

## SCAPHOID FRACTURE NON-UNION

### Patient Information Brochure

#### What is a scaphoid fracture non-union?

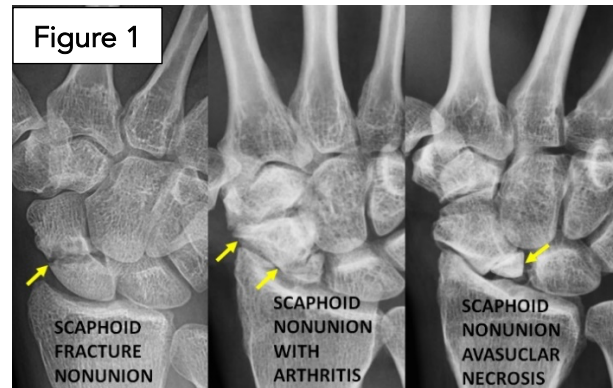
This scaphoid is the most commonly fractured carpal bone, usually as a result of falling on the outstretched hand. The blood supply of the scaphoid bone is delicate and tends to be disrupted when a fracture occurs through the waist or the proximal part of the scaphoid bone. This compromises the ability of the fractured scaphoid to unite leading to the condition of scaphoid non-union. It is not uncommon for patients who have suffered a scaphoid fracture to present in a delayed fashion because pain may not always be severe. This increases the risk of non-union.

#### How are scaphoid fracture non-unions diagnosed?

Patients are generally able to recall an episode where the wrist was injured from a bad fall. Sometimes, if the event occurred at a remote point in time, the only presentation may be a chronic constant pain on the radial side (thumb side) of the wrist. Pain with strenuous activity and wrist extension is typically present. Long standing non-union may be associated with deformity and loss of wrist mobility. The hand surgeon will order x-rays of the wrist (Figure 1) which may not only demonstrate the non-union, but also may show features of complications of a non-union; including arthritis and avascular necrosis (death of the bone from chronic disruption of the blood supply).

Avascular necrosis is deemed to be present when the fragment atrophies and becomes sclerosed (white). Sometimes a CT scan is ordered to determine if there is a non-union with collapse leading to carpal malalignment. An MRI may be ordered if avascular necrosis needs to be excluded.

Figure 1



#### What is the treatment for non-union?

Studies have shown that non-union of a scaphoid fracture will lead to evolution of wrist arthritis which progresses with time. This may translate to more pain, stiffness, and deformity. The longer the non-union has been present, the more difficult it is to achieve union even with surgical intervention. The choice of treatment depends on several factors that include fracture location, the duration of the non-union, the presence of carpal malalignment, avascular necrosis and/or arthritis.

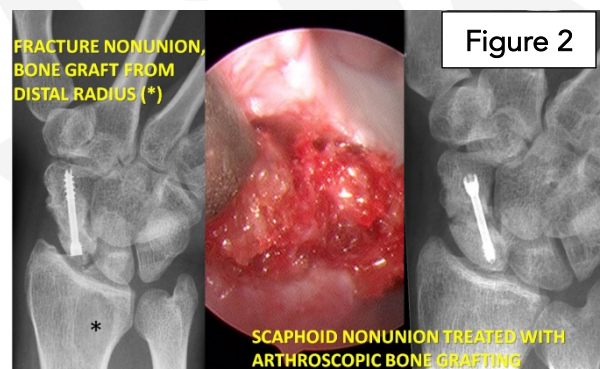


Figure 2

#### Uncomplicated non-union

In an uncomplicated scenario, the non-union may be treated with bone graft and the scaphoid fracture stabilized with a screw. The bone graft augments the healing process and provides structural support when there

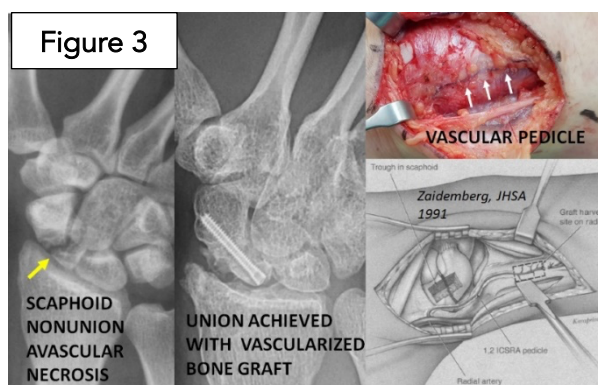


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is carpal collapse. The bone graft may be obtained either from the same wrist from the adjacent radius bone or occasionally from the hip (iliac crest). Some fracture non-unions are amenable to arthroscopic grafting and fixation (Figure 2).

#### **Non-union with avascular necrosis**

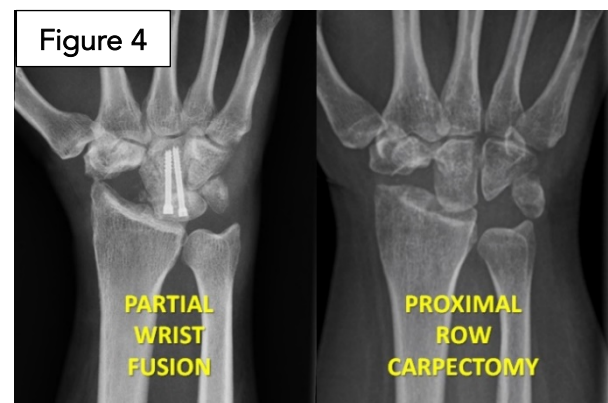


When avascular necrosis is present, more complex techniques are required. This typically involves vascularized bone grafting. The most common donor site for the graft is from the adjacent radius. In this case, the blood vessel to the bone graft is meticulously harvested together with the graft and transferred to the non-union site. This improves the chances of fracture healing (Figure 3).

#### **Non-union with arthritis**

With long standing non-union of a scaphoid fracture, there is abnormal carpal bone motion leading to accelerated wear of cartilage surfaces. This eventually leads to arthritis of the wrist, pain and deformity. In select cases of early arthritis, preservation of the scaphoid may be attempted. In cases with advanced arthritis, pain relief and preservation of function is the goal. This can

often be achieved by rest, activity modification, and judicious use of pain killers. However, if symptoms are not adequately addressed through such conservative measures, salvage procedures may be advised. These are generally effective in relieving pain but come at a cost of wrist mobility. The scaphoid bone and its fragment are removed, and a partial wrist fusion is typically performed. Other procedures (such as a proximal row carpectomy) may be advised depending on the location of the arthritis (Figure 4).



#### **What kind of results can I expect?**

Our hand surgeons have extensive experience in treating this condition including novel strategies. They will discuss the goals of treatment and advise you on the best course of action based on your expectations. The aim is to achieve a pain free union and a supple wrist. With current techniques, success rates in achieving union are high. When arthritis is present, treatment is directed towards pain relief and this may be obtained by conservative means alone. Salvage procedures are reserved for persistent, symptomatic severe arthritis.