DISLOCATION OF THE CARPOMETACARPAL JOINT OF THE THUMB

V. T. CHEN

From the King George Hospital, Ilford, Essex

A case is reported of traumatic dislocation to the carpometacarpal joint of the left thumb, treated by ligament reconstruction.

Carpometacarpal dislocation of the thumb is a rare injury, even when compared to Bennett's fracture-subluxation. There is scant reference in the literature to this injury apart from the reports of single cases and the methods used for stabilization. Slocum (1943), treated his case of traumatic dislocation with an intra-articular palmaris longus graft, which was stable eight months later. Eggers (1945), used a portion of the extensor carpi radialis longus as a tendon transfer through a drill hole near the base of the first metacarpal on the ulnar side, dorsal to the first intermetacarpal ligament, maintaining stability ten months later. Kestler (1946) treated a late case of dislocation with the extensor pollicis brevis tendon re-routed through drill holes in the trapezium and the base of the first metacarpal, but subsequently advised use of the abductor pollicis longus; fourteen months later the patient had no complaints. Cho (1970) treated his case of instability of the carpometacarpal joint of the thumb by translocation of the abductor pollicis longus tendon. They had seven male patients with a past history of trauma: one being a fresh dislocation. Five of the post-traumatic joints were rated as excellent and two good, at a mean follow-up of 2½ years. The long-term results of 38 such reconstructions (Eaton et al. 1984), seven years later, indicated that this procedure gave good or excellent results in 32 cases, of which 18 had an aetiology of trauma. Biddulph (1985) reported on the results of his extensor sling procedure for the unstable carpometacarpal joint of the thumb in ten patients, including three traumatic cases, using a portion of the extensor carpi radialis to reconstruct the first intermetacarpal ligament: he achieved consistently good results at a mean follow-up of 3½ years.

Shah et al. (1983) reported on their four cases of complete carpometacarpal dislocation, in which three required open reduction and three Kirschner wire fixation, followed by spica casting for six weeks. In the cases requiring open reduction, the dorsal capsule was observed to be avulsed or torn, but neither the volar capsule nor the anterior oblique ligament were disrupted. At follow-up, between 1 and 2½ years later, three of the four patients had no complaints, but two had asymptomatic dorsal subluxation.

Illustrative Case

History: This thirty-year-old painter and decorator slipped and fell on the 7th June, 1985, striking the tip of his left thumb on the ground. He attended the Accident & Emergency Department of King George Hospital on the same day, where he was considered to have sprained the carpometacarpal joint, as X-rays were normal. The thumb was protected in a plaster backslab which the patient removed after four days. He continued working despite an ache at the base of his thumb, and when gripping noticed a recurrent deformity of the carpometacarpal joint which he reduced by applying pressure to the palmar aspect of the metacarpophalangeal joint (Figure 1). When referred to the Hand Clinic on the 25th July, 1985, the patient readily demonstrated the recurrent displacement of the carpometacarpal joint of the left thumb on active extension, which was confirmed radiologically to be dorsoradially dislocated (Figures 2 and 3). It was also noted that the metacarpophalangeal joints of both hands hyperextended to ninety degrees and the right carpometacarpal joint subluxated radiologically in opposition (Figures 4 and 5).
DISLOCATIONS OF CARPOMETACARPAL JOINT OF THUMB

Operation: On the 20th September, 1985, the carpo-metacarpal joint of the left thumb was stabilized using the lateral half of the flexor carpi radialis tendon. Exposure was through a curvilinear incision along the lateral margin of the first metacarpal and over the donor tendon. The thenar muscles were reflected to expose the carpometacarpal joint. The lateral capsule was incised and some of the hypertrophic synovium excised; this revealed attrition of the articular surfaces (Figure 6).

The distal end of the flexor carpi radialis tendon was displayed, after division of the palmar branch of the radial artery and partial reflection to the lateral attachment of the flexor retinaculum. The tendon was then bisected longitudinally (Figure 7) and after release of the lateral portion proximally it was routed through a sagittal drill-hole in the base of the first metacarpal close to the joint, in a dorsal direction (Figure 8). The tendon was tightened to stabilize the joint in abduction and extension and then fixed to the abductor pollicis longus insertion with one non-absorbable suture, before passing it deep to the extensor pollicis brevis and the abductor pollicis longus tendons and through the distal end of the intact portion of the flexor carpi radialis, again the tendon transfer was fixed before re-routing it over the lateral capsule and finally attaching the end to the abductor pollicis longus insertion (Figures 9 and 9A). The tourniquet was released, the wound closed with...
suction drainage, and the thumb immobilised in forearm plaster for six weeks.

The wound healed by first intention. Eight months later, the patient had returned to work, with normal power and no discomfort in the left thumb. The left trapeziometacarpal joint was clinically and radiologically stable with a full range of active movements (Figures 10 and 11).

Discussion
Mechanism: Green et al. (1975), quoted by Shah et al. (1983), considered the mechanism of injury to be due to a longitudinally-directed blow along the metacarpal shaft with the carpometacarpal joint in flexion, consistent with the latter author's finding of a torn or avulsed dorsal capsule, but intact volar capsule, in their three operative cases. In the present case, it seems likely that the axial force on the thumb produced hyperextension of the lax metacarpophalangeal joint, flexion...
DISLOCATIONS OF CARPOMETACARPAL JOINT OF THUMB

Fig. 7 Tendon of flexor carpi radialis divided longitudinally, with hook on radial portion.

Fig. 8 Blunt probe in drill hole through base of first metacarpal holding detached radial portion of flexor carpi radialis tendon.

Fig. 9 Flexor carpi radialis tendon reinforcing reduced trapeziometacarpal joint.

VOL. 12-B No. 2 JUNE 1987
of the carpometacarpal joint and, with the continued axial force, dorsal displacement with stretching and final rupture of the anterior oblique and first intermetacarpal ligaments, resulting in the recurrent dislocation of the trapeziometacarpal joint. No doubt his joint hypermobility was the predisposing factor, contributing to this rare injury and the development of early secondary osteoarthrosis (Kirk, 1967).

Operative procedures: These are designed to prevent dorsoradial displacement of the trapeziometacarpal joint. Earlier authors, namely Schoolfield (1940), Kestler (1946) and Eggers (1945), confined their reconstructions to the impaired function of single capsular ligaments, whereas Cho (1970) translocated the abductor pollicis longus to counteract its deforming action and reinforce the dorsoradial capsule. Bunnell (1944), however, described a procedure for chronic dislocations (without case reports), which effectively reinforced three sides of the trapeziometacarpal joint, using a palmaris longus graft threaded through drill holes in the coronal and sagittal planes of the first metacarpal base and trapezium respectively. The two more recent authors, Eaton (1984) and Biddulph (1985), have similarly enhanced their reconstructions by reinforcing the function of several capsular structures.
Eaton considered the anterior oblique ligament the most important stabilizing structure and therefore used his flexor carpi radialis transfer, not only to replace this function, but also to strengthen the dorsoradial capsule. Biddulph, influenced by the experimental work of Pagalidis et al. (1981), used an extensor carpi radialis longus transfer to simulate the function of the first intermetacarpal ligament and possibly to reinforce the posterior oblique ligament, preventing radiodorsal instability (Pieron, 1973): this reconstruction, however, does not appear to reinforce the anterior oblique ligament, because the tendon ‘sling’ is not fixed to the volar beak as in Eaton’s procedure.

Conclusions
Trapeziometacarpal dislocations are rare injuries due to the infrequency of axial forces applied to the flexed thumb. The deforming action of abductor pollicis longus, in the absence of normal capsular ligaments, causes recurrent dorsoradial displacement. The results of conservative treatment for instability have been disappointing in reported series: it is therefore recommended that early ligament reconstruction be considered to reduce the likelihood of secondary osteoarthrosis.

Acknowledgments
I wish to express my appreciation to Mr. John Ireland for referring this case for treatment and Miss Marcia Chen for Fig. 9A. I also wish to thank Mrs. Jill Jones, Medical Photographer, for her skilful assistance with the illustrations and Miss Josephine Cronin for her most willing secretarial help.

References