“General reasons and mechanisms of winter sport accidents: Is it speed only?”

Rebecca M Hasler, MD MSc

Department of Emergency Medicine
The faster they ride, the harder...

\[ \bar{v} = \frac{s(t)}{t} \]

Doubling the speed produces a four-fold increase in the energy of the impact.
External factors

- Protectors used
- Slope conditions
- Snow conditions
- Visibility / weather
- Aggression on slopes
- Age of skiing material
Personal factors

- Age, gender
- Risky behaviour
- Skiing experience
- Warm-up
- Offensive or defensive skiing style
- Alcohol, drugs
Impact with a speed up to 20-23km/h
(CE-EN 1077)
Environmental conditions
• Risky behaviour
• Low speed
• New skiing material
• Old snow
• Powdery slopes
• Drug consumption


Combined risk factors

- Medium speed
- Icy slopes
- No helmet
Risky behaviour in helmeted skiers

Chi-square tests revealed that ski helmet use did not significantly differ between self-reported risky and cautious people (81% vs 83%).

Riding off-piste

Multivariate regression analysis revealed […] and off-slope skiing (OR 2.2, P = 0.060) to be predictive for a risky behavior on ski slopes.

The analyses comparing riders off-piste versus those on the slope showed a significantly increased OR of 7.62 (p=0.004) for sustaining a head injury with need for surgical intervention.

Beginners?


Higher skill levels?

Mechanism of injury

10% collisions, 90% self-inflicted


Hours of the day
Alcohol consumption?


Accident prevention on ski slopes - Perceptions of safety and knowledge of existing rules.
KEEP CALM AND SKI ON
<table>
<thead>
<tr>
<th>Outcome</th>
<th>Crude OR (95% CI)</th>
<th>Adjusted OR (95% CI)</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Moderate to severe TBI</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>alpine skiers</td>
<td>2.76 (0.75-10.2)</td>
<td>2.37 (0.63-8.86)</td>
<td>0.202</td>
</tr>
<tr>
<td>snowboarders</td>
<td>23.3 (3.52-153.5)</td>
<td>27.7 (3.26-235.3)</td>
<td>0.002</td>
</tr>
<tr>
<td><strong>Open head injury</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>alpine skiers</td>
<td>1.66 (0.35-7.95)</td>
<td>1.18 (0.24-5.88)</td>
<td>0.843</td>
</tr>
<tr>
<td>snowboarders</td>
<td>----</td>
<td>----</td>
<td></td>
</tr>
<tr>
<td><strong>Complicated minor TBI</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>alpine skiers</td>
<td>2.22 (0.60-8.18)</td>
<td>1.89 (0.50-7.13)</td>
<td>0.350</td>
</tr>
<tr>
<td>snowboarders</td>
<td>----</td>
<td>----</td>
<td></td>
</tr>
</tbody>
</table>