Type II Fracture of the Capitellum
Operative Treatment of a Rare Injury

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Abstract
Background: Capitellar fractures are rare injuries. There continues to be controversy regarding the management of these injuries.

Case Study: Because of the lack of studies focusing on type II capitellar fractures, we report a case of such an injury, which was treated by open reduction and internal fixation using Kirschner wires and absorbable sutures through drill holes on the lateral surface of the epicondyle. The recommended treatment of displaced type II capitellar fractures appears to be excision, however, this may not always give a satisfactory outcome. Our patient went on to achieve a good functional outcome with no complications.

Conclusion: To our knowledge, this mode of fixation of a displaced type II injury has not been described before.

Key Words
Capitellum · Fracture · Kocher-Lorenz · Internal fixation

Introduction
Isolated fractures of the capitellum are rare injuries, accounting for approximately 1% of elbow fractures [1–5]. The usual mechanism of injury is shearing of the capitellum by the radial head, resulting from a fall on the outstretched hand with the elbow extended. They are usually seen in adolescents (11–17 years), largely because of the cartilaginous composition of the capitellum [3, 4]. In younger children, a similar injury results in a supracondylar or a lateral condylar fracture.

Historically, there has been an eponymous classification of capitellar fractures: Hahn-Steinthal (type I) and Kocher-Lorenz (type II) [2–4, 6, 7]. Type I fractures involve most of the capitellum, with some or no extension into the lateral aspect of the trochlea. These are, by far, the most common. Type II fractures consist mainly of thin articular shell, with minimal subchondral bone; these tend to cause diagnostic difficulties. Type III fractures are now recognized as comminuted fractures [4], whilst the recently described type IV fracture is a coronal shear fracture of the anterior surface of the distal humerus, such that the capitellum and the lateral trochlear ridge separate as one fragment [8].

Various treatment options are used in the management of these difficult injuries, including splintage, closed reduction, open reduction and internal fixation, and excision of the fragment [2–4, 6, 7]. There continues to be controversy regarding the best mode of treatment of these injuries, in particular of the type II fracture. Reviewing the literature, the recommended treatment appears to be splintage if undisplaced, or excision if displaced [2, 6, 9]. We present a case of a displaced type II fracture of the capitellum, treated by open reduction and internal fixation, which, to our knowledge, has not been described before.

Case Study
A 16-year-old male presented with an injury to his right elbow sustained during karate. On examination, he had a painful swollen elbow with restricted movement. Radiographs showed a type II fracture of the capitellum (Figures 1a and 1b), with anterior and proximal displacement of the articular shell. He was admitted for surgery and consented for exploration with possible fixation or excision.

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At surgery, under general anesthesia using a pneumatic tourniquet, a lateral Kocher approach was used to expose the capitellum and radial head. A large fragment consisting mainly of articular cartilage measuring $3 \times 3 \times 0.5$ cm was found displaced anteriorly in the elbow joint. It was deemed that the result of excision would be unsatisfactory due to the relatively large size of the fragment containing articular cartilage (Figure 2). A decision to fix the fracture was therefore made. After irrigation and debridement of the joint, the fracture was fixed with the aid of two posteroanteriorly directed Kirschner wires (K-wires, diameter 2.0 mm) and three absorbable PDS sutures through drill holes on the lateral surface of the epicondyle, under direct vision and image intensifier guidance. An anatomic reduction was achieved at the end of the procedure (Figure 3). The wound was closed in layers after reconstructing the lateral collateral ligament complex. The arm was then placed in an above-elbow posterior plaster, with the elbow in 90° of flexion. Postoperative radiographs were satisfactory (Figures 4a and 4b). The patient made an uneventful recovery and was discharged home the next day.

At follow-up, at 4 weeks, both the plaster and K-wires were removed. At this time, he was pain-free and had an active range of movement at the elbow of 30–60°. Radiographs confirmed the fragment satisfactorily in place. Physiotherapy was commenced.

At further visits, range of movement at the elbow continued to improve to normal, with further radiographs showing satisfactory union of the fracture (Figures 5a and 5b). The latest radiographic evaluation, at 18 months postoperatively, revealed no evidence of osteonecrosis of the capitellum or of posttraumatic osteoarthritis.