Scaphoid nonunion

Definition, clinical presentation and subtypes

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Scaphoid fracture: risks

- Malunion
- Delayed union
- Nonunion
Scaphoid nonunion: definition

- Delayed union
- Established nonunion
  - Fibrous nonunion
  - Sclerotic nonunion (pseudarthrosis)
Scaphoid nonunion: definition

- Delayed union = 3 months
- Failure to unite = >6 months or
  - diagnosis on CT scanner
- Untreated nonunion could evolve towards degenerative wrist arthritis: SNAC
Scaphoid nonunion: risk factors

- Primary risk factor for nonunion is instability / displacement
  - Up to 55% nonunion
Scaphoid nonunion: risk factors

- Fracture displacement
- Delayed / missed diagnosis
- Inadequate treatment
- Fracture location
- Blood supply
Scaphoid nonunion: presentation

- Clinical
  - Presentation often many years after fracture / nonunion
  - Asymptomatic +++
- Radiological discovery
Scaphoid nonunion: clinical presentation

- Restricted wrist motion
- Tenderness in snuffbox
- Dorsal swelling
- Pain at extremes of motion (extension)
- Decreased grip strength
Scaphoid nonunion: radiological presentation

- Standard x-rays
- CT scanner
- MRI
Scaphoid nonunion: subtypes

- Asymptomatic – symptomatic
- Stable – non-displaced
- Unstable – displaced
- Osteonecrotic
- Arthritic
Scaphoid nonunion: classification

- Herbert type (C), D1, D2
- Dias
- Gupta
- Slade & Geissler
- Mack & Lichtman

Singh, Dias, Focus on scaphoid fractures; JBJS 2011
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Scaphoid nonunion: subtypes

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Scaphoid nonunion: classification

1. Simple
2. Unstable
3. Avascular
4. Arthritic
Scaphoid nonunion:

1. simple

- No deformity
- Preserved vascular supply
- Limited bone resorption
- No degenerative changes
Scaphoid nonunion: 2. Unstable nonunion

- Fracture line <> apex of the dorsal ridge
  - Distal to the apex → volar displacement
  - Proximal to the dorsal apex → dorsal displacement
type 2 with volar displacement

- Distal waist fracture line
- Large bone defects
- Humpback deformity
  (malunion or nonunion)
- SL angle > 70°

→ DISI

Buijze, Management of scaphoid nonunion; JHS 2012
Type 2 with dorsal displacement

- proximal waist fracture line
- Small, flat bone defect
Scaphoid nonunion: 3. avascular

- Proximal pole fractures

- Diagnosis on x-rays, CT scanner and MRI
Scaphoid nonunion:

4. arthritic

- Starts localised:
  - Scaphoid – radial styloid
- Evolves following SNAC wrist classification
- Diagnosis
  - X-rays
  - Arthro-CT and arthro-MRI
Scaphoid nonunion: classification

1. Simple
2. Unstable
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