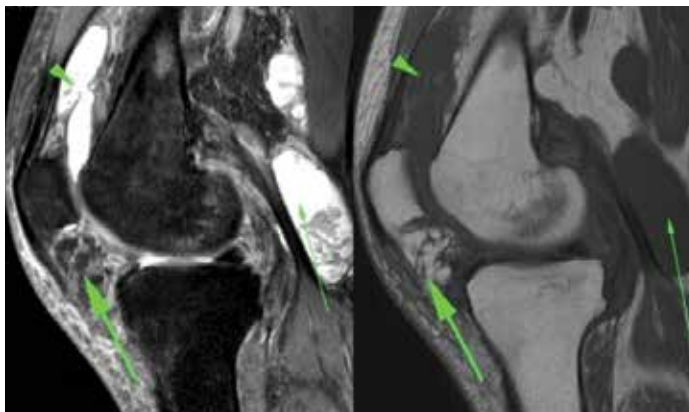


# Heterotopic ossification (myositis ossificans progressiva): A condition interfering with rheumatic disease

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A 47-year-old woman presented with an approximately 1.5-year history of swelling and pain in the hand, elbow, shoulder, knee, and temporomandibular joint; bruising (either spontaneously or following a trauma); and pruritus all over the body. She was diagnosed with rheumatoid arthritis (RA) and was prescribed immunosuppressive drugs. Although the patient regularly took these medications, her joint pain and limited movement increased daily over the course of 1.5 years. Physical examination revealed limited motion, swelling, and tenderness in her wrists, metacarpophalangeal joints, proximal interphalangeal joints, elbows, shoulders, and knees. The patient had subcutaneous nodular lesions and itching on her arms, back, and both hips and ecchymoses on her legs. Her laboratory test results were as follows: hemoglobin, 11.2 (12–15) g/dL; calcium, 10.5 (8.6–10.0) mg/dL; gamma-glutamyl transferase, 126 (5–36) U/L; alkaline phosphatase, 106 (35–104) U/L; erythrocyte sedimentation rate, 18 (0–20) mm/h; and C-reactive protein, <3.3 (0.0–3.5) mg/L, and rheumatoid factor, anti-cyclic citrullinated peptide antibodies, and anti-nuclear antibodies were negative. There were no erosive changes in her hand joints that were suggestive of RA. Knee magnetic resonance imaging (MRI) was performed because of pain, swelling, and flexion contracture in the knee joint; the findings are shown in Figure 1. Full-body scan and regional single-photon emission computed tomography (SPECT)/CT revealed heterogeneous and symmetrical involvement of bony substance in the soft tissue around both hip joints, in the gluteal region, and around both shoulder joints; increased osteoblastic activity that was compatible with degenerative/inflammatory changes in both knee joints, elbows, and ankle joints; involvement of bony substance in the soft tissue around the hip joint and medial border of both the lower and middle sections of the scapula; and concentration of symmetrical involvement of bony substance in the above-described areas that were compatible with heterotopic ossification (Figure 2). On the basis of clinical, radiographic, and SPECT/CT findings, the patient was determined to have heterotopic ossification.

Heterotopic ossification is characterized by new bone formation in the tissue in which ossification should not normally occur (1). In the acute phase, erythema, swelling, and warm are observed, and during the formation process, severe pain can be seen (2). In addition, limited movement and nerve entrapment can result in an impaired quality of life (3). Direct trauma to the muscle tissue and burns, fractures, surgery, and other causes of trauma may cause heterotopic ossification, which is usually classified into the following three groups: neurogenic, traumatic, and myositis ossificans progressiva (MOP) (4). MOP is a rare autosomal dominant disease, and radiological and laboratory findings can be helpful in diagnosis. Following a trauma, a decrease in the calcium level and a subsequent increase in the alkaline phosphatase level can be observed. Direct radiographs and bone scintigraphy are important; however, ultrasonography, CT, and MRI can also be helpful (5). Heterotopic ossification can be treated by protecting the affected joint's range of motion, administering medical treatment such as non-steroidal anti-inflammatory drugs, performing radio-



**Figure 1. a, b.** Sagittal T2-weighted fat-suppressed (a) and T1-weighted (b) MRI showing a signal similar to that of the bone marrow in the region of the patellar apex corresponding to heterotopic ossification (*thick arrow*), supra-patellar bursal fluid (*arrowhead*), and a popliteal cyst (*thin arrow*).



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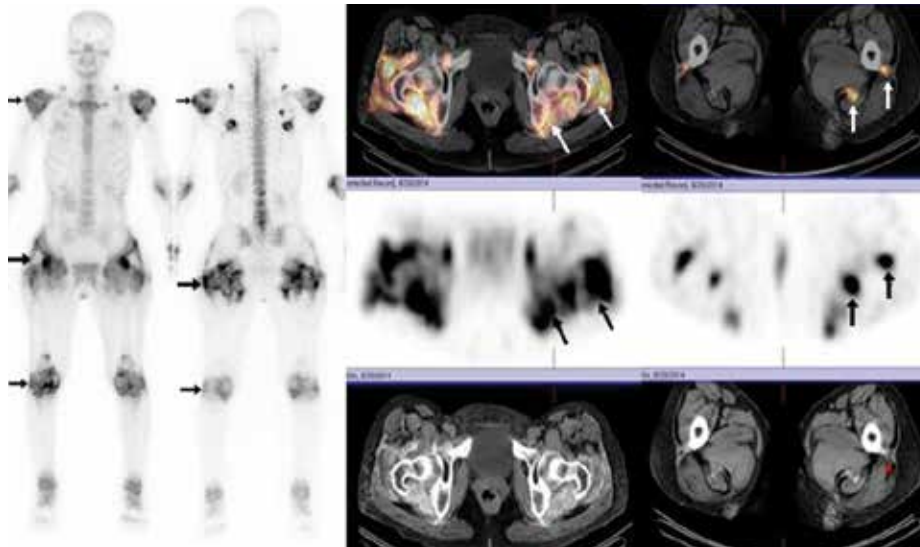
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**Figure 2. a-d.** Anterior (a) and posterior (b) full-body scans show heterogeneous accumulation of  $^{99m}\text{Tc}$ -MDP in periarticular muscles of joints. In the axial SPECT/CT images, symmetrical accumulation of  $^{99m}\text{Tc}$ -MDP around the hip joints (c) and semitendinosus muscle at the proximal part of the femur (d) is observed.

therapy, and performing surgery of the mature bone tissue in joints with a limited range of motion.

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