

# Traumatology of the scaphoid and scapholunate ligament complex

---

Frank Kolo

Philippe Cuénod

Laszlo Dongo

Alexander De Smet

Stéphane Kämpfen

Michaël Papaloïzos



Centre de chirurgie et de thérapie de la main  
Genève

# Fracture patterns and classification

[www.swisshandsurgery.ch](http://www.swisshandsurgery.ch)

Dr.Laszlo Dongo

Clinique CH8

10.12.2015

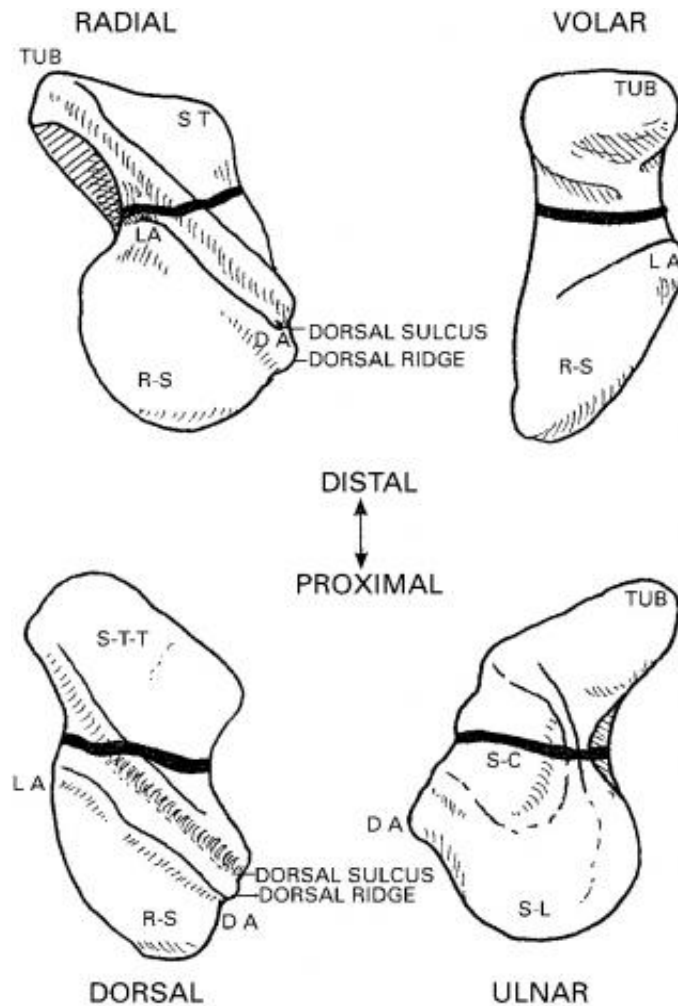
# Incidence

- Fractures of the scaphoid represent nearly 2 percent of all the fractures. (Leslie and Dickson 1981)
- The scaphoid is the most common of the carpal bones to be fractured; it accounts for 51 to 62 percent of all the carpal fractures.  
(Gasser 1965)

# Fracture patterns

- In 11 of the 47 retrospective cases, it proved impossible to define fully the three-dimensional pattern.
- In the 80 scaphoids for which a fracture line could be accurately defined, there appeared to be three main fracture patterns involving: 1) the surgical waist; 2) the dorsal sulcus; or 3) the proximal pole.

# Waist fracture



# Classifications

- There are many classifications of the scaphoid fractures but three classifications are more or less commonly used in the clinical practice including the Mayo, the Russe and the Herbert classification.

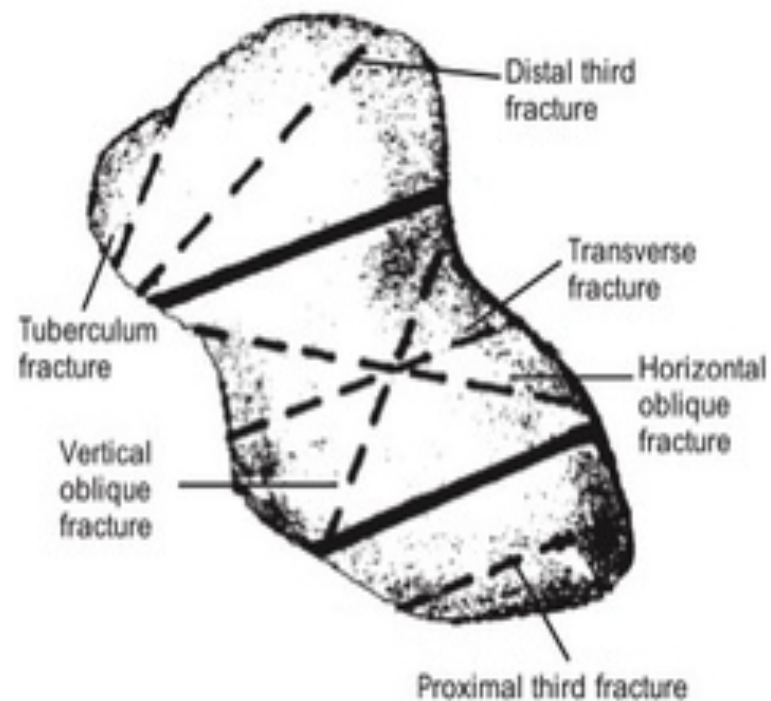
# Comparison by anatomic sites

**Table II.** Classifications of scaphoid fractures

Site of fracture	Russe <sup>11</sup>	Herbert <sup>12</sup>	Mayo clinic <sup>13</sup>	Prosser <sup>14</sup> (Distal pole)	Compson <sup>15</sup> (Radiographic)
Tuberosity fracture		Type A (Stable) A1 Tubercle A2 Incomplete	Distal (5%) (Union rate 100%)	Type I Fractures of tuberosity  Type II Distal intra-articular  Type III Osteochondral fracture	Type 2 The dorsal sulcus
Waist fracture	Horizontal oblique  Transverse  Vertical oblique (5%)	Type B (Unstable) B1 Oblique distal third B2 Displaced B4 Fracture dislocations  Type C Delayed union 6 weeks after plaster  Type D D1 Fibrous nonunion D2 Sclerotic Nonunion D3 Nonunion with fixed DISI	Middle (65%) (Union rate 80%)		Type 1 The 'surgical waist'
Proximal pole fracture		Type B3 Proximal third  Type D4 Nonunion with AVN	Proximal (30%), (Union rate 64%)		Type 3 The proximal pole

Table 1. Classification of scaphoid fractures in adults

SITE AND TYPE OF FRACTURE	%
Distal third*	10
Middle third	70
• Transverse	• 42
• Horizontal oblique	• 24.5
• Vertical oblique	• 3.5
Proximal third	20





Location (Mayo):

distal (tubercule+distal pole)

middle (waist)-70-90%

proximal pole

Orientation (Russe):

transverse

horizontal oblique

vertical oblique

Anatomy, stability, chronicity (Herbert):

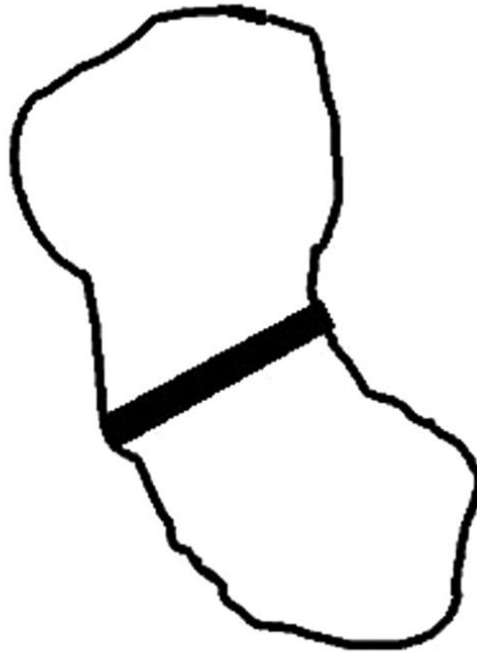
undisplaced

displaced or angulated

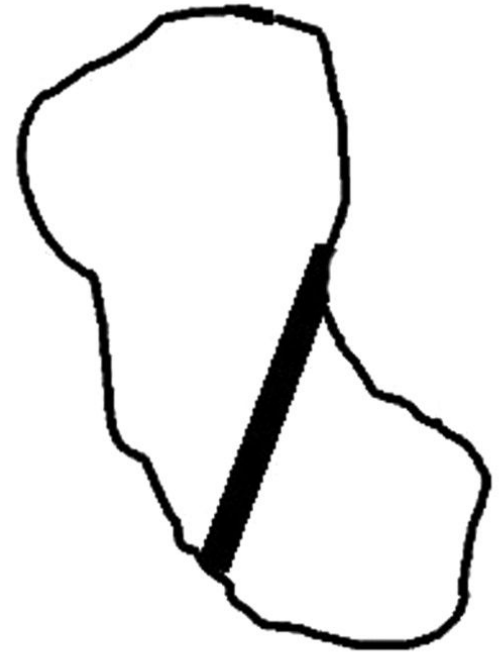
# Russe classification of scaphoid fractures



Horizontal Oblique

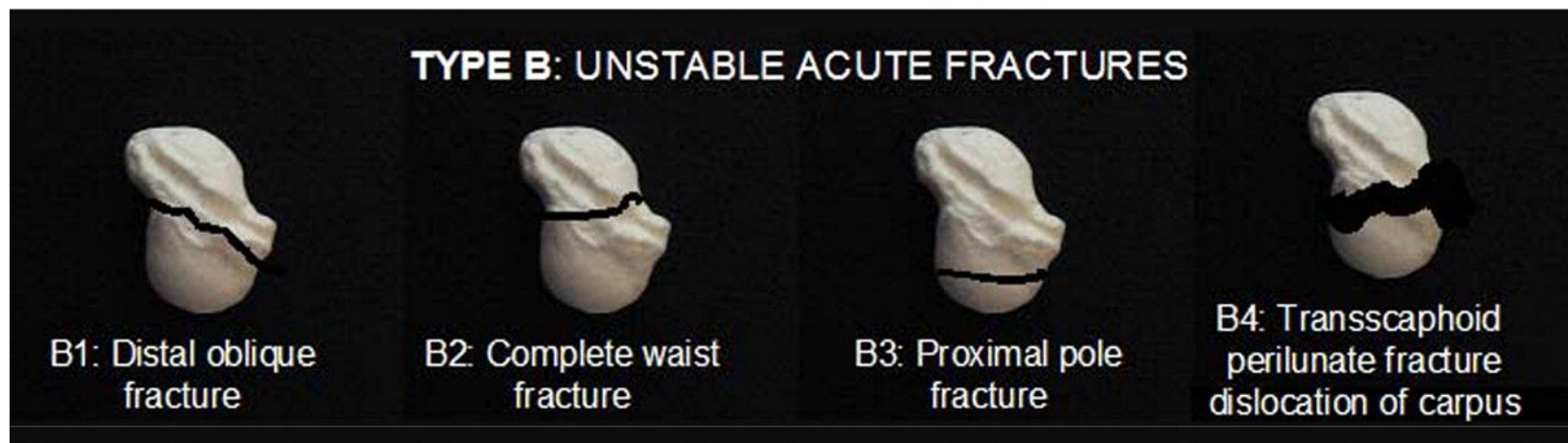
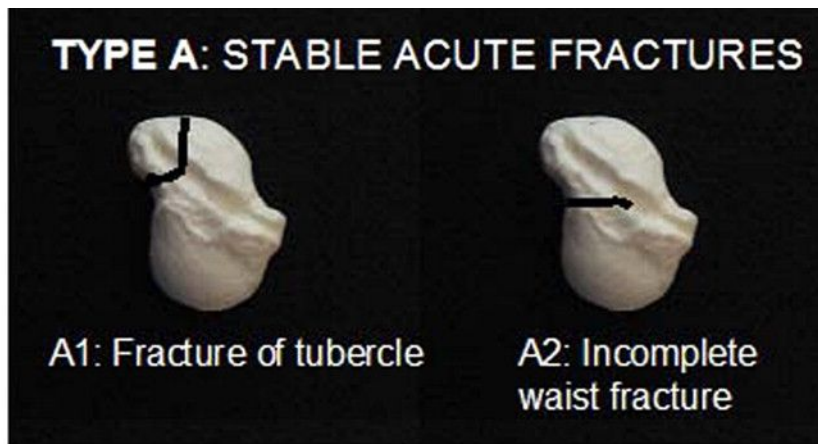


Transverse



Vertical Oblique

# Herbert's classification of scaphoid fractures



# Herbert's classification

- Type C: delayed union (after 12 weeks)
- Type D: established non-union
  - D1- fibrous non-union
  - D2- pseudarthrosis (early deformity)
  - D3- sclerotic pseudarthrosis  
(advanced deformity)
  - D4- avascular necrosis of the prox.pole

# Cooney, Dobyns and Linscheid

- **Undisplaced:** Stable, no displacement evident on any of the views

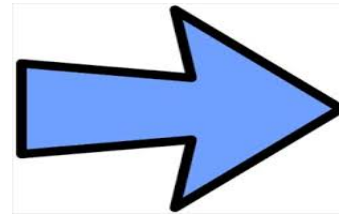
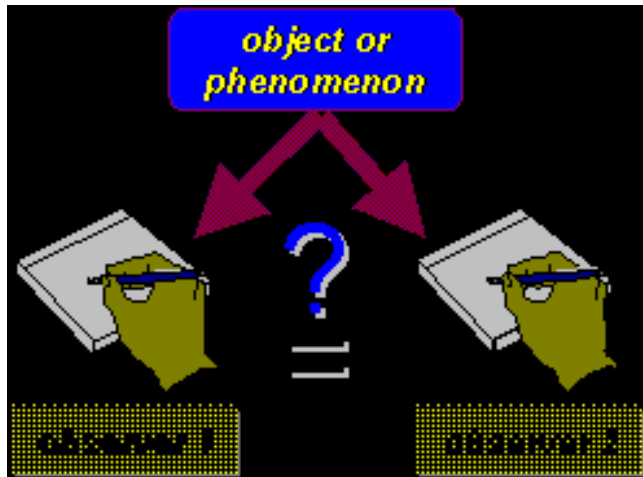
- **Displaced:** Unstable

More than 1 mm displacement on AP and oblique views, or

More than 15 degrees lunocapitate angulation on lateral view, or

More than 45 degrees scapholunate angulation

Some studies have demonstrated limited prognostic value and poor **inter-** and intraobserver reliability of scaphoid fracture classification schemes.



(Desai VV, Davis TRC, Barton NJ. The prognostic value and reproducibility of the radiological features of the fractured scaphoid. J Hand Surg [Br] 1999;24:586–90.)

# Take home messages

- These classifications are mainly useful in complimenting each other.
- However, the scaphoid fractures always need to be analysed independently based on their particularities.

**Thank you for your attention!**