



Reading list



Fractures of the scaphoid by Mr Grant Bayne and Mr David Warwick

Anatomy and radiology of the scaphoid

Compson JP.

The anatomy of acute scaphoid fractures: a three-dimensional analysis of patterns.

J Bone Joint Surg [Br] 1998;80-B:218-24.

Roolker W, Tiel-van Buul MMC, Bossuyt PMM, et al.

Carpal box radiography in suspected scaphoid fracture.

J Bone Joint Surg [Br] 1996;78-B:535-9.

Bhat M, McCarthy M, Davis TRC, Oni JA, Dawson S.

MRI and plain radiography in the assessment of displaced fractures of the waist of the carpal scaphoid.

J Bone Joint Surg [Br] 2004;86-B:705-13.

These papers on the anatomy and radiology of the scaphoid all highlight the difficulties in interpreting radiographs of the carpus to assess for scaphoid fracture. This is because of the three-dimensional anatomy of the bone (Compson). Detailed understanding of the alignment of fractures to the long axis of the bone and the relationship to ligament attachments would help establish potential stability. This would be of value in predicting outcome and is also important for surgical intervention in both acute fractures and nonunions. The diagnostic sensitivity can be improved by means of further plain radiographs or a more specific system such as the 'carpal box'

(Roolker et al). However, even if the fracture is diagnosed with plain radiographs, displacement which is an indication for surgery, may not be apparent. MRI may demonstrate displacement more accurately (Bhat et al) and thus perhaps clarify the indication for surgery and prognosis in an individual fracture.

Blood flow of the scaphoid

Kulkarni RW, Wollstein R, Tayer R, Citron N.

Patterns of healing of scaphoid fractures: the importance of vascularity.

J Bone Joint Surg [Br] 1999;81-B:85-90.

Dawson JS, Martel AL, Davis TRC.

Scaphoid blood flow and acute fracture healing: a dynamic MRI study with enhancement with gadolinium.

J Bone Joint Surg [Br] 2001;83-B:809-14.

Kulkarni et al looked at blood supply of the scaphoid using MRI. They defined 4 main types of MRI (fracture) pattern on the basis of scaphoid vascularity (2 sets of blood vessels, one enters the dorsal side via the dorsal ridge and the other more distally on the laterovolar aspect near the tuberosity. These 4 types of fracture each behave in a characteristic fashion and can be used to predict union.

Dawson et al also using MRI examined whether blood flow to the proximal scaphoid could be used to predict non-union in acute fractures of the scaphoid. Interestingly they found that poor proximal enhancement on MRI, suggesting avascular proximal pole, did not correlate with nonunion. It would appear that even initially avascular bone can revascularise with subsequent union, consistent with the observation of revascularisation fronts advancing into devitalised proximal fragments on MRI.

Conservative versus operative treatment

Hambidge JE, Desai VV, Schranz PJ, et al.

Acute fractures of the scaphoid: treatment by cast immobilisation with the wrist in flexion or extension?

J Bone Joint Surg [Br] 1999;81-B:91-2.

Saeden B, Tornkvist H, Ponzer S, Hoglund M.

Fracture of the carpal scaphoid: a prospective, randomised 12 year follow-up comparing operative and conservative treatment.

J Bone Joint Surg [Br] 2001;83-B:230-4.

Fractures of the scaphoid will usually heal in a plaster cast and the type of cast probably makes little difference (Hambidge et al). However, early fixation is an alternative that makes no difference in longer follow-up but does reduce the time away from work for some occupations. The longer term risk of STT arthritis with fixation (Saeden et al) is probably caused by the open technique used and may not be a risk with percutaneous techniques.

Fixation

Filan SL, Herbert TJ.

Herbert screw fixation of scaphoid fractures.

J Bone Joint Surg [Br] 1996;78-B:519-29.

Inoue G, Shionoya K.

Herbert screw fixation by limited access for acute fractures of the scaphoid.

J Bone Joint Surg [Br] 1997;79-B:418-21.

Haddad FS, Goddard NJ.

Acute percutaneous scaphoid fixation: a pilot study.

J Bone Joint Surg [Br] 1998;80-B:95-9.

These three papers all suggest that early fixation of the scaphoid, whether by percutaneous, semi-open or open methods, can reduce the time away from work and promote earlier healing. The surgery is demanding but, notwithstanding the learning curve and risk of complications, worthwhile.

Nonunion

Moritomo H, Tada K, Yoshida T, Masatomi T.

The relationship between the site of nonunion of the scaphoid and scaphoid nonunion advanced collapse (SNAC).

J Bone Joint Surg [Br] 1999;81-B:871-6

Daly K, Gill P, Magnussen PA, Simonis RB.

Established nonunion of the scaphoid treated by volar wedge grafting and herbert screw fixation.

J Bone Joint Surg [Br] 1996;78-B:530-4.

DeI Pinal F.

Treatment of nonunion of the scaphoid by a limited combined approach.

J Bone Joint Surg [Br] 2001;83-B:78-82.

Nonunion is a significant problem, leading to a risk of arthritis. The risk and the pattern of arthritis depend upon