Spine Injuries in the Extreme Sports Athlete

Extreme Sports Congress
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Disclosures

- Research Support Synthes, Medtronic, Aesculap, Vertiflex, Medicrea
- Fellowship Support OREF
- Orthofix - Travel
Outline

▪ Common Acute Injuries
▪ Common Chronic (Overuse) Injuries
▪ Conclusion
Acute Cervical Injuries
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NOTE: Values are in percentage; total cases are N. Values may not equal 100% because of rounding.
*Includes boats and rotating wing aircraft.
†Includes water skiing, baseball, basketball, rodeo, track, field, hang gliding, air sports, and skateboarding.
Acute Cervical Injuries

- Mountain Biking
  - Dodwell et. al. (Am J Sports Med, 2010)
    - 74% of spine injuries cervical
    - 82% lower cervical spine (C3-7)
    - 40% w/ spinal cord injuries
    - 76% over the bars (“endo”)
    - 91% direct impact

Image courtesy oldglorymtb.com
Acute Cervical Injuries

- Skiing
  - Spinal cord injuries 0.01 - 0.075 for every 1,000 hours\(^6\)
  - Head/Spine 3-15%\(^3\)
  - Hubbard et. al. (Neurosurg Focus, 2011)
    - Cervical spine more prevalent – 41%
    - Lumbar spine – 35%
    - Spinal cord injury rate 1.07%
Acute Cervical Injuries

- Water Sports
  - Often related to seafloor impact
  - Chang et. al. Trauma 2006
    - Most common level C6
    - 75% with neurologic deficit
    - 26/100 had neuro deficient w/o fracture, dislocation, other
    - Shorebreak affects injury rates
Acute Cervical Injury Case

- 23 year old shallow diving injury
  - C6-7 fracture-dislocation
  - Flexion-distraction injury
Acute Cervical Injury Case

- MRI

- CT Scan
Acute Cervical Injury Case

- Traction applied and increased every 15 minutes until 55 lbs. reached
- Closed reduction attempted
Acute Cervical Injury Case
Acute Thoracolumbar Injuries

Courtesy wvsky youtube.com
Acute Thoracolumbar Injuries

- Typically Axial loading (type A)
- May include distraction/rotation (type B or C)
Acute Thoracolumbar Injuries

- Rock-climbing/Ice Climbing
  - Thoracolumbar extension w/ fall (harness)
  - Falling rock
  - 12.5% suspected spine injury – Boulder area
- Hohlrieder et. al. Wilderness and Environ Med 2007
  - 8 spine fractures
  - 6 T/L (4 Type A, 1 Type C)
  - 2 Cervical
Acute Thoracolumbar Injuries

- Snowboarding
  - 2-4% of injuries head/spine related
  - Up to 80% related to jumping
- Hubbard et. al. (Neurosurg Focus, 2011)
  - Thoracolumbar more common
  - 0.93% w/ SCI
Acute Thoracolumbar Injuries

- BASE jumping, Skydiving, Paragliding and other airborne sports
- Majority thoracolumbar spine
  - L1 most common
- Hasler et. al. Injury 2012
  - Of admitted 49% w/ spine
  - 92% Type A
  - 35% L1
  - SCI rates not calculated
    - 23 w/ neurologic deficits
27 y/o M skydiver reported “hard landing”
Acute Spinopelvic Dissociation

- Rare Injuries
- Hasler et. al.
  - 4.4% of admitted paragliders
  - 21-fold higher than non-airborne injured
  - 50/50 flexion/extension
Acute Spinopelvic Dissociation

20 y/o F – skiing and struck a tree
Acute Spinopelvic Dissociation
Chronic (Repetitive) Injuries

- Spondylolysis/listhesis
  - Repetitive hyperextension
- Disc herniations/degeneration
  - Repetitive loading
Spondylolisthesis

17 M climber, mountain biker, throwing athlete
Spondylolisthesis
Spondylolisthesis

45 M skydiver, active duty military
Spondylolisthesis
Disc Herniation/Degeneration
Spine Injuries in the Extreme Sports Athlete

- **Summary**
  - Acute Cervical Injuries: Mountain Biking, Water Sports, Skiing
  - Acute Lumbar Injuries: Snowboarding, Airborne Sports, Rock Climbing
  - Chronic Injury Rates: Unknown

- Thanks to Chris Cain and Evalina Burger for cases and images
References

Thank You!