

# The significance of optimal and timely diagnosis and treatment of a scaphoid fracture

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**Abstract:** This case report discusses the importance of optimal and timely diagnosis which impacts on the treatment of a patient with a scaphoid fracture. The scaphoid is a 'boat'- shaped carpal bone that articulates with the distal radius, trapezium, and capitate. A delay in diagnosis may lead to a variety of adverse outcomes such as non-union, delayed union, decreased grip strength, decreased range of motion, and osteoarthritis of the radiocarpal joint [1- 5]. A fracture of a scaphoid is easily misdiagnosed due to its minute size and vague clinical symptoms. To avoid a variety of severe adverse outcomes it is necessary for early recognition and diagnosis which should result in the necessary treatment for fast healing of the fracture [5].

**Keywords:** non-union, Russe graft, Herbert scaphoid screw.

## Case report

A 21 year old male patient was referred to an academic hospital after he had a fall during a soccer match. There was tenderness and swelling of his left wrist. He was referred to the radiology department for wrist radiographs. A fracture through the middle (waist) of the scaphoid was diagnosed following routine and additional radiographs. Routine wrist protocols include posterior-anterior (PA), lateral (LAT), PA oblique and anterior-posterior (AP) oblique projections. A thin 'hair'-line fracture through the waist of his scaphoid was evident on the PA projection. Macroradiography of the left wrist was done as an additional view to magnify the scaphoid thereby demonstrating the fracture clearly on the radiograph. A non-displaced fracture was seen as a single line through the waist of the scaphoid.

After diagnosis the patient underwent surgery for insertion of an Herbert scaphoid screw. His wrist was immobilized in a splint. Four months later the follow-up radiograph revealed a healed scaphoid with the screw completely inside the bone. It was unnecessary to remove the screw.

## Discussion

Scaphoid fractures occur in people of all ages. Young men aged 20 to 30 years are most affected due to their day to day activities which include high contact sports. The fracture occurs most often as a result of motor vehicle accidents or during sport activities, when for example, a person falls on an outstretched hand, with weight placed on the palm [1].

The symptoms may not be a clear indication of a fracture therefore many patients who present with a scaphoid fracture may confuse their symptoms with those of a sprained wrist [5]. Some common symptoms include a deep, dull pain and mild swelling or bruising of the thumb side of the wrist and may be accompanied by severe pain with motion of the wrist or when gripping an object [3, 5].

While fractures of the scaphoid can occur in the proximal and distal part of the scaphoid bone, the waist of the scaphoid is the most common area for a fracture [1]. A fracture of the scaphoid tuberosity is also possible. A tubercle fracture occurs through the tuberosity of the distal pole of the scaphoid. A transverse fracture follows through the middle of the waist part of the scaphoid, dividing the scaphoid in equal halves.

The reason why a scaphoid fracture could be misdiagnosed is that it is not always visible on routine radiographs due to its minute size. This is why it is so important to accurately diagnose the fracture and avoid adverse outcomes. By means of accurate positioning and high quality radiographs an acute, non-displaced fracture is visible as a single line through the scaphoid. If there is more than 1mm of

displacement between fracture fragments, an unstable fracture is considered.

A delay in diagnosis may lead to serious complications such as non-union, delayed union, decreased grip strength, decrease in motion and osteoarthritis in the carpal joint [5]. The most serious complication of a scaphoid fracture is non-union [4]. Eisenberg and Johnson (4) state that the complication rate may increase where motion or displacement of the fracture fragments are present. The complications could be due to improper immobilization, for example. Other causes of poor healing of fractures of the scaphoid include, inter alia, poor immobilization, too short a time in a too short cast, and even smoking can have an affect on the healing time [3]. Displaced fractures of the scaphoid have a tendency not to heal, even though all the treatment procedures had been done properly.

Poor blood supply can retard healing of a scaphoid fracture. The blood supply, which keeps the bone alive, comes from the radial artery through the distal portion of the scaphoid. The bone is covered by cartilage. Since blood vessels cannot enter through the scaphoid and there is no direct blood supply, when a fracture is present, a non-union fracture of the proximal portion of the scaphoid is serious. Consequently the proximal fragment may become avascular, turning into ischemic necrosis [4]. Both non-union and ischemic necrosis may lead to arthritis of the wrist. Symptoms of arthritis in the wrist may include pain in the wrist, decrease in motion, and pain when lifting or gripping something [3].

Surgery of the scaphoid involves the realignment of the bone and stabilizing it with screws. The incision is on the anterior or the posterior of the wrist, depending on which part of the scaphoid is fractured [1]. In cases of non-union, a bone graft is recommended which involves a small piece of bone tissue, which is removed usually from the patient's iliac crest and then placed on the scaphoid to stimulate the bone in the fracture [2].

A Russe graft is a surgical procedure where the scaphoid bone is hollowed out. The bone graft is then packed into the hollowed-out scaphoid cavity. Another type of bone graft uses the Herbert scaphoid screw and a solid block of bone between the two ends of the fractured scaphoid. The healing rate of this operation is at least as good, if not better, than the Russe type graft [2].

Rehabilitation after the surgery may include having to wear a cast or splint while the scaphoid fracture is healing. A patient would be warned to avoid heavy lifting and carrying of heavy objects and not to do contact sports. Some people have stiffness in the wrist after scaphoid fractures. An orthopaedic surgeon may recommend hand therapy to help regain the motion and strengthen the wrist [1].

Radiographers play an important role in accurately demonstrating

the scaphoid fracture for optimal diagnosis. With imaging technology improving at such a fast rate, some radiographers may feel it is unnecessary to read up on small, insignificant subjects like the scaphoid. However one should always remember the adage of going back to basics especially as most of these new technologies, such as digital imaging, have not reached the remote radiology departments in South Africa.

### Conclusion

This back to basics case report of a scaphoid fracture highlights the role of routine and additional radiographic projections to ensure that the fracture is timeously diagnosed to minimise possible complications.

### References

1. AAOS. American Academy of Orthopaedic Surgeons (online). Available from < <http://orthoinfo.aaos.org/> > accessed on 26/04/07
2. COSM. The Centre of Orthopaedics and Sport Medicine (online). Available from < <http://www.arthroscopy.com/> > accessed on 26/04/07
3. Dr Nelson. 2007. Scaphoid fracture (online). Available from < <http://www.davidnelson.md/> > accessed on 26/04/07
4. Eisenberg, R.L. & Johnson, N.M. 2003. 3<sup>rd</sup> ed. *Comprehensive Radiographic Pathology*. St. Louis: Mosby, 138.
5. Phillips TG., Reibach AM., Slomiany WP. 2004. American Family Physician (online). Available from < <http://findarticles.com/> > accessed on 26/04/07

<b>ANSWERS to the CPD questions of the November 2008 issue:</b>	
Question 1 (c)	Question 11 (b)
Question 2 (d)	Question 12 (a)
Question 3 (d)	Question 13 (d)
Question 4 (c)	Question 14 (d)
Question 5 (d)	Question 15 (a)
Question 6 (b)	Question 16 (b)
Question 7 (b)	Question 17 (d)
Question 8 (d)	Question 18 (c)
Question 9 (d)	Question 19 (b)
Question 10 (d)	Question 20 (b)



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