



Segmental hemodynamic changes after cervical spinal cord injury

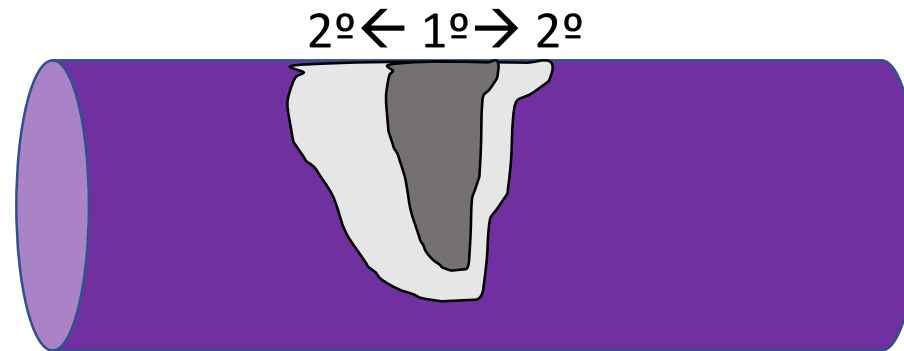
UW Department of Neurological Surgery

Hofstetter Lab

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Introduction

- 17,000 new cases of spinal cord injury (SCI) per year in U.S, majority are cervical
- Primary spinal cord injury—mechanical impact ²
- Secondary spinal cord injury—pathological damage to neural tissue following mechanical impact ²



Introduction

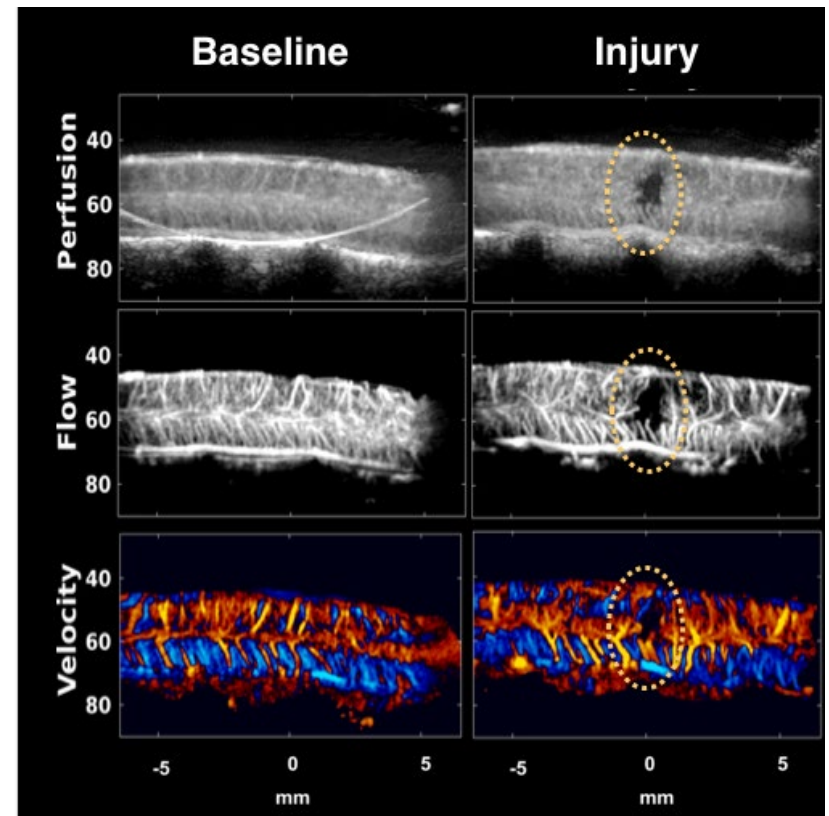
- Ultrafast contrast-enhanced ultrasound (CEUS) allows for real-time visualization of hemodynamic changes

CEUS

Clinical Anatomical Ultrasound

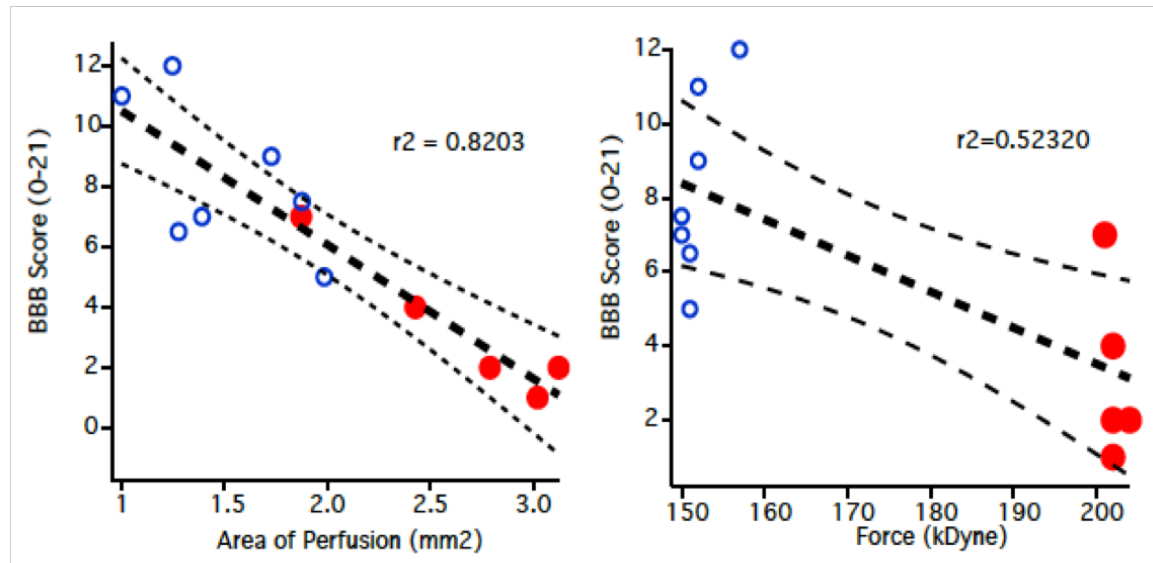


Cross-section ultrasound image of a fetus Source: Courtesy of Phillips Health Care- iu22xMATRIX system



Introduction

Acute perfusion deficits correlate with chronic functional outcomes



Our unique ability to visualize perfusion deficits and their correlated functional outcomes has meaningful implications for cervical SCI patients

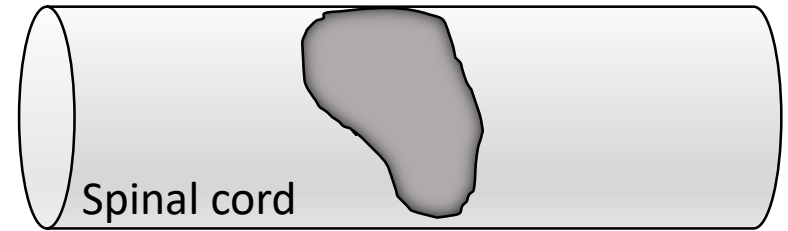
Our Study

Procedure

- Laminectomy
- Pre-injury CEUS
- Unilateral contusion
- Post-injury CEUS

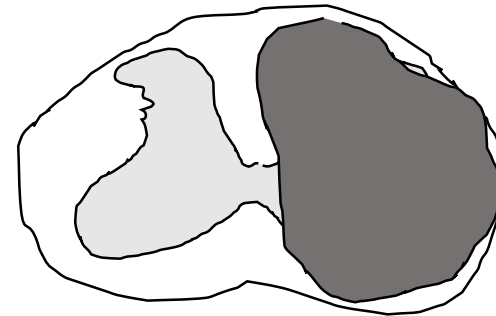


Measurements



Longitudinal

- Area of perfusion deficit



Cross-sectional

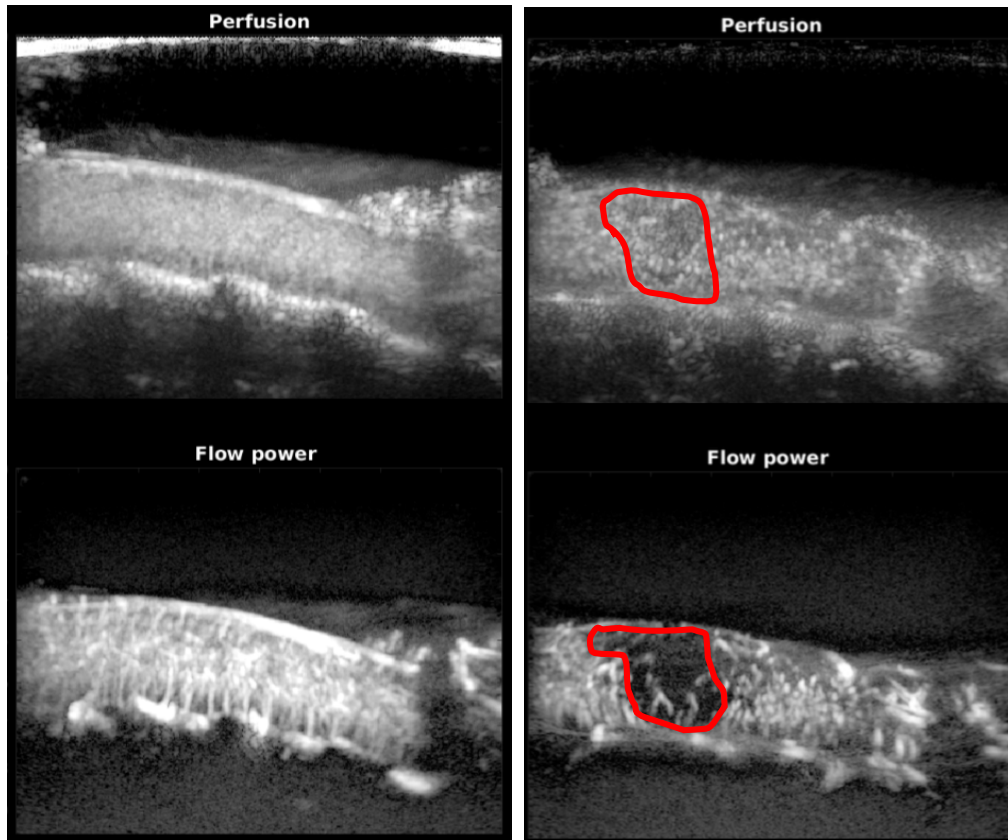
- Area of perfusion deficit
- **Segmental deficit differences**
- Cross sectional area changes



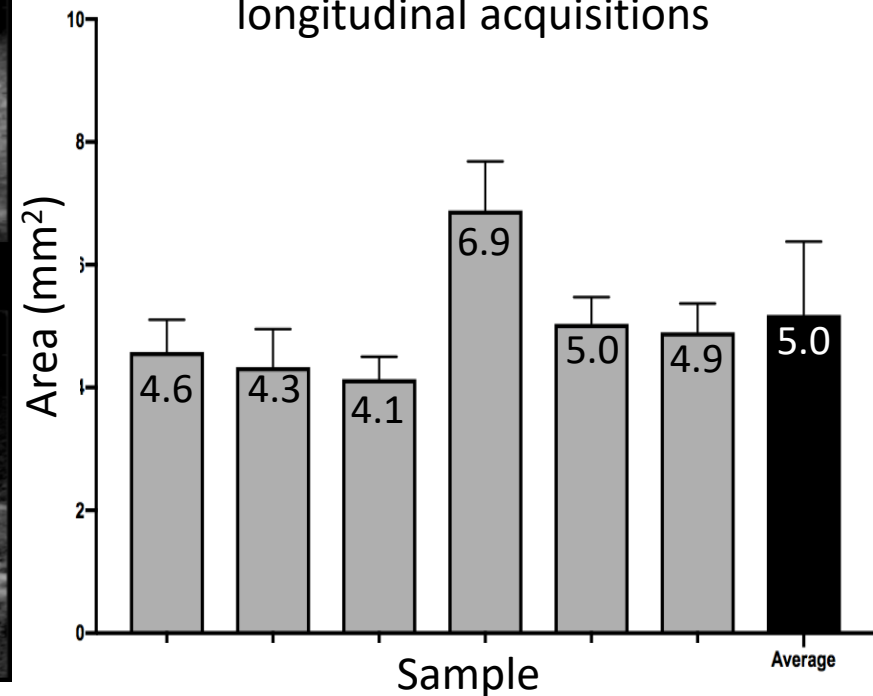
Lesion area analysis using longitudinal acquisitions

Pre-Injury

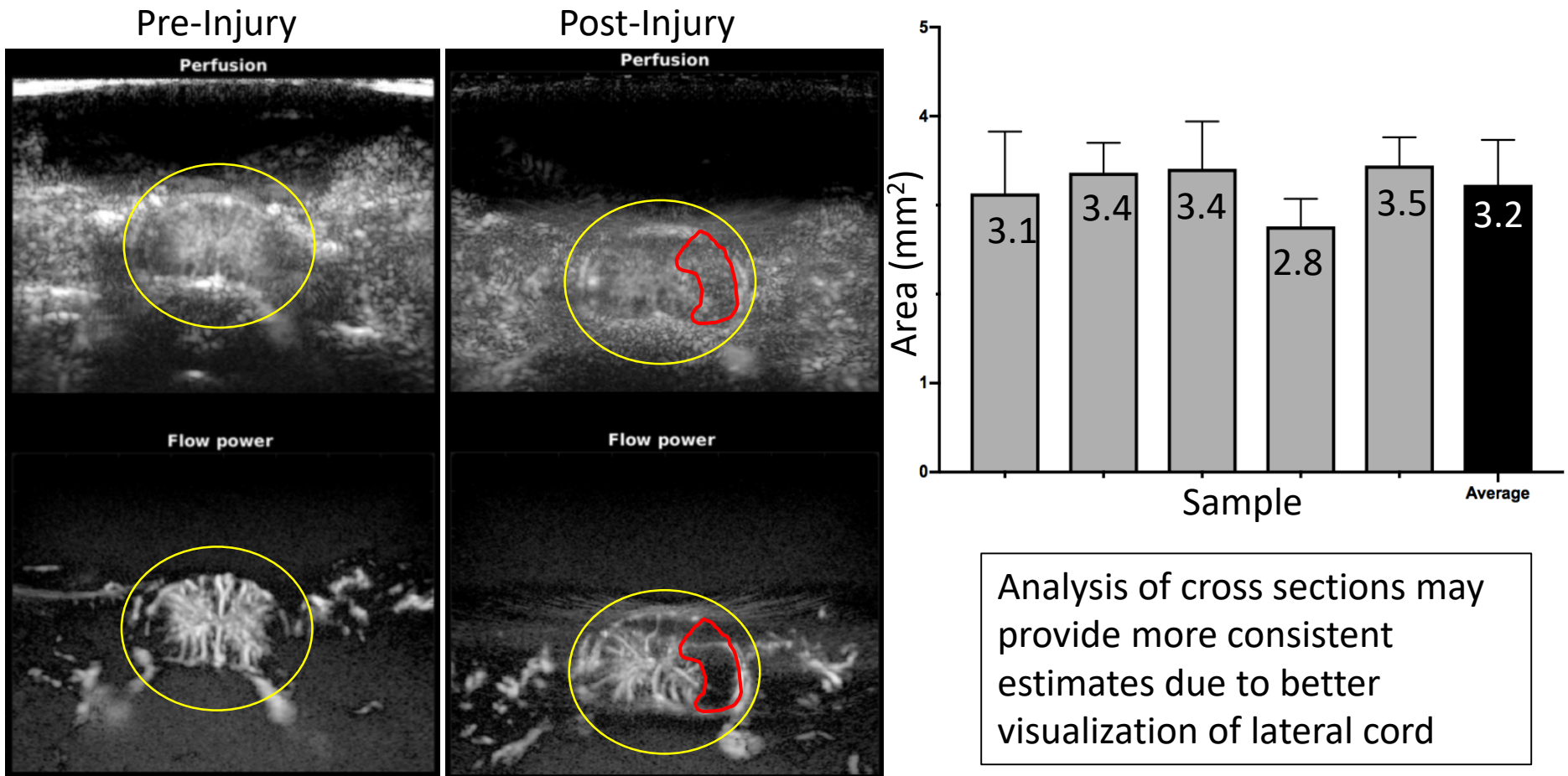
Post-Injury



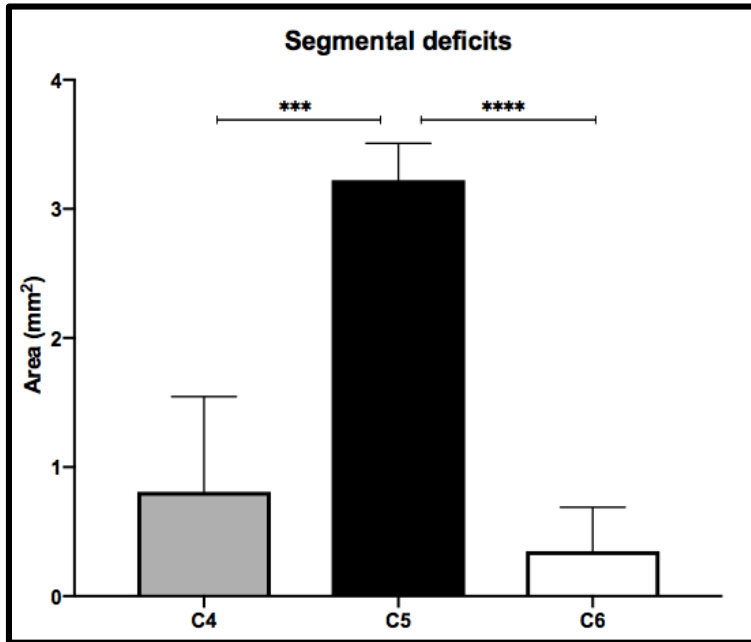
Lesion area analysis using longitudinal acquisitions



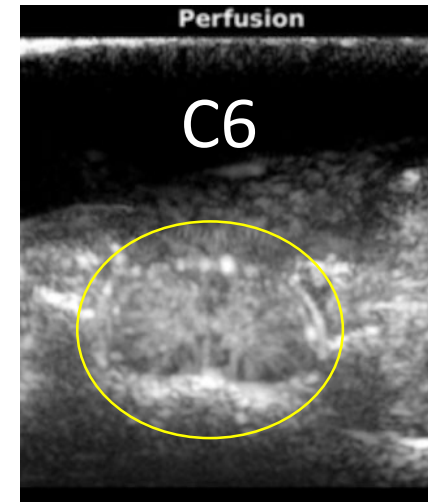
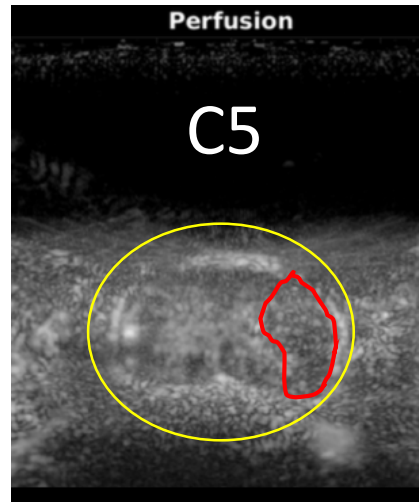
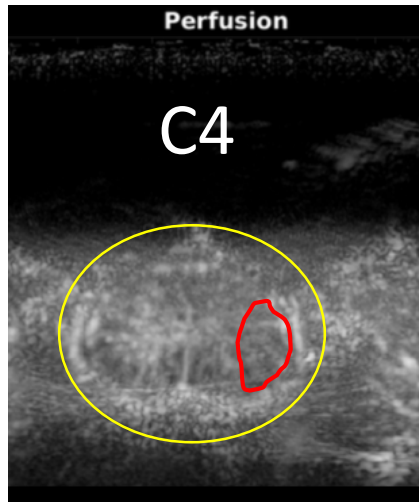
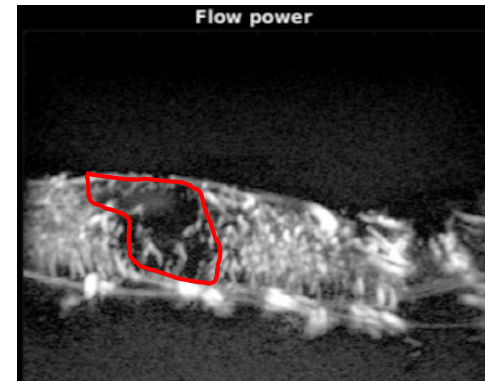
Lesion area analysis using cross-sectional acquisitions



Segmental perfusion deficits

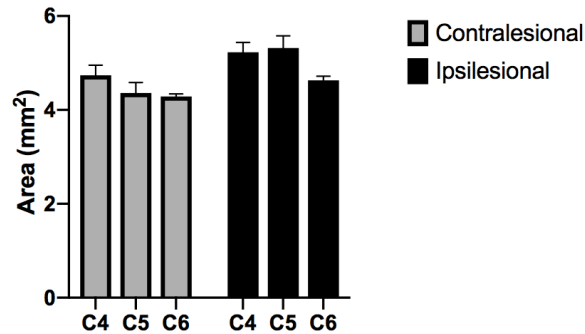


Cross-section segmental data consistent with qualitative observations in longitudinal acquisitions

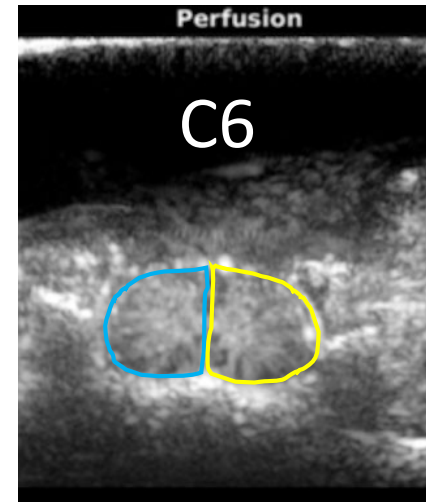
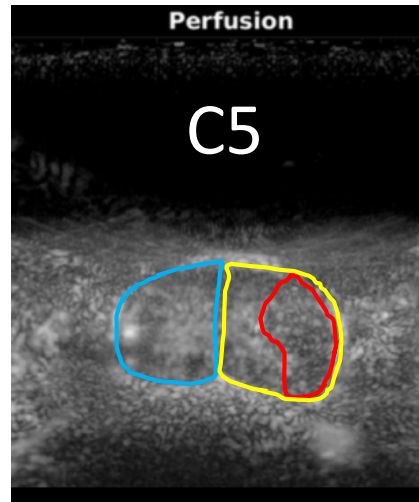
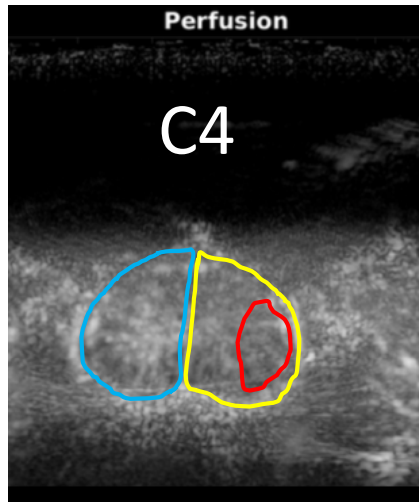
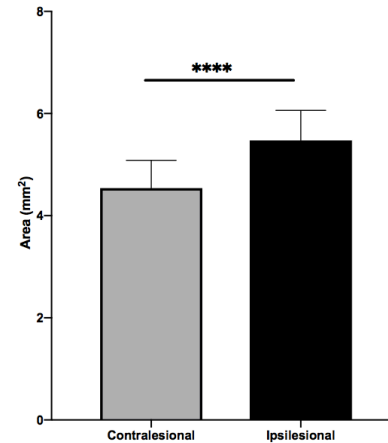


Segmental area analysis for comparison of swelling and spared tissue

Segmental cross section area analysis



C5 cross sectional area analysis





Future analysis



Acknowledgements

Hofstetter Lab:

- Christoph Hofstetter, MD, PhD
- Zin Khaing, PhD
- Matt Bruce, PhD
- Lindsay Cates
- Jeff Hyde
- Brian Nguyen

Funding:

- NIH NINDS Grant
- Department of Neurological Surgery
- Craig Neilsen Foundation
- CDMRP DoD
- Raisbeck Foundation

Neurological Surgery Summer Student Program

- Chair & Program Director: Richard G. Ellenbogen, MD, FACS
- Program Executive Advisor: Sandra Ellenbogen, RN
- Department Director: Jana Pettit, MBA
- Program Administrators: Christine MacDonald; PhD & Jim Pridgeon, MHA; Sylvia Zavatchen, MEd
- Program Coordinator: Julie Bould
- Jeff Ojemann, MD



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