

# **Skiing Injuries: Snowboarding**

Background

Upper Extremity

Lower Extremity

Nordic Skiing

Snowboarding

Contributors

## **Epidemiology**

1. 25% of injuries occur during 1st time snowboarding
2. 50% of injuries occur during 1st year
  - Falls-most common cause
  - Jumps second most common cause
  - Collisions 5-10%
  - Waiting in lines, entering/exiting ski lifts 2-8 %
  - High torque between free foot and locked leg (lead leg)
    - Increased knee injuries
  - Severe injuries
    - 54% head
    - 32% abdomen
    - 32% bones
    - 16% thorax 16%

## **Prevention**

1. Lessons for proper technique
2. Snowboard within own physical ability
3. Good physical conditioning
4. Snowboard with a buddy
5. Stop before fatigued

## **Upper Extremity**

1. Epidemiology
  - Lead upper arm more vulnerable
  - Beginners
    - More wrist injuries
  - Intermediate/Advanced
    - More shoulder, hand, elbow injuries
  - Snowboarding injuries more common than alpine ski injuries
2. Mechanism of injury
  - Falls most common cause
    - Forward – shoulder injuries
    - Backward – wrist injuries
    - Aerials – elbow dislocations, AC sprains, wrist dislocations
3. Wrist
  - Epidemiology
    - 25% all injuries – most common injury
    - 44% of all UE injuries

- Physical exam of the hand
  - Imaging
    - AP/lateral X-ray of wrist
    - Scaphoid fracture difficult to image
    - If pain present over snuff box or scaphoid tubercle
      - PA/lateral X-ray of wrist
      - If no fracture
        - PA/oblique view with ulnar deviation
      - If no fracture
        - Thumb spica splint
      - Repeat X-rays with ulnar deviation in 2-3 weeks if pain persists
      - Pain/no fracture visualized MRI or bone scan
    - Injuries
      - 65% of wrist injuries are fractures
        - Distal radius fractures: Colle's, Smith's, Barton's
        - Carpal fractures
      - Sprains and dislocations
        - Scapholunate dissociation versus wrist sprain
    - Prevention
      - Wrist guards help
        - May increase injuries proximal to wrist guard
      - Keep hand in closed-fist position while snowboarding

#### 4. Shoulder

- Epidemiology
  - 8% of all injuries
- Symptoms and physical exam
  - History and Physical Exam of the Shoulder
- Imaging – dependent on injury
- Injuries
  - Rotator cuff sprains
  - Fracture
    - Clavicle fractures
      - Most common fracture of shoulder
    - Scapula fractures
  - Acromioclavicular (AC) joint injuries
  - Anterior shoulder dislocation
  - Posterior shoulder dislocation

#### 5. Elbow

- Epidemiology
  - 4% all injuries
  - 8% of UE injuries
- Physical exam
  - Neurovascular exam pre and post reduction
  - See Musculoskeletal Exam: Above the Waist
- Imaging
  - AP/lateral X-rays of elbow
    - Non-displaced radial head fractures may be difficult to see

- Injuries
  - Fracture
    - Olecranon fractures
    - Radial head and neck fractures
  - Elbow dislocation

#### 6. Forearm

- Epidemiology
  - 6% of all UE injuries
  - Usually fracture radius and ulna
- Imaging
  - AP/lateral X-ray of wrist/elbow
- Injuries
  - Fractures
    - Both bone forearm fracture (adult)
    - Monteggia and Galeazzi fractures
      - Very rare

#### 7. Hand

- Epidemiology
  - 8% of all UE injuries
  - 50% hand injuries were fractures
- Physical exam
  - See Physical Exam of the Hand
- Imaging
  - Metacarpal
    - PA, lateral, oblique radiographs
  - Phalanges
    - AP, lateral, oblique X-rays
- Injuries
  - Fractures
    - Metacarpal
    - Phalanges
  - Sprains
  - Dislocation
    - Metacarpophalangeal dislocations
    - PIP joint dislocations

### **Lower Extremities**

#### 1. Epidemiology

- 33% of all injuries
- More likely to have foot and ankle injuries than alpine skiers
- Lead leg at greatest risk
  - 75% of LE injuries
    - Related to boot type
  - Soft boots are most commonly used
    - Increased risk of ankle fractures
  - Hard boot better for carving/racing
    - Lead to "boot top" fractures of tibia and
    - Increased knee sprains (~16% of all injuries)
  - Hybrid boots

## 2. Ankle

- Epidemiology
  - 17% of all injures
- See Lower Extremity Exam
- Imaging
  - Ottawa Ankle Rule
- Injuries
  - Ankle fracture
    - 50% of ankle injuries
  - Snowboarder's ankle
    - Epidemiology
      - 15% of all ankle injuries
      - Type 1 – articular process chip fracture of the talus
      - Type 2 – single large fragment extending from talofibular joint to subtalar joint
      - Type 3 – comminuted fracture of entire lateral process
    - Mechanism of injury
      - Forced ankle dorsiflexion and inversion – especially when landing from a jump or aerial maneuver
    - Symptoms and physical exam
      - Severe "ankle sprain"
      - Persistently painful
      - Limited ROM
      - Not improve with appropriate management
    - Imaging – hard to diagnose on X-ray
      - Lateral with 10-20 degrees of inversion
      - CT or MRI if X-ray negative and still suspicious
    - Treatment<sup>12</sup>
      - Non-displaced or minimally-displaced fracture: short-leg partial weight bearing cast for six weeks
      - Displace and comminuted fracture - ORIF
    - Prevention
      - Hard boots and hybrid boots are protective

## 3. Knee

- Epidemiology
  - Decreased knee injuries (16% vs. 38%) compared to skiers
    - Less twisting and rotation during crash
- Physical findings
  - See Lower Extremity Exam
- Imaging
  - See Ottawa Knee Rule
- Injuries
  - Sprains – most common knee injury
    - Anterior cruciate ligament (ACL)
    - Collateral ligaments (MCL/LCL)
    - Prevention
      - Soft boots decrease injury

#### 4. Head and spine injuries

- Epidemiology
  - Increased head injuries versus alpine skiing
  - Increased spine injuries versus alpine skiers
  - More backward falls leading to axial loading
    - Inexperienced snowboarders – falls
    - Expert and intermediate snowboarders - jumping accidents
      - Jumping causes 80% of spinal injuries
        - Usually affect the thoracolumbar area
  - Most common injury: traumatic brain injury
- Mechanism of injury
  - Impact to back of head
    - Force low due to impact on rest of body first
- Injuries
  - Concussion
    - 15% of all injuries
  - Spine injuries
    - See Back Trauma
- Prevention
  - Helmet use not required in US
  - Helmet recommendations: European Committee for Standardization
    - Lightweight
    - No larger than athlete's head
    - Not interfere with hearing and sight
    - Be careful of helmets popular among snowboarders
      - Shorter in back but occipital area most frequently injured in snowboarding
    - Helmet should cover entire head but not touch nape of neck

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### **Evidence-Based Inquiry**

1. What is the Best Way to Evaluate an Acute, Traumatic Knee Injury?

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