

## 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 (see table below). 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

Available for free here: <https://scireproject.com/outcome-measures/outcome-measure-tool/six-minute-arm-test-6-mat/#1467983894080-2c29ca8d-88af>

Worksheet link:

[https://scireproject.com/wp-content/uploads/worksheet\\_6-mat.docx](https://scireproject.com/wp-content/uploads/worksheet_6-mat.docx)

### 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, mixed injury types, chronic SCI, mean time since injury (SD)= 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, mixed injury types, chronic SCI, mean time since injury (SD)= 12.0 (9.8) years)

## Measurement Properties

### Validity – High

#### **High** correlation between 6-MAT VO<sub>2</sub> and VO<sub>2</sub> Peak:

r = 0.91-0.92

(Totosy de Zepetnek et al. 2016; n=52, mixed injury types, traumatic SCI, mean time since injury (SD)= 13.0 (10) years)

#### **High** correlation between 6-MAT Power Output and VO<sub>2</sub> Peak:

r = 0.73

#### **High** correlation between 6-MAT Heart Rate and VO<sub>2</sub> Peak:

r = 0.63

(Hol et al. 2007; n=30, 25 males, mixed injury types, chronic SCI, mean time since injury (SD)= 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

VO<sub>2</sub>: ICC = 0.81

(Hol et al. 2007; n=30, 25 males, mixed injury types, chronic SCI, mean time since injury (SD)= 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**