Function in Sitting Test – Spinal Cord Injury (FIST-SCI)

Assessment Overview

Assessment Area

ICF Domain:
Activity
Subcategory:
Mobility

You Will Need

Length:
14 items, less than 15 minutes:

1. Anterior nudge.
2. Posterior nudge.
3. Lateral nudge.
4. Static sitting.
5. Sitting, move head side to side.
6. Sitting, eyes closed.
7. Sitting, lift foot.
8. Turn and touch a spot behind you.
9. Forward lean.
10. Lateral lean.
11. Touch dorsum of foot.
12. Posterior scooting (2”).
13. Anterior scooting (2”).
14. Lateral scooting (2”).

Equipment:

- Tape measure.
- Stopwatch.
- It may require a stool or step depending on table or mat height.

Scoring:
Items are rated on the amount of assistance required to accomplish each task on a 5-point scale of 0 (complete assistance - patient cannot perform the task at all) to 4 (independent – patient completely autonomous in performing the task). Scores can be added together for a total score ranging from 0 to 56.

Summary

The Function in Sitting Test – Spinal Cord Injury (FIST-SCI) was designed by physiotherapists (Palermo et al. 2020) for trunk skills assessment in patients with SCI. The tool represents a further development of the original FIST scale, developed by Gorman et al. (2010) for individuals with stroke.

The FIST-SCI evaluates static, reactive, and proactive balance and sensory integration.

The scale allows the quantification of trunk abilities in all patients with paraplegia, irrespective of the level of injury and compatible with residual abilities/assistance needs; administration is possible in both hospital and home settings, and includes a set of fourteen motor tasks divided into three macro-areas:

- Static balance
- Dynamic balance
- Proprioceptive sensitivity

Availability

Worksheet: Can be found here.

Language: English and Italian

Assessment Interpretability

Minimal Clinically Important Difference

Minimal Detectable Change: 3.5

(Palermo et al. 2020; n=38; 34 males, 4 females; mean age 39.7 years; ASIA A-C; tetraplegia and paraplegia; mean (SD) time since injury: 14.1 (11.5) years)

Statistical Error

Standard Error of the Mean (SEM): 1.3

(Palermo et al. 2020; n=38; 34 males, 4 females; mean age 39.7 years; ASIA A-C; tetraplegia and paraplegia; mean (SD) time since injury: 14.1 (11.5) years)

Typical Values

A FIST-SCI cutoff score of 45 or greater was 92% sensitive and specific in characterizing transfer ability.

(Palermo et al. 2020; n=38; 34 males, 4 females; mean age 39.7 years; ASIA A-C; tetraplegia and paraplegia; mean (SD) time since injury: 14.1 (11.5) years)

Measurement Properties

Validity – Moderate to High

Moderate correlation with the Motor Assessment Scale item 3 (MAS-SCI):
r = 0.522

(Palermo et al. 2020; n=38; 34 males, 4 females; mean age 39.7 years; ASIA A-C; tetraplegia and paraplegia; mean (SD) time since injury: 14.1 (11.5) years)

High correlation with the UEMS:
r = 0.720

Moderate correlation with the Maximal Inspiratory Pressure (MIP):
r = 0.480

Moderate correlation with the Sustained MIP (SMIP):
r = 0.467

(Palermo et al. 2022; n=37; 34 males, 3 females; mean age 39.8 years; ASIA A-C; tetraplegia and paraplegia; mean (SD) time since injury: 13.6 (11.2) years)

Moderate correlation with the level of injury:
r = 0.507-0.527

(Palermo et al. 2020; n=38; 34 males, 4 females; mean age 39.7 years; ASIA A-C; tetraplegia and paraplegia; mean (SD) time since injury: 14.1 (11.5) years)
(Palermo et al. 2022; n=37; 34 males, 3 females; mean age 39.8 years; ASIA A-C; tetraplegia and paraplegia; mean (SD) time since injury: 13.6 (11.2) years)

Number of studies reporting validity data: 2

Reliability – High

High Inter-rater reliability:
k_w = 0.985 (0.971-0.992)

(Palermo et al. 2020; n=38; 34 males, 4 females; mean age 39.7 years; ASIA A-C; tetraplegia and paraplegia; mean (SD) time since injury: 14.1 (11.5) years)

ICC = 0.942 (0.76-0.98)

(Ciardi et al. 2023; n=10; 8 males, 2 females; age range: 40 to 62 years; ASIA A-C; injury level: T5 to T12; time range since injury: 2.5 to 32 years; Italian version)

High Intra-rater reliability:
k_w = 0.983 (0.966-0.991)

(Palermo et al. 2020; n=38; 34 males, 4 females; mean age 39.7 years; ASIA A-C; tetraplegia and paraplegia; mean (SD) time since injury: 14.1 (11.5) years)

High Internal consistency:
Chronbach α = 0.94.

(Palermo et al. 2020; n=38; 34 males, 4 females; mean age 39.7 years; ASIA A-C; tetraplegia and paraplegia; mean (SD) time since injury: 14.1 (11.5) years)

Number of studies reporting reliability data: 2

Responsiveness

Floor/Ceiling Effect:

Not established in SCI

Effect Size:

FIST-SCI scores distinguished individuals requiring assistance to transfer from those who were independent (t=4.51; P<.05).

(Palermo et al. 2020; n=38; 34 males, 4 females; mean age 39.7 years; ASIA A-C; tetraplegia and paraplegia; mean (SD) time since injury: 14.1 (11.5) years)

Responsiveness to change (6 weeks):
3.6 (1.6 – 5.7)

(Gambhir et al. 2025; n=40; mean age: 28 (7) years; tetraplegia and paraplegia; ASIA A-B; mean time since injury: 15 (16) months; RCT)

Number of studies reporting responsiveness data: 2