



Isolated fracture of the fibular shaft due to alpine skiing; a specific injury

Halis Atıl Atilla¹, Ozkan Kose², Ferhat Guler², Hayati Aygun³, Cemil Yildiz⁴

¹ Sarıkamış Military Hospital, Orthopedics and Traumatology Clinic, Kars, Turkey

² Antalya Education and Research Hospital, Orthopedics and Traumatology Clinic, Antalya, Turkey

³ Kafkas University, Faculty of Medicine, Orthopedics and Traumatology Department, Kars Turkey

⁴ Gulhane Military Medical Academy, Department of Orthopaedics and Traumatology, Ankara, Turkey

Abstract

Although musculoskeletal injuries of lower leg due to alpine skiing is well known and widely reported, an acute isolated fibula fracture as a specific ski injury has not been reported in the relevant literature. Herein, we present a case of isolated fibula fracture which is missed at initial admission, and discuss the mechanism of injury and relationship with alpine skiing equipment.

Key words: Alpine skiing, skiing injuries, fibula, fracture

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Corresponding author: Ferhat Guler, Uncali Mah. 30 Cad. Park Koza Evleri B Blok Daire 11 Konyaalti, Antalya, Turkey

E-mail: drferhatguler@gmail.com **Phone:** +90 505 346 61 03

Introduction

Skiing is one of the most popular winter sports all over the world. Skiing has evolved into many different disciplines that differ greatly regarding both technique and equipment [1]. Alpine skiing, also known as downhill skiing, involves the highest speeds and therefore carries the greatest risk for injuries [2-3]. A wide variety of injuries have been reported as a result of alpine skiing ranging from simple soft tissue contusions to severe spinal cord injuries and even death[2]. The reported injury rate for alpine skiing is 2.5- 10.9 per 1000 skier day [4-6]. Although, musculoskeletal injuries and fractures of lower extremity related to alpine skiing are well known and widely reported [7], to the best of our knowledge an acute isolated fibular fracture as a specific ski injury has not been reported up to date. Herein, we present an isolated fibular fracture due to direct impact of ski boat edge which was missed at initial admission. We have discussed the possible mechanism of this specific injury, and the relationship between the alpine skiing equipment.

Case Report

28 year-old male professional skier was admitted to our outpatient orthopedic clinic with lateral sided leg pain after a fall while skiing one week ago. Immediately after the fall, he could weight bear with little pain and he thought that it was a simple soft tissue injury and continued skiing for whole day. He stated that he attended the emergency department of another medical center because of the persistent pain at the end of the day, and his leg radiographs were taken. Thereafter, rest, ice, compression and elevation were advised and pain medications were prescribed for a diagnosis of muscular contusion. Despite, resting and treatment his complaints worsened throughout the week.

On physical examination, there were local tenderness and mild swelling over the lateral aspect of the leg. Active and passive range of motion of the ankle and the knee were in normal limits with slight pain on ankle dorsiflexion. Neurovascular examination was also normal. The new radiographs of the leg showed bowing of fibula and cortical discontinuity, and we described this injury as a fibular fracture (Figure 1). The patient was treated with partial weight bearing with crutches for a month, followed by sport activity restriction for an additional month. At the 2th month follow-up, the patient returned to his previous level of activity, with slight pain on forceful movements. At the final follow-up, 6 months after the

initial injury, the patient was completely free of pain with evidence of radiologic fracture union (Figure 2).



Figure 1. Radiographs taken at the initial admission. Note the apparent fibular bowing with subtle cortical discontinuity (arrow).

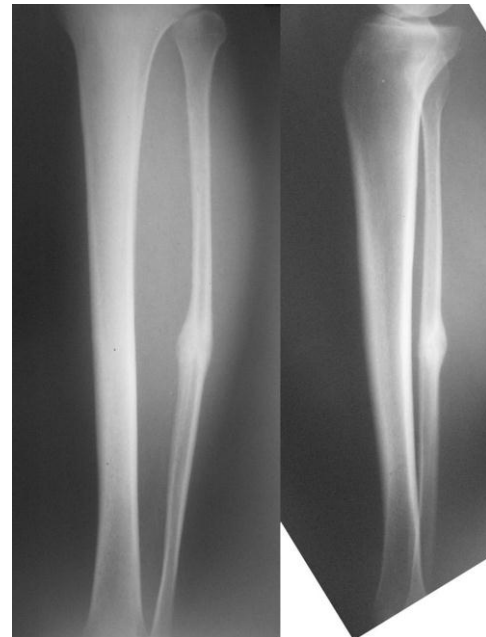


Figure 2. Radiographs at the final follow up. Fracture union with aberrant callus formation is seen (arrow).



Figure 3. A photograph showing the possible mechanism of injury. The black arrow shows the site of injury where rigid boot edge applied direct force to the fibular shaft.

Discussion

We have tried to explain the possible mechanism of injury with detailed history of falling with the patient who is an elite skier. The patient gave a history of a valgus and external rotation injury which has been already described in detail in previous studies for skiers' knee [8]. However, in our patient there was no knee injury. In our opinion, with valgus and external rotation of the leg, rigid ski boot edge impacted a direct force on the posterolateral aspect of the leg and the fibula, and fibular bowing and fracture occurred (Figure 3). However, magnitude and duration was not enough to cause a further fracture at the tibia or ligamentous injuries in knee because of releasing of the bindings just after the fracture and falling. In Alpine skiing the boots are composed of rigid plastic which covers the ankle and the lower leg, and fixed to the ski at the heel and toe [9]. Inappropriate tightening of the boot may further be a predisposing factor for this specific fracture pattern. We think that loose tightening of the boot caused free movements of the leg in the boot similar to the three point bending forces in which the boot edge hinged the fibula.

Although, isolated fractures of the distal fibula (lateral malleolus) are frequent, isolated fracture of the fibular shaft is an uncommon injury. These fractures usually occur following direct blow to the lateral aspect of the leg[10]. Similarly in our patient, fibular fracture occurred with direct impact of the rigid ski boot. In relevant literature [1, 11-13], there are various descriptive studies which investigate the alpine skiing injuries. A comprehensive survey of the literature including series, revealed no isolated fracture of midshaft fibula. We think these injuries are more likely to be underreported immediately by the skiers, because these fractures are self-limited and benign in nature. It is also possible that most patients are misdiagnosed as soft tissue contusions in emergency admissions. Occasionally isolated fibular fractures may occur in the form of bowing rather than a complete fracture [14]. Moreover, these fractures usually do not show displacement due to intact tibial shaft.

As a conclusion, isolated fibular shaft fractures should be kept in mind during evaluation of leg pain in an alpine skier. These fractures can easily be missed due to subtle clinical and radiographic findings. Furthermore, our case may provide an insight for the progression in alpine ski boot design and binding technology. Flexible and elastic ski boot edges may be a solution.

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