PARALYMPIC ATHLETES COMPETING IN EXTREME CONDITIONS

2010 – NPC Team Physician Conference

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Overview

- Trauma and Injury patterns and rates
- Resuscitation issues
- Altitude
- Cold exposure

Injury Epidemiology

- Limited data compared with able-bodied athletic injuries
- 2002 Salt Lake Paralympic Injury survey
- 2006 Torino Paralympic injury survey
- Non-scientific survey of Canada athletes

- Similar overall sport medicine and trauma injuries as in able-bodied alpine

Games Comparison

	Alpine Skiing	Nordic Skiing	Sledge Hockey	Wheel-chair Curling	Total
Salt Lake	194 (12%)	134 (3%)	88 (14%)	-	416
Torino	190 (12%)	132 (4%)	132 (11%)	40	474

OVERALL INJURY RATE

9 % Salt Lake

8% Torino

Comparison of Injuries from Two Paralympic Winter Games: Salt Lake 2002 & Torino 2006 Webborn, N1,2 Willick, S3

Salt Lake 2002 Paralympics

- Amongst all Paralympic athletes most common diagnoses were:
  - Sprains (32%)
  - Fractures (21%)
  - Strains and lacerations (14% each)
- Amongst Para-Alpine athletes:
  - Upper extremity injury 33%
  - Lower extremity injury 38%

Torino 2006 Paralympics

- Within Para-alpine:
  - 78% acute traumatic injury
  - 22% overuse or chronic injury
  - 53% upper extremity, 80% were sit skiers
  - 26% lower extremity, all standing

Webborn, N., Willick, C. and Reeser, J. C. (2006) Injuries among disabled athletes during the 2002 Winter Paralympic Games. Medicine & Science in Sports & Exercise, 38 (5). pp. 811- -815.

Altitude

- High alt 1500- 3500m - very high 3500-5500m
- Normal response to altitude and hypoxia
  - Increased ventilation
  - SOB on exertion
  - Altered breathing at night – secondary to low levels of CO_2
  - Diuresis
  - Disturbed sleep

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Acute Mountain Sickness

- Due lack of acclimatization to hypoxia

- Ideal altitude is the altitude you last slept
- Above this is a zone altitude to which your body can tolerate the increased hypoxia
- Above this zone the body is not able to compensate for the hypoxia strain

- Develop - acute mountain sickness

Acute Mountain Sickness

- Above 2500 m with the following-
  - Headache-
  - Loss of appetite, nausea, or vomiting
  - Fatigue or weakness
  - Dizziness or light-headedness
  - Difficulty sleeping
- AKA BAD HANGOVER
- **If you feel unwell and there is no other reason you probably have AMS**

Who is at risk

- Anyone- genetic, rate of accent
- Avoid things that will suppress respiration
  - Alcohol
  - Narcotics
  - Sleeping pills
- Can consider prophylaxis with Diamox if regularly get AMS or if ascent rapid

Treatment

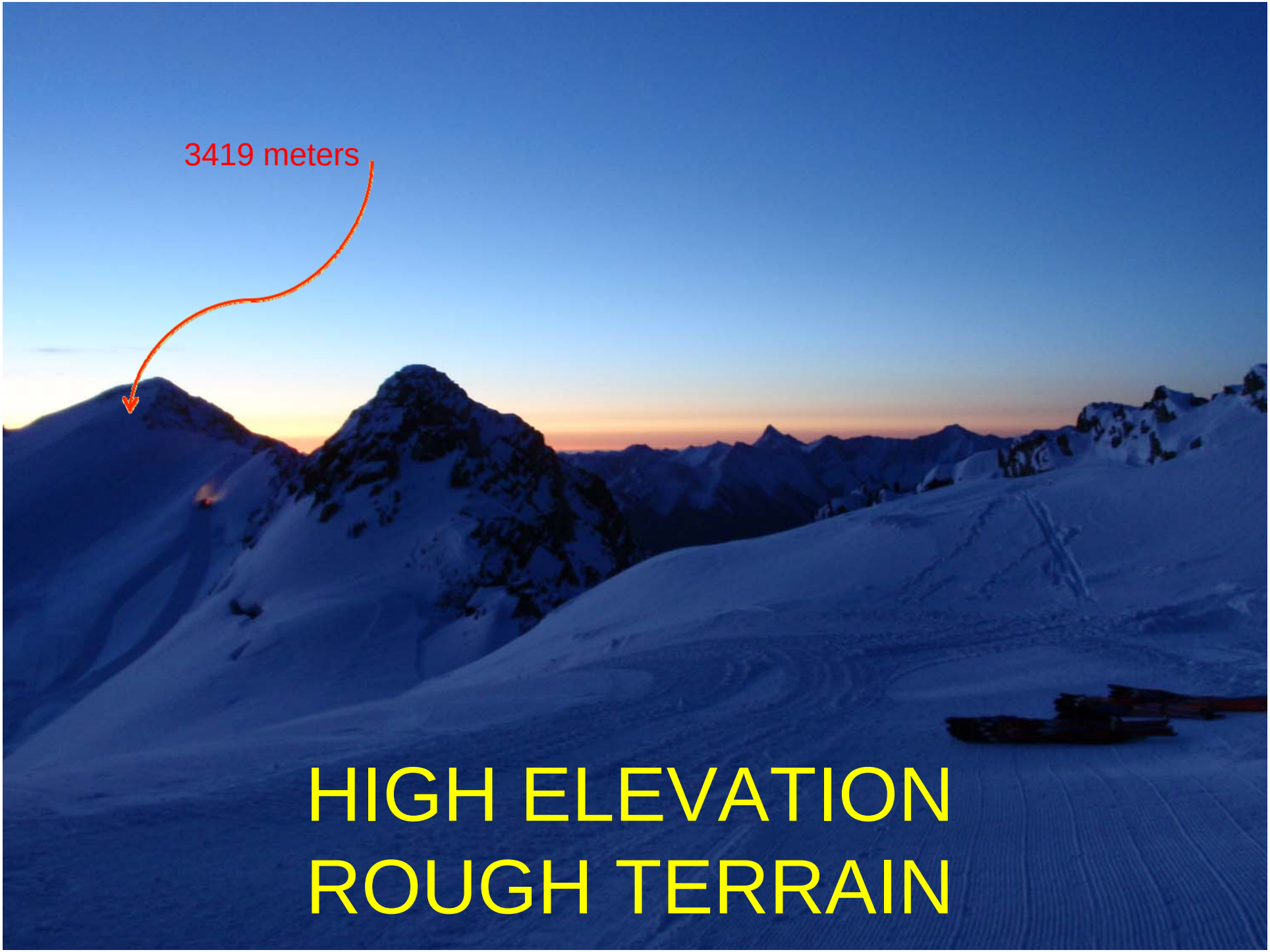
- Supportive
- Rest (don't go higher and decrease O2 demands)
- Fluids
- NSAIDS
- O2
- If symptoms more severe
  - Diamox – Acetozolamide

Logistics and Terrain

Just getting there can be risky

TRAVEL

POTABLE WATER


3419 meters
HIGH ELEVATION
ROUGH TERRAIN

Light or UV Exposure

- High altitude
- Reflective surface for nordic and alpine
- UV Keratitis
- Need proper eye wear protection


TELUS
GMC
BOMBARDIER
SPYDER
Audiolr
BOMBARDIER

Cold Exposure

- Cold injury
- Exercise and cold induced bronchospasm
- Hypothermia
  - Weather, clothing, hydration, hypoglycemia
  - Athlete factors – fat composition, muscle mass, SCI– impaired thermoregulation

Hypothermia

- Prevention is key!

- Follow the C-O-L-D clothing principle:
- Clean
- Open – when exercising to reduce sweating/wetness
- Loose/Layers – to retain heat
- Dry – to limit conductive heat loss

Para Alpine Medical Issues

SIT SKIERS

- Acute and Chronic neck and arm injuries are very common
- Hard to rest!
- Pressure sores or Sit wounds (travel)

Para Alpine Medical Issues

SIT SKIERS

- Bowel and bladder
  - Most athletes volume restrict during training days
  - Timing of bowel care can be an issue
- Autonomic Dysreflexia – less of an issue as athletes on most teams below T6 for alpine

Para Alpine Medical Issues

STANDING SKIERS

- Chronic Musculoskeletal problems
  - Asymmetric gait
  - Overuse problems
  - Neurologic patterning
- Acute Musculoskeletal injuries similar to able bodied:
  - knee, hip, shoulder, back, neck
  - Concussion
- Residual limb hygiene

Para Alpine Medical Issues

VISUALLY IMPAIRED

- 100% injured 2008/9
- 75% > out for >1 month
- Rate of injury highest

- Causes? – multiple concussions, balance impairment, knee and ankle injuries

Canadian - Injury Patterns 2009-10

- 69% = 9/13 athletes injured
- 23% = 3/13 athletes injured > 1 month
- Total of 14months off snow and competition
  - Concussion, Rotator cuff, pressure – on hill
  - pressure sore, hip fracture – off hill

On-hill Dx and Management

- Assessment of insensate athletes with careful 2* survey
- Sit-skier extraction
- Mindful environmental exposure
- Volume resuscitation (especially sit-skier)

Conclusion

- Paralympic winter athletes compete in adverse conditions and are at risk of-
  - Cold exposure or injury
  - Altitude sickness but no more than able bodied athlete
  - High rates of injury in sports like alpine and sledge hockey
    - 12% athletes at major games and the majority of team over a season (69%
- High index of suspicion for injury in insensate athlete

Thank-you!

Acknowledgements:

Dr. Van de Vliet, Willick, and Webborn