The new kid on the World Para Athletics block: The evidence for classification measures to be included in RaceRunning classification

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What is RaceRunning?

- Allows athletes with limited or no walking ability to propel themselves independently

- Light weight ‘trike’ with chest support and without pedals

- Allows athletes with limited or no walking ability to propel themselves independently

- Expected health benefits which the majority may not experience from any other sport: cardiovascular & bone health
RaceRunning history

• 1991: Connie Hansen designs first ‘Petra bike’ for Mansoor Siddiqi

• 2009 CPISRA develops RaceRunning classification (RR1, RR2, RR3)

• 2016-now: RaceRunning research by RR research Scotland & CPISRA

• 2017: RaceRunning accepted as an World Para Athletic event

➢ 2018/2019: 100m RaceRunning European and World para-athletic championships
2016 data RaceRunning research Scotland
Trunk control?

• Trunk control (TCMS [1]) strongest association with gait capacity in CP [2]

• Trunk impairment was the most important factor for tilting the chair and acceleration in wheelchair rugby athletes [3]

Research Questions

• What is the association between lower limb impairment measures & trunk control and RaceRunning speed over 100 and 200m?

• Can cluster analysis being used to inform the number of classes?
Demographics

- 13 males and 13 females
- Average age 24 (SD 7)
- Majority CP (24 out of 26)
- RaceRunning class:
  - RR1: 7
  - RR2: 9
  - RR3: 10
- RaceRunning experience: 4.3(3.1) years (range: 1-11)
Methods

• Data collection 2017 Camp & Cup
  • Spasticity (ASAS & MAS), Selective Voluntary Motor Control (SCALE) and trunk control (TCMS)
• Fastest 100m and 200m
• Spearman’s Rho
• K-means cluster analysis: for 3 and 2 clusters
Spasticity

Selective voluntary motor control

Trunk Control
Spearman correlation coefficients

<table>
<thead>
<tr>
<th></th>
<th>100m</th>
<th>200m</th>
<th>DL100mspeed</th>
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<tbody>
<tr>
<td><strong>MAS</strong> total</td>
<td>.556**</td>
<td>.733**</td>
<td>-.566**</td>
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<tr>
<td><strong>ASA</strong> total</td>
<td>.647**</td>
<td>.798**</td>
<td>-.619**</td>
</tr>
<tr>
<td><strong>SCALE</strong> total</td>
<td>-.654**</td>
<td>-.741**</td>
<td>.619**</td>
</tr>
<tr>
<td><strong>TRUNK Total 58</strong></td>
<td>-.688**</td>
<td>-.737**</td>
<td>.708**</td>
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</tbody>
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***p<0.01
100 meter results.

Total Spasticity (ASAS)

Selective motor control (SCALE)

Bilateral scoring 0-4
- Gastrocnemius
- Hamstrings
- Adductors
- Quadriceps

Bilateral scoring 0-2
- Hip
- Knee
- Ankle
- Subtalar joint
- Toes
100 meter results.

Trunk control (TCMS)

Three components: Static sitting balance, selective motor control, dynamic reach. Total score ranges from 0-58 points.
K (3) means cluster with ASAS, SCALE, TCMS

*p=0.001
K (2) means cluster with ASAS, SCALE & TCMS

*p=0.001

n=13  n=13
Conclusions

- Statistically significant correlation between TCMS, SCALE, ASAS (and MAS) and 100m & 200m race time

- Cluster analysis indicated a favourable outcome for the two-cluster model
BUT:

- Unknown/unclear effect of other coordination impairments such as presence of dystonia/athetosis, ataxia, upper limb involvement

- Unknown influence of confounding variables such as training status, presence of other impairment types (intellectual, vision)
Ongoing & future research

• Ataxia & Dyskinesia specific measures
• Ratio scaled measures
• Minimum Impairment Criteria
• Performance measures (e.g. motion analysis)
Thank you!