# The Brain and Spinal Injury Center (BASIC) Spinal Cord Injury Score (SCI): A Novel, Simple, and Reproducible Method for Assessing Severity of Acute SCI Using Axial T2 MRI

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## Introduction

Studies evaluating the prognostic value of MRI-based T2-signal changes in the injured spinal cord have focused on the longitudinal extent of signal abnormality in the sagittal plane. While the transverse extent of injury and degree of spared spinal cord white matter has been shown to be important for predicting outcomes in pre-clinical models of SCI, surprisingly little is known in humans regarding the prognostic value of altered T2 relaxivity as assessed in the axial plane.

## Methods

We undertook a retrospective chart review of 60 patients who presented to our Level I trauma center with acute blunt traumatic cervical SCI. All patients underwent an MRI which included axial and sagittal T2 imaging within 48 hours of admission. Neurological outcomes, evaluated by the American Spinal Injury Association (ASIA) grade, at time of admission and hospital discharge were correlated with MRI findings. Five distinct graded patterns of intramedullary spinal cord T2-signal abnormality were defined in the axial plane at the injury epicenter. These patterns, referred to as the BASIC SCI score, were assigned ordinal values 0-4, which encompassed the spectrum of injury severity.

## Results

The BASIC score strongly correlates with neurological outcomes at time of admission and hospital discharge and distinguishes between patients presenting with complete injury who improved by at least one ASIA grade by time of discharge from those who made no improvement. Our proposed grading scale was rapid to apply and demonstrated excellent inter-rater reliability.

## Conclusions

We describe a novel 5 point ordinal MRI score for classifying acute SCI based on axial T2 imaging. The proposed BASIC score stratifies injury based upon extent of transverse T2 signal abnormality during the acute phase of injury and improves upon current MRI-based prognostic descriptions for SCI by reflecting functionally and anatomically significant patterns of intramedullary T2 signal abnormality in the axial plane.

### Learning Objectives

1. The BASIC score is a simple method of quantifying MRI evidence of SCI

2. The BASIC score has the potential to provide prognostication after SCI

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