some of these measured features are non-specific, it will be important to obtain histopathological correlation whenever feasible and to enrol patients in longitudinal studies to validate this modality as an outcome measure of disease.

We conclude that, in addition to plain radiographs, these new imaging techniques with validation will help detect early changes in the peripheral joints, the periarticular tissues, and the spinal structures in patients with psoriatic arthritis.

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