Not many upper extremity injuries are as potentially devastating to the athlete as scaphoid fractures. The diagnosis is easily missed, and failure to initiate treatment promptly may result in non-union. Even in the best of circumstances, cast treatment will likely keep the athlete on the sidelines for several months. The advent of percutaneous scaphoid fixation offers the possibility of earlier return to sport, but is it worthwhile? This paper will review contemporary issues regarding the fractured scaphoid.

Far and away, the most common mechanism of injury is fall onto an outstretched hand. Another reported mechanism for scaphoid fracture is contact with a closed fist, termed ‘puncher’s fracture’. Using United States National Emergency Department data, a 2010 study demonstrated that two-thirds of scaphoid fractures occurred in men. The peak age range was 10 to 19, followed closely by 20 to 29 years of age. Among male athletes, the highest number of scaphoid fractures occurred while playing basketball (11%) followed by bicycling and skateboarding. Among female athletes sustaining scaphoid fractures, rollerblading and skateboarding were the most common activities.

Scaphoid fractures may result in a minimal degree of swelling. Often the athlete will ignore the injury, assuming that it was a sprain. The most specific clinical finding is ‘snuffbox’ tenderness, found by palpating the wrist in the hollow between the abductor pollicis longus and the extensor pollicis longus. The diagnosis is confirmed with radiographs, including a posterior-to-anterior (PA) and lateral of the wrist, a PA in ulnar deviation and a semi-pronated PA view. The latter two views are intended to horizontalise the flexed scaphoid, placing the fracture plane in line with the X-ray beam. These fractures are notoriously difficult to treat, and failure to initiate cast immobilisation within 4 weeks is an independent risk factor for non-union. Therefore, the physician should immobilise any injured wrist whenever a scaphoid fracture is suspected, regardless of whether the radiographs are normal. In about 16% of such cases, the fracture will eventually become apparent.

If the initial radiographs are normal in a clinically-suspected scaphoid fracture, the physician has several options. He can choose to immobilise the wrist for 2 weeks, and then repeat the clinical examination and radiographs. Occasionally, resorption at the fracture site will make the scaphoid fracture evident. For the elite athlete, time is of the essence in making a definitive diagnosis. Computed tomography (CT) and magnetic resonance imaging (MRI) are both reasonable next steps. CT is better for assessing scaphoid fracture displacement, but is not quite as sensitive in detecting non-displaced fractures. MRI is better for identifying concomitant ligamentous injuries and altered scaphoid vascularity, but may be overly sensitive in diagnosing scaphoid contusions as fractures. In general, if I simply want to prove that a suspected scaphoid fracture exists, I will order a CT scan, whereas if I am concerned that there is a serious wrist injury with nonspecific clinical findings, I will order an MRI.

Once the scaphoid fracture is diagnosed, the physician has to consider three factors: fracture location, displacement and associated injuries. Distal pole scaphoid fractures generally heal well with 6 weeks of immobilisation. Proximal pole scaphoid fractures heal slowly if at all, and may be associated with avascular necrosis. Waist fractures typically take 8 to 12 weeks to heal. Historically it was felt that scaphoid waist fractures would heal 95% of the time with cast immobilisation. However, more recently, it has become clear that any degree of displacement reduces the likelihood of union to less than 50%. As a general rule, if the physician can easily see the fracture on standard radiographs, it is displaced more than 1 mm. A CT should be obtained if there is any concern for displacement. Associated injuries such as trans-scaphoid perilunate fracture-dislocations are highly unstable. To summarise, surgery is clearly indicated for any proximal pole fracture, any waist fracture with displacement of >1 mm and any scaphoid fracture associated with a perilunate injury. For non-displaced

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**A LETTER FROM**

**BOSTON, USA**

**Should we be repairing all scaphoid fractures in the athlete?**

*Written by Charles Cassidy, USA*

Not many upper extremity injuries are as potentially devastating to the athlete as scaphoid fractures. The diagnosis is easily missed, and failure to initiate treatment promptly may result in non-union. Even in the best of circumstances, cast treatment will likely keep the athlete on the sidelines for several months. The advent of percutaneous scaphoid fixation offers the possibility of earlier return to sport, but is it worthwhile? This paper will review contemporary issues regarding the fractured scaphoid.

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Fractures, cast immobilisation is appropriate. Despite numerous studies on various types of casts, there is no consensus as to what the best cast is (short arm versus long arm, or whether to include the thumb). In general, I will use a short arm thumb spica cast for truly non-displaced fractures.

Scaphoid fractures in athletes pose some unique problems:

1. Sports requiring upper extremity dexterity may be impossible to perform with the limb immobilised;
2. Legislative bodies may prohibit participation of patients wearing casts or solid orthotics;
3. Vigorous activity may disrupt fracture healing.

The specific restrictions regarding athletic participation with casts vary from sport to sport and even among associations within sports. Many sports do allow padded casts. For example, the National Federation Soccer Rule Book (Rule #4 Section 2 Article 1C) requires that all casts, splints or body braces must be covered in their entirety with at least ½ inch thick padding over the entire cast such as high density, closed cell material such as polyurethane. These requirements are obviously intended to protect the opponents from injury. A physician release form is required.

There is very little literature regarding scaphoid fractures in the athlete. A 1985 study of athletes treated with a custom moulded Silastic cast demonstrated excellent results with conservative treatment of scaphoid waist fractures (union in 10/11). The only failures were in proximal pole fractures and in one waist fracture with a delay in treatment of 7 weeks, both of which would be considered indications for surgery today. Another retrospective study of athletes treated with either open reduction and Herbert screw fixation or immobilisation with a playing cast demonstrated that the surgically-treated athletes returned to sport 1 month later than did the casted athletes (8 vs 4.3 weeks). Undoubtedly, the surgeons in this study were conservative in permitting these patients to return to athletics.

The advent of percutaneous scaphoid fixation has expanded the surgical indications to include non-displaced scaphoid waist fractures. To my knowledge, there are no studies looking specifically at this treatment in the elite athlete. However, the rigors of military life may approximate the upper extremity demands seen in sport. In 2001, a prospective, randomised study of U.S. Military personnel treated with either screw fixation or a long arm thumb spica cast demonstrated return to full duty 7 weeks earlier (8 vs 15 weeks) for the patients treated with screw fixation. All fractures healed. The time to union was 5 weeks faster in the surgical group (7 vs 12 weeks). One patient required removal of a prominent screw.

A recent meta-analysis (Buijze et al) comparing operative and non-operative treatment of scaphoid fractures concluded that:

1. “Surgical treatment of non-displaced and minimally displaced fractures results in significantly better patient-reported functional outcome, greater patient satisfaction, better grip strength, a shorter time to union and earlier return to work and that
2. there are no significant differences between surgical and conservative treatment with regard to pain, range of motion, the rates of nonunion, malunion, infection, or complications or total treatment cost.”

Clearly, from the perspective of the athlete and the team, there are compelling reasons to repair the fractured scaphoid including earlier return to sport without encumbrance, minimal atrophy from ‘cast disease’, and earlier return of wrist motion and strength. However, before advocating for surgical treatment of a fracture that has a 95% likelihood of healing without surgery, we must consider the potential complications from surgery, which range from 0 to 29% across the spectrum of papers on percutaneous scaphoid fixation. The majority of reported complications are technical, including broken guidewires, iatrogenic fracture of the proximal pole, tendon ruptures and prominent screws. Attention to detail will likely minimise these complications. Scar tenderness is more common with the volar than the dorsal approach, as is scaphotrapezial arthritis due to violation of this joint during screw placement. The long-term consequences of this fairly frequent radiographic finding are unknown. Sudeck’s atrophy is an uncommon but potentially disastrous complication. Finally, screw fixation does not guarantee union. If early return to sport...
jeopardises the outcome, both the athlete and surgeon will be wondering whether the surgery should have been performed in the first place.

With these issues in mind, I propose the following algorithm: All proximal pole fractures, displaced scaphoid waist (>1 mm), combined injuries and fractures that were neglected for more than 1 month should be repaired without second thought. Acute, non-displaced scaphoid waist fractures warrant a thorough discussion with the athlete and his or her representative. If the nature of the sport requires upper extremity dexterity, cast treatment will likely preclude the athlete from participating for approximately 4 months, whereas surgical treatment will get them back 2 months earlier. In most instances, I would recommend surgery. For sports that do not require upper extremity use, the decision revolves around whether the athlete will be allowed to participate with a padded cast. If not, then I would recommend surgery. If the athlete is allowed to play with a cast, then it is his or her choice whether to accept a cast for 8 to 12 weeks or to undergo surgery. In either scenario, I would obtain a CT scan to confirm union before permitting the athlete to play without a cast.

If early return to sport jeopardises the outcome, both the athlete and surgeon will be wondering whether the surgery should have been performed in the first place.

Further Reading

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