Skiing Injuries: From Deep Powder to Big Air

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More common scenario for injury
Overall Injury Risk

- 2-4: 1000 participant days (Ekeland et al)
  - If you ski 20 days per year, injury every 12-25 years.

- Lower than other popular sports like football

- Fallen steadily over recent years
  - Improved equipment
  - Ski Area design and prepartation
Alpine Ski Injury Classification

- Sprain/Strain: 47.7%
- Concussion/LoC: 4.4%
- Contusion: 12.1%
- Joint injury: 6.5%
- Fracture: 18.9%
- Laceration: 10.4%
Injury Type

Commonly injured areas
Alpine skiing

<table>
<thead>
<tr>
<th>Area</th>
<th>% of all Injuries</th>
</tr>
</thead>
<tbody>
<tr>
<td>Knee</td>
<td>33.4</td>
</tr>
<tr>
<td>Head/face</td>
<td>13.5</td>
</tr>
<tr>
<td>Shoulder</td>
<td>9.5</td>
</tr>
<tr>
<td>Lower leg</td>
<td>8.6</td>
</tr>
<tr>
<td>Ankle</td>
<td>6.1</td>
</tr>
<tr>
<td>Thumb</td>
<td>4.4</td>
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</tbody>
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ACL Injuries

- Historically mechanism most common landing on tails of skis
  - Reduced with modern carving skis with smaller tail

- Braces:
  - Prophylaxis may reduce rate of secondary injuries (2.74X) but not shown in primary prevention
Before releasable bindings “Boot Top” tibia fractures were most common fracture
Shoulder Injuries

- Glenohumeral dislocations
- Acromioclavicular separations
- Clavicle fractures
- Proximal Humeral fractures
Thumb Injuries

- **Skier’s Thumb**
  - Fall with pole in palm causing radial force to thumb
  - UCL injury to 1st MCP
- Reduced with pole design
- Releasable straps
- Thumb “on-top”
Axial Injuries

- Head injuries
  - Potentially serious head injuries are rare.
  - Typically from collision without helmet

- Spinal Injuries
  - Most common from aerial maneuvers
  - Effective Fall Height (terrain parks)
    - Nordic ski jumps have an EFH of only 0.6 M despite lengths >100m
Risk of Death

- 1: 1,570,000 participant days
  - Lower than swimming and cycling
- High speed collision (tree or another person)
- Medical: MI, hypothermia, asthma
Michael Schumacher skiing crash: did helmet camera cause head injuries?

Investigators are exploring the theory that Michael Schumacher's helmet camera could have caused the helmet to shatter, leading to serious head injuries.
Off Piste (Backcountry Skiing)

- In addition to the standard equipment required for on-piste activities, backcountry skiers and boarders should carry supplementary equipment to assess and manage the risks and consequences of avalanche.
- This includes avalanche transceivers, probes, shovels, and airbag systems.
- Regular training in avalanche search techniques is recommended as time is a critical factor in avalanche survival.
Before you go...

- Take a Safety Class
- Practice Rescue
- Check conditions
  - www.avalanche.org
- Ask yourself what if...

- Always Carry:
  - Avalanche Transceiver – to locate burial site
  - Probe – to pinpoint the victim
  - Shovel – to extract the victim

- Consider carrying:
  - Avalanche Balloon System
  - Emergency Communication Device – to call for help
  - First aid kit, warm jacket and tarp or pad to reduce the onset of hypothermia until help arrives.
90% of people involved in Tree Well/ SIS hazard research experiments could NOT rescue themselves.

If a partner is not there for immediate rescue, the skier or rider may die very quickly from suffocation - in many cases, he or she can die as quickly as someone can drown in water.
Injury Reduction
Equipment

- Personal Fit
  - Borrowing a friend’s equipment may increase risk of injury by 800%
- Helmets
- Bindings checked regularly (15% of ski injuries)
  - Properly set bindings may reduce by 25%
- Self Test
Testing your toe piece setting

With your ski angled so that the front inside edge is on the ground, try and twist your boot inwards so that the toe should twist out of the front of the binding. Apply the force gradually – you should not have to use excessive force.
Testing your heel piece setting

With your ski flat on the ground, slide your foot back until your leg is out straight. Now try and lift the heel of your boot out of the binding. Don’t use too much force - you’ll strain a muscle or possibly even rupture your Achilles tendon if you’re too vigorous!
Conditioning

• Begins pre-season
• ACL Conditioning Classes
  • Squats (double and single leg)
  • Core (planks, bridges)
  • Landing mechanics
Conclusions

- Injuries in skiing are relatively rare compared to other sports
- Dominantly involve lower extremity
- Injury prevention may greatly reduce risk
References

- Ekeland A, Rodven A. Skiing and boarding injuries on Norwegian slopes during the two winter seasons 2006/07 and 2007/08. Skiing Trauma and Safety 18th volume. ASTM STP. 2011;1525:139–49.
- http://www.ski-injury.com
- http://www.deepsnowsafety.org