



Case Report

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Scaphoid Non-Union Fracture of Both Wrists in a Young Elite Wrestler Without Significant Trauma: A Case Report



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Running Title Bilateral Non-Union Fracture of Scaphoid

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ABSTRACT

Special attention is needed to assess constant wrist pain to avoid missed carpal bone fractures after traumatic events. Also, the consideration of avascular necrosis of carpal bones such as scaphoid bone after a traumatic or stress fracture is crucial. We hereby report a young elite wrestler who has been complaining about pain in both wrists for about two years before his visit to our clinic. The interesting point about this athlete is bilateral involvement and that the second pathology was probably overuse without any trauma.

Introduction

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caphoid is a critical bone owing to its anatomical position as well as its precious role in wrist normal performance. The distinctive location and blood supply of the scaphoid bone are the most important causes of mal-union or non-

union, which interfere with normal wrist range of motion and impair an individual's productivity [1].

Scaphoid breakage normally occurs following a drop against an extended arm with a sharply dorsiflexed wrist. Youngsters, especially males are mostly affected. The main manifestations are discomfort at the radial border of the wrist, snuffbox sensitivity, scaphoid tu-

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bercle painfulness, and limited mobility. Furthermore, the stress fracture of the scaphoid should be considered in the case of mentioned complaints in every individual whose wrist is under recurring trauma even though there is not a tangible memory of actual damage.

Radiography and occasionally magnetic resonance imaging are used to verify the diagnosis. The expanded distal plate of the radial bone in radiography might be attributed to a critically damaged growth plate at the distal end of the radius which is related to recurring axial pressures due to dorsiflexed wrist [2-4].

In this case, we report a bilateral carpal scaphoid non-union in a young elite wrestler presented with pain and limited function of both wrists. There was an undiagnosed scaphoid fracture in his right hand following a direct trauma about two years ago that subsequently caused Avascular Necrosis (AVN). Furthermore, he suffered from a probably scaphoid stress fracture in his left hand as a result of overuse and the repetitive micro-trauma that imposed an excessive load on the left hand.

Case Presentation

A 19-year-old male elite wrestler was referred to the Sports Medicine Clinic affiliated to Tehran University of Medical Sciences, complaining of pain and limited extension of both wrists (Figure 1). The patient reported that he hit his outstretched right hand to the wall while running fast about two years ago. In the initial

radiograph at that time, no fracture or other bony disorders were seen. He had been treated with rest and exercise cessation for two weeks.

Then he had started training again, but thereafter, more force had been exerted on the left hand due to remaining pain in the right wrist. Five months before the last visit, he felt severe pain in the left wrist while training without any significant trauma. As a result, he stopped training for about two weeks. However, he had to be prepared for a wrestling competition; therefore, he continued training vigorously despite pain even after the competition (about one month before the visit). Finally, he stopped wrestling owing to severe pain and bilateral limited wrists extension.

Evaluation

On physical examination, there was not any swelling or deformity in his hands; however, wrist extension was limited in both active and passive movements. He had tenderness on both dorsal and volar sides of the middle part of his left wrist. Moreover, ulnar and radial deviation was not limited; likewise, there were no sensory defects on both sides. The axial pressure on the first metacarpal bone was not painful, and there was no tenderness on the scaphoid tubercle in the anatomic snuff box. Additionally, other movements such as supination, pronation, and digital movements were normal. His grip strength, measured by hand dynamometer (JAMAR hydraulic hand dynamometer. Model J00105. Lafayette



Figure 1. Limited dorsiflexion in both wrists

Table 1. The result of routine laboratory studies

Result	Normal Range
White blood cells (WBC)=8000/ μ L	4000-11000
Hemoglobin (Hb)=13.3 g/dL	13.5-17.5
Platelet count (Plt)=272000/ μ L	150000-450000
ESR=4 mm/h	<15
Fasting Blood Sugar (FBS)=75mg/dL	70-100
C-Reactive Protein (CRP)=negative	Negative
Rheumatic Factor (RF)=negative	Negative
25(OH) Vit D=21.7 ng/mL	Sufficient: 30-100
Urea=31 mg/dL; Creatine=0.9 mg/dL	15-50 mg/dL; 0.7-1.4 mg/dL



instrument, the USA) showed diminished strength on both hands, especially on the right side (26 and 38 kgf in right and left side, respectively) (Table 1).

Because of the high probability of avascular necrosis, both wrists MRI was requested (Figures 2 & 3).

According to the MRI, reported by an expert musculoskeletal radiologist, evidence of non-union fracture of the scaphoid waist along with AVN changes in the proximal pole was noted that was more severe on the right side. A mild abnormal signal in lunate bone (radial side)

was reported attributing to a trabecular fracture on the right side. Other bony and tendon structures as well as TFCC were normal.

Intervention

The patient was referred to a hand surgeon who recommended surgery owing to his critical position as an elite wrestler. However, the patient did not accept the surgery.



Figure 2. Scaphoid view of left wrist

X-ray (Scaphoid views) was taken from both wrists and a non-union scaphoid fracture of both wrists with sclerotic changes of the proximal pole was reported.



Figure 3. Scaphoid view of right wrist



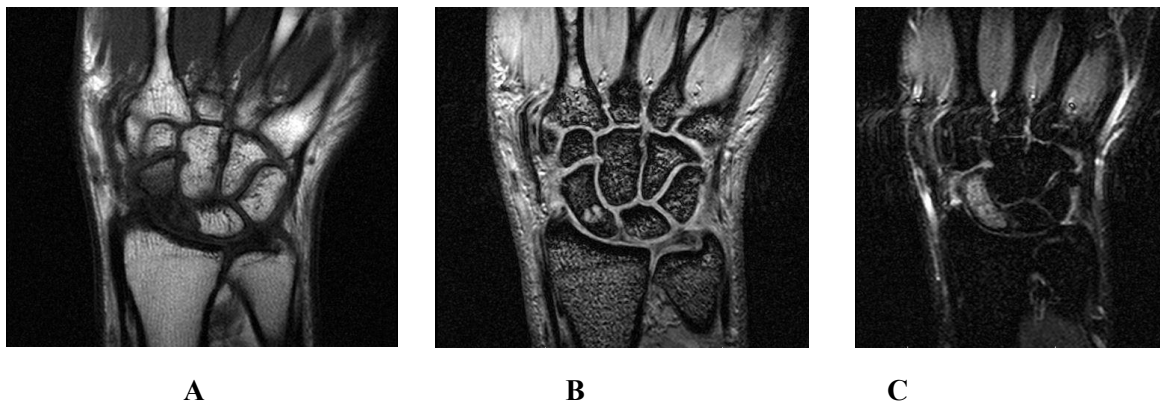


Figure 4. MRI of the right wrist (T1, T2, STIR)

A: T1 weighted, B: T2 weighted, C: STIR

Evidences of non-union fracture of the scaphoid waist, along with AVN changes in the proximal pole were noted in wrist MRI. A mild abnormal signal in lunate bone (radial side) was reported attributing to a trabecular fracture.

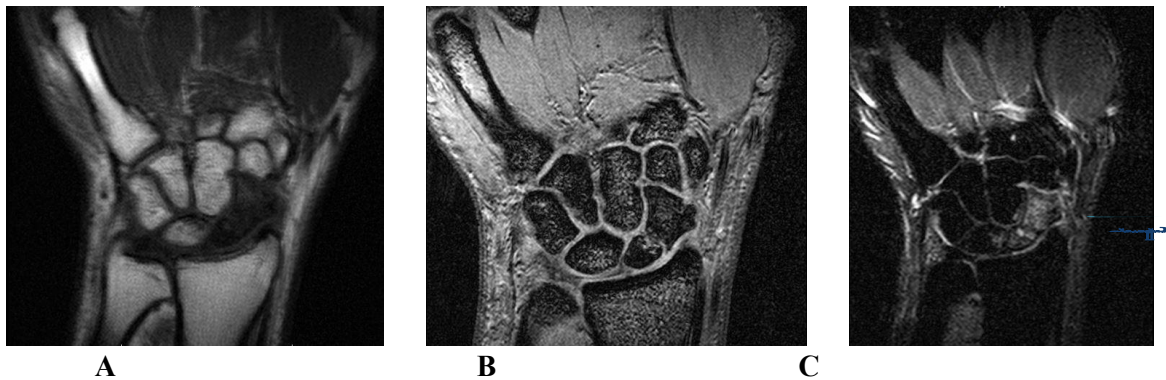


Figure 5. MRI of the left wrist (T1, T2, STIR)

A: T1 weighted, B: T2 weighted, C: STIR

Evidences of non-union fracture of the scaphoid waist, along with AVN changes in the proximal pole were noted in wrist MRI.

Discussion

Up to 70% of all carpal bone fractures are associated with the scaphoid fracture which is the most common type of carpal bone fractures in athletes [1]. Scaphoid fracture most likely to occur in young males whose ages are around 10 to 19 years [4]. Most reported injuries are the result of exerting an axial extension force on the scaphoid bone caused by a fall on an extended wrist [3]. Usually, the initial radiographs are normal and show no abnormalities, which makes it hard to diagnose acute scaphoid fracture [4].

On suspicion of a scaphoid fracture with negative radiographs, the physician can order an MRI of the wrist to assess the existence of fracture [5]. Scaphoid fracture should be taken care of as soon as possible because any delay can result in complications, like non-union, avascular necrosis, and future arthritis [3, 5]. Non-union and

avascular necrosis are both estimated variably from 5% to 50% [5] (Figures 4 and 5)

Two major categories can be considered for hand and wrist injuries; traumatic and overuse. In traumatic injuries, fractures, dislocations, and ligament tears are often reported in contact/collision sports; while stress and overuse conditions are usually reported in gymnastics, racquet sports, and golf. Soft tissue injuries like sprains, strains, and contusions compose most of the injuries occurring in primary care settings [6]. Young, high-level athletes who exhibit repetitive loading with the wrist in extension have also been reported, though rarely, to have scaphoid stress fractures after overuse or repetitive micro-trauma. However, this condition can also occur without an obvious history of major trauma [2].

Most carpal bone stress fractures follow longstanding mechanical overload. Usually, athletes tend to play

through pain which can result in delayed diagnosis. Clinical diagnosis of scaphoid stress fractures may be highly difficult in sportspeople because such fractures usually are not associated with obvious trauma [7]. Thus, patients usually visit a physician as late as six weeks to three months with radiological features indicative of non-union [8]. Although numerous cases of scaphoid stress fracture are reported in particular sports like gymnastics, badminton, and diving [7-9], as far as we know, such cases have not been reported in wrestling so far.

Although severe hand injuries are not common in wrestling, the most common type of fractures seen in wrestlers is bony fractures in hand [10]. Therefore, chronic wrist pain in wrestlers should be investigated with great caution, even in cases where no acute trauma is already reported. In these cases, early requests for more sophisticated imaging modalities (such as MRI) and careful follow-up of the athlete seem mandatory. Otherwise, some irreversible complications may result in unpleasant consequences for the health and career of elite athletes.

Ethical Considerations

Compliance with ethical guidelines

All ethical principles are considered in this article. The participants were informed about the purpose of the research and its implementation stages; they were also assured about the confidentiality of their information; moreover, they were free to leave the study whenever they wished, and if desired, the research results would be available to them.

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Conflict of interest

The authors declared no conflict of interest.

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