

# ` Quick Review of Model System Research

## Reliability of S3 Pressure Sensation and Voluntary Hip Adduction/Toe Flexion and Agreement with Deep Anal Pressure and Voluntary Anal Contraction in Classifying Persons with Traumatic Spinal Cord Injury

### What is the study about?

### This study aims to evaluate whether the ability to feel pressure at the S3 dermatome (S3P) (on the buttock over the bone where you sit), and voluntary hip adductor(the muscle that brings the leg toward the midline) or toe flexor(curling the toes downward) contraction (VHTC) can be used instead of the standard sacral examination. The sacral examination components of the International Standards for Neurological Classification of Spinal Cord Injury (ISNCSCI), are used to determine if an injury is considered complete but are often difficult to perform. This is particularly true regarding the deep anal pressure (DAP) and voluntary anal sphincter contraction (VAC). Clinicians have observed that the hip adductors and the toe flexors may be the earliest muscles in the lower extremities that show voluntary contractions in a person with spinal cord injury (SCI). The hip adductors and toe flexors are easily tested when someone is supine or lying on their back and would be more comfortable and less intrusive than testing VAC.

### What did the study find?

This study found that all sacral examination elements: DAP, S3P, VHTC and VAC to be highly reliable. Agreement between the two sensory sacral elements and the two motor elements was high. S3P seems to be a reasonable alternative to DAP, and VHTC a reasonable alternative to VAC in cases where the neurologic level is above T11. Study authors recommend that reliability and agreement should be evaluated at earlier timepoints and in children with SCI.

### Who participated in the study?

Individuals (1-month n=51, follow-up n=39) with acute traumatic SCI, neurological levels T12 and above, AIS grades A–C from five Spinal Cord Injury Model System Centers.

### How was the study conducted?

This study was a longitudinal cohort study that used the ISNCSCI examination, S3P and VHTC conducted at 1-month post-injury; retest of the sacral exam, S3P and VHTC within 3 days. Follow-up examinations performed at 3, 6, and 12 months.

### How can people use the results?

### Individuals with SCI and their families can use the results of this study to better understand that there may be a less uncomfortable test to determine if an injury is complete that is also reliable for people with SCI. Practitioners can use the results to identify a less invasive approach to the ISNCSCI examination can be incorporated into routine practice with patients.

### Reference

Marino, R.J., Schmidt-Read, M., Chen, A., Kirshblum, S.C., Dyson-Hudson, T.A., Field-Fote, E., & Zafonte, R. (2019). Reliability of S3 pressure sensation and voluntary hip adduction/toe flexion and agreement with deep anal pressure and voluntary anal contraction in classifying persons with traumatic spinal cord injury. *The Journal of Spinal Cord Medicine, 43*(5), 616-622. doi:10.1080/10790268.2019.1628496

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