Sigmoid Notch Reconstruction and Limited Carpal Arthrodesis for a Severely Comminuted Distal Radius Malunion: Case Report

Francisco del Piñal, MD, PhD, Alexis Studer, MD, Carlos Thams, MD, Eduardo Moraleda, MD

We present the case of a young patient with a severely comminuted, malunited, intra-articular distal radius fracture and complete disruption of the sigmoid notch. We reconstructed the malunited distal radioulnar joint by osteotomy and repositioning the displaced sigmoid notch fragments through a combined dorsal and volar approach. At the same time, we carried out a radioscapholunate arthrodesis with distal scaphoid excision. We used a free vascularized corticoperiosteal flap from the medial femoral condyle to span the massive bone defect in the radius to obtain union. At the 2.5-year follow-up, the patient had essentially normal function of the distal radioulnar joint (painless, with 85° of active pronation and 75° of supination). He resumed work as a bricklayer without limitations. We conclude that sigmoid notch reconstruction by osteotomy is worthwhile in the setting of malunited distal radius whether or not the radiocarpal joint is reconstructable. *(J Hand Surg 2012;37A:481–485. Copyright © 2012 by the American Society for Surgery of the Hand. All rights reserved.)*

Key words Sigmoid notch, intra-articular osteotomy distal radius, distal radius malunion, distal radioulnar joint.

Dorsal tilt, radial inclination, radial translocation, or shortening of the distal radial fragment may be responsible, alone or in association, for distal radioulnar joint (DRUJ) pathology in malunited distal radius fractures.[1,2] As long as the sigmoid notch anatomy is preserved, procedures exist to reconstruct the DRUJ relationships. Radial osteotomy and ulna shortening with or without ligament reconstruction are among the most common. When the sigmoid fossa is irreversibly damaged, however, the options are limited to a salvage procedure. Darrach, Bower, Sauvé-Kapandji, and ulnar head replacement are the most popular alternatives. None of the salvage operations will provide a normal joint. Residual pain and limitations in grip strength and motion are all too common after salvage operations.[3]

Reconstruction of the sigmoid notch facet after a fracture has rarely been reported. Merrell et al[4] published a case report in which a nonvascularized osteochondral graft was taken from the scaphoid fossa to reconstruct a partial defect of the sigmoid notch. del Piñal et al[5,6] reconstructed not only the dorsal part of the sigmoid notch but also the lunate fossa, by means of a vascularized osteochondral flap taken from the base of the third metatarsal.

When treating intra-articular malunions of the distal radius, it is often necessary to mobilize the medial fragments. This is done to restore the contour of the lunate facet. This indirectly restores the anatomy of the sigmoid notch. However, we have not found a case in which the sigmoid fossa has been specifically reconstructed by mobilizing the malunited fragments. The purpose of this article was to present a complex intra-articular malunion of the radius in which the sigmoid notch was reconstructed with good results.

From the Department of Hand and Plastic Surgery, Private Practice, and Hospital Mutua Montañesa, Instituto de Cirugía Plástica y de la Mano, Santander, Spain.

Received for publication July 11, 2011; accepted in revised form December 7, 2011.

No benefits in any form have been received or will be received related directly or indirectly to the subject of this article.

Corresponding author: Francisco del Piñal, MD, PhD, Department of Hand and Plastic Surgery, Private Practice and Hospital Mutua Montañesa, Instituto de Cirugía Plástica y de la Mano, Calderón de la Barca 16-entlo, E-39002-Santander, Spain; e-mail: drpinal@drpinal.com.

0363-5023/12/37A03-0012$36.00/0
doi:10.1016/j.jhsa.2011.12.006

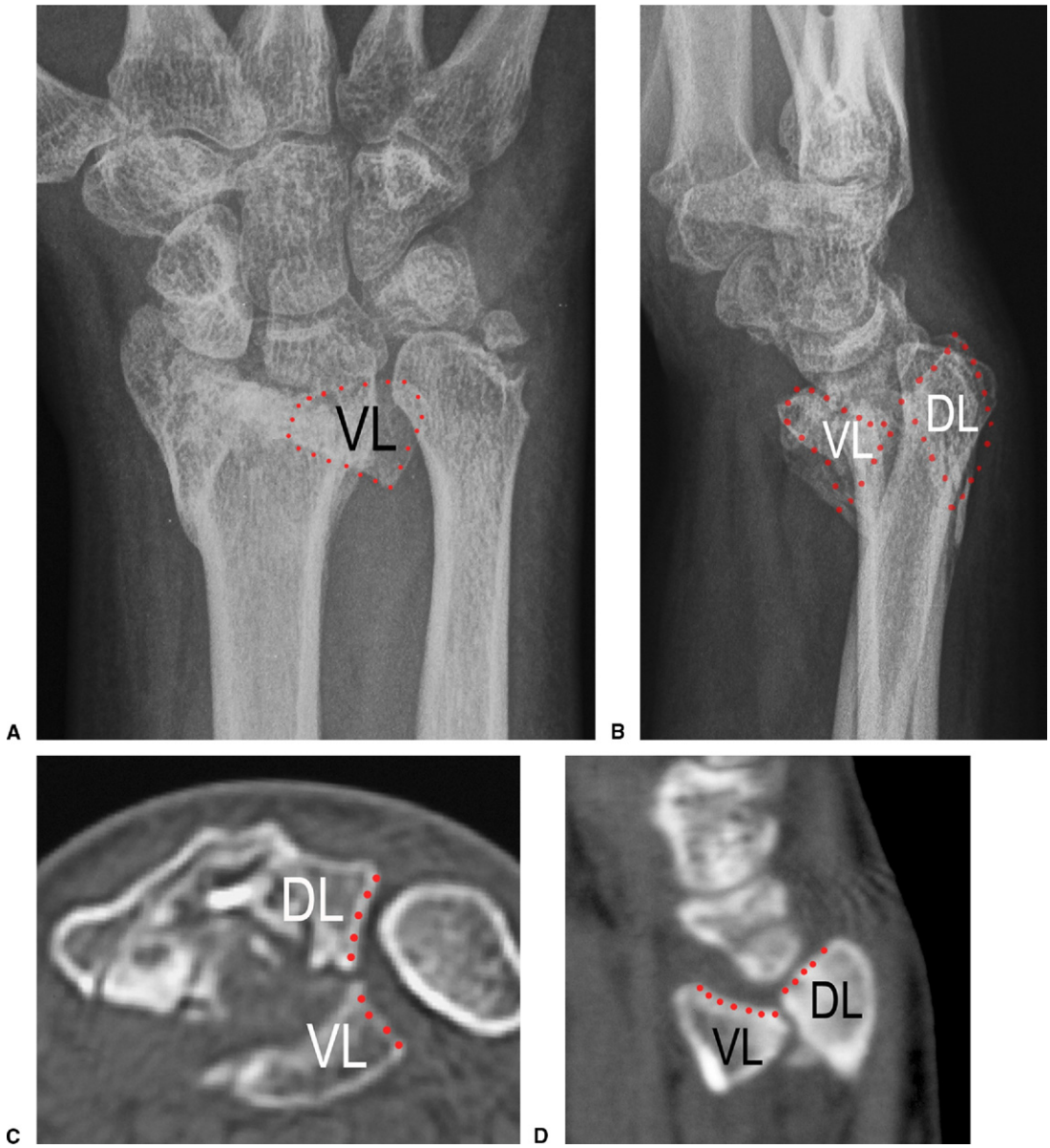

FIGURE 1: A–D Plain x-rays at the first visit (4 months after the injury). On the computed tomography scan 1 month earlier, the 2 fragments that formed the sigmoid notch articular facet (volar-lunate facet fragment [VL] and dorsal-lunate facet fragment [DL]) are highlighted.

CASE REPORT

A 23-year old man sustained a high-energy distal radius fracture and a comminuted scaphoid fracture of the dominant wrist in a motor vehicle accident. Initial treatment consisted of external fixation for the distal radius fracture and percutaneous K-wire fixation of the scaphoid fracture. The wires and external fixator were removed at 8 weeks. Because of persisting pain, a total wrist arthrodesis with a Sauvé-Kapandji procedure was recommended at the patient's local facility. He presented to us for a second opinion.

We first saw the patient 4 months after injury. He reported painful radiocarpal and DRUJ joints. The wrist moved from 20° of flexion to 45° of flexion. Pronation was 30° and supination was 10°. Grip strength was 14 kg, which was 30% of the uninjured side. There was volar displacement of the wrist and prominence of the ulnar head.

On plain radiograph the lunate and scaphoid had sunk more than 1 cm into the radius (Fig. 1A, B). The severity of comminution at the scaphoid and lunate fossae shown by the computed tomography scan was such that we judged it impossible to reconstruct this area by osteotomy and repositioning of the fragments. Consideration was given to the possibility of radioscapholunate arthrodesis with distal scaphoid exci-