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Unique Aspects of Snowboarding Injuries

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Objectives

- Review epidemiology of snowboarding and related injuries.
- Understand mechanism of injury in snowboarding.
- Discuss anatomic regions injured.
- Contrast injuries with those in alpine skiers.
- Review injury prevention for snowboarding.

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Snowboarding participation

- Skiing and snowboarding continues to grow
- In the US, 11-12 million people hit the slopes each year, approx. 3% of population
- 30-40% are snowboarders
- Beginner snowboarders are more likely to have significant injury

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Anatomic location of snowboarding injuries

Wrist	16-32%
Elbow	2-5%
Shoulder	8-16%
Foot	1-3%
Ankle	12-28%
Knee	12-20%
Spine	2-7%
Head	10-18%
Chest	1-3%
Abdomen	6%

Compiled from multiple sources

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Common Injury Mechanisms

- Catching an edge
- Falls on uneven terrain
- Falls loading and unloading from ski lift
- Falling during tricks or jumps
- Hard landing from jumps
- Collision with objects and other riders

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Catching toe edge at speed

Sequence of injury:

- -Wrist, Elbow, Shoulder
- -Chest, face, head, neck
- -Lumbar hyperextension.
- -Hip/knee and ankle as the board digs in a second time.

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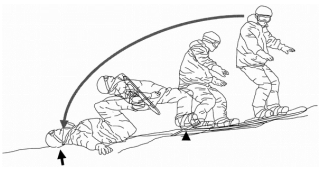
Catching the heel edge



-Straight elbow if time to reach back
-Occiput impact – more significant head injury
-Board digs in after roll, possible ankle, knee and hip involvement

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Half pipe - hard landing

- Halfpipe 18-22 feet tall and 50 feet across.
- Injuries include hard landing on the top edge
- Falls into the flat bottom
- Twisting injuries related to tricks.

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Head injuries

- From crashes and collisions
- More frequent than in skiers.
- 15% of snowboarding injuries are head injuries
- Head at risk with heel edge crashes – harder to break fall with arms. Occipital impact.
- Most common cause of morbidity and death among snowboarding
- Helmets have been shown to lower the risk
- Spine and pelvic fractures may occur from collisions with fixed objects and hard landings.
- Sprains and compression fracture may occur

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Head injury and severe initial symptoms

- ❖Risk of death is 0.71 per million snowboarder days. Similar to skiing, but small studies.
- ❖Stabilize as in trauma
- ❖Airway, breathing, circulation
- ❖Cervical spine stabilization
- ❖If unconscious or decreased mental status, assume cervical spine injury
- ❖Medical planning and trained personnel

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Upper Extremity

- The wrist is the most commonly injured body part in snowboarders
- Used to break the fall – heel edge straight elbow
- Sprains and fracture occur of varying severity.
- In those injured requiring hospital/ER visit, 36% of upper extremity injuries were fractures in snowboarders compared to 9% in skiers
- Snowboarders have up to twice the number upper extremity injuries.
- First time skiers and snowboarders have approx. 4% chance of injury.
- In snowboarders, these injuries are more likely to need immediate medical attention.
- Beginners, wrist sprains, physeal fractures and distal radius fracture.
- Intermediate and advanced riders sustain higher force injuries such as scaphoid fractures and scapholunate dissociation
- Forward falls toe edge more likely to cause shoulder injury

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Lower extremity

- 12-28 % of snowboarding injuries occur at the ankle.
- 2/3 to the lead leg.
- Sprains, fractures and contusions
- ACL only 1% of snowboarding injuries.
- Unique pattern of lower extremity fractures in the lateral process of talus.

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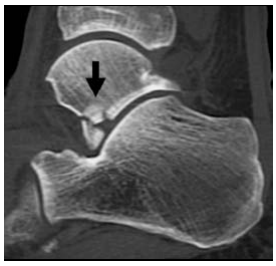
Lateral Process of Talus Fracture

- Uncommon fracture, <1% of ankles fractures outside of snowboarding, but approximately 34% of ankle fractures in boarders.
- This commonly missed fracture, aka "Snowboarders fracture" presents similar clinically to lateral ankle sprain, but the mechanism is not a usual sprain.
- Ankle loading and dorsiflexion from landing with the board as leverage.
- Xray will miss or underappreciate the injury.
- CT scan needed if fracture seen or suspected.
- Surgical referral indicated due to consider surgical options.



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On Mountain Snowboarding Event Coverage

- Coordinate with venue staff and ski patrollers.
- Review site specific emergency action plan, access to medical clinic, ER, trauma center and ambulance/helicopter access
- Medical provider must be skilled and able enough to navigate expert snowboard terrain to access injured athlete
- The usual airway, c spine, back board equipment must be available on the course – usually with ski patrollers coordination
- Understand the banned substance list for FIS and IOC (varies from the NCAA list)
- In addition to trauma, be prepared to treat altitude illness, cold injury and travel illness
- Have access to adequate record keeping for injury documentation and handoff to outside providers

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Injury prevention in snowboarding

Prevention

- Helmet use has steadily increased over 2 decades and now 80% of snowboarders under 17yo wear snowboarding helmets.
- Multiple studies have shown a decreased risk of head injury and a decreased severity in helmeted riders.
- Wrist guards decrease the incidence and severity of wrist injuries by up to 50% in some studies.
- Beginners benefit from lessons to learn how to manage the opposite edge, how to turn and how to fall.
- Adequate protection from the cold, padded knees and elbow may help.
- Soft snow conditions rather than icy conditions recommended when learning.
- Spine protectors and full facet helmets may be useful in terrain park, big air and halfpipe riders.

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References

Owens BD, Nacca C, Harris AP, Feller RJ. Comprehensive Review of Skiing and Snowboarding Injuries. J Am Acad Orthop Surg. 2018 Jan 1;26(1):e1-e10. doi: 10.5435/JAAOS-D-16-00832. PMID: 29206691.

Wasden CC, McIntosh SE, Keith DS, McCowan C. An analysis of skiing and snowboarding injuries on Utah slopes. J Trauma. 2009 Nov;67(5):1022-6. doi: 10.1097/TA.0b013e3181b0d559. PMID: 19901663.

Gammons M, Boynton M, Russell J, Wilkens K. On-mountain coverage of competitive skiing and snowboarding events. Curr Sports Med Rep. 2011 May-Jun;10(3):140-6. doi: 10.1249/JSR.0b013e31821a9fd5. PMID: 21623306.

Franz T, Hasler RM, Benneker L, Zimmermann H, Siebenrock KA, Exadaktylos AK. Severe spinal injuries in alpine skiing and snowboarding: a 6-year review of a tertiary trauma centre for the Bernese Alps ski resorts, Switzerland. Br J Sports Med. 2008 Jan;42(1):55-8. doi: 10.1136/bjsm.2007.038166. Epub 2007 Jun 11. PMID: 17562746.

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Thank you!

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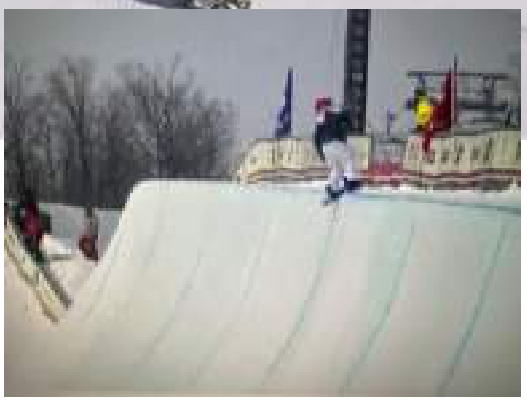

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