

Spinal Injuries in the Wilderness



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Objectives

- ✓ Anatomy and Injuries
- ✓ Determine who has a Spinal Injury
- ✓ How / When to *'clear a spine'*
- ✓ Wilderness Care and Transport



CASE



- ✓ 32 y.o. female in snowmobile accident
 - ✓ Severe Low Back Pain
- ✓ SAR Callout
 - ✓ Helicopter - Snowmobile Ground Backup







Case

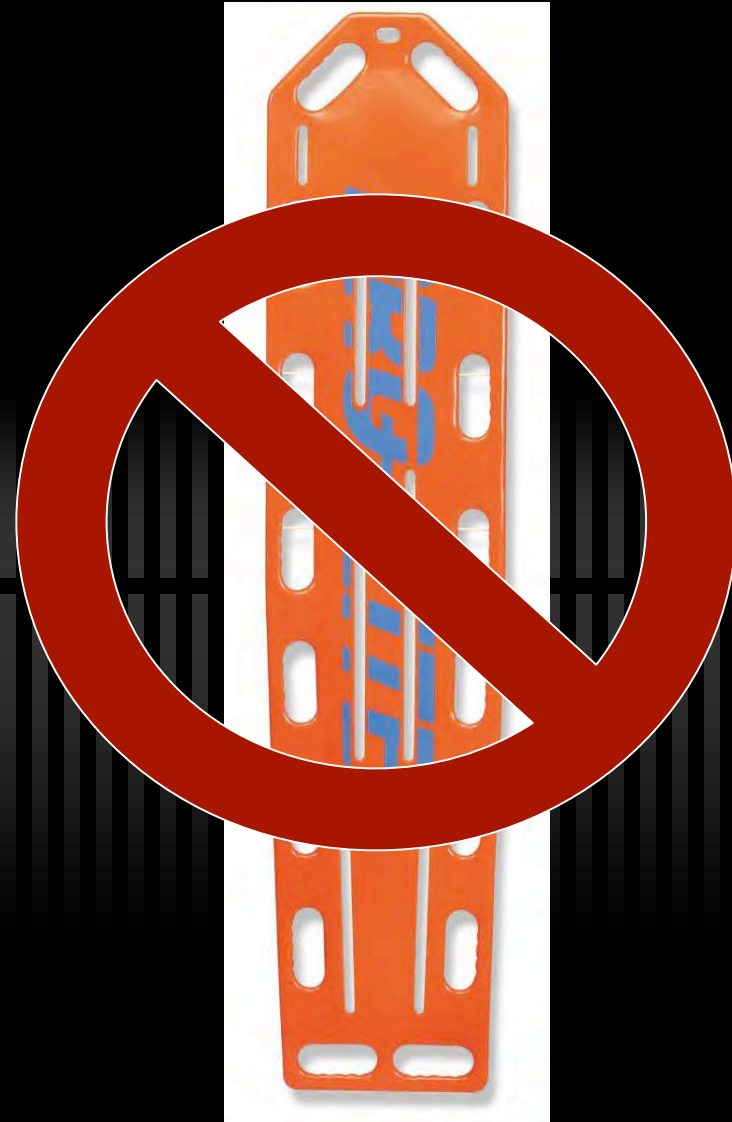


- ✓ Alert, Normal Vital Signs
- ✓ Isolated lumbar back pain (midline)
- ✓ Neurological exam intact

Case



- ✓ Can you 'clear the spine'?



Case

- ✓ Logistics of Rescue
 - ✓ 1130 Incident Time
 - ✓ 1345 Helicopter Arr
 - ✓ 2 hr 15 min
 - ✓ 1420 At Hospital
 - ✓ 3 hours
- ✓ Ground Time (+4hrs)



Case



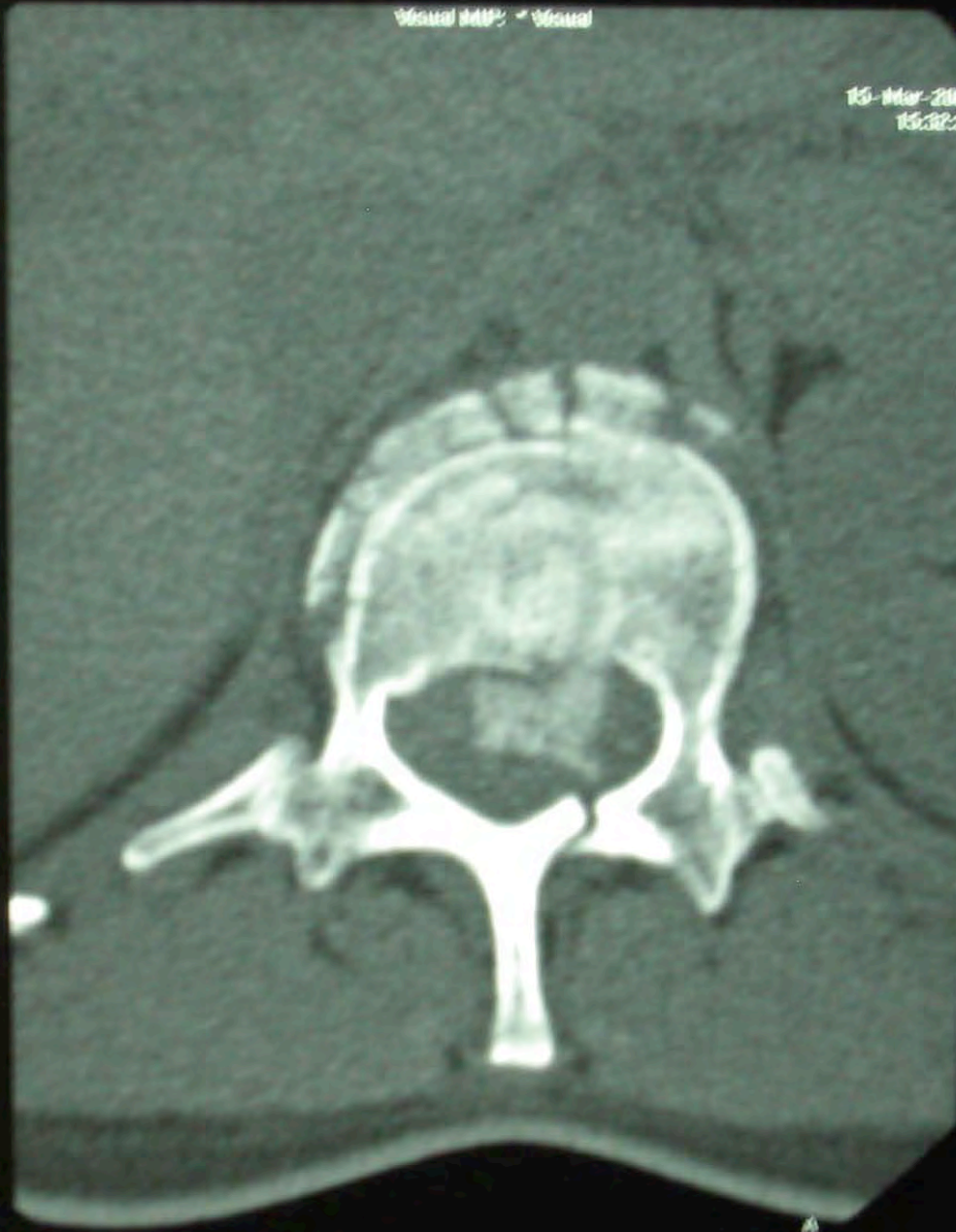
- ✓ Spinal Immobilization
- ✓ IV Morphine, Compazine
- ✓ Helicopter transport to hospital

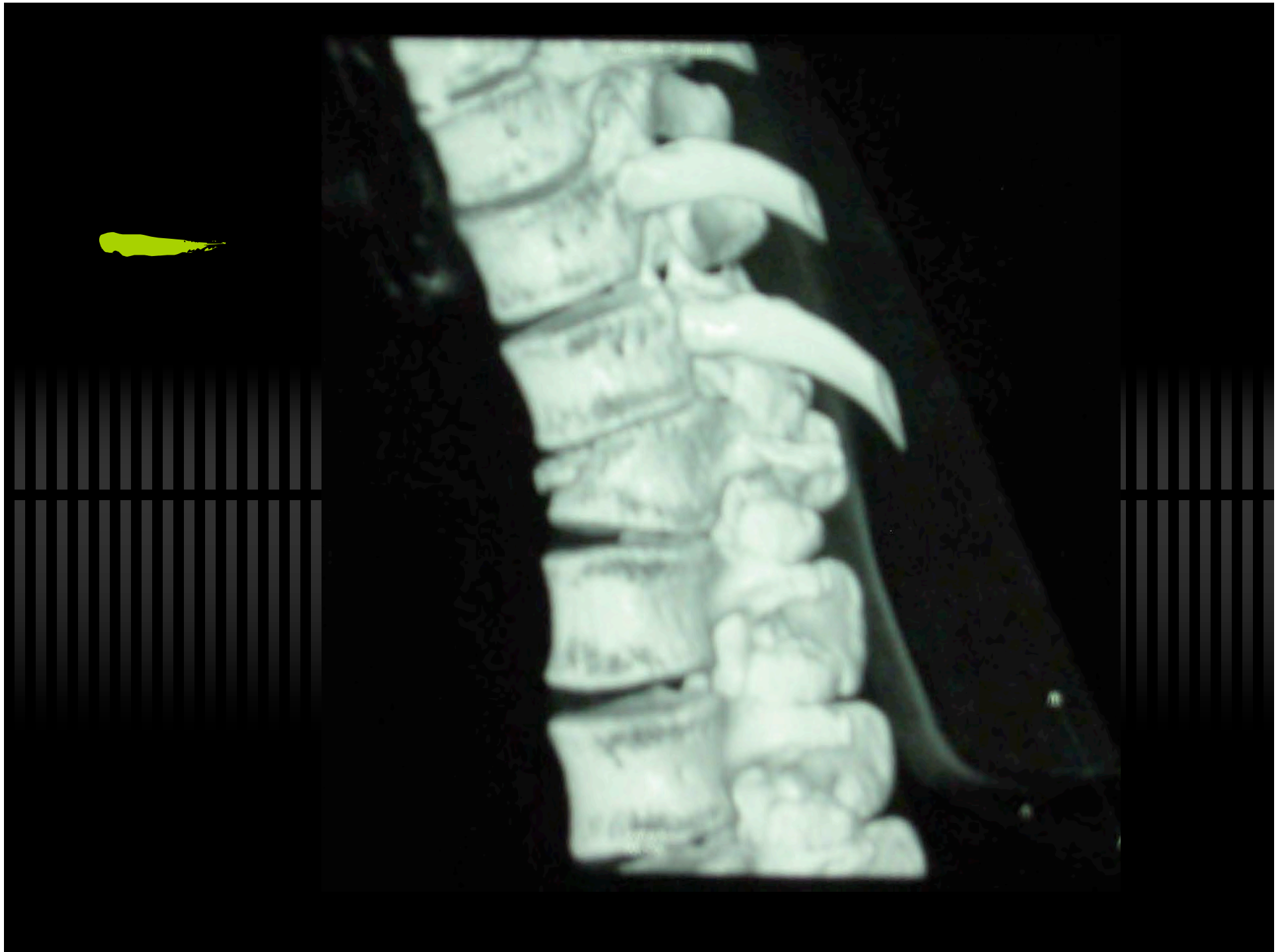
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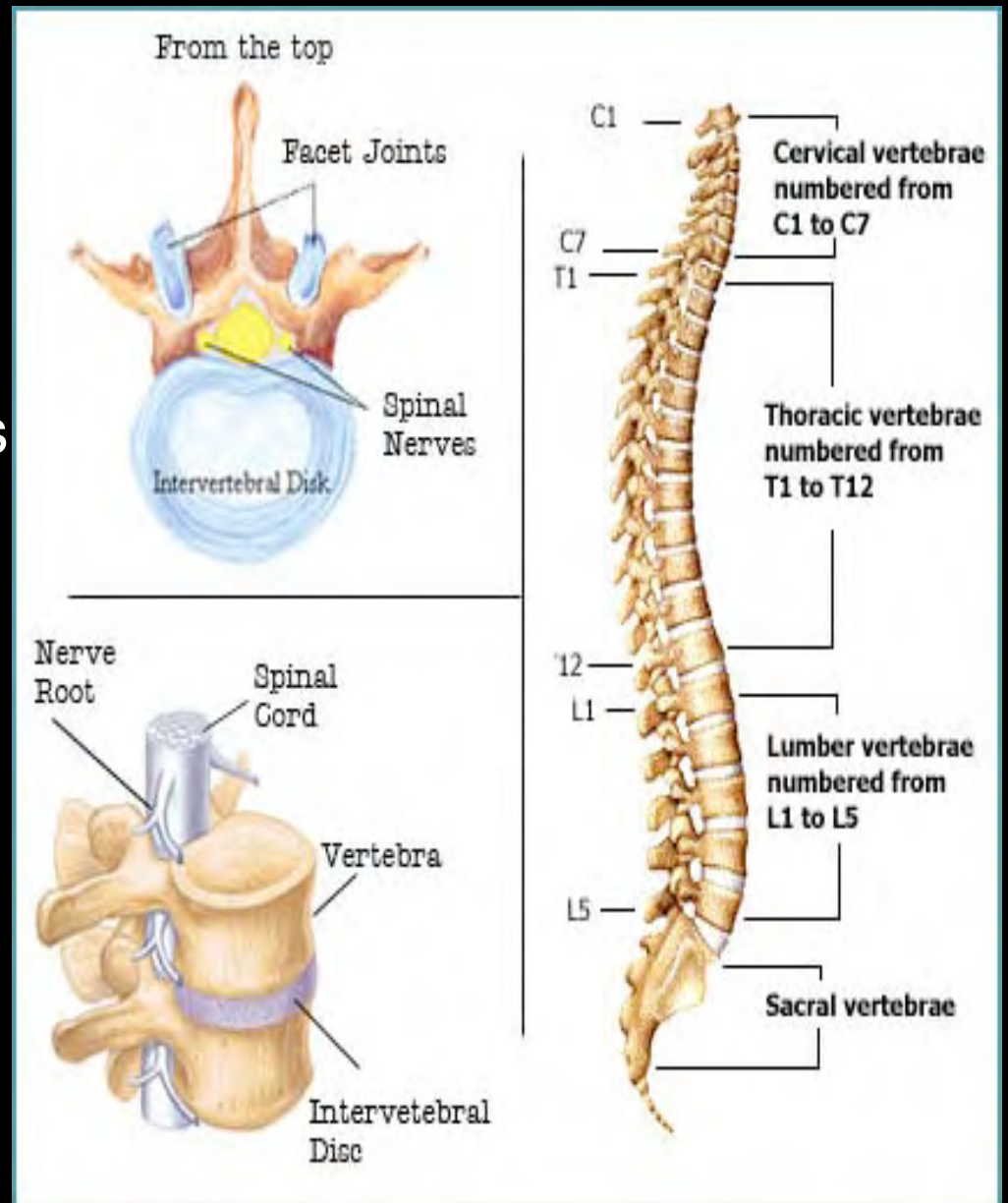
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Spine Anatomy

- ✓ C - Spine (7)
 - ✓ 55% of spine injuries
 - ✓ T- Spine (12)
 - ✓ L - Spine (5)
 - ✓ Sacrum/Coccyx (5/4)
- ✓ 28% Have 2nd Fx

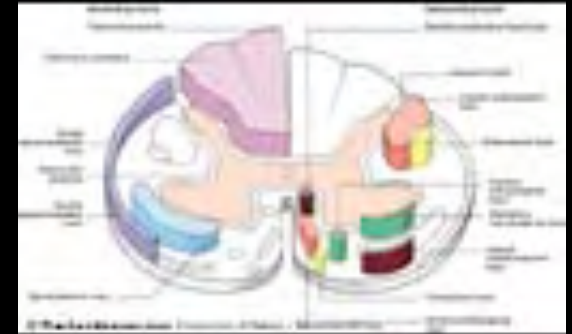


Injuries

- ✓ Bones
- ✓ Ligaments
- ✓ Cord
 - ✓ SCIWORA
- ✓ BLUNT
- ✓ Penetrating



Spinal Cord Syndromes



- ✓ **Anterior Cord Syndrome** - flexion injury
 - ✓ C5-6 (poor prognosis)
 - ✓ Paraplegia and loss of pain and temp
- ✓ **Central Cord Syndrome** - fall forward with hyperextension
 - ✓ Loss of motor greater in upper than lower extremities - variable sensory loss

Spinal Cord Syndromes



- ✓ **Brown-Sequard Syndrome** - hemisection of the cord (penetrating trauma)
 - ✓ Ipsilateral motor and position sense loss
 - ✓ Contralateral (2 levels below) sensory loss

Stable vs. Unstable

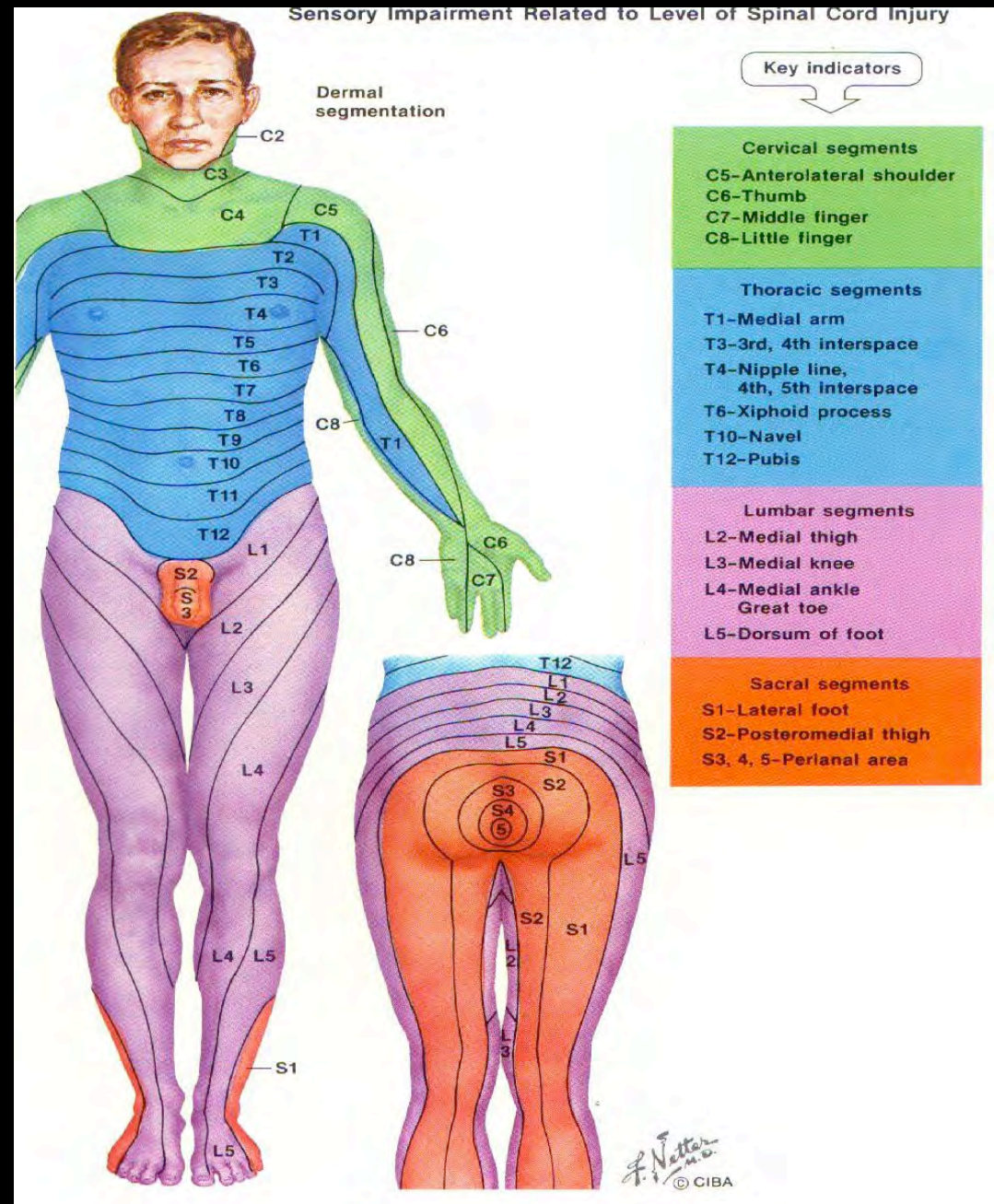
- ✓ Stable
 - ✓ Fracture unlikely to allow further injury
 - ✓ Spinous/Transverse Processes
- ✓ Unstable
 - ✓ May allow future cord injury



Dermatomes

SENSORY

- ✓ C6 - Thumb
- ✓ T4 - Nipple
- ✓ T10 - Umbilicus
- ✓ L1 - Inguinal
- ✓ L4 - Great Toe
- ✓ S4 - Anus



Motor Levels



- ✓ C3-Diaphragm
- ✓ C5-Deltoid
- ✓ C6-Wrist Extensors
- ✓ C7-Elbow Extensors
- ✓ C8-Finger Flexors
- ✓ T1-Finger Abductors
- ✓ L2-Hip Flexors
- ✓ L3 - Knee Extensors
- ✓ L4-Ankle
Dorsiflexors
- ✓ L5-Great Toe
Extensors
- ✓ S1-Plantar Flexors

What do we do for spine injuries?

✓ Urban EMS

✓ Rural EMS

✓ Wilderness EMS



Urban EMS



- ✓ Rapid Transport
 - ✓ Less than 15 minutes
 - ✓ Present to emergency departments
 - ✓ Spine clearing protocols
 - ✓ NEXUS, Canadian C-Spine Rule
 - ✓ Xrays or CTs

- ✓ Little risk to patients or EMS providers

Rural EMS



- ✓ Prolonged Transport
 - ✓ 15 minutes to 1-2 hours
 - ✓ Air Bed, vacu-mattress, padding
 - ✓ Early stage 1 Decubitis Ulcers (redness)
- ✓ Pt. uncomfortable, no provider risk

Wilderness EMS



- ✓ Extended Transport
 - ✓ 2 Hours to Days
- ✓ Risks of Spinal Immobilization
 - ✓ Decubitus ulcers, pt. discomfort
 - ✓ Extrication problems, rescuer risks
- ✓ Risk vs. Benefit of Spinal Immobilization

Stratify Risks



- ✓ Evidence Based Wilderness Medicine
 - ✓ No Double Blind, Randomized Controlled Trials
 - ✓ Extrapolate data from urban settings
 - ✓ Anecdotal
- ✓ Actual number of neurologically significant spinal injuries is very small

Who needs to be immobilized?



Focused Spine Assessment



- ✓ Mechanism of Injury
- ✓ Reliable Patient
 - ✓ NO distracting injury, NO intoxication
- ✓ NO Spine Tenderness (midline)
- ✓ Normal Neurological Exam
 - ✓ Sensory - Sharp/Dull
 - ✓ Motor - Wrist/Hand/Foot

Focused Spine Assessment

✓ WMI (NOLS)

✓ WMA

✓ SOLO



Wilderness Spine Injuries



- ✓ To Backboard or Not To Backboard
 - ✓ Hours to Days
- ✓ If unsafe - Move, Move, MOVE!!!
 - ✓ Extreme patient/rescuer risk

Wilderness Settings - High Angle



Wilderness Settings - Cave



Wilderness Settings - Swiftwater

TODAY'S WEATHER
HIGH **35** LOW **8**
LOCAL AND NATIONAL FORECAST ON PAGE 27.

WYOMING Cubin votes to cut programs, sell public lands. PAGE 6
PEOPLE Civil jury orders Blake to pay \$30 million. PAGE 24
SPORTS Wyoming playing for pride in final game. PAGE 40

Sat. & Sun.
Nov. 19-20, 2005
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Jackson Hole Daily
Valley pilot dies in crash

BY MARTIN REED
JACKSON HOLE DAILY

Rescue crews recovered the body of a Jackson Hole man who died in a Civil Air Patrol plane crash in Snake River Canyon on Friday morning.

Fletcher F. Anderson, 57, died at the scene from injuries he suffered in the crash that happened at about 8:55 a.m., according to the Civil Air Patrol's Wyoming Wing.

The plane crashed in the Snake River about 17 miles south of Hoback Junction near Wolf Creek. No one else was aboard the Jackson-based Civil Air Patrol plane.

Anderson may have collided with a cable hanging across the canyon while flying the single-engine Cessna 182R, said Doug Henry, a member of Star Valley Search and Rescue and Civil Air Patrol.

"He may have not been aware of the gauging cable" used to measure the river's flow, Henry said at the scene. "We don't know why he was that low."

A Wyoming Highway Patrol trooper who discovered the crash said the canyon did not have clouds at the time. "He stated it was clear," Trooper George Nykun said after talking with his colleague.

"We were asking the same thing, why he'd be flying so low, but there was no cloud coverage in the canyon this morning," Nykun said Friday.

See CRASH page 2

Angus M. Thuermer Jr./JACKSON HOLE DAILY

Teton County Search and Rescue volunteers Rob Sgrol, Dr. Will Smith, Ty Garland and Doug Cook wade in the Snake River after a Civil Air Patrol plane crashed Friday morning. Valley resident and pilot Fletcher Anderson died in the accident.



Wilderness Settings - Swiftwater



Wilderness Settings - Avalanche



Wilderness Settings - Snowmobile



Prolonged Care Considerations

- ✓ Padding - Pain Control
 - ✓ Bend Knees (MORE PADDING!!)



Padding





Prolonged Care Considerations

- ✓ Hydration / Urination / Defecation



Prolonged Care Considerations

- ✓ Selective immobilization
 - ✓ Lumbar Injury - Leave Head Free



Pearls



- ✓ Evaluate and accept your and the patient's risks and make a decision
- ✓ Follow pre-planned protocols for evaluating suspected spine injuries

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