

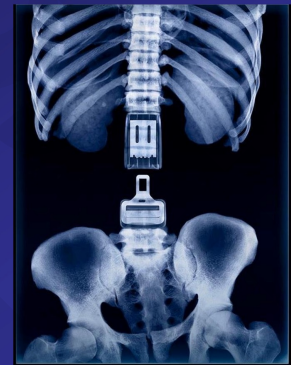
Panceltic 2015 Spinal Trauma Update

Mr M J H McCarthy
Consultant Spinal Surgeon



Outline

- Assessment
- Treatment
- Miscellaneous
- The Future



Goals of Spine Trauma Care

- Protection
 - Detection
 - Optimize conditions for neuro recovery
 - Maintain / restore spinal alignment
 - Minimize loss of spinal mobility
 - Obtain healed and stable spinal column
 - Rehabilitation
- #s = Manage the ass soft tissue injury

Suspecting a Spinal Injury

- Mechanism of Injury
- Unconscious
- Neurological Deficit
- Spinal Pain / Tenderness



ASIA INTERNATIONAL STANDARDS FOR NEUROLOGICAL CLASSIFICATION OF SPINAL CORD INJURY (ISNCSCI)

Patient Name: _____ Date/Time of Exam: _____
Examiner Name: _____ Signature: _____

RIGHT MOTOR KEY MUSCLES: C2, C3, C4, C5 (Elbow flexors), C6 (Wrist extensors), C7 (Elbow extensors), C8 (Finger flexors), T1 (Finger abductors), T2, T3, T4, T5, T6, T7, T8, T9, T10, T11, T12, L1, L2 (Hip flexors), L3 (Knee extensors), L4 (Ankle dorsiflexors), L5 (Long toe extensors), S1 (Ankle plantar flexors), S2, S3, S4-5 (Voluntary anal contraction).

LEFT MOTOR KEY MUSCLES: C2, C3, C4, C5 (Elbow flexors), C6 (Wrist extensors), C7 (Elbow extensors), C8 (Finger flexors), T1 (Finger abductors), T2, T3, T4, T5, T6, T7, T8, T9, T10, T11, T12, L1, L2 (Hip flexors), L3 (Knee extensors), L4 (Ankle dorsiflexors), L5 (Long toe extensors), S1 (Ankle plantar flexors), S2, S3, S4-5 (Voluntary anal contraction).

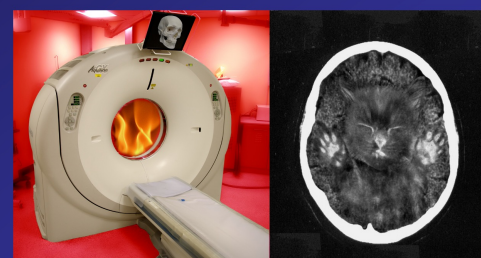
SENSORY KEY SENSORY POINTS (Light Touch, Pin-Prick, Vibration): C2, C3, C4, C5, C6, C7, C8, T1, T2, T3, T4, T5, T6, T7, T8, T9, T10, T11, T12, L1, L2, L3, L4, L5, S1, S2, S3, S4-5.

NEUROLOGICAL LEVELS: 1. SENSORY, 2. MOTOR, 3. NEUROLOGICAL LEVEL OF INJURY (NLI), 4. COMPLETE OR INCOMPLETE?, 5. ASIA IMPAIRMENT SCALE (AIS).

AB and CT

- ATLS Cervical XR
 - Now part of secondary survey
 - It doesn't change initial management

Neurological Outcome o
Oxygenation
Perfusion
Time to Spinal Unit



Clinical Study

The role of magnetic resonance imaging in acute cervical spine fractures

Sina Pourtaheri, MD^{a,*}, Arash Emami, MD^a, Kumar Sinha, MD^a, Michael Faloona, MD^a,
Ki Hwang, MD^a, Eiman Shafa, MD^a, Laurens Holmes, Jr., MD, PhD^b

^aDepartment of Orthopedic Surgery, Seton Hall University–St Joseph's Regional Medical Center, 703 Main St. Paterson, NJ 07653, USA

^bDepartment of Orthopedic Surgery, Nemours/Alfred I. DuPont Children's Hospital, 1600 Rockland Rd, Wilmington, DE 19808, USA

- 99 pts **cervical spine fractures** - CT and MRI
- Risk factors further injury seen only on MRI:
 - Male over 60yrs, polytrauma, cervical spondylosis, neurological deficit, obtunded
- Suggest consideration to MRI in these subgroups



- MRI - additional info – 48%
 - Change management 39% (?- 20% group)
 - 24% non op management changed to op
- The change management
 - 81% illustration spinal cord
 - 19% occult instability

Erect Radiographs to Assess Clinical Instability in Patients with Blunt Cervical Spine Trauma

J Bone Joint Surg Am. 2012;94:e174(1-4)

Simon Humphry, MRCS, Andrew Clarke, FRCS (Orth), Michael Hutton, FRCS (Orth), and Daniel Chan, FRCS (Orth)

Investigation performed at the Peninsula Spine Unit, Princess Elizabeth Orthopaedic Centre, Royal Devon and Exeter Hospital, Exeter, United Kingdom

- Erect XRs test physiological loading and can detect instability
- Consider in cases **except** where instability is already evident



Treatment of Spinal Fractures



The Personalities

- Personality of the patient
 - Age
 - Comorbidity
 - Bone stock
 - Energy of injury / other injuries
 - Time since injury



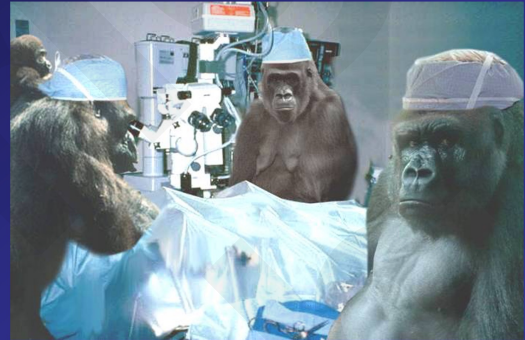
The Personalities

- Personality of the fracture
 - Canal compromise
 - Neurologic compromise
 - Kyphosis
 - Anterior collapse
 - Progression



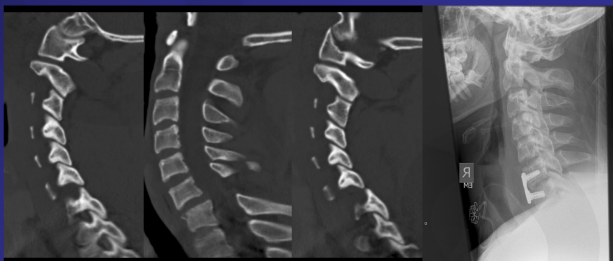
The Personalities

- Personality of the surgeon



The Dreaded...

- Scan it
- Reduce it
- Fix it



TL Burst Fractures

THE SPINE JOURNAL

The Spine Journal 14 (2014) 2557–2564

Clinical Study

Orthosis versus no orthosis for the treatment of thoracolumbar burst fractures without neurologic injury: a multicenter prospective randomized equivalence trial

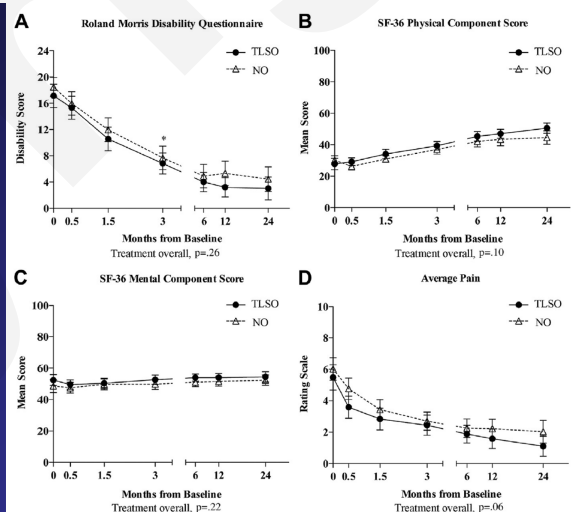
Christopher S. Bailey, MD, MSc^a, Jennifer C. Urquhart, PhD^a, Marcel F. Dvorak, MD^b,
Melissa Nadeau, MD^a, Michael C. Boyd, MD^b, Ken C. Thomas, MD, MHSc^c,
Brian K. Kwon, MD, PhD^b, Kevin R. Gurr, MD^b, Stewart I. Bailey, MD^a,
Charles G. Fisher, MD, MHSc^{b,*}

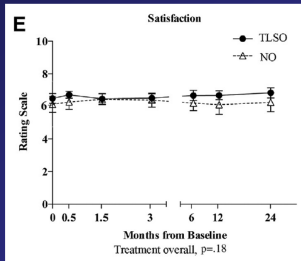


Nothing at all for burst fractures!

- AOA3 fractures T11-L3
 - Isolated injury, PLC intact, kyphosis <35, no neuro deficit, 16-60yrs, <3 days from injury, healthy BMI
- 47 TLSO
 - 8-10/52
- 49 No group
 - Ambulate immediately bending restrictions 8/52
- 6 required fixation (4 in TLSO 2 in No)
- LOS same

Very Specific Group of Patients





Outcome measure	NO	TLSO	Treatment effect (95% CI)
RMDQ*	9.8 ± 0.6	8.7 ± 0.7	1.1 (-0.8 to 2.9)
SF-36 PCS†	36.6 ± 1.1	39.1 ± 1.1	-2.6 (-5.6 to 0.5)
SF-36 MCS‡	50.8 ± 1.2	52.2 ± 1.2	-2.1 (-5.5 to 1.3)
Average pain§	3.4 ± 0.3	2.7 ± 0.2	0.6 (-0.03 to 1.3)
Satisfaction§	6.2 ± 0.1	6.4 ± 0.1	-0.3 (-0.6 to 0.02)

Surgical Treatment TL #s

It's like removing your bendy spine..

and replacing it with a metal pole!

AO Principles

- Anatomic Reduction
- Stable Internal Fixation
- Atraumatic Technique
- Early Active Mobilisation

Realign
Stabilize
Decompress
Prevent Late Pain / Deformity

Surgical Treatment



MAJOR BACK SURGERY
DOESN'T HAVE TO MEAN
MAJOR SCARS.

TOWN CENTER SURGERY
WELCOMES

DR. VIRELLA!

Dr. Marc Lussier would like to welcome
Dr. Anthony A. Virella to Town Center Surgery.
Dr. Virella brings his considerable skills as a
neurosurgeon specializing in minimally invasive spine
surgery. Please contact Virella Neurosurgery today
at 661.388.5281 or visit www.dr-virella.com.

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Leaders in
Minimally Invasive
Spine Surgery



Review

Journal of Clinical Neuroscience

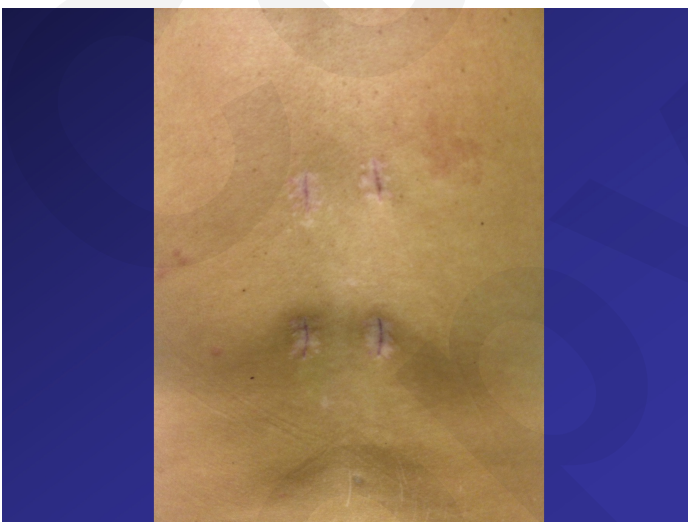
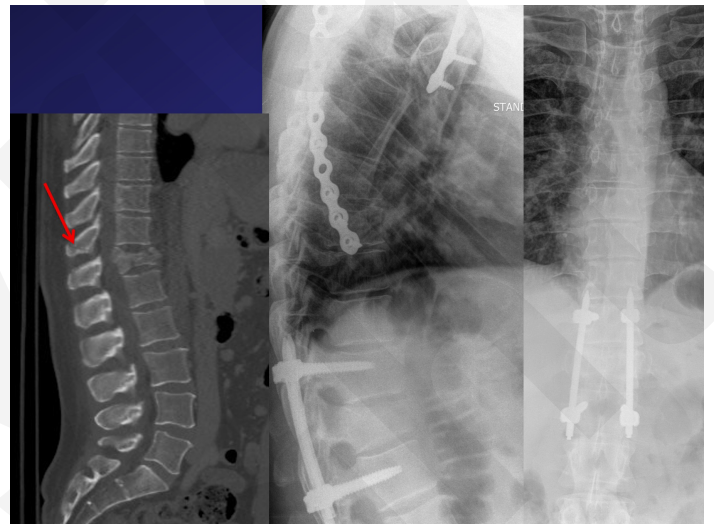
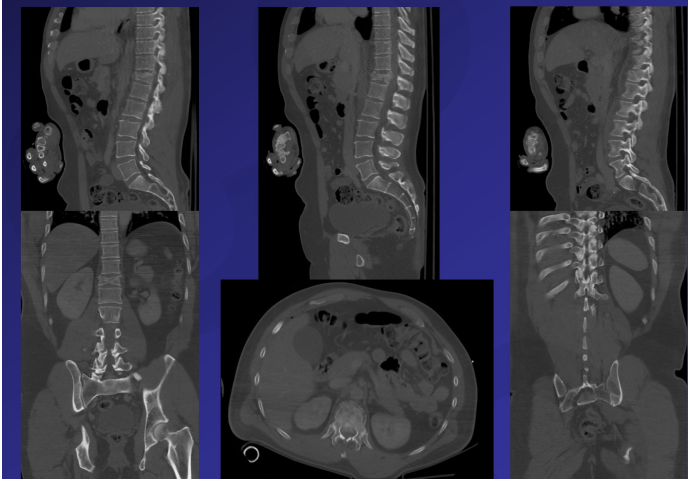
Minimally invasive spinal surgery for the treatment of traumatic thoracolumbar burst fractures

Taemin Oh, Justin K. Scheer, Shayan Fakurnejad, Nader S. Dahdaleh, Zachary A. Smith*
Department of Neurological Surgery, Northwestern University, Feinberg School of Medicine, 676 N. St Clair Street, Suite 2210, Chicago, IL 60611, USA

Traumatic thoracolumbar spinal injury: an algorithm for minimally invasive surgical management

Neurosurg Focus 37 (1):E9, 2014
©AANS, 2014

SANJAY S. DHALL, M.D.,¹ RISHI WADHWA, M.D.,¹ MICHAEL Y. WANG, M.D.,²
ALEXANDRA TIEN-SMITH,³ AND PRAVEEN V. MUMMANENI, M.D.¹



Spine
Research Article
Long Thoracic and Lumbar Spinal Stabilization with a Minimally Invasive Spine Surgery Technique
Hiroshi Kuroki*, Naoki Inomata, Hideaki Hamanaka and Etsuo Chosa
Department of Orthopaedic Surgery, University of Miyazaki Faculty of Medicine, Japan

Timing of Fracture Surgery

Eur Spine J (2013) 22:2157–2166
DOI 10.1007/s00586-012-2624-1

REVIEW ARTICLE

A methodological systematic review of early versus late stabilization of thoracolumbar spine fractures

2014

ORIGINAL ARTICLE

J Trauma Acute Care Surg
Volume 76, Number 2

Early or delayed stabilization in severely injured patients with spinal fractures? Current surgical objectivity according to the Trauma Registry of DGU: Treatment of spine injuries in polytrauma patients

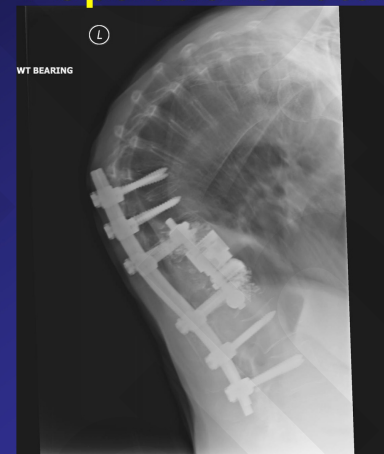
Fix Early esp in Polytrauma

Miscellaneous



In short don't operate because you can't win

4 Operations Later

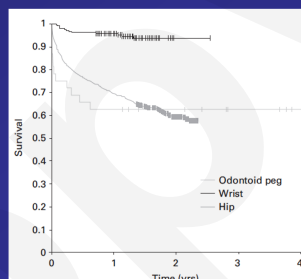


■ SPINE

VOL. 96-B, No. 1, JANUARY 2014

Survival analysis of elderly patients with a fracture of the odontoid peg

- The Spinal NoF
- 37.5% mortality at 1 yr (vs 32% for NoF)
- Inform the patient
– Serious injury
- Warn the family



WORLD NEUROSURGERY 82 (5): 848-854, NOVEMBER 2014

The Current Role of Steroids in Acute Spinal Cord Injury

Mohamad Bydon, Joseph Lin, Mohamed Macki, Ziya L. Gokaslan, Ali Bydon

- Not recommended or supported by current evidence

British Orthopaedic Association
PUBLISHED BY THE BRITISH ORTHOPAEDIC ASSOCIATION



THE INITIAL CARE AND TRANSFER OF PATIENTS WITH SPINAL CORD INJURIES

Published by the British Orthopaedic Association, January 2006

Evidence-based management of central cord syndrome

NADER S. DAHDALEH, M.D., CORT D. LAWTON, B.S., TAREK Y. EL AHMADIEH, M.D.,
ALEXANDER T. NIXON, M.S., NAJIB E. EL TECL, M.D., SANDERS OH, B.S.,
RICHARD G. FESSLER, M.D., Ph.D., AND ZACHARY A. SMITH, M.D.

Management of Acute Traumatic Central Cord Syndrome (ATCCS)

Neurosurgery 72:195–204, 2013

Spine

SPINE Volume 40, Number 5, pp 349-356
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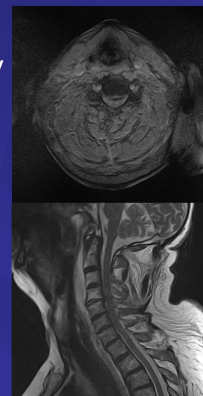
SURGERY

Delayed Surgery After Acute Traumatic Central Cord Syndrome Is Associated With Reduced Mortality

Andre M. Samuel, BBA* Ryan A. Grant, MD, MSt Daniel D. Bohl, MPH* Bryce A. Basques, BS*
Matthew L. Webb, AB* Adam M. Lukasiewicz, MSc* Pablo J. Diaz-Collado, MD* and Jonathan N. Grauer, MD*

Acute Traumatic CCS

- Early surgery if:
 - Fracture / Dislocation / Instability
 - Acute compression
 - Acute disc prolapse
 - Haematoma
- Evidence to lie flat for 6 weeks then tilt table to allow cord to recover
 - ?Rapid / Slow recovery
 - ?Dense / Mild deficit



Flat Bed Rest Following SCI?

Trauma 2006; 8: 29–46

Traumatic spinal cord injury: the relationship between pathology and clinical implications

WS El Masri(y)

- Documented evidence of further neurological deterioration with postural hypotension
- Early mobilization can reduce vital capacity and impair the cord further
- 6/52 flat bed rest for cervical cord injuries
- Do tilt table studies as cord recovers

The Future is Coming



WORLD NEUROSURGERY 82 (1/2): 207-214, JULY/AUGUST 2014

Hypothermia for Acute Spinal Cord Injury—A Review

Faiz U. Ahmad, Michael Y. Wang, Allan D. Levi

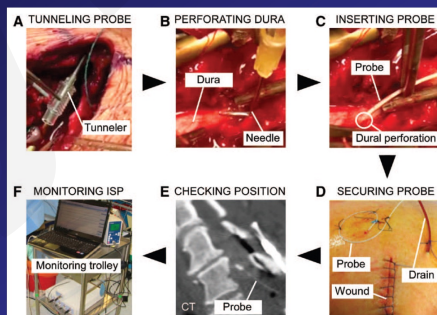
CONCLUSIONS: There is robust experimental and some clinical evidence that hypothermia is beneficial in acute SCI. Larger, multicenter trials should be initiated to further study the usefulness of systemic hypothermia in SCI.



Critical Care Medicine

March 2014 • Volume 42 • Number 3

Monitoring of Spinal Cord Perfusion Pressure in Acute Spinal Cord Injury: Initial Findings of the Injured Spinal Cord Pressure Evaluation Study*



- Subdural ISP
 - cf ICP
- SCPP
 - cf CPP
- Laminectomy
 - no difference

