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
   o Falls-most common cause
   o Jumps second most common cause
   o Collisions 5-10%
   o Waiting in lines, entering/exiting ski lifts 2-8%
   o High torque between free foot and locked leg (lead leg)
     ▪ Increased knee injuries
   o 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
   o Lead upper arm more vulnerable
   o Beginners
     ▪ More wrist injuries
   o Intermediate/Advanced
     ▪ More shoulder, hand, elbow injuries
   o Snowboarding injuries more common than alpine ski injuries
2. Mechanism of injury
   o Falls most common cause
     ▪ Forward – shoulder injuries
     ▪ Backward – wrist injuries
     ▪ Aerials – elbow dislocations, AC sprains, wrist dislocations
3. Wrist
   o Epidemiology
     ▪ 25% all injuries – most common injury
     ▪ 44% of all UE injuries
o 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
      o PA/oblique view with ulnar deviation
    • If no fracture
      o 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
      o Distal radius fractures: Colle's, Smith's, Barton's
      o Carpal fractures
    • Sprains and dislocations
      o Scapholunate dissociation versus wrist sprain
  • Prevention
    • Wrist guards help
      o May increase injuries proximal to wrist guard
    • Keep hand in closed-fist position while snowboarding

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

5. Elbow
  o Epidemiology
    • 4% all injuries
    • 8% of UE injuries
  o Physical exam
    • Neurovascular exam pre and post reduction
    • See Musculoskeletal Exam: Above the Waist
  o 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 injuries
   - 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 form 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
     - 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
   o 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
         o Jumping causes 80% of spinal injuries
           ▪ Usually affect the thoracolumbar area
     ▪ Most common injury: traumatic brain injury
   o Mechanism of injury
     ▪ Impact to back of head
       • Force low due to impact on rest of body first
   o Injuries
     ▪ Concussion
       • 15% of all injuries
     ▪ Spine injuries
       • See Back Trauma
   o 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
         o Shorter in back but occipital area most frequently injured in snowboarding
       • Helmet should cover entire head but not touch nape of neck

References

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

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