LETTERS TO THE EDITOR

Dear Editor,

We read with interest the case report by Jaya Kumar *et al*. (2011) in the July 2011 issue entitled "Giant cell tumour (GCT) of the distal ulna: a rare presentation'. In their case, en-block resection was carried out and the stability of the distal ulna was achieved by a simple technique of tenodesis using the medial-half of ECU tendon according to Kayias *et al.* (2006). At one year follow-up, the affected wrist was reported as stable with surprisingly good range of pronation and supination of 0^{o}-70^{o} and 0^{o}-60^{o} respectively. However, with en-block resection of the distal ulna, the ulna column of the DRUJ is practically lost. The prospect of long-term ulna-side instability of the wrist and deteriorating function in the ensuing years is a matter of time.

We would like to share our experience in managing similar case treated with a different type of reconstruction. A 34-year-old lady with GCT of the distal ulna was managed by wide resection (figures 1 and 2). The ulna-side stability of the wrist was recreated by using tricortical bone graft with inguinal ligament taken from the anterior superior iliac spine to reconstruct ulna column bony support. The graft was screwed to the distal radius (figures 3 and 4). The technique used by us was similar to the technique reported by Minami *et al.* (2010). After four years, the operated wrist had excellent function and remained stable. She was able to carry out her routine house chores with minimal limitation (figure 5).

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Fig. 1

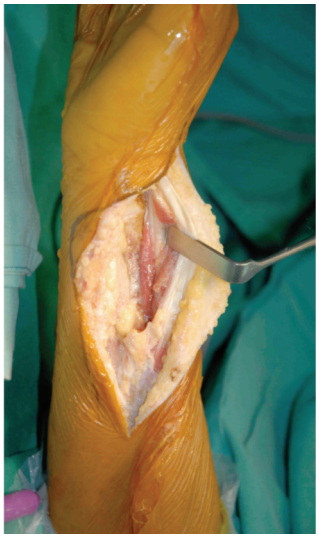

Fig. 2

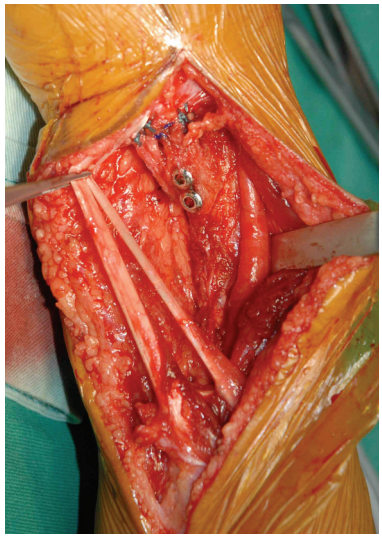

Fig. 3

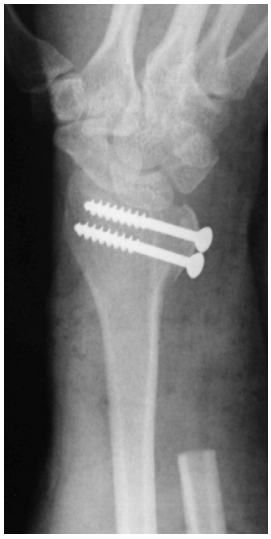

Fig. 4

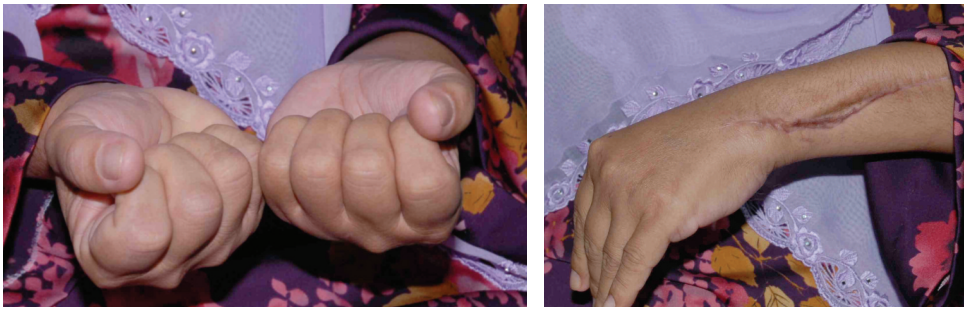

Fig. 5a & b

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Authors' Reply

Sir,

Thank you for sharing your experience in treating a similar case of GCT of the distal ulna. We believe your intention in reconstructing the ulnar component of the wrist joint is to prevent radioulnar instability with ulnar subluxation of the carpus. A similar technique using a longer autologous iliac bone graft was described by Hashizume et al. (1996) to achieve the buttress effect against axial stress loading. Hence the term 'ulnar buttress arthroplasty'.

Reconstruction of ulnar support of the wrist joint and ulnar stump stabilization are two important factors surgeons have to consider after wide resection of the distal end of ulna. We decided to stabilize the ulnar stump (extensor carpi ulnaris tenodesis technique) alone without an iliac bone graft for distal ulnar joint reconstruction as our patient was afraid of donor site morbidity and decided against it.

On the contrary, Dhillon et al. (2010) reported that there was no radiological evidence of recurrence, radioulnar convergence and ulnar translocation of the carpus after en-bloc resection of the distal ulna.

GCT of distal end ulna is a rare entity with no standard treatment modality. At present, en-bloc resection of the distal part of the ulna with or without stabilization of the ulnar stump is the recommended treatment. The technique should be individualised according to the age of the patient, the location and extension of the tumour, and the functional demands, without adding unnecessary risk and morbidity.

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Editor's Comment

The distal ulna represents an uncommon site for GCT of bone. Experiences in managing GCT at this location are limited to sporadic case reports. The case reported by Jaya Kumar et al. represents an active aggressive stage-3 tumour as classified by Campanacci *et al.* (1987) or stage-1C benign bone tumour (Enneking *et al.* 1980). In principle, treatment of such lesion with significant structural compromise requires wide resection of the ulnar column of the DRUJ plus its stabilizing soft tissue structures and reconstruction. The aim of reconstruction is to provide a stable distal ulnar stump consistent with painless useful wrist function. The *en-block* gross specimen of the tumour indicated that the entire ulna-column supporting structure of the DRUJ along with most of its soft tissue stabilizers: the sixth dorsal compartment subsheath, pronator quadratus, distal interosseous ligament and triangular fibrocartilage complex, were resected. The ECU tendon and extensor retinaculum were preserved. In the absence of the ulna head, the authors have opted for a simple tenodesis technique using the ulna half of the ECU alone to stabilize the ulna stump. The eventual good range of pronosupination was a remarkable achievement in comparison to the more complex ECU-FCU tenodesis technique.

The technique of stabilization by graft-arthrodesis of the DRUJ used by Faisham in his case of similar lesion represents another salvage technique, a modification of the Sauve-Kapandji procedure (Minami *et al.* 2000). The technique emphasizes the importance of articular surface of the ulnar column together with the sigmoid notch in providing the mechanical fulcrum for radioulnar motion and load-bearing activity. In this modified technique, the ulna-column of the DRUJ was reconstructed by using a tricortical iliac graft with the inguinal ligament used to reconstruct the ulnar collateral ligament and/or sixth dorsal compartment sheath for the ECU tendon. However, nothing was mentioned related to reconstruction of the TFCC particularly the deep fibers of the TFCC *(ligamentum subcruentum).*

Both reconstruction-stabilization techniques: simple tenodesis using the ECU tendon and modified Sauve-Kapandji operation resulted in reasonable range of

pronosupination and preservation of some useful hand functions. However, to obtain a reasonably painless stable reconstruction with optimum range of pronosupination after sacrificing most of the extrinsic and intrinsic stabilizers of the DRUJ is something extraordinary if we are to account on the current knowledge on the importance of the DRUJ.

The DRUJ is a non-constrained joint of incongruous surfaces owing to a geometrically larger radius curvature of the sigmoid notch than that of the ulnar seat (Af Ekenstam & Hagert, 1985). Functional stability of this inherently unstable joint is largely provided by extrinsic extracapsular and intrinsic intracapsular structures. The extrinsic stabilizers include the ECU tendon, sixth dorsal compartment ECU tendon subsheath, pronator quadratus and distal interosseous ligament. However, biomechanically effective stabilizer of the DRUJ is intrinsically provided by two sets of checkrein mechanisms: the superficial and deep fibers of radioulnar components of the TFCC. The superficial fibers insert directly onto the ulnar styloid and deep fibers insert into the ulnar fovea. The superficial fibers which form an acute angle as they converge to the ulnar styloid from the radius, provide a poor mechanical guidance throughout range of pronosupination. The deep fibers of the TFCC, also known as *ligamentum subcruentum* (Kleinman, 2007), provide significant mechanical guidance in stabilizing rotation of the radius as they form an obtuse angle owing to their convergence from the radius to the fovea.

The function of these two sets of TFCC fibers in controlling forearm rotation and translation has analogically been conceptualized to resemble a team of horses (the radius) with the buckboard driver holding the reins securely at the buckboard seat (the ulnar fovea). The deep fibers are most effective in controlling motion by virtue of their obtuse angle and shorter radius. Anatomic reconstruction of deep fibers of the TFCC (Adams procedure) has been considered as a crucial step to provide DRUJ stability and to improve range of pronosupination (Adams, 2000). In cases where the ulnar column is not salvageable, many options for DRUJ replacement are currently available. Replacement of part or all of the DRUJ has expanded the armamentarium for surgical treatment of DRUJ pathology. These include the uHead endoprosthesis (SBI, Morrisville, Pennsylvania), ulnar head sigmoid notch resurfacing prosthesis (SBI, Morrisville, Pennsylvania) and Scheker semiconstrained DRUJ prosthesis (Aptis Medical, Louisville, Kentucky).

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