**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

#### 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.

#### 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.

### Availability


### 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$_2$ and VO$_2$ 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$_2$ Peak:
  \[ r = 0.73 \]
  (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 Heart Rate and VO$_2$ 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$_2$: 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