REGENERATION OF BONE AFTER LOSS OF THE DISTAL HALF OF THE HUMERUS

CASE REPORT WITH A 20-YEAR FOLLOW-UP

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A 16-year-old boy was involved in an agricultural accident in which he sustained a large wound to the right arm and forearm. Radiological examination showed loss of the distal half of the humerus. A posterior splint was applied and after two months there was regeneration of the distal humerus including the articular portion. He was able to use his arm at five months. Twenty years later, he had a painless elbow and a 70° range of movement.

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Open fractures with loss of a large segment of bone usually require complex reconstructive procedures. We describe such a case which was treated only by a posterior splint for two months. When seen 20 years later there was regeneration of bone, including the joint surface, and excellent function.

CASE REPORT

In 1976 a 16-year-old boy was admitted with an open wound in his right arm as a result of an agricultural accident in which the arm had been rolled into a heavy machine. The wound extended from 10 cm above the elbow to about 15 cm into the forearm. Radiography revealed loss of the distal half of the humerus. After debridement and irrigation of the wound a posterior splint was applied. All the local nerves and vessels were intact and almost all of the peri-

osteum of the distal half of the humerus was in place. Later, the avulsed portion of the bone was recovered (Fig. 1).

The wound healed in two months, and regeneration of the missing segment, including the articular portion, was seen (Fig. 2). After five months (Fig. 3), the patient was able to use his arm without pain and had 70° of movement at the elbow.

In 1996 when he was reviewed, he was working as a waiter. There had been no change in the range of movement (Figs 4 and 5).

DISCUSSION

In children the capacity of the periosteum to regenerate the diaphysis is well known.^{1,2} With increasing age, the periosteum becomes thinner, less vascular and the ability to form new bone decreases, but the potential to form bone or cartilage remains.¹

A review of the literature produced only one report of regeneration of a large segment of bone, in an eight-year-old girl with loss of the proximal femur.²

Current thought advocates reposition and osteosynthesis of the detached fragment² or reconstruction using an osteoarticular allograft or an implant.^{3,4} Application of a simple splint, however, may give the bone and articular surface a chance to regenerate, and this case emphasises the importance of preservation of the periosteum.

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Fig. 1

The avulsed segment of bone.

Fig. 2

A radiograph two months after injury showing regeneration of the distal humerus.

Fig. 3

Anteroposterior and lateral radiographs five months after injury.

Fig. 4a

Fig. 4b

The appearance (a) and range of movement in the elbow (b) 20 years after injury.

Fig. 5

Anteroposterior and lateral radiographs 20 years after injury.