Reconstruction of the coronoid for chronic dislocation of the elbow

USE OF A GRAFT FROM THE OLECRANON IN TWO CASES

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From Kansai Rosai Hospital, Hyogo, Japan

Persistent dislocation of the elbow after a fracture of the coronoid process is a difficult problem. We have performed an open reduction with reconstruction of the coronoid by an osteocartilaginous graft from the ipsilateral olecranon for two patients.

Both achieved a painless, stable joint with a functional range of movement. The joint surface of the graft has a similar curve to that of the coronoid giving good congruency and stability. The technique is simple and the graft is obtained through the same incision.

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Persistent dislocation of the elbow associated with a large fracture of the coronoid process is difficult to manage. Cobb and Morrey reported good results with distraction arthroplasty, but this requires special apparatus and careful management.

We have performed open reductions with reconstruction of the coronoid using osteocartilaginous grafts from the ipsilateral olecranon in two patients.

Case reports

Case 1. A 54-year-old man sustained a posterior dislocation of his left elbow with associated fractures of the coronoid process (Regan type 3), the shaft of the ulna and the head of the radius in a traffic accident (Fig. 1a). The initial treatment was reduction, stabilisation by wire fixation of the fracture of the coronoid, plating of the ulnar fracture and excision of the head of the radius. Movement started after three weeks but a radiograph showed posterior subluxation of the elbow (Fig. 1b).

He was referred to us with pain on movement which was restricted to between 35° and 80°. Six months after the first operation, we used an anteromedial approach to remove extensive scar tissue around the joint and to reattach the medial collateral ligament to the medial epicondyle of the humerus. Posterior subluxation recurred two weeks later (Fig. 1c), and was treated by reconstruction of the coronoid process, using part of the olecranon.

Through an anteromedial incision the neurovascular bundle and the flexor and pronator muscles were retracted medially and the biceps tendon laterally. The olecranon was exposed through the same incision, after carefully retracting the ulnar nerve. Part of the proximal part of the olecranon, with its articular cartilage equivalent to the size of the coronoid defect, was excised with a saw. This was fixed to the deficient site with an AO screw so that its articular surface matched the curve of the remaining ulnar surface (Fig. 2). This restored stability and allowed smooth movement at operation. A plaster cast was removed at four weeks for active mobilisation. Union was observed on radiographs at three months.

Five years later, the patient had a range of movement from 25° to 135°. The elbow was stable and painless, with no radiological evidence of osteoarthritic change or absorption of the graft.

Case 2. A 28-year-old man sustained a posterior dislocation of the right elbow with fractures of the shafts of the ulna and radius in a traffic accident (Fig. 3a). The joint was reduced and held with percutaneous pins, the ulnar shaft was stabilised with an intramedullary nail and the radius by external fixation. A fracture of the coronoid process was not recognised. After four weeks, the pins were removed from the elbow and movement started, but there was posterior subluxation of the joint.

The patient was referred to us three months after injury with pain, only 5° of movement, and gross restriction of forearm rotation. Tomograms showed a Regan type-2 fracture of the coronoid with persistent posterior subluxation of the humeroulnar joint (Fig. 3b).

The elbow was explored four months after injury, with reattachment of the medial collateral ligament by suture anchors and reconstruction of the coronoid as described...
Movement started three weeks later. One year later the range of movement was 30° to 120°, with no restriction in everyday activities. Radiographs showed good congruency and no resorption of the graft (Fig. 3c).

Discussion

Fracture of the coronoid process is uncommon, but has been reported in 2% to 10% of patients with dislocation of the elbow. These injuries have been classified by Regan and Morrey, and type 2 or type 3 may result in recurrent dislocation or persistent subluxation if treated inadequately. Persistent instability may require reconstruction and loss of significant portions of the coronoid process may require a bone-block procedure. Allograft or autograft from the iliac crest has been used but cannot provide a congruent surface of articular cartilage.

We used an osteocartilaginous graft from the ipsilateral olecranon to replace the missing joint surface with congruent articular cartilage. This graft can be obtained from the same incision; removal of less than 50% of the olecranon does not usually cause clinical instability.
Cobb and Morrey\textsuperscript{1} have treated such chronic subluxation with a defect of the coronoid process by distraction arthroplasty using external fixation; they reported success in six of seven cases, with an average increase in arc of movement of 56°. The distraction apparatus stabilises the joint during bone and soft-tissue healing, while allowing maintenance of movement, but its use requires special apparatus and careful management. Such a distraction device neutralises the forces acting on the coronoid process and protects it during healing, but we found that our technique gave adequate stability at four weeks with no displacement of the grafted bone. The operation restores a congruent joint surface, maintaining stability and reducing subsequent osteoarthritic changes.

References