

# A STRESS FRACTURE OF THE SCAPULAR BODY IN A CHILD

Robert A. Hart, M.D.  
Vickie Diamandakis, M.D.†  
Georges El-Khoury, M.D.§  
Joseph A. Buckwalter, M.D.

While any bone is subject to stress fractures, locations in the lower extremity are typical. The calcaneal body, metatarsal shafts, femoral shaft or neck, and tibial or fibular shaft are common locations in military recruits, long distance runners, and ballet dancers<sup>7</sup>. Stress fractures of the upper extremity are far less frequent. Different patterns occur in children due to the softness of the immature skeleton. Again, fractures of the lower extremity predominate, with fractures of the proximal third of the tibia and distal half of the fibula most common, although isolated cases involving the femoral shaft and neck are reported<sup>3, 5, 6, 8, 15</sup>. Only a few cases of stress fractures involving the scapula exist in the literature, none of which involve a child<sup>1, 2, 4, 13</sup>.

Differentiation between healing stress fractures, myositis ossificans and bone tumors is difficult on isolated radiographs. Unfortunately, histologic specimens of a healing stress fracture can also be misinterpreted as a bone forming tumor, and therefore biopsies are best delayed until the possibility of a stress fracture can be clinically excluded. In fact, a case of misdiagnosis of osteosarcoma based on a biopsy of a stress fracture of a rib (honeymoon fracture) was reported<sup>9</sup>. When stress fractures occur in unusual locations, concern regarding the nature of the lesion is greater. In this report, we discuss a case of a stress fracture of the body of the scapula in a child.

## CASE REPORT

D.W., a healthy seven year old boy, presented to his pediatrician with a one week history of pain and swelling over the body of the left scapula with pain on range of motion of the left shoulder. The boy had a history of a minor fall on his shoulder while playing approximately a week prior to the onset of the pain. He had no history of repetitive use of the left upper extremity. He had no systemic symptoms or other relevant medical problems.

Radiographs on initial presentation showed a lytic region extending from the lateral border across the body of the scapula with surrounding sclerosis and profuse periosteal reaction (Figure 1). A CT scan was obtained due to concern that this might represent a tumor. This showed a linear lucency with surrounding sclerosis, and was inter-

preted as a stress fracture although bone forming tumors could not be ruled out. (Figure 2)

It was elected to follow the lesion over two weeks to confirm the diagnosis of stress fracture. The boy was instructed to rest the upper extremity in the interim. On his return in two weeks, repeat radiographs showed clear evidence of callus formation and fracture consolidation. (Figure 3) Repeated radiographic exams showed continued resolution of the fracture. Three months following initial presentation radiographs showed complete healing and remodeling. (Figure 4) No further problems developed.

## DISCUSSION

Stress or fatigue fractures occur when bone is subjected to repeated loading at a frequency exceeding the ability of the bone to repair itself. Although these fractures can progress to complete fractures with displacement through the fracture site, patients usually present prior to this with complaints of pain without any obvious trauma. In some patients, the source of the repetitive loading is clear, although this is not always the case. Plain films are negative early in the course of healing with a linear sclerosis appearing in stress fractures of cancellous bone during repair. In diaphyseal bone, the fracture appears as a linear cortical lucency with surrounding periosteal reaction. Bone scans or CT provide a more sensitive means of making the diagnosis when plain films fail to show the lesion<sup>10</sup>.

Stress fractures of the upper extremity are much less frequent than those of the lower extremity. There are only a few prior reports of stress fractures involving the scapula. Boyer described a fracture of the coracoid process following repeated loading due to trapshooting<sup>1</sup>. Dennis et al. discussed three cases of stress fractures of the acromion process following superior migration of the humeral head due to large rotator cuff tears<sup>4</sup>. Veluvolu et al. described a case of an avulsion fracture of the supraspinatus due to repeated jogging while holding weights in the hands<sup>13</sup>. Brower et al. discussed a case of an assembly line worker with an avulsion of the teres minor due to repetitive use of the arm in an overhead position at work<sup>2</sup>.

Stress fractures in children can be difficult to diagnose on initial appearance. A detailed history of what activities elicit the pain may be lacking. Children show a much more

Correspondence to: Robert A. Hart, M.D., Departments of Orthopaedic Surgery, §Radiology, and †Pediatrics, University of Iowa Hospitals and Clinics, Iowa City, Iowa 52242-1009

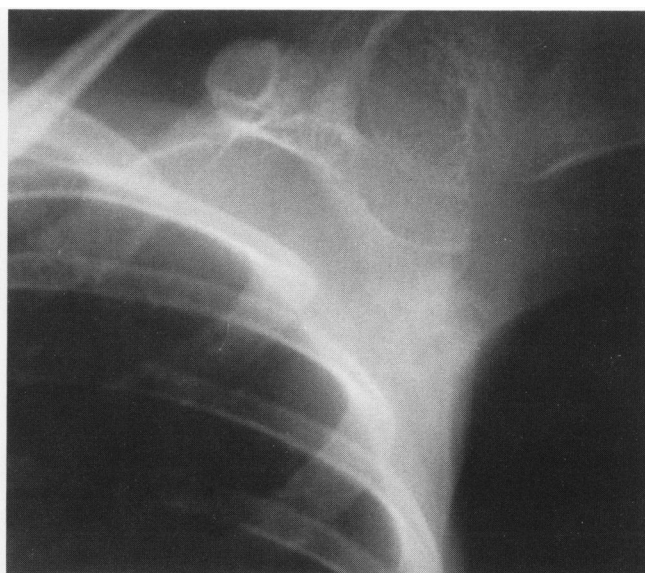
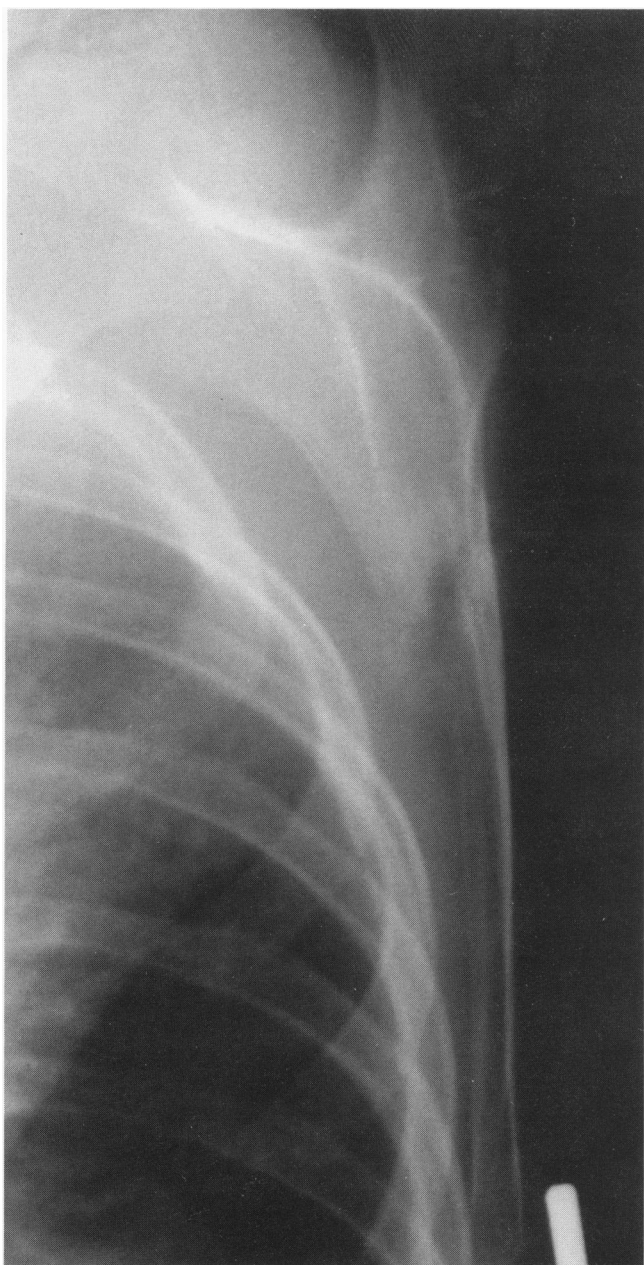


Figure 1a,b. Radiographs made two weeks after the onset of pain in the left shoulder of a seven year old boy. Abundant periosteal reaction around a central lytic region is apparent.

abundant periosteal reaction than adults, and the radiographic appearance may suggest Ewing's or osteogenic sarcoma, osteoid osteoma or osteomyelitis. The concern over the possibility of tumor or infection when these lesions occur in children has been discussed<sup>5, 6, 7, 14</sup>. Proceeding with a biopsy based on the initial appearance of the lesion may subject the child to an unnecessary surgical procedure and slow resolution of the fracture. Delaying treatment by several weeks in order to observe the course of the lesion is warranted when the diagnosis is uncertain.

The case presented describes a young child with persistent pain in the scapular region. Although he reported a

fall to this region prior to the onset of pain, it was of insufficient energy to cause an acute fracture of the scapular body, which usually is associated with high energy injuries<sup>10,11,12</sup>. In addition, the presence of periosteal reaction on radiographs one week following the fall indicates a process which must have predated the described fall. Given the clinical history and radiographic behavior of the lesion, it must be considered a stress fracture. This case illustrates the need to consider this diagnosis even when such lesions appear in unlikely locations.

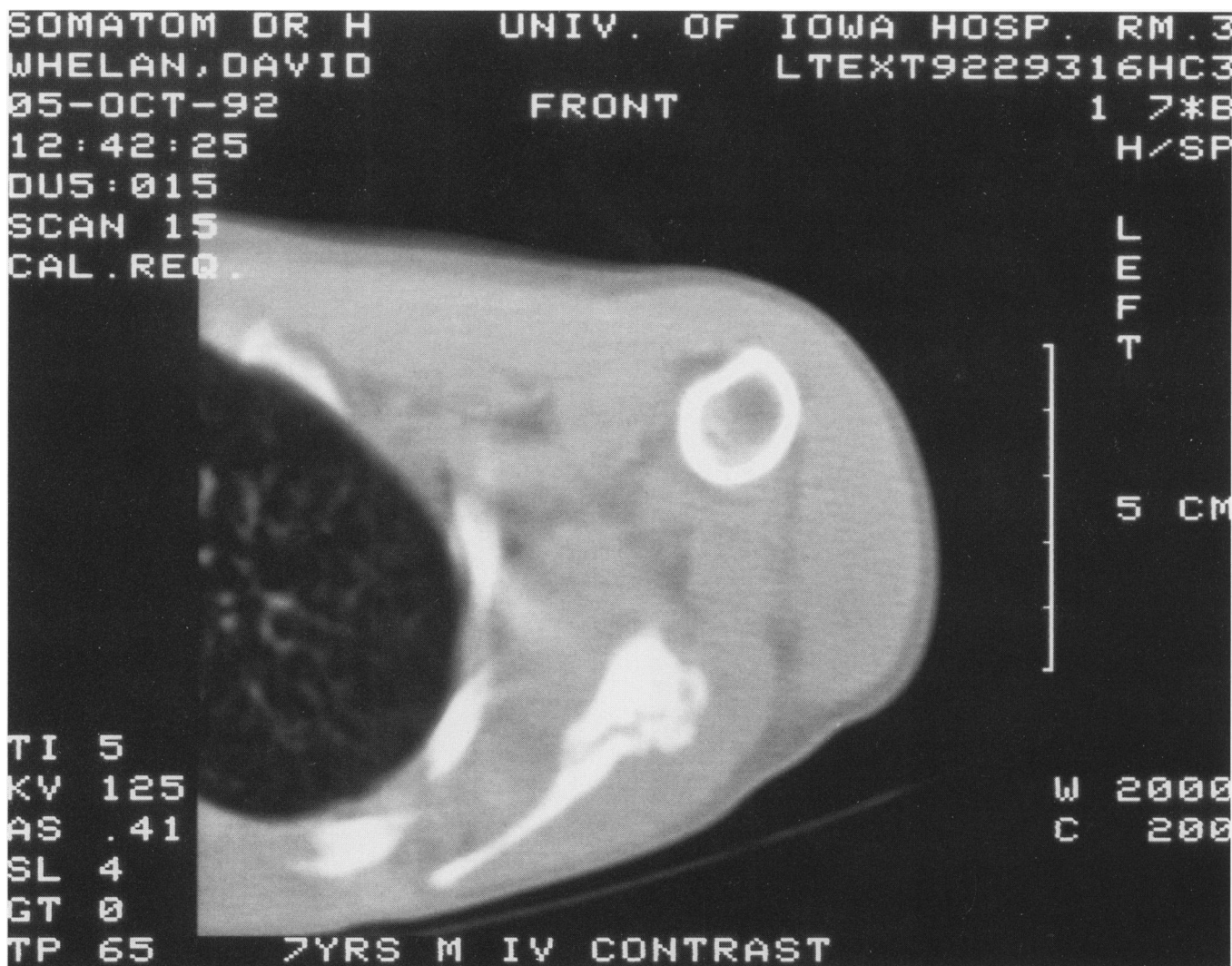
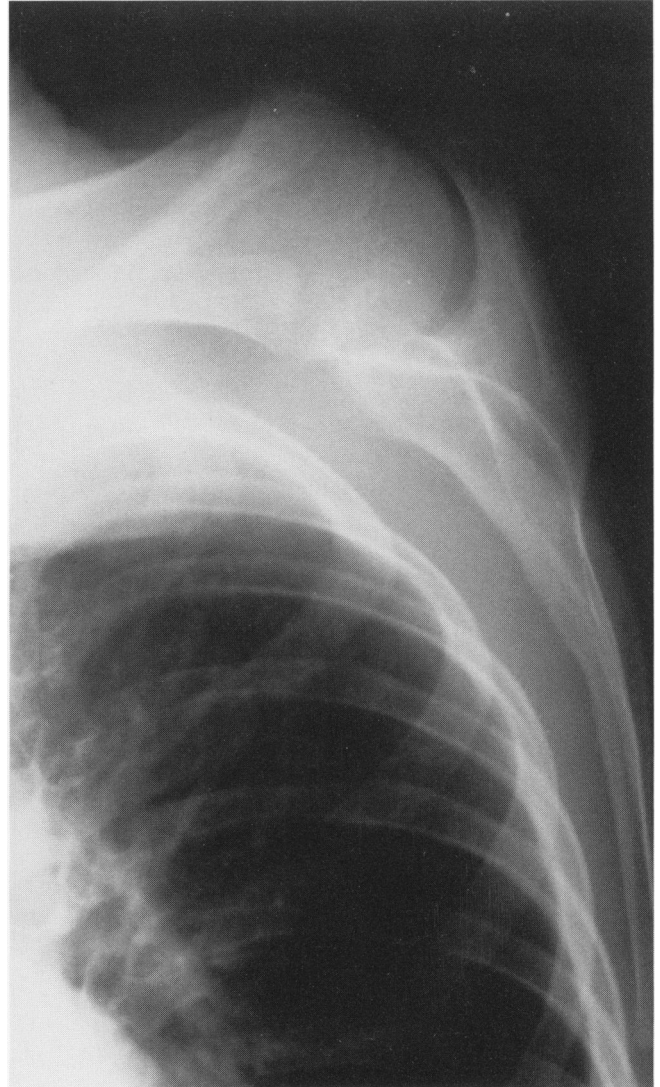


Figure 2. CT appearance of the lesion at two weeks. A linear lucency suggestive of stress fracture is apparent.



**Figure 3.** At four weeks, further consolidation of the fracture callus is apparent.



**Figure 4.** By three months, complete resolution and remodeling of the fracture had occurred.

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