

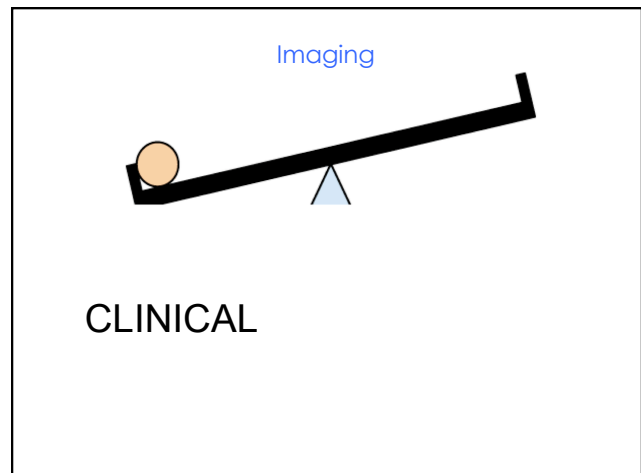
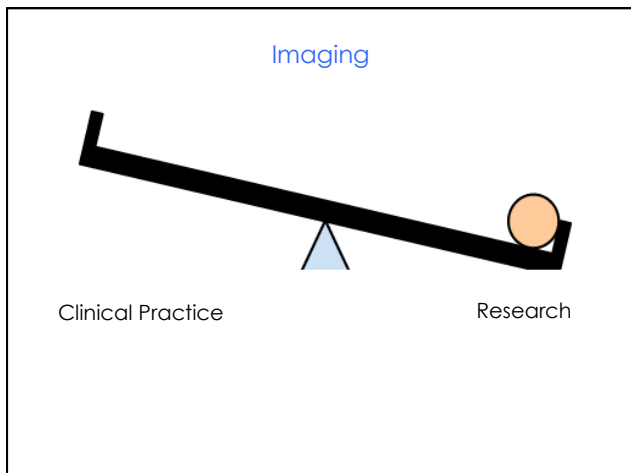
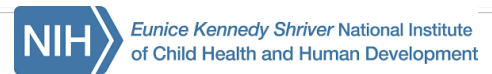


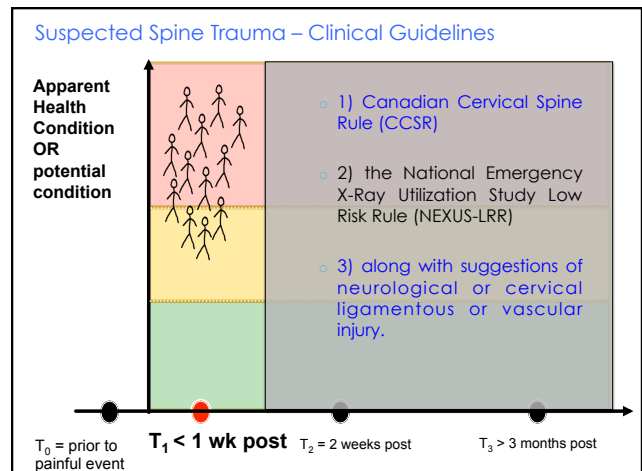
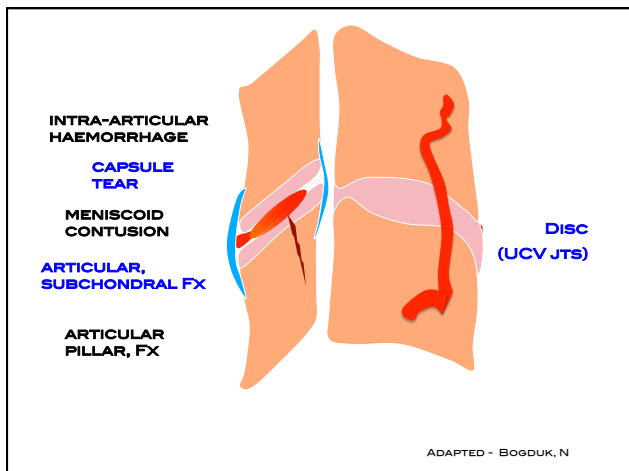
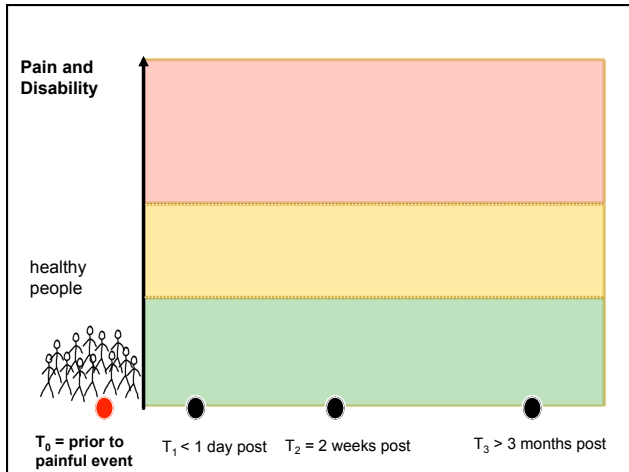
Disclosure...

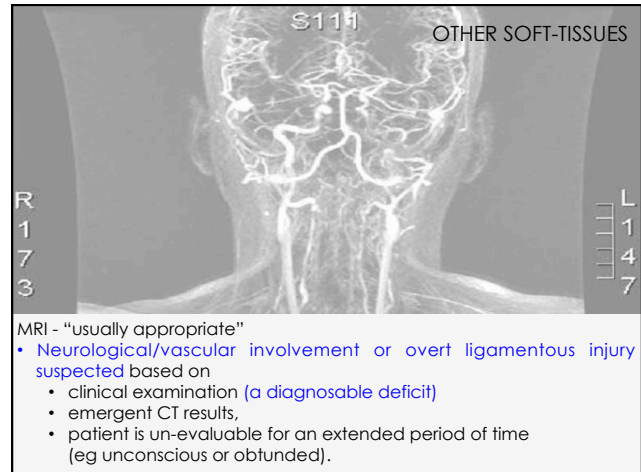
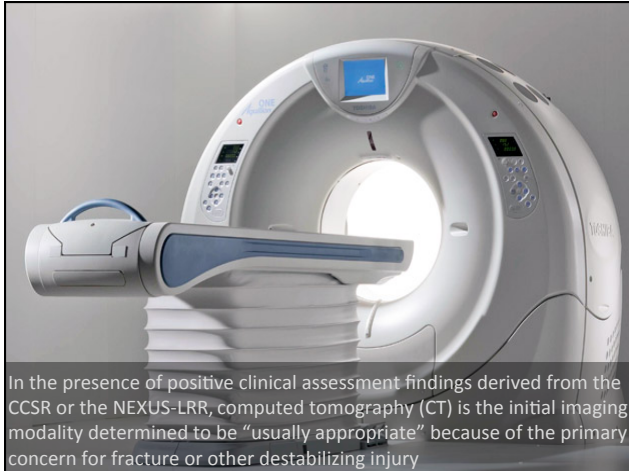
Relevant activities outside the body of this presentation include a 35% ownership/investment interest in the following medical consulting start-up:

Pain ID, LLC

Work discussed in my presentation is supported by the National Institutes of Health: R01 - HD079076-01 A1







Clinical conclusions

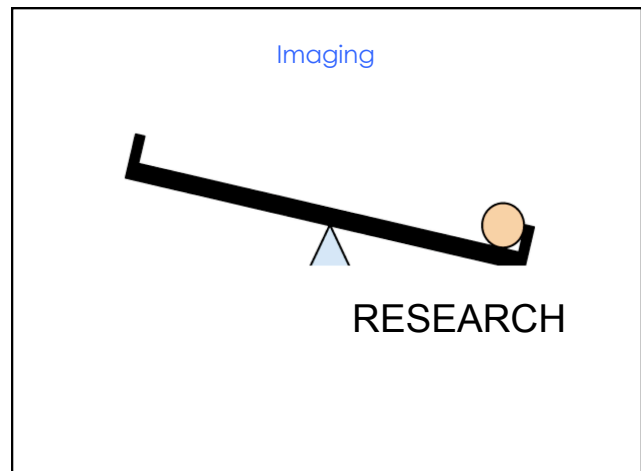
Plain x-rays remain a screening tool in low risk patients and offer a quick overview in significant trauma.

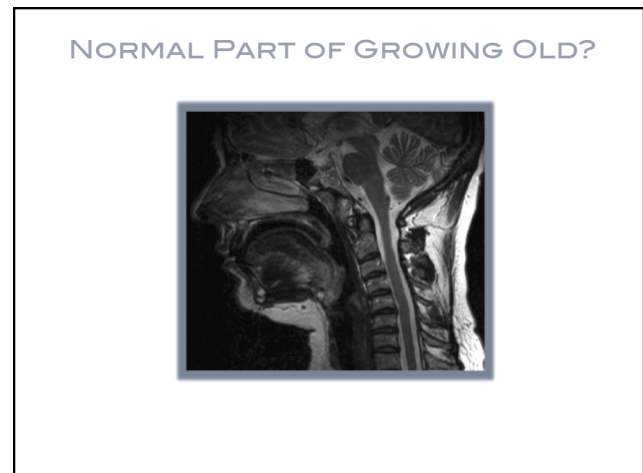
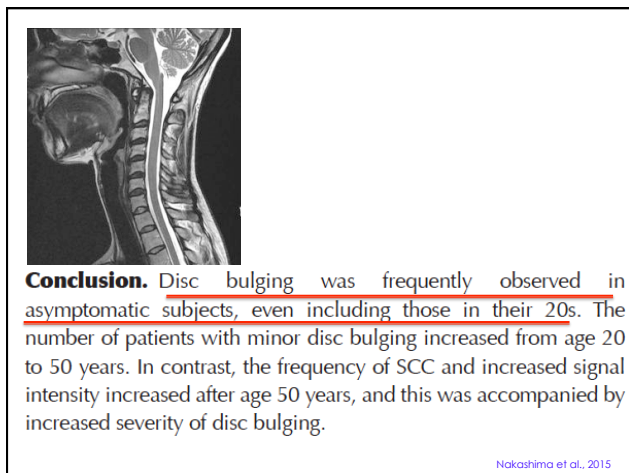
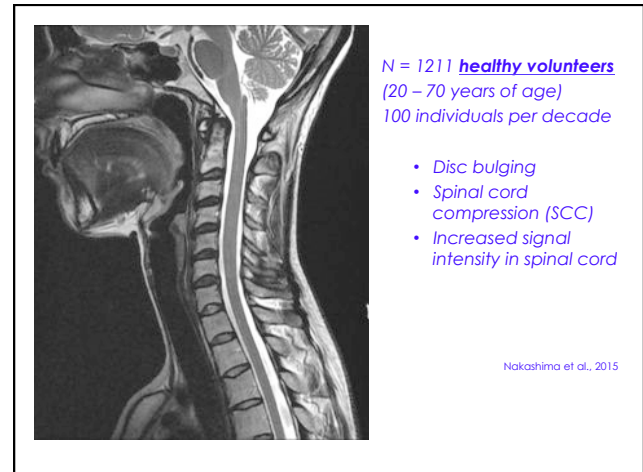
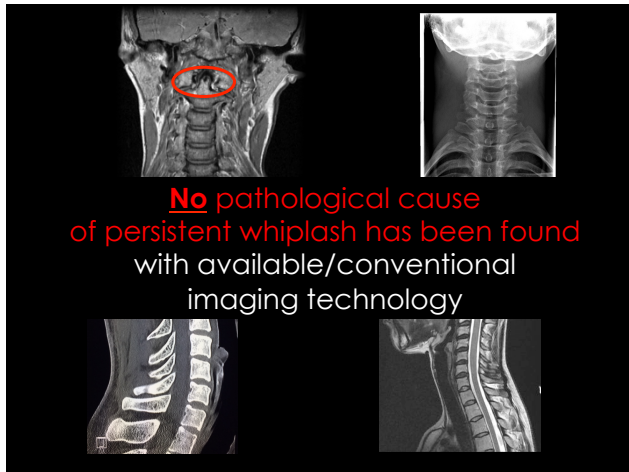
Helical CT with reconstructed images is the study of choice to exclude and define fractures.

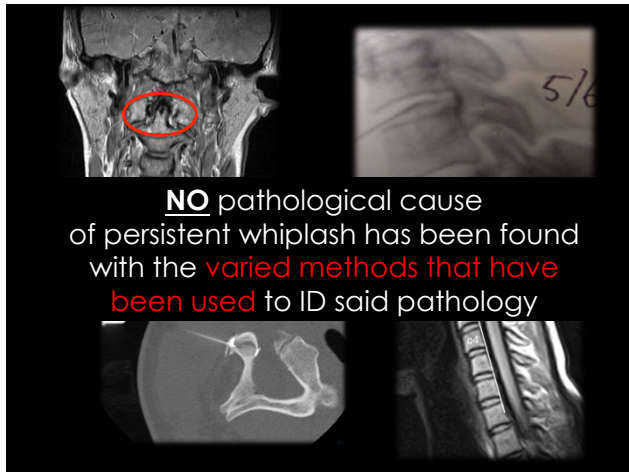
MR offers significant advantages in patients with

- neurologic symptoms,
- evaluate the spinal cord,
- vascular injury,
- and soft tissue

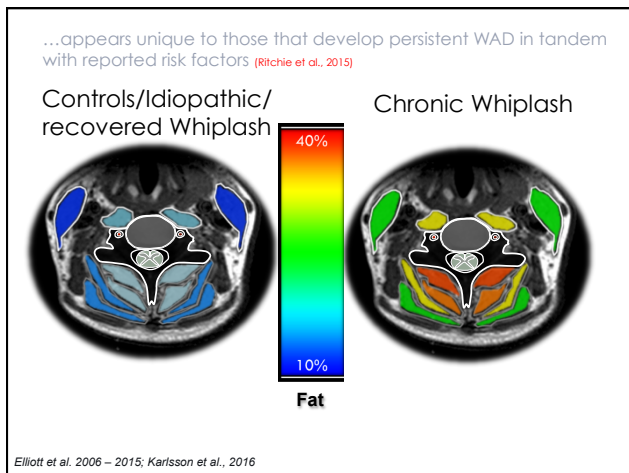
RANZCR, 2015





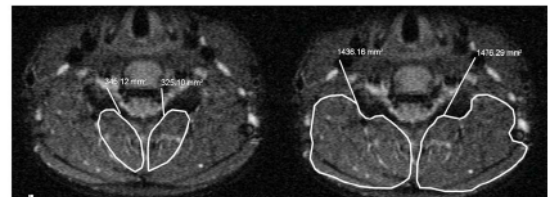


Other Pathologies
(or observable responses to an injury event)



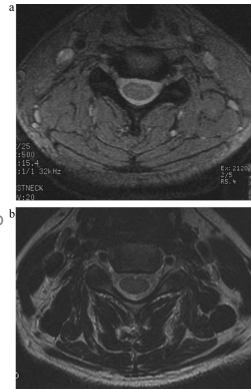
But there is divergent evidence

Ulbrich et al., Cervical muscle area measurements in whiplash patients: Acute, 3, and 6 months of follow-up. *J Magn Reson Imaging*. 2012;36:1413-1420.



But there is divergent evidence

Matsumoto et al., Cross-sectional area of the posterior extensor muscles of the cervical spine in whiplash injury patients versus healthy volunteers – 10-year follow-up MR study. *Injury*. 2012;43



Different research design/methodologies

Variability in outcomes assessment provides impetus for consistency

Little consideration for the heterogeneity of WAD

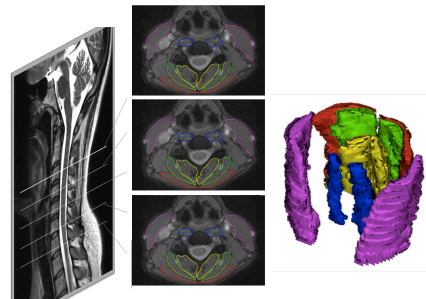
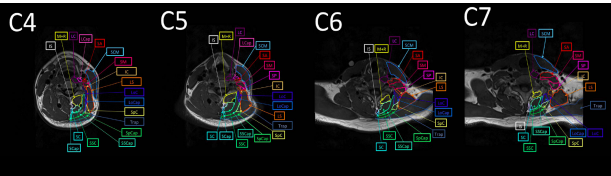
Variability across imaging parameters and measurements provides impetus for consistency

VIEWPOINT

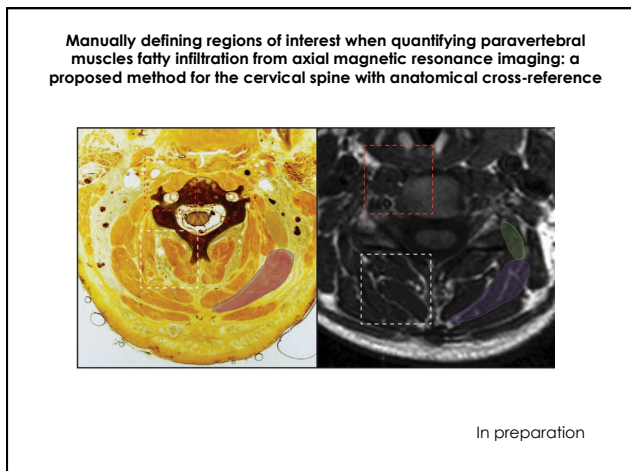
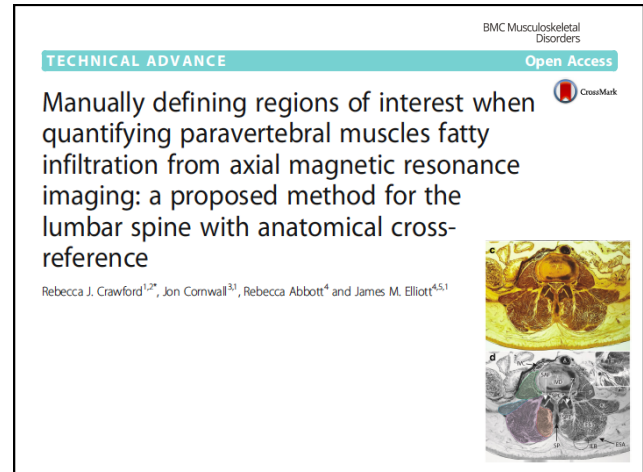
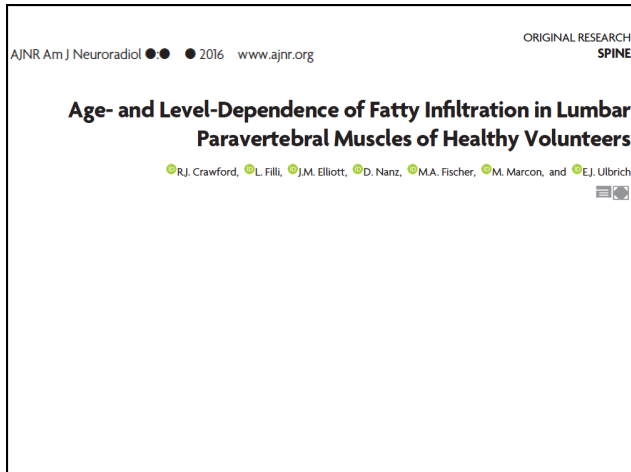
Magnetic Resonance Imaging Atlas of the Cervical Spine Musculature

JOHN AU,^{1,2*} DIANA M. PERRIMAN,^{1,2} MARK R. PICKERING,³ GRAHAM BUIRSKI,^{2,4} PAUL N. SMITH,^{1,2} AND ALEXANDRA L. WEBB²

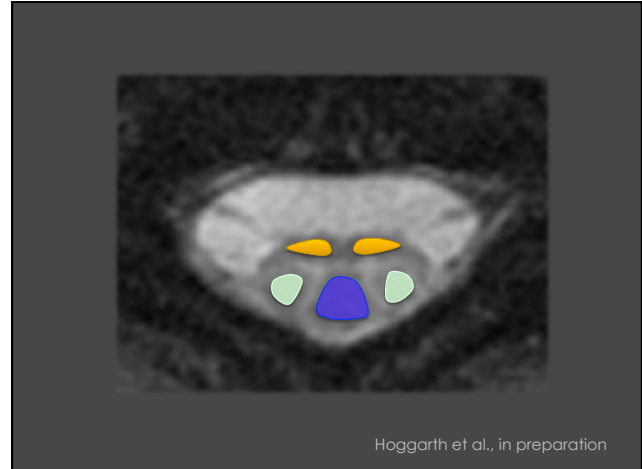
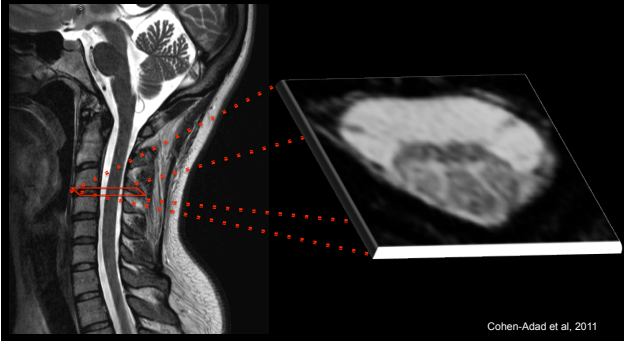
Clinical Anatomy 29:643–659 (2016)



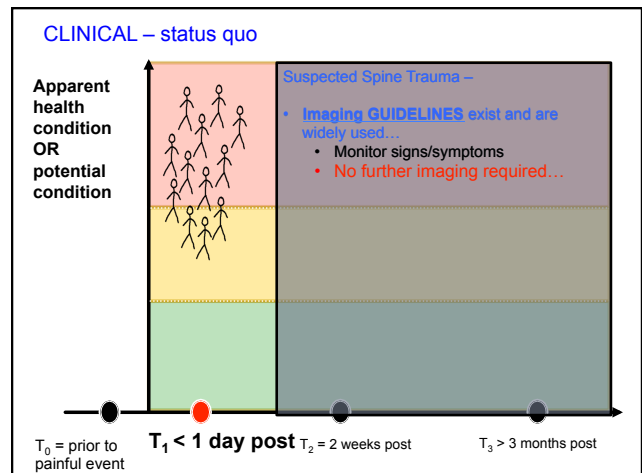
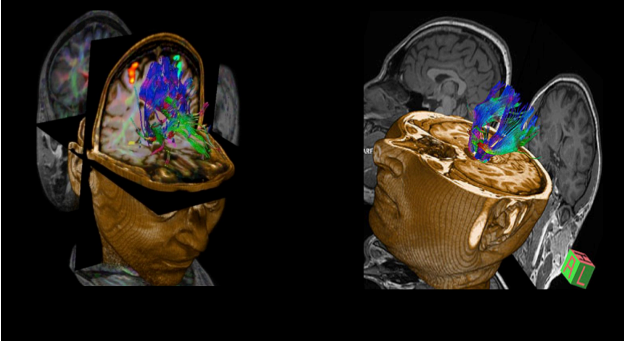
Improved segmentation of the cervical muscles, which could improve quantification of muscle changes

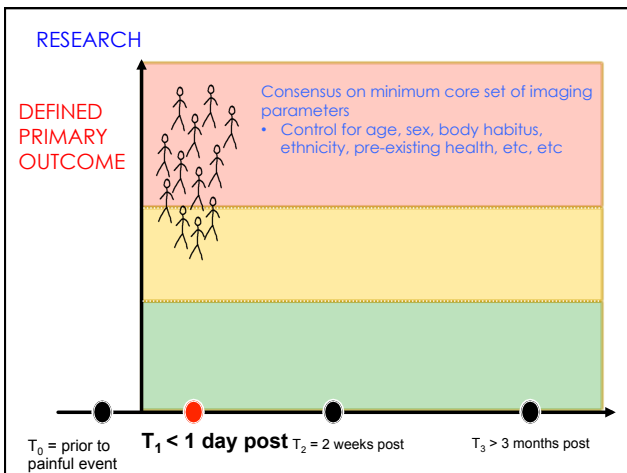
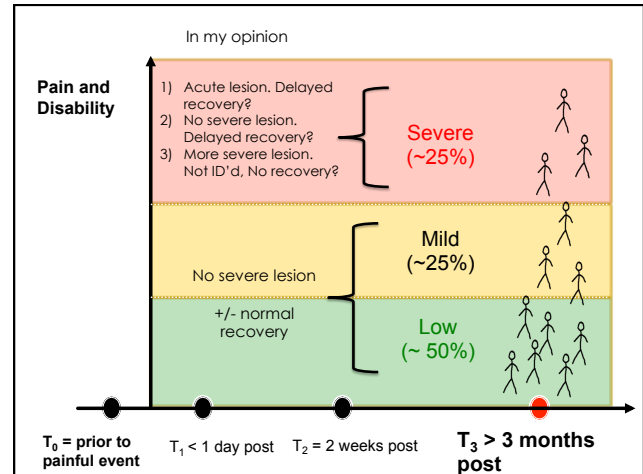
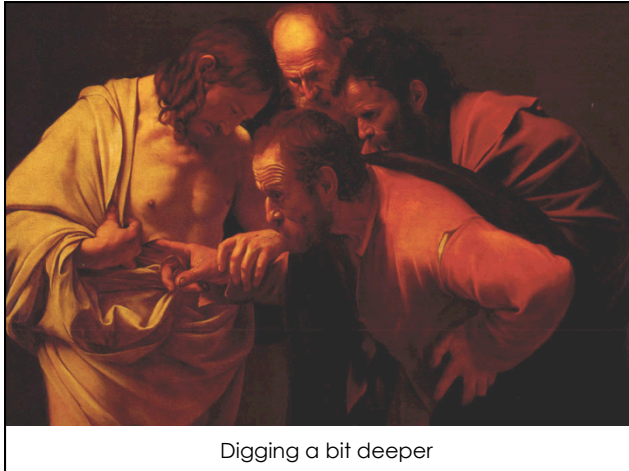


Spinal Cord Imaging




What about up top?





Thank You



Lab Members
 Rebecca Abbott
 Mark Hoggarth
 Jacob McPherson
 Marie Wasielewski

Collaborators
 Phil Bolton
 Linda Carroll
 Mark Courtney
 Jon Cornwall
 Gary Cowin
 Rebecca Crawford
 Olof Dahlqvist Leinhard
 Scott Farrell
 Graham Galloway
 Mark Hancock
 George Hornby
 Gwen Jull
 Anette Karlsson
 Theresia Licka
 Sarah Linnstaedt
 Bonnie Martin-Harris

Sam McLean
 Katie McMahon
 Shaun O'Leary
 Ashley Pedler
 Todd Parish
 Gunter Siegmund
 Andrew Smith
 Ashley Smith
 Cheryl Sparks
 Michele Sterling
 Steph Valentin
 Beth Winkelshtein
 Dave Walton

@elliottjim
 @NIRL_NU