DORSORADIAL AVULSION OF THE TRIANGULAR FIBROCARTILAGE COMPLEX WITH AN AVULSION FRACTURE OF THE SIGMOID NOTCH OF THE RADIUS

Y. MORISAWA, T. NAKAMURA and K. TAZAKI

From the Department of Orthopaedic Surgery, School of Medicine, Keio University, Japan and the Department of Orthopaedic Surgery, Ogikubo Hospital, Tokyo, Japan

We report two extremely rare cases of dorsal radial avulsion injury of the triangular fibrocartilage complex accompanied by an avulsion fracture of the sigmoid notch of the radius. Anatomical reduction of the bone fragment in conjunction with reattachment of the dorsal portion of the radioulnar ligament to the radial sigmoid notch were necessary to restore stability of the distal radioulnar joint and tension of the triangular fibrocartilage proper.
Journal of Hand Surgery (European Volume, 2007) 32E: 6: 705–708

Keywords: radial avulsion, triangular fibrocartilage complex, avulsion fracture, sigmoid notch of the radius, DRUJ instability

Palmer (1989) classified radial tears of the triangular fibrocartilage complex (TFCC), in which the radial portion of the triangular fibrocartilage (TFC) proper, the fibrocartilaginous area, is torn, as a 'Palmer 1D' tear. Radial tear of the TFCC is usually found as a small slit tear on radiocarpal arthroscopy. It may not destabilise the distal radioulnar joint (DRUJ), despite biomechanical studies indicating that total radial avulsion of the TFCC induced DRUJ instability (Kihara et al., 1995; Martineau et al., 2005). In contrast, ulnar avulsion tear has been widely identified as a potential destabiliser of the DRUJ (Haugstvedt et al. 2006; Nakamura and Yabe, 2000; Nakamura et al., 1996, 2001).

In this case report, we report two cases of extremely rare radial avulsion tear of the TFCC associated with an avulsion fracture of the dorsal edge of the radial sigmoid notch. Both wrists demonstrated instability of the DRUJ.

CASE REPORTS

Case 1

A 49 year-old female office worker injured her right wrist when she collided with a metal post while riding in a motorboat. The wrist was forced into hyperpronation and hyperflexion. She visited the local hospital soon after the injury and a small bone fragment in the distal area of the DRUJ was identified on plain X-ray. Her wrist was immobilised for 2 weeks, then active ROM exercises began. As ulnar side wrist pain persisted, she visited our hospital 4 weeks after the accident. She suffered from wrist pain, especially on wringing out towels, twisting doorknobs or doing pushing ups. Her right wrist appeared almost normal, but with a markedly tender area on the dorso-distal side of the DRUJ. She felt pain on maximum pronation and maximum supination and ulnar deviation of the wrist enhanced the pain. The range of motion of the wrist and forearm were not restricted. There was obvious DRUJ instability. The grip strength of the right and left hands was 6 and 23 kg, respectively, because of severe wrist pain. Posteroanterior plain X-ray showed neutral ulnar variance and a small bone fragment at the most dorsal edge of the radial sigmoid notch of the DRUJ (Fig 1). Computed tomography confirmed a small bony fragment at the sigmoid notch and coronal MRI delineated the avulsed fragment at the dorsal sigmoid notch (Fig 2) and a degenerative tear of the TFCC. The patient was treated conservatively with splinting for three months, because she refused surgery. She continued to complain of pain and a loose feeling of the DRUJ, so finally agreed to surgery. Arthroscopy revealed no slit tear in the TFCC. However, loss of the trampoline effect and decrease of tension of the TFC was apparent. Surgical exposure revealed that the bony fragment, attached to the dorsal portion of the radioulnar ligament, had been avulsed from the radial sigmoid notch of the radius, while the palmar side of the TFCC was attached firmly to the palmar side of the sigmoid notch of the radius. The radioulnar ligament, including the bony fragment, was reduced and reattached using a bone anchor (Fig 3). After repair of the avulsion fragment with the radioulnar ligament, the tension of the TFC felt almost normal on radiocarpal arthroscopy. The patient no longer had DRUJ instability or wrist pain 2 years after surgery, although the bone fragment was not united on multidirectional plain X-ray.

Case 2

A 20 year-old man fell on his outstretched left hand, forcing hyperextension of the wrist, while skiing. As the ulnar side pain in his wrist persisted, he visited our

Fig 1 Plain X-ray showing the avulsion fragment of the sigmoid notch of the radius (white arrow).

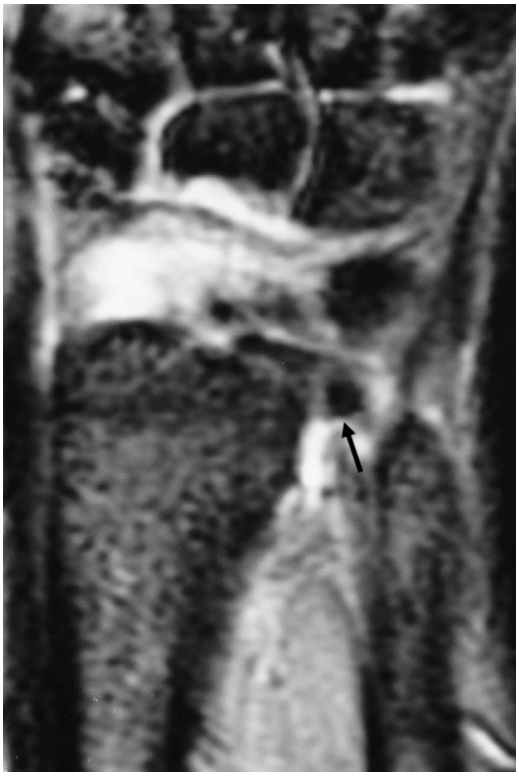

Fig 2 MRI delineating the avulsed fragment at the dorsal sigmoid notch on the very dorsal coronal slice (arrow).

Fig 3 Postoperative X-rays demonstrating fixation of the avulsed fragment (white arrow) with a suture anchor.

hospital four weeks after the initial injury. He noted extremely severe wrist pain when doing pushing-ups. On physical examination, his left wrist appeared normal with the exception of a tender spot on the dorsal side of the DRUJ. Although the range of motion was not restricted, he felt pain on forced extension. There was obvious DRUJ instability when compared with the right wrist. The grip strength of the left and right hands was almost identical (44.5/45.5 kg, respectively). Posteroanterior plain X-rays indicated neutral ulnar variance. Computed tomography demonstrated a small bone fragment on the dorsal side of the DRUJ (Fig 4). Arthrogram revealed a leak from the radiocarpal joint to the DRUJ at the radial attachment of the TFCC, suggesting a Palmer 1D TFCC injury (Palmer, 1989). After 5 weeks of conservative treatment without recovery, surgery was carried out. Surgical exploration revealed that the dorsal rim portion of the radioulnar ligament of the TFCC was found to be attached to a detached small bone fragment of the radius. The remainder of the TFCC was still attached to the radius. The bone fragment, including the dorsal portion of the radioulnar ligament, which had been avulsed from the radial sigmoid notch of the radius, was reattached to