



## Fracture Diagnosis Using Magnetic Resonance Imaging: A Case Report

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### Abstract

Falling is likely to occur in daily life and sports activities cause from right injury to severe injury in the upper extremity. The injuries from falls can range from contusion and sprain to fracture and dislocation. The injury occurs on the upper extremity more than on the lower extremity because people put their hands out to protect themselves from the body. Radiography (X-ray) can quickly diagnose a fracture because of the fracture line. In this case report, a 20-year-old woman slipped and put her hand to protect her body during ice-skating. The radius is a fine fracture line that could not be diagnosed by X-ray in this case even though magnetic resonance imaging (MRI) presented a fracture line.

### Keywords

Bone Fracture, Magnetic Resonance Imaging, Radiography, Range of Motion, Case Report

### Introduction

Falling is an accident that is likely to occur when walking or climbing stairs in daily life. It also tends to occur in sports activities on the water. Injuries from this fall range from mild to severe injuries requiring hospitalization or surgery. Interviews, palpitations, and diagnostic imaging are used for these diagnoses. X-ray has been used as the primary imaging technique for accurate evaluation and localization of patients with a suspected fracture. Ultrasonography (US) procedures were utilized to rule out deep tissue. MRI has been used as an imaging modality for soft tissue damage such as tendinous and ligamentous. MRI, recently, has become an imaging modality choice for identifying occult fractures which are missed on X-ray [1,2].

In this case study, I would like to present the

diagnostic imaging of MRI in the radial injury caused by a fall.

### Patient Information

A 20-year-old healthy and active woman did not have any medication and treatment. She visited a clinic at the university with severe pain in the left hand and wrist. She slipped down by herself and hit her hips and palms with a full extension on the ice during ice-skating. She had severe pain and mild swelling in the hand and wrist of her left limb with difficulty in moving her fingers and wrist. Immediately after being injured, she was put on ice with a splint and bandage to stabilize her left wrist and arm.

### Diagnostic Assessment

She had severe pain and mild swelling in the hand and wrist of her left limb with difficulty in moving her

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fingers and wrist. During the physical examination by the orthopaedic doctor, there was tenderness in the palm, the wrist, and the distal part of the radius with palpation, but not tingling. The injured hand was not able to close (flex) because of the increase in severe pain. No fracture line and dislocation in the injured palm, wrist, ulnar, and radius on radiography (X-ray). Ultrasonography (US) procedures were utilized to rule out deep tissue. The US revealed a shadow part in the radius. A magnetic resonance image (MRI) demonstrated many small fracture lines of the distal part of the radius (**Fig-1**).



**Fig-1:** MRI image of the injured radius bone with small fracture lines (above the star) in the left wrist.

### Therapeutic Intervention

She was treated with the conservative methods of resting, cold pad, plastic splint, compression and sling (triangle bandage) [3,4].

### Discussion

Falling during sports activity and/or daily living is possible to cause a fracture in the upper extremity. Although injuries to the upper extremity are the costliest, the picture of the upper extremity injury problem remains incomplete [5]. Ice skating is a most popular winter sport; related fractures have been reported as high as 82.8% of all sports-related fractures [4]. The most common fractures in ice skating in adults have involved upper (80%) and lower extremity injuries (11%). The majority of the

upper injuries has been distal radius fracture [6]. Another sports-related fracture in the upper extremity is soccer. Soccer is a popular sport in the world, and related injuries which were 35% upper extremity and 53% lower extremity injuries were recorded [7]. Fractures were more frequently diagnosed in the upper than in the lower extremities (44% and 14%, respectively), especially in children. Falling was the main cause of upper extremity injury. Andersson et al. [8] presented the relationship between injury incidents and layoff time. Injuries to the hand, and upper extremity constituted less than 1% of all time-loss injuries in male professional soccer players. However, fractures are the most common injuries that occur in the upper extremity such as the hand (54.1%), wrist (60.0%), and forearm (85.7%). In addition, the layoff time for injured soccer players with upper extremities was hand (16±27 days), wrist (15±18 days), and forearm (45±8days). Therefore, although the rate of injury in the upper limbs is low, when an injury occurs, the fracture is severe and the period of layoff time is long. The last study presents that children injured their upper extremities during physical activity. Of the upper extremity injuries, 55% were sprain, 47% occurred in the hand/wrist, and 53% of cases were caused by a fall [5].

Since the fracture due to X-ray could not be confirmed, it was diagnosed as sprain or bruise, and it is possible to return to practice or the game early by fixing with splint and bandage. Therefore, another fall may result in a more severe fracture. In that case, fixing the plate by surgery increases the physical and mental stress and financial burden. Distal radius fractures in adults are among the most common fractures encountered by orthopedic surgeons. Treatment options vary depending on injury severity and stability of the fracture reduction. Common surgeries include pinning with and without external fixation. Dorsal plating with low profile plates and fragment-specific techniques, also, can be successful in treating distal radius fractures [9]. However, it is necessary to make a decision of surgical treatment with the consideration of bone growth and development, if the patient is a growing child.

### Conclusion

Falling is the cause of fracture in the upper extremity. The risk factors should be taken into account when diagnosing and managing injuries in the upper extremity.

### Learning Points

- Fracture of the distal part of the radius without the dislocation is seen regularly in fall down in soccer and ice-skating.
- MRI have been used as the primary imaging modality for evaluation of patients with the acute injury.

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### Conflict of Interest

The author has contributed equally in preparing the manuscript research, review, writing and all of them have approved the final draft of the article. The author has no conflicts of interest to declare.

### Patient Consent for Publication

Obtained

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