

## A Case of Bilateral Galeazzi Fractures Associated with Dislocation of the Right Elbow

Mitsuhiko Nanno<sup>1,2</sup>, Takuya Sawaizumi<sup>1,2</sup> and Shinro Takai<sup>1,2</sup>

<sup>1</sup>Department of Restorative Medicine of Neuro-musculoskeletal System, Orthopaedic Surgery, Graduate School of Medicine, Nippon Medical School

<sup>2</sup>Department of Orthopaedic Surgery, Nippon Medical School Musashi Kosugi Hospital

### Abstract

We report an unusual case of bilateral Galeazzi fractures associated with dislocation of the right elbow and fracture of the right scaphoid caused by a motorbike accident in a 32-year-old man. Bilateral radiuses were fixed with plates, and the right scaphoid was fixed with a screw after closed reduction of the right elbow. A satisfactory result was obtained with a return to work and no radiographic problems 7 years after surgery. The mechanism of the injury was thought to be a high-velocity fall on the outstretched hands combined with extreme pronation of the forearms and extension of the wrists and the elbows. This case had a favorable outcome following operative stabilization of the fracture-dislocations and early mobilization.

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**Key words:** Galeazzi fracture, dislocation of the elbow joint, scaphoid fracture, surgery

### Introduction

The Galeazzi fracture<sup>1</sup>, involving fracture of the distal one-third of the radial shaft with a distal radioulnar joint dislocation, has been described as a fracture requiring operative treatment. Moore et al.<sup>2</sup> have reported that Galeazzi fractures account for 6.8% of forearm fractures. However, only 3 cases of the combination of Galeazzi fracture and dislocation of the elbow joint in the same extremity have been reported, indicating that such cases are rare<sup>3–5</sup>. Moreover, Suzuki et al.<sup>6</sup> have reported an extremely rare case of bilateral Galeazzi fractures. The present report describes a case of the combination of bilateral Galeazzi fractures, dislocation of the right

elbow, and fracture of the right scaphoid. The mechanism and treatment of this injury are also discussed.

### Case Report

A 32-year-old man was injured in a motorbike accident. On examination he complained of marked bilateral wrist and elbow pain and instability to move both joints. Bilateral extremities were deformed and swollen. No neurovascular deficit was present. Initial radiographs showed bilateral radial fractures, bilateral dislocation of the distal radioulnar joint, dislocation of the right elbow joint, and a fracture of the right scaphoid (**Fig. 1A, B, 2A, B, 3**). Closed reduction of the bilateral wrists and the right

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Correspondence to Mitsuhiko Nanno, Department of Orthopaedic Surgery, Nippon Medical School Musashi Kosugi Hospital, 1-396 Kosugi-cho, Nakahara-ku, Kawasaki, Kanagawa 211-8533, Japan

E-mail: nanno-mi@ga2.so-net.ne.jp

Journal Website (<http://www.nms.ac.jp/jnms/>)



Fig. 1 Initial radiographs of the right forearm show a right Galeazzi fracture and dislocation of the ipsilateral elbow: posteroanterior view (A), lateral view (B).



Fig. 2 Initial radiographs of the left forearm show a left Galeazzi fracture: posteroanterior view (A), lateral view (B).



Fig. 3 Scaphoid view of the right wrist shows a Herbert type A2 fracture of the scaphoid (arrow).

elbow was immediately attempted. Reduction of the right elbow was successful, but the ulnar heads of bilateral wrists remained dislocated because of bilateral fractures of the ulnar styloid process.

Surgery was performed 7 days after injury. The bilateral radial fractures were treated with open reduction and internal fixation by means of a 3.5-millimeter dynamic compression plate (Synthes Inc., West Chester, PA, USA). However, the bilateral instability of the distal radioulnar joint remained. The bilateral fractures of the ulnar styloid processes were then fixed with 1.2-millimeter wires and 0.4-millimeter soft wires by means of the tension band technique. At that point the distal radioulnar joints were stable. The fracture of the right scaphoid (type A2 according to Herbert's classification) was fixed with a Herbert screw by means of a minimally invasive technique. Radiographs after surgery showed good reduction of bilateral distal radioulnar joints (Fig. 4A-D). The postoperative course was uneventful. Exercise was started after 4 weeks of immobilization of the neutral forearm rotation and 90° elbow flexion.

Fourteen months after surgery, the plates and wires were removed. Radiographs demonstrated

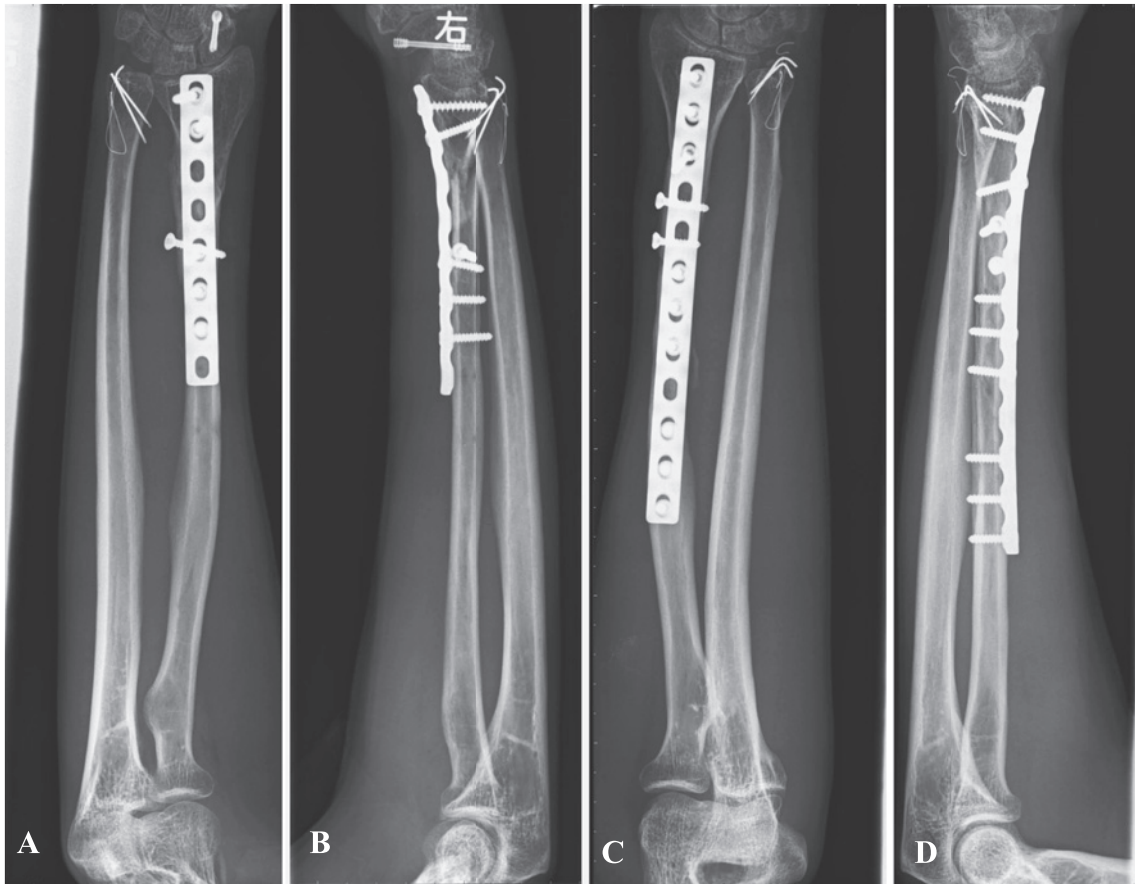


Fig. 4 Postoperative radiographs of the forearms show good reduction and fixation of both the bilateral distal Galeazzi fractures and the fracture of the right scaphoid: posteroanterior view of the right forearm (A), lateral view of the right forearm (B), posteroanterior view of the left forearm (C), lateral view of the left forearm (D).

stable reduction of the distal radioulnar joints and healing of bilateral radii, ulnar styloid processes, and the right scaphoid. Seven years after surgery, the range of motion was 0° to 135° at the right elbow, 60° dorsal flexion and 60° palmar flexion at the wrists, and 90° pronation and 90° supination of the forearms. The patient has returned to work as a truck driver.

### Discussion

The Galeazzi fracture is not an uncommon injury. However, the injury complex described here—bilateral Galeazzi fractures associated with dislocation of the right elbow joint and fracture of the right scaphoid—has not, to our knowledge, been described previously and is likely rare.

When treating Galeazzi fracture, it is important to obtain an anatomical reduction of the distal

radioulnar joint at the time of fixation of the radius, because persistent subluxation and instability at this joint are the most frequent sources of poor results. In the present case, after closed reduction of the right elbow, the radii were fixed with a plate, the right scaphoid was fixed with a Herbert screw, and the ulnar styloid processes were fixed with a tension band technique. The distal radioulnar joints were then stable. Operative stabilization of the fractures allowed early mobilization and contributed to the satisfactory outcome, with union of the radii, right scaphoid, and ulnar styloid processes in optimal alignment, the absence of pain, and good range of motion in the wrists and right elbow 7 years after surgery.

Two principal mechanisms of injury in Galeazzi fracture have been reported<sup>7</sup>. Hughston<sup>8</sup> has proposed that Galeazzi fracture is usually caused by a direct blow to the dorsoradial aspect of the

forearm. On the other hand, Mikic<sup>9</sup> has proposed that the most probable mechanism is a fall on the outstretched hand combined with extreme pronation of the forearm. He has related that the forces cross the radiocarpal joint, producing the dislocation and foreshortening of the radial shaft. He has also noted that as the displacement continues, dislocation of the ulnar head occurs with tearing of the triangular fibrocartilage, which then loses its stabilizing influence on the wrist. Wilkins<sup>10</sup> has reported that dorsal-type dislocations of the distal radioulnar joint occur with the forearm in pronation and that palmar-type dislocations develop with the forearm in supination and with axial pressure to the elbow in extension. The present case was a dorsal-type dislocation. Sarup and Bryant<sup>5</sup> have described the mechanism of injury in the ipsilateral humeral shaft fracture and Galeazzi fracture with dislocation of the elbow. They related that the extreme axial loading from the impact of an outstretched hand with a fully extended elbow and a pronated forearm, with the weight of the patient's body acting as a driving force, could result in a Galeazzi fracture. Collapse of the radial column would result in transmission of this force through the soft tissues and the ulna to the extended elbow, resulting in elbow dislocation. Further collapse and hyperextension from the driving body weight would fracture the humerus. We believe the mechanism of injury in the present case is similar to that proposed by Sarup and Bryant, although in their case the humerus, rather than scaphoid, was fractured. With respect to the fracture of the scaphoid, Weber<sup>11</sup> has proposed that its mechanism is a fall on the extended or hyperextended wrist, which is usually also radially deviated. Our patient reported that he had struck the ground with bilateral upper extremities outstretched and pronated. Therefore, the likely mechanism of injury in the present case was a high-velocity fall on the outstretched hands combined with extreme pronation of the forearms and full extension of the wrists and the elbow. The extreme axial loading from the impact with the ground could have caused the scaphoid fracture when the wrist was extended and the forearm was pronated,

producing the dislocation of the distal radioulnar joints, thereby resulting in the radius fractures. As the injury process continued, foreshortening of the shaft of the radius transmitted the force through the ulna to the extended elbow and resulted in elbow dislocation.

In conclusion, we have reported a case of bilateral Galeazzi fractures associated with dislocation of the right elbow joint and fracture of the right scaphoid. This unusual case had a favorable outcome following operative stabilization of the fracture-dislocations and early mobilization.

### References

1. Galeazzi R: Ube rein besonderes Syndrome bei Verletzungen im Bereich der Unterarmknochen. *Archives Orthopaedic Unfall-Chir* 1935; 35: 557-562.
2. Moore TM, Klein J, Patzakis MJ, Harvey JP: Results of compression-plating of closed Galeazzi fractures. *J Bone Joint Surg* 1985; 67A: 1015-1021.
3. Mezzadra A, Gusmeroli E, Tettamanzi M, Prestianni B, Molinari D: A rare injury to the upper limb: elbow dislocation combined with Galeazzi fracture-dislocation. *Ital J Orthop Traumatol* 1991; 7: 567-572.
4. Arima Y, Yamatoku Y, Uchino M, et al.: A case of Galeazzi fracture combined with dislocation of the elbow. *Kanto Seikeisaigaijeka gakkai Zasshi* 1994; 25: 225-228 (in Japanese).
5. Sarup S, Bryan PA: Ipsilateral humeral shaft and Galeazzi fractures with a posterolateral dislocation of the elbow: A variant of the "floating dislocated elbow". *J Trauma* 1998; 43: 349-352.
6. Suzuki M, Nishikawa M, Naganuma S, Takeuchi K, Fukuda A, Wada K: A case of bilateral Galeazzi's fracture. *Tohoku J Orthop Traumatol* 1999; 43: 283-286 (in Japanese).
7. Anderson LD: Fractures of the shafts of the radius and ulna. In *Rockwood and Green's Fractures in Adults* (Rockwood CA, Green DP, eds), Vol. 1, 1984; pp 550-556, J. B. Lippincott, Philadelphia.
8. Hughston JC: Fracture of the distal radial shaft. Mistakes in management. *J Bone Joint Surg* 1957; 39A: 249-264.
9. Mikic ZDJ: Galeazzi fracture-dislocations. *J Bone Joint Surg* 1975; 57A: 1071-1080.
10. Wilkins KE: Distal radius and ulna fractures. In *Rockwood and Green's Fractures in child* (Rockwood CA, Wilkins KE, King RE, eds), Vol. 3, 1984; pp 50-514, J. B. Lippincott, Philadelphia.
11. Weber ER: Biomechanical implication of scaphoid waist fractures. *Clin Orthop* 1980; 149: 83-89.

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