

skin lesions were found during the follow-up period of 28 years. This conflicts with the diagnosis of SAPHO syndrome, although in rare instances the skin manifestations may be delayed more than 20 years after the appearance of bone lesions (Kahn et al. 1991).

Our patient showed progressive ossification around the lateral end of the clavicle years after the spinal and sternoclavicular changes seemed complete. SCCH can occur with AS (Jurik 1992), and the acromioclavicular joint fusion (Emery et al. 1991) or the coracoclavicular ligament ossification (Pritchett 1983) individually may develop in AS. However, to our knowledge, ossification of all the ligamentous connections of the clavicle has not been described. We believe that, in AS, progressive ossification of the peripheral joints and ligaments may occur, even after the hyperostosis of the axial skeleton has seemingly been completed. This, in turn, indicates that a long-term follow-up is required to diagnose the final extent of ossification and to discuss the similarity or dissimilarity of hyperostotic syndromes. In addition, our case indicates that AS may cause painless restriction of shoulder joint mobility due to loss of scapulothoracic motion, not due to the glenohumeral involvement.

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## Spontaneous osteonecrosis of the capitate—a case report

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Submitted 97-06-20. Accepted 98-03-08

A 26-year-old man presented with a long history of pain in his left wrist. He had no trauma and no symptoms suggestive of systemic arthropathy. There was a history of primary hypothyroidism and possible coeliac disease. He had a short stature and small hands, a markedly reduced range of movement in all directions at his wrist, and he was tender over the dorsum of the wrist.

Radiographs revealed a fragmented and sclerosed capitate and a diagnosis of spontaneous osteonecrosis of the capitate was made (Figure).

At operation, the capitate was soft and the joint sur-

face was abnormally pink. The capitate was subtotally excised, leaving the distal one third, and the space was filled with an iliac cortico-cancellous graft. The surrounding joint surfaces were denuded of articular cartilage and the carpal mass was fixed with staples. Histological analysis showed necrotic bone, but no vasculitis.

4 months postoperatively, he was almost pain-free and the range of wrist movement was from 10 degrees of extension to 40 degrees of palmar flexion. Radiographs showed progressive union of the carpal fusion.



A fragmented and sclerosed capitate.

## Discussion

Avascular necrosis of the capitate is a rare condition. An association has been postulated with repeated minor or a single episode of major trauma (Rahme 1983). It has also been reported in association with exposure to vibration (James and Burke 1984) and in association with dorsal instability of the carpus (Newman and Watt 1980). Bolton-Maggs et al. (1984) reported a case of bilateral avascular necrosis of the capitate and concluded that the condition was rare because an anomalous blood supply and carpal instability were required for this condition to develop.

Milliez et al. (1991) has reviewed the 19 published case reports of avascular necrosis of the capitate since its initial description by Jonsson (1942), and devised a classification system based on the site of osteonecrosis: type I with cephalic involvement, type II with involvement of the body and type III with total involvement. Our case would be a type I both radiographically and histologically, thus being the fourth, and only the second with no history of trauma.

Vander Grend et al. (1991) has described three different internal vascular patterns of the capitate, which are in keeping with the three types of osteonecrosis described by Milliez et al. The external vascular anatomy of the capitate puts it at risk of avascular necrosis, as described by Gelberman et al. (1983), since large areas are supplied by a single nutrient vessel. In two thirds of the specimens examined, the head and neck were supplied by dorsal nutrient vessels, the other 33% by palmar nutrient vessels. In only one third of cases, was there evidence of intraosseous anastomosis.

We believe that avascular necrosis of the capitate is an important, although rare, cause of spontaneous onset of wrist pain.

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# Lengthening of an above-knee amputation stump with the Ilizarov technique—a case report

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Submitted 97-06-14. Accepted 98-01-30

A 25-year-old man sustained an open comminuted fracture of the femoral diaphysis with neuro-vascular damage in a road traffic accident. Limb salvage was attempted, but severe infection developed and after 18 months of unsuccessful treatment an above-

knee (AK) amputation was performed. The resultant stump became infected. He eventually healed with a short stump. After several failed trials, the patient refused to use a prosthesis.

The stump measured 22 cm from the tip of the