

Six-Minute Arm Test (6-MAT)

Assessment Overview

Assessment Area

ICF Domain:

Body Function

Subcategory:

Functions & Structures of the Cardiovascular, Haematological, Immunological and Respiratory Systems

You Will Need

Length:

6 minutes

Equipment:

- Arm ergometer
- Heart rate monitor
- RPE scale

Scoring:

The power output (PO) is selected for each individual based on their manual muscle strength, ASIA motor score and physical activity level. The aim is to attain a steady heart rate of 60%-70% of age-predicted maximum heart rate or a rating of 11-15 on the Borg RPE scale. Clinicians should record heart rate during the final 30 seconds of the test and the RPE at the end.

Summary

The Six-Minute Arm Test (6-MAT) assesses cardiovascular fitness in people with SCI.

It involves 6 minutes of sub-maximal arm ergometry at a constant power output. This single stage test is simple and quick to administer clinically.

Availability

Worksheet: Six-Minute Arm Test worksheet be found [here](#).

Assessment Interpretability

Minimal Clinically Important Difference

Not established in SCI

Statistical Error

Standard Error of Measurement:

Heart rate = 7.12 beats/min (95% CI, 0.75-0.96)

VO₂ = 1.62 mL/kg/min (95% CI, 0.58-0.92)

Minimal Detectable Change:

Heart rate = 19.74 beats/min

VO₂ = 4.49 mL/kg/min

(Hol et al. 2007; n=30; 25 males; mean (SD) age: 36.3 (9.3) years; ASIA A-D; mean (SD) time since injury: 12.0 (9.8) years)

Typical Values

Mean (SD) Scores:

Heart rate (beats/min) = 129 (29), range = 75-183

VO₂ peak (mL/kg/min) = 18.6 (8.4), range = 6.5-38.1

(Hol et al. 2007; n=30; 25 males; mean (SD) age: 36.3 (9.3) years; ASIA A-D; mean (SD) time since injury: 12.0 (9.8) years)

Measurement Properties

Validity – High

High correlation between 6-MAT VO₂ and VO₂ Peak:

$r = 0.91-0.92$

(Totosy de Zepetnek et al. 2016; n=52, 31 tetraplegia, 21 paraplegia; traumatic SCI, mean (SD) time since injury: 13.0 (10) years)

High correlation between 6-MAT Power Output and VO₂ Peak:

$r = 0.73$

High correlation between 6-MAT Heart Rate and VO₂ Peak:

$r = 0.63$

(Hol et al. 2007; n=30; 25 males; mean (SD) age: 36.3 (9.3) years; ASIA A-D; mean (SD) time since injury: 12.0 (9.8) years)

Number of studies reporting validity data: 2

Reliability – High

High Test-retest Reliability (1 week interval):

Heart Rate: ICC = 0.90

VO₂: ICC = 0.81

(Hol et al. 2007; n=30; 25 males; mean (SD) age: 36.3 (9.3) years; ASIA A-D; mean (SD) time since injury: 12.0 (9.8) years)

Number of studies reporting reliability data: 1

Responsiveness

Floor/Ceiling Effect:

Not established in SCI

Effect Size:

Not established in SCI

Number of studies reporting

responsiveness data: 0