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# Modifying the Function In Sitting Test for the Spinal Cord Injury Population: Development and Reliability Testing



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## Introduction

Clinically appropriate and reliable balance measures in patients with spinal cord injury (SCI) patients are lacking. The Function in Sitting Test (FIST), a seated balance test validated in stroke and multiple sclerosis, may be applicable across SCI levels and types. The purpose of this study was to:

- (1) Modify the FIST for individuals with SCI
- (2) Investigate initial reliability of the modified FIST (mFIST) on Veterans with SCI.

## Methods

Modifications to the FIST:

- In object-grabbing tasks, changed the object from a tape measure to an empty water bottle to account for potential grip weakness
- In scooting tasks and leg lift, allowed upper extremity use to accommodate lower extremity weakness.

Each item was scored between 1-4 as follows:

- 4= Completed independently
- 3= Required verbal cues/increased time
- 2= Required upper extremity support
- 1= Required assistance
- 0= Dependent/ unable to complete

- The mFIST was administered to the same patient twice within 1 week by the same evaluator, while being video-recorded for scoring by additional evaluators.

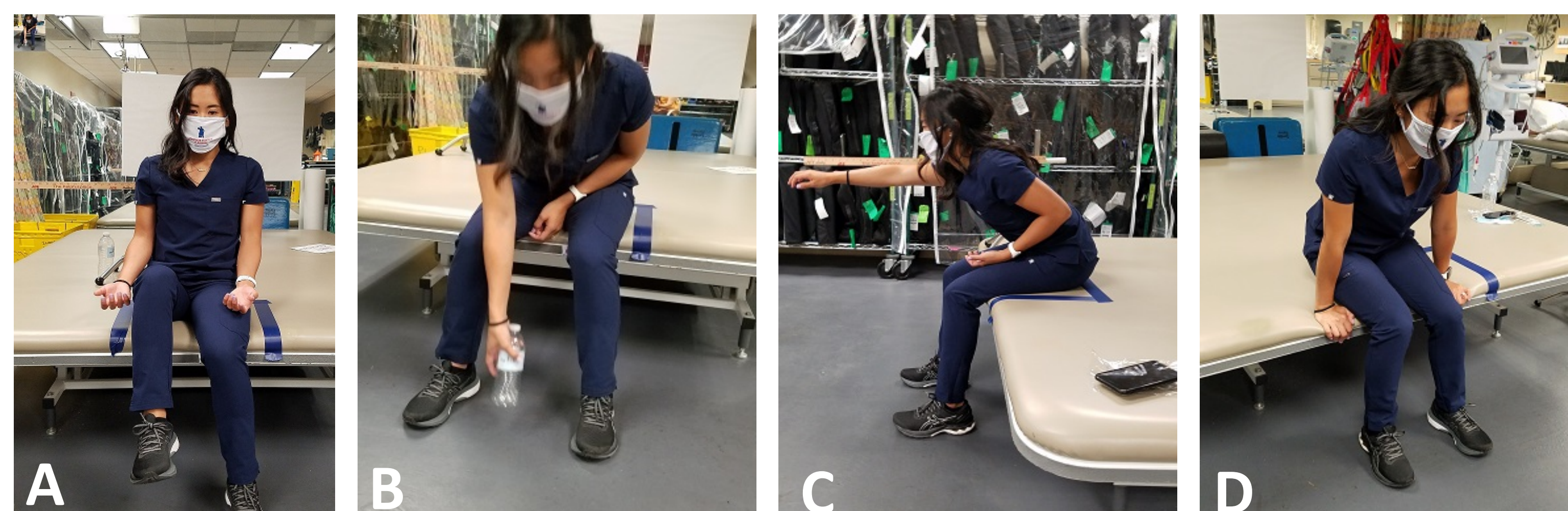
- Reliability testing using intraclass correlation (ICC) was performed on a cohort of Veterans with SCI (level C4-L2; all AIS grades). Test-retest (intra-rater) reliability was determined using in-person ratings, while inter-rater reliability was determined across all ratings (video to in-person).

## mFIST Items

Anterior nudge: to superior sternum
Posterior nudge: between scapular spines
Lateral nudge: to dominant side at acromion
Static sitting: 30 seconds
Sitting, eyes closed: 30 seconds
Sitting, head shake 'no': left and right
<b>Sitting, lift thigh with hands: foot must clear ground 1 inch*</b> (Image A)
<b>Pick up water bottle from posterior midline*</b>
<b>Pick up water bottle from between feet*</b> (Image B)
Forward Reach: use dominant arm, full available ROM (Image C)
Lateral Reach: use dominant arm, clear opposite ischial tuberosity
<b>Lateral scooting: move to dominant side 2 inches*</b> (Image D)
<b>Anterior scooting: move forward 2 inches*</b>
<b>Posterior scooting: move backwards 2 inches*</b>

\*Items modified from original FIST

## Images of mFIST Items



## Results

	ICC (95% CI)	p-value	ICC Interpretation
<b>Intra-rater reliability</b>	0.80 (0.67 – 0.89)	0.0001	Good
<b>Inter-rater reliability</b>	0.78 (0.64 – 0.87)	0.0001	Good
<b>Inter-video-rater reliability</b>	0.90 (0.80 – 0.95)	0.0001	Excellent

## Cohort Characteristics

- 45 Veterans with SCI
- Primarily Caucasian males (73%)
- Mean age of 62 (range 22-77)
- 42% cervical and 58% thoracic-lumbar injury levels
- 47% complete and 53% incomplete injury type

## Conclusion

- Seated balance is clinically important for the completion of functional tasks and determination of rehabilitation goals in patients with SCI.
- The FIST was previously tested on non-veteran patients with chronic SCI and the test-retest reliability was excellent with discriminant validity.<sup>1</sup> However, the FIST in its original form does not accommodate all the balance needs of the SCI population.
- The mFIST can be used for balance assessment in Veterans with SCI across injury levels and types with good intra- and inter-reliability.
- Video rater reliability was higher than in-person suggesting possible issues with visibility when rating in-person.
- Further subgroup analysis and validity testing to existing balance measures are underway.

## References

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