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Recent publications from the Department of Orthopaedics at Denver Health

Hak DJ. Anterolateral approach for tibial pilon fractures. *Orthopedics* 2012, 35:131-3.

Mauffrey C, McGuinness K, Parsons N, Achten J, Costa ML. A randomized pilot trial of "locking plate" fixation versus intramedullary nailing for extra-articular fractures of the distal tibia. *J. Bone Joint Surg. Br.* 2012, 94:704-8.

Mauffrey C, Bailey JR, Hak DJ, Hammerberg ME. Percutaneous reduction and fixation of an intra-articular calcaneal fracture using an inflatable bone tamp: description of a novel and safe technique. *Patient Saf. Surg.* 2012, 6:6.

Agudelo JF, Flierl MA, Smith WR, Moore EE, Williams AE, Eckels PC, Morgan SJ, Stahel PF. Influence of preoperative 7.5% hypertonic saline on neutrophil activation after reamed intramedullary nailing of femur shaft fractures – a prospective randomized pilot study. *J. Orthop. Trauma* 2012, 26:86-91.

Weckbach S, Losacco JT, Hahnhaussen J, Gebhard F, Stahel PF. Challenging the dogma on inferiority of stainless steel implants for fracture fixation: An end of the controversy? [German]. *Unfallchirurg* 2012, 115:75-9.

Neher M, Weckbach S, Huber-Lang MS, Stahel PF. New insights into the role of peroxisome-proliferator activated receptors in regulating the inflammatory response after tissue injury. *PPAR Res.* 2012, 728461.

Newman JT, Morgan SJ, Resende GV, Williams AE, Hammerberg EM, Dayton MR. Modality of wound closure after total knee replacement: are staples as safe as sutures? A retrospective study of 181 patients. *Patient Saf. Surg.* 2011, 5:26.

Mehler PS, Colwell CB, Stahel PF. A structured approach to improving patient safety: Lessons from a public safety-net system. *Patient Saf. Surg.* 2011, 5:32.

Hammerberg EM, Whitesides TE Jr, Seiler JG 3rd. The reliability of measurement of tissue pressure in compartment syndrome. *J. Orthop. Trauma* 2012, 26:24-31.

Ozer K, Wolf JM, Watkins B, Hak DJ. Comparison of 4 fluoroscopic views for dorsal cortex screw penetration after volar plating of the distal radius. *J. Hand Surg. Am.* 2012, 37:963-7.

The physicians at Denver Health Orthopedics are committed to partnering with you to provide care for your patients with complex fractures, polytrauma, and microvascular replantation injuries.

Consults and transfers available 24 hours a day, 365 days a year.

ACCESS Denver Health Trauma Hotline: 1-866-348-7286 (1-866-DH-TRAUMA).



OrthoInnovations



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FEEDBACK FROM THE 2012 Ortho Conference

Denver Health was pleased to present the inaugural **Rocky Mountain Orthopedic Trauma Conference** in Beaver Creek, Colorado in August. Orthopedic and trauma physicians gathered to discuss the latest techniques and challenges in orthopedic care.

Special thanks to our exhibitors for their support of the conference: **CarboFix Orthopedics, Inc., KCI, Lilly, Medtronic, Smith & Nephew, Stryker Trauma and Extremities, Synthes Trauma, US Army and Zimmer.**

SAVE THE DATE! We look forward to August 2013 for the 2nd Annual Rocky Mountain Orthopedic Trauma Conference.

AUGUST 3 - 4, 2013

"All excellent, enthusiastic, professional. Clearly dedicated to improving patient care."

"Excellent panel of speakers. Patient safety talk [was] excellent."

"Great command of the presented material. Excellent presentations."

"Your Orthopedic Trauma Conference at Beaver Creek was a wonderful experience. I especially enjoyed your entire faculty. I have had some association with Denver Health for many years. Your current orthopedic staff is the best ever, and probably the best in the USA."

Surviving an "unsurvivable" injury: A vertical free fall from 300 feet

The *American College of Surgeons' Committee on Trauma* (ACS-COT) defines a critical threshold for a fall height in adults as > 20 feet, as part of the field triage decision scheme for transport to a designated trauma center. A landmark study which analyzed the prognostic factors in vertical fall victims revealed that falls from height of 8 stories (i.e. around 90-100 feet) and higher, are associated with a 100% mortality (Lapostole et al., *Crit. Care Med.* 2005,33:1239-42). Thus, a vertical falling height of more than 100 feet is generally considered to constitute a "non-survivable" injury.

In this newsletter, we discuss the impressive case of a 28-year old rock climber who survived an "unsurvivable" injury consisting of a vertical free fall from 300 feet onto a solid rock surface. This

impressive case emphasizes the crucial role of body position to impact surface at the time of the accident, and the importance of early transfer to a level 1 trauma center for definitive care.



(continued)

A 28-year old woman was free climbing with her boyfriend near Gunnison, Colorado. She had 20 years of experience of rock climbing. The ascent consisted of three pitches of 90-100 feet (ca. 30 m) each. The climbing distance was defined by the climbing rope which had been fixed at a defined length. The girl took the lead on the third pitch, to a total height of 300 feet (ca. 90 m). After securing the anchor at that height, the rope – which was lacking a security knot – slid through her harness. She then fell a total of 300 feet, with a first impact at 200 feet onto a flat rock surface, and a further fall for about 100 feet. Based on this falling height, the velocity at the time of impact is estimated around 75-80 mph. Her boyfriend witnessed the entire fall, climbed back down and provided first aid at the scene. The patient was awake and moaning, but not responsive to verbal or painful stimuli. She was intubated at the scene and transported to a local level IV trauma center, where she was resuscitated and then transferred to Denver Health’s Rocky Mountain Regional Level I Trauma Center.

She sustained the following combination of injuries (Figure 1):

- Blunt chest trauma with sternal fracture, bilateral hemo-/pneumothoraces, bilateral pulmonary contusions, right 1 and 2 rib fractures, left 9-11 rib fractures
- Blunt abdominal trauma with grade 3 liver laceration, grade 2 splenic laceration, and a devascularized right kidney
- Mild traumatic brain injury
- Rotationally unstable flexion/distraction injury at T6 with traumatic spinal cord transection and complete paraplegia ASIA grade A below T6 (Figure 2)
- Unstable L1 burst/split fracture
- Unstable pelvic ring injury with bilateral SI-joint disruption, bilateral L5 transverse process fractures, bilateral pubic rami fractures, and left-side transalar transforaminal Denis type 2 sacral fracture
- Right femur shaft fracture
- Right type IIIA open talar body fracture and associated posterior facet calcaneus fracture
- Left comminuted joint-depression type calcaneus fracture

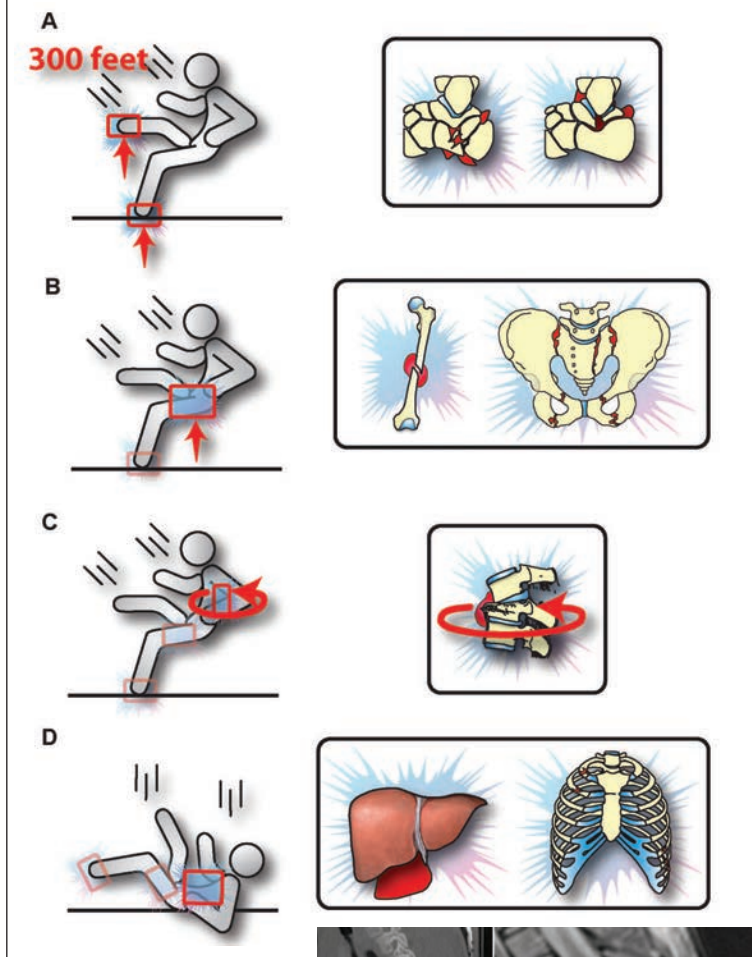


Figure 1



Figure 2

After initial resuscitation, she was taken to the operating room for “damage control orthopedics” (DCO) with spanning external fixation of the right femur fracture, surgical debridement of the open talar fracture with primary wound closure, and spanning external fixation. The contralateral comminuted calcaneus fracture was managed nonoperatively and placed in a well-padded bulky Jones splint. The patient was then transferred to the surgical intensive care unit (SICU) for further resuscitation. She was taken back to the operating

room on day 2 day for preliminary spinal fixation as a “spine damage control” procedure, including a posterior spinal fusion from T4-T8 with laminectomy and spinal canal decompression at T6, as well as posterior spinal fusion T12-L2, and lumbo-pelvic fixation (Figure 3). She recovered well from her injuries and from the “damage control” procedures and was extubated on hospital day four (Figure 4). She remained fully awake and alert, and had a complete paraplegia to bilateral lower extremities, consistent with the traumatic spinal cord disruption at T6 seen on initial MRI. On day five, she was taken back to the operating room for definitive fixation of the talar body fracture and right femur shaft fracture (Figure 5).

The patient had an excellent recovery and was mobilized into a wheelchair with physical and occupational therapy. On day 13, she was taken back to the operating room for completion 360° fusion T5-T7 and T12-L2, with anterior corpectomy of T6 and L1 vertebral bodies, and placement of two titanium expandable cages and bone grafting. She had an uneventful recovery. All surgical wounds healed well, and there were no postoperative complications. The patient quickly progressed to independent wheelchair transfers. She was transferred to her local community regional spinal cord rehabilitation center out-of-state at 2½ months after injury in excellent conditions, for completion of her neuro-rehabilitation program. At 6 months, she was back on the slopes skiing in a specially designed “sit-ski” (Figure 6).

In summary, the patient’s specific injury pattern is suggestive of a trauma mechanism by which the patient landed on both feet first, followed by a deceleration/twisting mechanism to her right femur and the thoracic and lumbar spine, ending in a fall on the back which

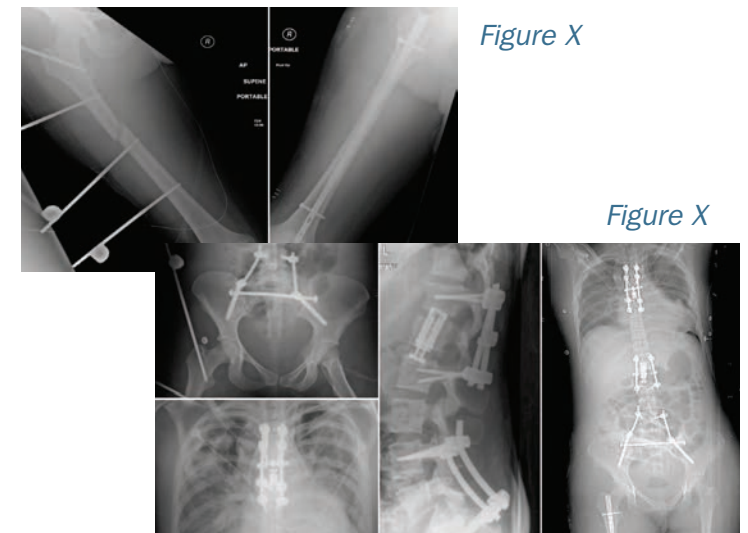


Figure X

Figure X

induced the final deceleration forces leading to the intra-abdominal and thoracic injuries. In addition to the crucial importance of body position to impact surface for survival (namely to land “feet first”), the rapid intubation, early resuscitation, and timely transfer to a qualified level 1 trauma center contributed to this patient’s survival.



Figure X

The full case report can be downloaded as a free “open-access” article at: <http://www.sjtrem.com/content/19/1/63>