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TWO PECULIAR CASES OF BONE DEFORMITY AFTER OSTEOSYNTHESIS

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Thanks to experience accumulated from innumerable operations with fixation of pins, plates and other appliances to living bone during the past 50 years (Venable & Stuck 1947, Leventhal 1951, Scales et al. 1959, Hicks et al. 1958, Laing et al. 1959, Emnéus et al. 1960, 1965, Müller et al. 1963), it is now possible to assess the effect of metal implants in the human body with reasonably good accuracy.

The human skeleton will accept almost any inert metal implant when used to stabilise bone temporarily, provided that there is no movement between the bone and the implant. Modern arthroplastic materials are accepted less well, though better than was anticipated 15 years ago.

This paper describes two almost identical cases with remarkable transformation of bone due to an implant.

CASE HISTORIES

Case 1: In December 1956 a 51-year-old woman sustained a fracture of the right humerus. An osteosynthesis ad modum Küntscher was performed, but January 1957 she fell again and the Küntscher nail was bent. The fracture was reduced and the nail was straightened. In July 1957 a pseudarthrosis was evident. A new Küntscher nail was inserted and bone grafting performed. External fixation was not employed.

The pseudarthrosis persisted, however, and in January 1959 the woman refused further treatment. She did light work at home until 1967, when she observed a large swelling of the distal part of the right upper arm. In February 1968 she sought advice at the Orthopaedic Department, Uddevalla, where examination showed an almost rigid elbow and a pseudarthrosis allowing almost 90° of movement. Distal to the pseudarthrosis X-rays revealed a transformation of the humerus to a cyst as big as an orange (Figure 1). In May 1968 she consented to

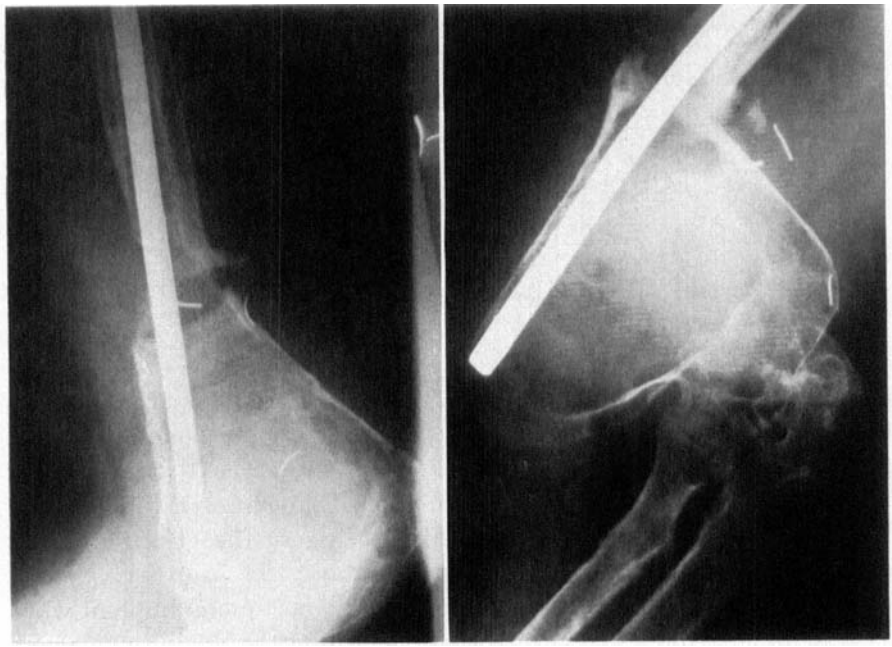

Figure 1. The appearance of the cystic deformed distal fragment 1967 ten years after the nailing.

extraction of the nail but refused further operations, as she had become accustomed to her unusual disability. We also thought it unlikely that the humerus could be stabilised satisfactorily. Biopsy of the pseudocyst had shown no evidence of malignant change. She was reluctant to return for review but finally agreed to an X-ray in 1971, by which time a considerable reduction in the size of the cyst had occurred (Figure 2).

Case 2: In June 1959 a 63-year-old woman sustained comminuted fractures of the right humerus and left femur. Open reduction of the fractures was carried out with osteosynthesis ad modum Küntscher of the humerus and fixation of the femur with plate and screws. By December 1959 it was clear that neither of the bones had united, and a new Küntscher nail was inserted into the humerus and the plate and screws were removed from the femur and replaced by a Rush pin. In March 1962 there was obvious pseudarthrosis of both humerus and femur. On the humerus a new Küntscher nailing and bone grafting was

Figure 2. Same patient three years after extraction of the nail.

Figure 3. The appearance of the pseudarthrosis 1963, three years after the fracture and one year after the last nailing.

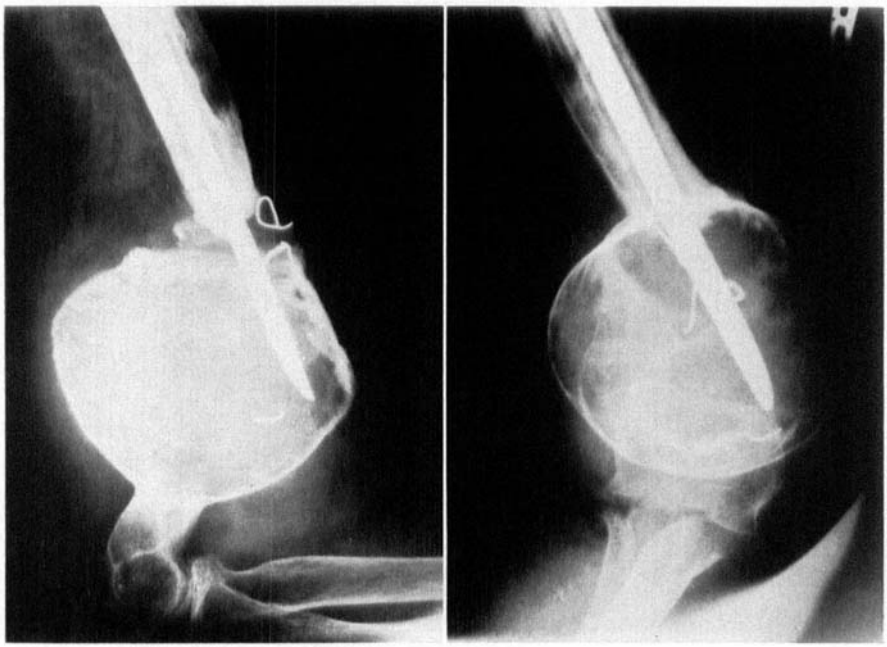

Figure 4. The cystic deformation of the distal fragment nine years after nailing.

done (Figure 3). A thoraco-brachial plaster was applied for two months. Unfortunately the fractures did not heal, and in 1963 the patient declined further treatment. She walked with two crutches.

In March 1971 she came to our department because of a tumor in the distal right humerus (Figure 4), and the femoral pseudarthrosis was so disabling that she could no longer walk. In September 1971 the femoral fracture was treated with compression osteosynthesis and is now healed. Concerning humerus, the only surgical procedure has been removal of the Küntscher nail (Figure 5).

In both these cases humeral mal-union was followed by the development of a grotesque cystic pseudarthrosis, allowing 90° of movement together with an almost complete fibrous ankylosis of the elbow. It is obvious that the pseudocyst formation was initiated by movement of the distal part of the Küntscher nail.

We have never seen anything like this before, nor have we been able to trace any publication of animal experiments in which attempts have been made to transform tubular bone to cystic bone of neoplastic type.

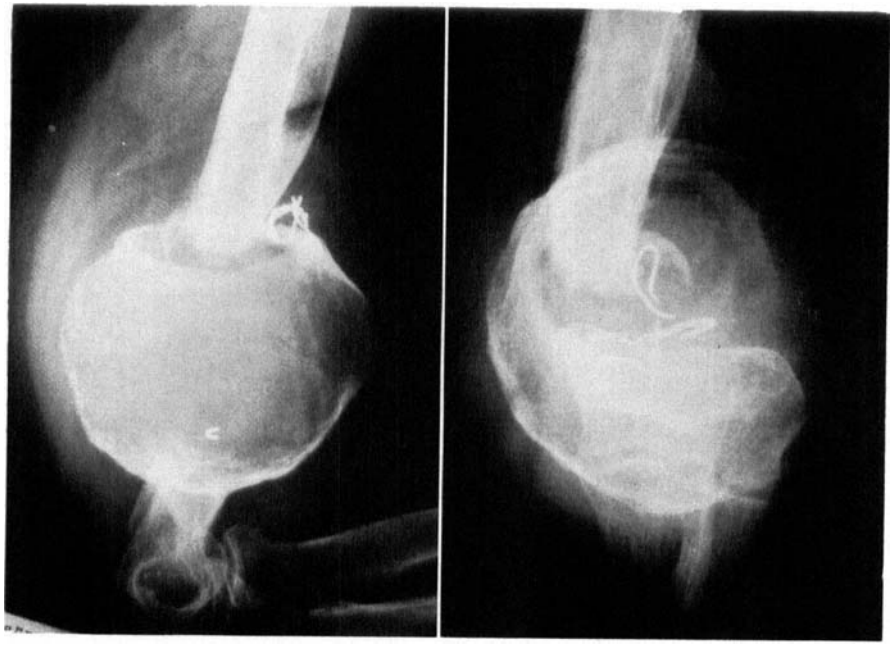

Figure 5. Same patient six months after extraction of the nail. Even here there seems to be a tendency for the cyst to decrease in size.

It appears that the spherical cyst will diminish after the nails have been extracted (Figure 2). According to Emnéus-Stenram (1965) only two cases of malignant transformation of human bone due to an implant have been published (Schinz 1952, McDougall 1956). We present these cases as examples of the tolerance of human bone to chemical and, above all, mechanical irritation by a foreign body.

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