Failure of active extension after traumatic cubitus varus

A CASE REPORT

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In children cubitus varus is common after malunion of a supracondylar fracture of the humerus. Later problems such as tardy ulnar nerve palsy, snapping of the lateral triceps tendon or ulnar nerve and posterolateral rotatory instability are well documented. We present a case of anteromedial dislocation of the entire triceps tendon with loss of extensor power and describe the method of treatment.

Supracondylar fractures of the distal humerus account for 3% of fractures in children, and may be associated with acute and long-term problems.

Gartland2 described a three-tier grading system in which the most severely displaced injury, type 3, had the highest incidence of bony and neurovascular complications. The precise cause of the cubitus varus is debatable, but inadequate or loss of reduction is an important factor. Failure to appreciate the degree of comminution of the medial column of the distal humerus and to correct internal rotation results in inequality of growth because of malalignment of the medial cortices. Cubitus varus is commonly only a cosmetic deformity, but it can cause functional problems. We report a case of functional disability which to our knowledge has not been previously described.

Case report

When playing in a jungle gym an eight-year-old boy sustained a closed type-3 supracondylar fracture of his right distal humerus with no neurovascular involvement. He was admitted to the regional hospital and closed reduction and immobilisation in a cast were performed. However, the post-reduction position was unsatisfactory and on the following day the fracture was remanipulated. No internal fixation was used. He was discharged on the second postoperative day with no neurovascular complications.

Six years later at the age of 14 years when planning a career as a carpenter he was referred by his family practitioner for review. He complained that he was unable actively to extend his elbow, once it had been actively flexed beyond 90°. This sudden loss of active extension power was associated with a soft-tissue clicking at the elbow. When this occurred he could only passively extend his elbow using his other hand. As it extended beyond a right angle, a further soft-tissue click was felt, following which he regained full active extension.

Clinical examination revealed a varus deformity at the right elbow of 5° compared with 15° valgus on the left. No loss of passive flexion, extension, pronation or supination was found, and there was no neurological or vascular deficit. Active movement between 90° of flexion and full extension revealed normal MRC grade-5 power in the triceps. At 90° of flexion, the entire bulk of the triceps muscle with its tendon could be felt to dislocate anteriorly with increasing elbow flexion. The triceps at this point was acting as a weak elbow flexor since it now lay anterior to the axis of flexion and extension. As a result the patient had no active extension of the elbow from this position and had to rely on passive extension or gravity to straighten the elbow. Once it extended beyond a right angle, the triceps spontaneously reduced and active extension was again possible (Fig. 1).

Radiographs confirmed malunion of the fracture with a cubitus varus deformity and surgical correction was undertaken.

Operative technique. We performed a lateral closing-wedge supracondylar osteotomy with external rotation and realignment of the triceps tendon as follows. A posterior approach to the distal humerus was made with the patient in...
the left lateral position under general anaesthesia and with a tourniquet. Antibiotic cover was given. The ulnar nerve was identified and transposed anteriorly. The entire triceps tendon dislocated medially when the elbow was placed beyond 90° confirming the clinical diagnosis of dislocation of this tendon. Lateral to the tendon an interval was created to allow access to the posterior aspect of the distal humerus. A lateral 30° closing-wedge osteotomy with 20° of external rotation was performed to correct the cubitus varus and to realign the triceps tendon. The osteotomy was temporarily held with Kirschner wires and tested through a full range of movement to confirm the stability of the realigned triceps. It was then fixed with AO plates. Radiographs confirmed a satisfactory position of the osteotomy and the implants. However, with growth medialisation of the insertion of the triceps on the olecranon had occurred and it was felt necessary to perform a secondary procedure similar to a Roux-Goldthwait patellar stabilisation. The medial half of the insertion of the triceps was therefore detached, reflected anterolaterally and reattached into a more normal position. A medial release of the tendon of triceps combined with lateral reefing was undertaken using interrupted absorbable sutures (Fig. 2). Following this the triceps mechanism could not be dislocated medially. The wound was closed and the arm immobilised in a sling. There were no neurological or vascular complications after operation and the patient went home on the second day.

Full active range of movement was regained over a period of six weeks. Radiographs showed bony union and the elbow regained normal MRC grade-5 active extensor power from full flexion to full extension. The click was abolished. At review at three months the patient had normal function and a full painfree range of active movement.

Discussion

Malunion and particularly cubitus varus is more common in Gartland type-3 supracondylar fractures with comminution.
of the medial column. Rotatory malunion is normally not considered to be a problem since it can be compensated for at the shoulder. However, this case shows that a rotatory element may cause the triceps to dislocate as the direction of force on the olecranon is changed. Only 10% of longitudinal humeral growth occurs at the distal physis. As a result the potential for remodelling is poor particularly in the varus and valgus planes. Damage to the physis may further accentuate malunion. Cubitus varus is often considered to be simply a cosmetic deformity, but complications such as ulnar neuritis or palsy, snapping of the ulnar nerve, postero-lateral rotary instability and snapping of the medial head of the triceps have been reported. The last may be the result not only of cubitus varus, but also of the anatomical variation of an accessory medial head. Many surgical techniques for cosmetic correction have been described, some with significant complications including nerve damage, nonunion, and recurrent deformity. In this instance plate fixation appeared to be the most practical solution.

Reviews of large series of corrective osteotomies suggest that surgery is best left until skeletal maturity, and success is more likely when the deformity is due to supracondylar fracture rather than to physeal injury. Impairment of active extension as seen in this patient has only been described once previously in association with partial subluxation of the tendon of the triceps because of a split in the tendon. This was treated by redirection of the split tendon and osteotomy was not required. Hayashi, Kojima and Kohno described a case of cubital tunnel syndrome eight years after supracondylar fracture in which dislocation of the medial head of the triceps was seen but there was no impairment of active extension. This was treated by medial epicondylectomy and release of the ulnar nerve. We believe our case to be a unique example of a late complication of malunion of a supracondylar fracture, causing dislocation of the entire tendon of the triceps anterior to the axis of flexion/extension with loss of active extension when the elbow was flexed beyond 90°.

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References