

Snow Sports Injuries

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Major sports



- SKIING
 - 200 million participants
- SNOWBOARDING
 - 70 million participants

Injury rate

- Injuries per thousand skier days (IPTSD)
- Mean Days Between Injury (MDB)

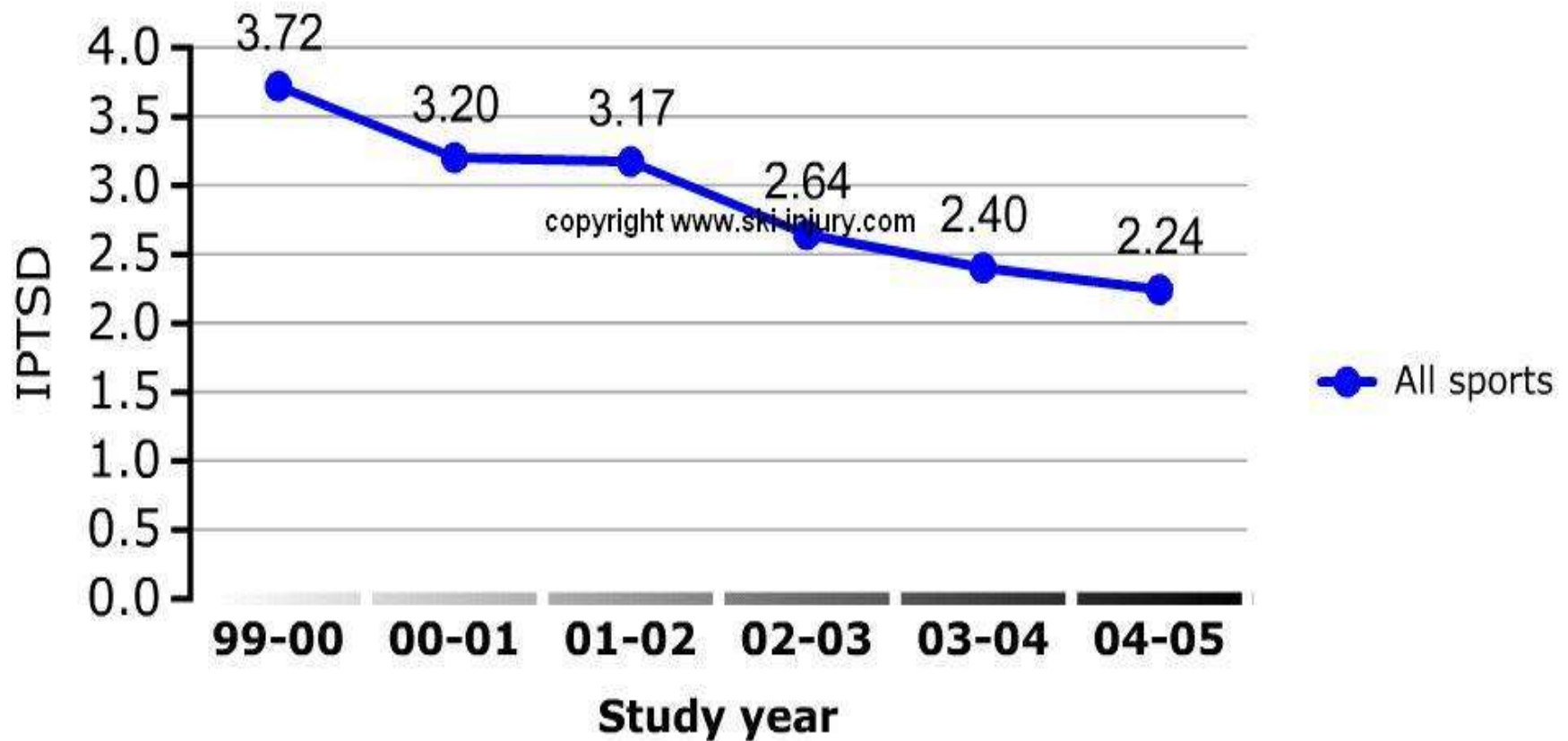
- SKIING <3 IPTSD
- SNOWBOARDING >4 IPTSD

MDBI

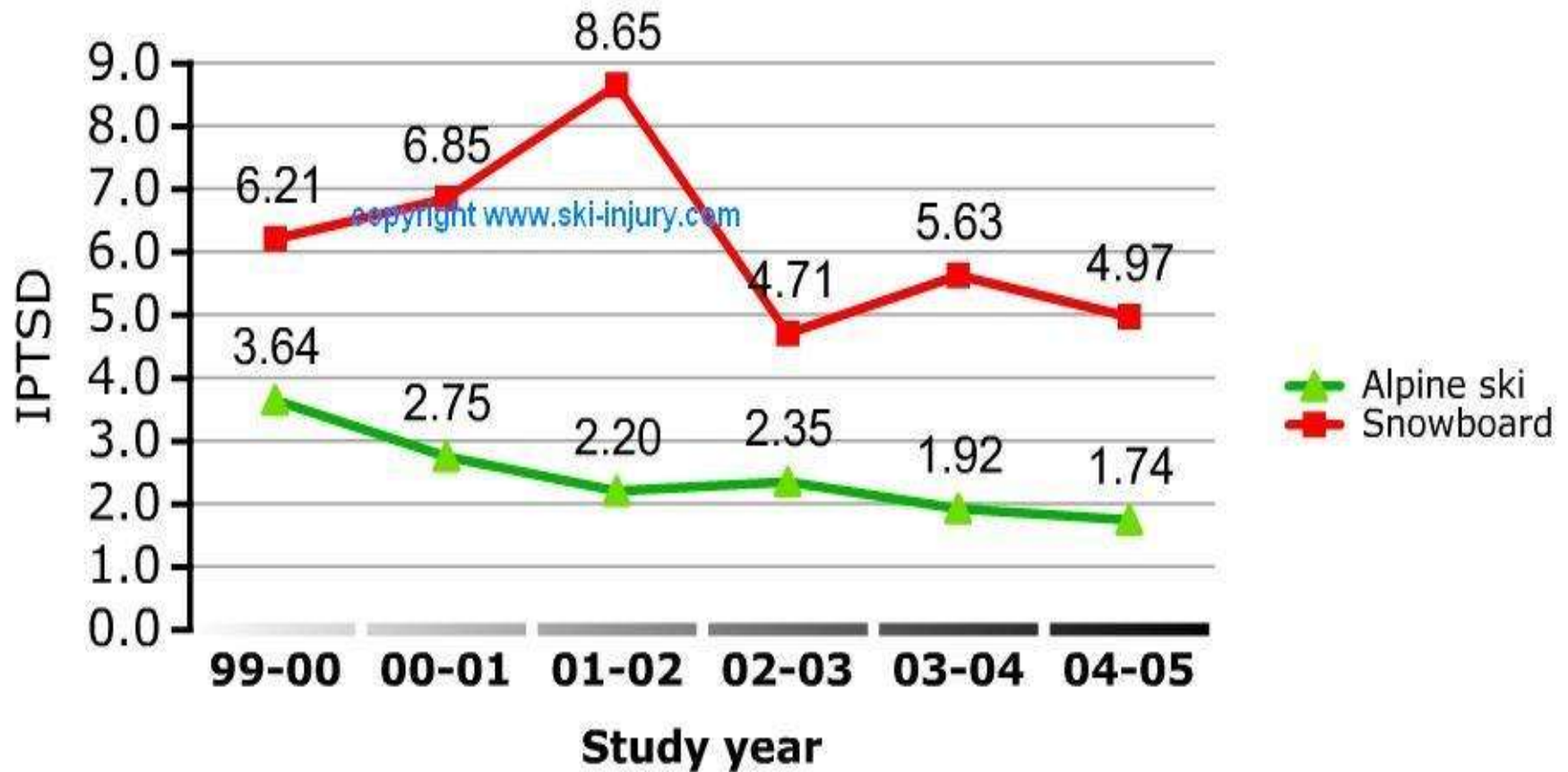


Can be used to define the frequency of specific injuries eg the MDBI for ACL rupture while skiing is approx 2100 days

Overall Injury Rate Scotland 1999-2005



Injury Rates 1999-2005



The top five injury sites



- Knees (39%)
- Shoulder (14%)
- Lower leg (8%)
- Upper and lower arm (7%)
- Hand/wrist (5%)

Cost of the problem in NZ

- 2006/2007 year, ACC spent \$12 million attending to 11,633 snow sport injury claims received that year, with \$8 million of that going on 1200 serious or moderate injuries (what ACC calls “entitlement claims”).



- In that year, 61% of new ACC snow sport claims for serious or moderate injuries (what ACC calls “entitlement claims”) were for skiing injuries

Injury distribution all snow sports

Injury location

by snow sport



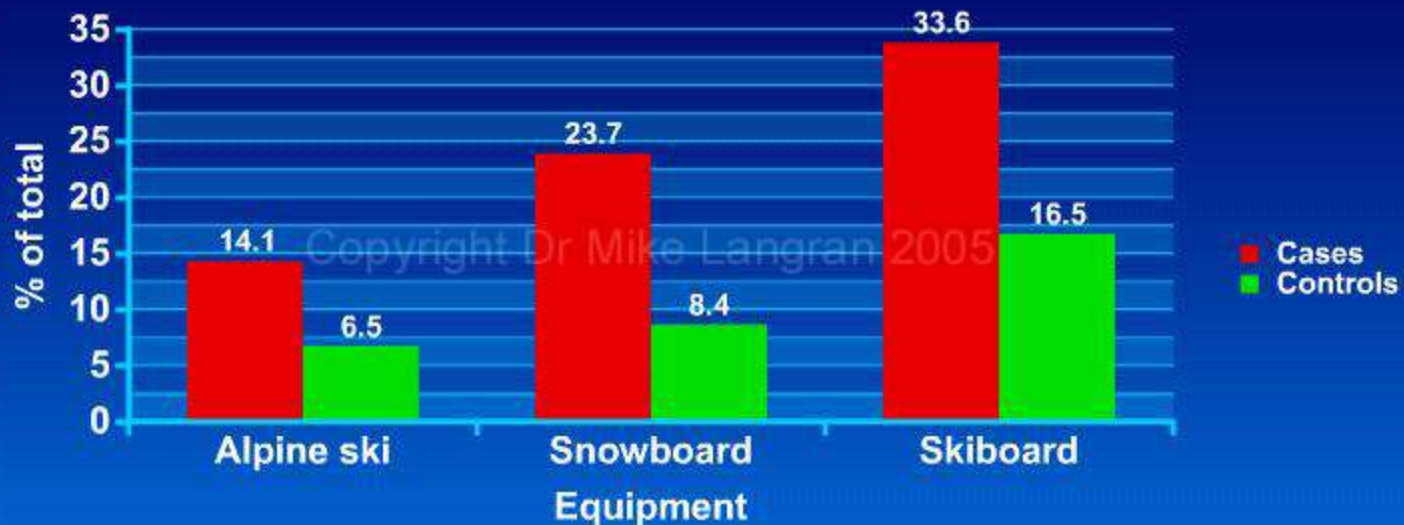
Type of injury all snow sports

Injury classification by snow sport



Injury related to experience

% of first day participants
by snow sport



Fatalities



Fatalities



Extremely rare

- USA from 1991-2004 there were 469 traumatic deaths within the boundaries of ski resorts
- 401 skiers and 58 snowboarders
- rate of 0.71/million skier days
- collisions with trees commonest
- 2003 rates decreased to 1/2.5 million skier days

Head Injuries



Helmets

- compulsory for Vale ski field employees from 2009-10 season
- USA 48% use helmets, higher in children
- CPSC study 7,000 head injuries/year could be prevented or reduced by use of helmets

Spinal injuries

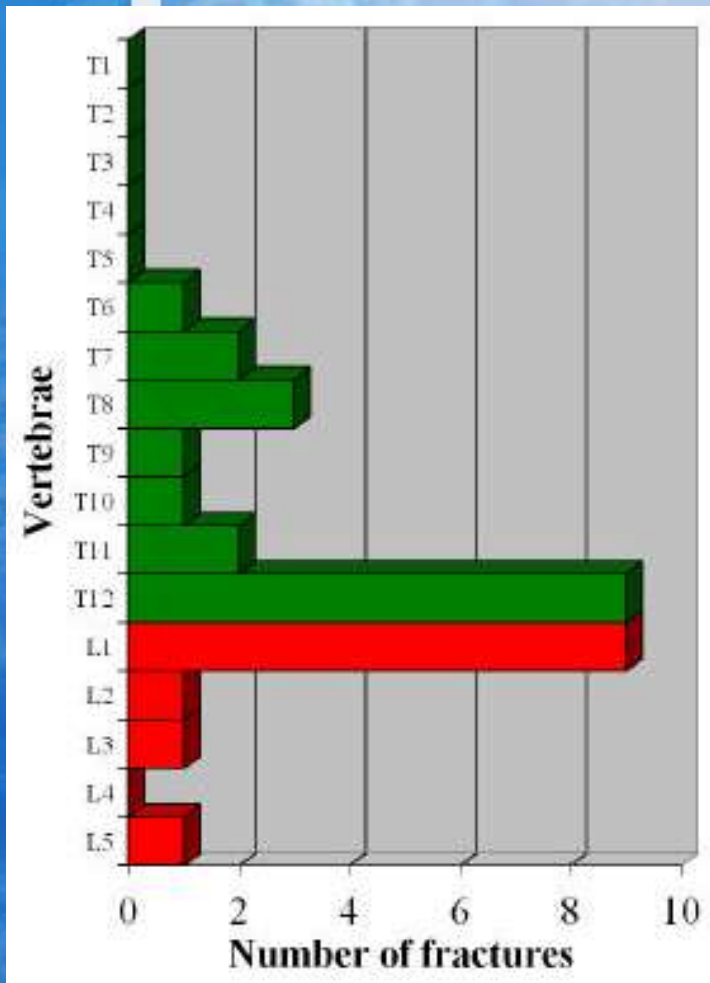
THE NEW ZEALAND
MEDICAL JOURNAL

NZMJ 24 June 2005

Are snowboarders more likely to damage their spines than skiers? Lessons learned from a study of spinal injuries from the Otago skifields in New Zealand

Simon Donald, David Chalmers, Jean-Claude Theis

Spinal injuries



	Skiers	Boarders
Number	7	18
Age	31.3	23.4
Male	3	11
NZer	3	10
Rate	0.01/1000	0.04/1000

Skiing injuries



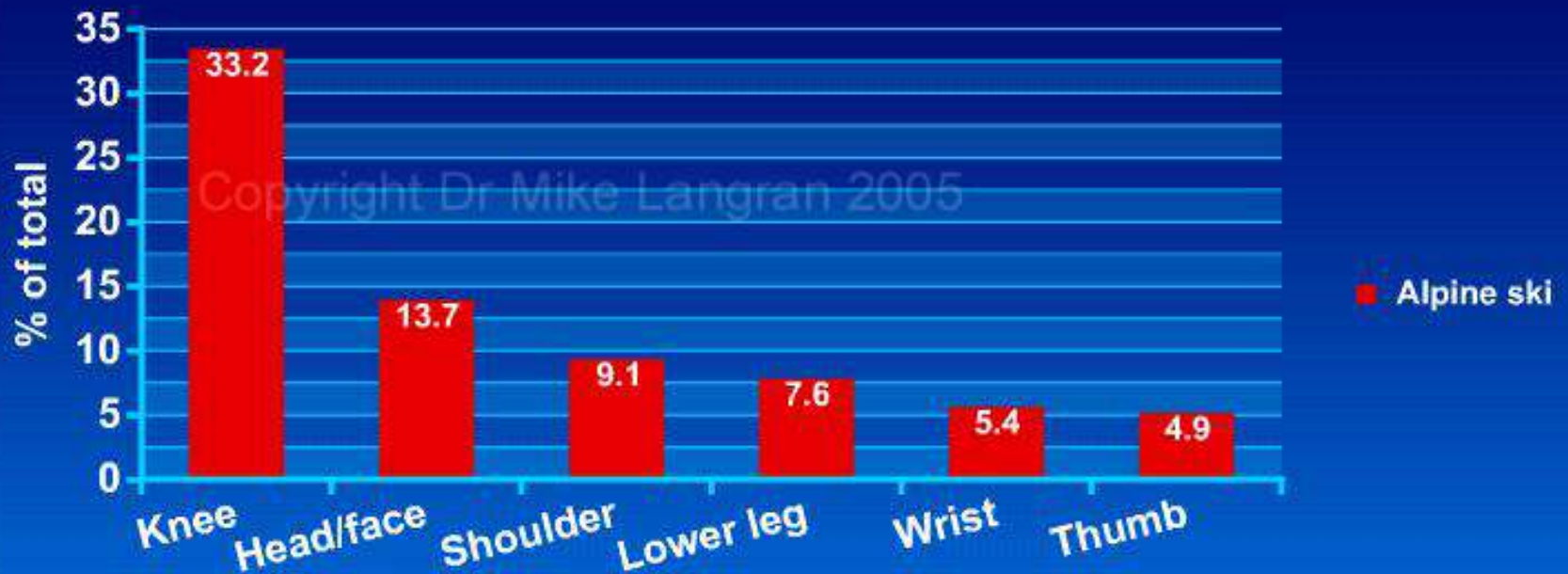
Injury type

Injury classification
Alpine Ski



Region injured

Main injuries by snow sport



ACL Rupture

- High index of suspicion
- Haemarthrosis
- Positive Lachman







Patellar tendon v Hamstrings

- Graft morbidity
- Graft fixation
- Graft laxity
- Graft rupture



Knee injuries and braces



ACL protective

- do they work?

Some evidence in ACL
reconstructed knees with
x2.74 less re-rupture

- do people use them?

Skiing – knee injuries

ACL rupture

- from 1970-1990 rate increased by 240%
- since 2000 rate has declined
- long ski tail + bindings not releasing in rotation
= ‘Phantom Foot’
- shorter skis have lower incidence of rupture

Ski bindings

- Effective in decreasing stress across leg with resultant decrease in tibial fractures BUT are poor at sensing force applied to the knee
- International call to decrease settings 15% in at risk groups eg females
- Release in a forward twisting fall which protects the MCL but fail in a backwards twisting fall which is the commonest (70%) cause of ACL rupture

Ski bindings

- Release in a forward twisting fall which protects the MCL but fail in a backwards twisting fall which is the commonest (70%) cause of ACL rupture
- Bindings with 2 pivot points front and back may sense forces across the knee better



Snowboarding injuries

Commonest injuries to upper limb followed by head injuries and lower limb (ankle)

Usually young male from non-skiing background with no professional instruction

Type of injury in snowboarding



Snow boarding injuries - region

Main injuries by snow sport



Snowboarding injuries

Commonest injury is to the wrist -
1/1135 days compared to
1/3000 days for a lower limb
injury

Both feet in non releasing bindings
with poor balance in novice
boarders



SNOWBOARDING?
Not sure about wrist guards?



[Click here for the latest information](#)

including advice on the right kind of guard

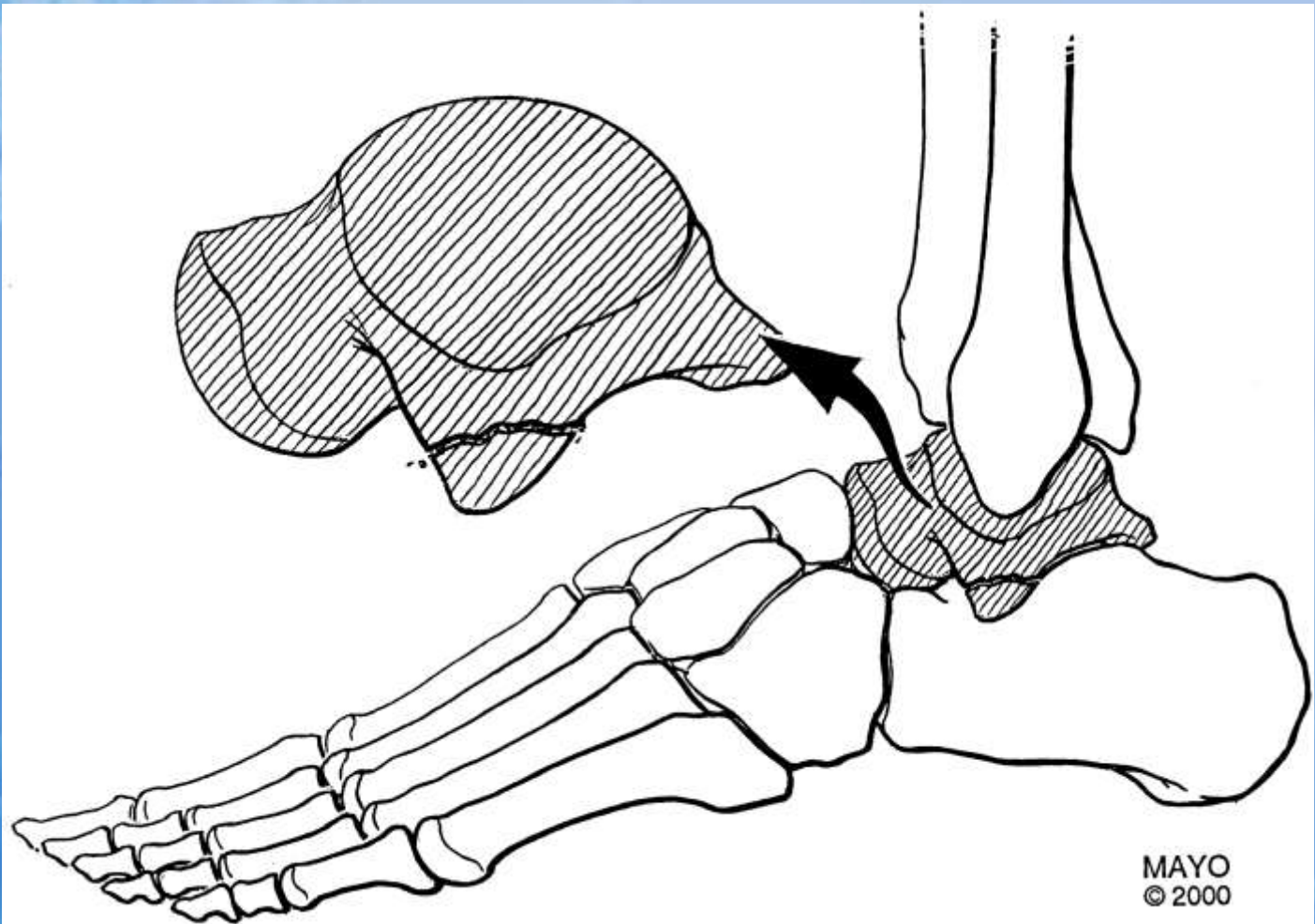
Prevention of wrist injuries

- Wrist guards
 - evidence in in-line skaters
 - Colorado Snowboard study with 7000 boarders showed those that wore wrist guards suffered 50% less wrist injuries

Reason for not wearing wrist guards	%
No need	32.8
Can't get hold of them	16.2
Too expensive	10.8
Don't like the look of them	2.5
Uncomfortable to wear	27.0
Won't protect against injury	8.3
Wasn't aware of them	22.1

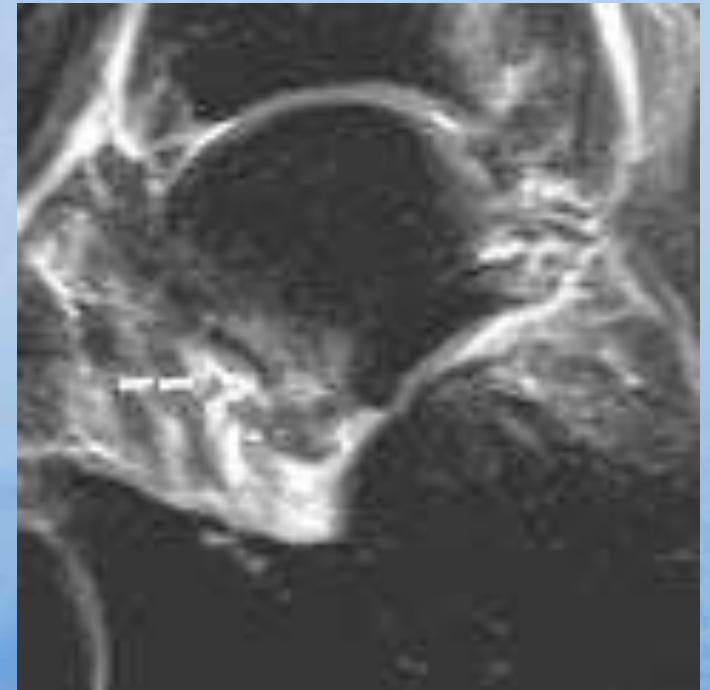
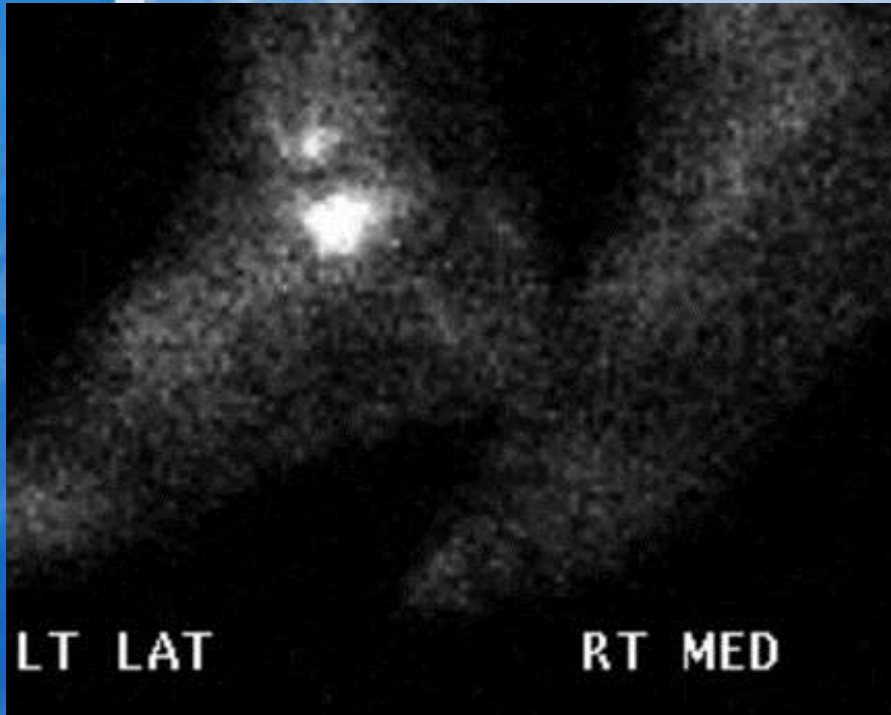
Snow boarding injuries - ankle

- Fractured lateral process of the talus (2% of all injuries)
 - combination of compressive and inversion forces
 - diagnosis difficult may look like ankle sprain
 - high index of suspicion if 'ankle sprain' does not heal within 1-2 weeks





Bone scan and MRI



Conclusion - ACC

The vast majority of snow sports injuries happen when someone falls over, and that's usually through **user error**. Most falls are from loss of control, perhaps because the skier is going too fast for the weather conditions or their abilities.

Factors to address

- Helmet use mandatory in those <20 years
- Wrist guards for all snow boarders
- Improving release bindings for snowboarders
- Improved bindings for skiers
- Education especially young male first time participant



Thank you

- **Potentially Serious Head Injuries (PSHI) at Sugarbush, Vermont: 1981 - 1997**

All Injuries	11,795	100%	135,000	All Injuries,
Excluding PSHI	11,486	97.4%	131,463	All
PSHI	309	100%	2.6%	3,537
Fatal head				
injuries	30.97%	0.04%	34	Skull
Fracture	103.2%	0.08%	114	Severe brain
injury	82.59%	0.07%	92	Concussion: moderate to
severe	3511.33%	0.3%	401	Concussion:
mild	23877%	2%	2,724	Concussion:
unclassified	154.85%	13%	172	

Injury location

by snow sport



Injury classification

Snowboard



Major sports



USA 2009/10 season
59.7 million visits