How should leg function be measured in people with brain injury and spasticity?

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Background

No comprehensive instrument

• To measure of function identified for the spastic lower limb
  – systematic review

• Function in the leg may range from:
  – Passive caring for the limb in severely disabled patients
  – Using the limb for active mobility in more able patients
  – Participation in wider society and quality of life

Aim

• Development of a measure of lower limb function in the context of spasticity.

LegA Development

Ashford S. Jackson D. Mahaffey P. Vanderstay R. Turner-Stokes L. (2016) Conceptualisation and development of the Leg Activity Measure (LegA) for patient and carer reported assessment of activity (function) in the paretic leg in people with acquired brain injury, Physiotherapy Research International. 10.1002/pri.1660
Difficulty for each item is scored over the preceding 7 days as follows:

- no difficulty
- mild
- moderate
- severe difficulty
- Unable to do activity

Section A

1. Cleaning and washing the area between your legs
2. Putting on a splint (If never done circle 0)
3. Positioning legs in a wheelchair (If never done circle 0)
4. Putting your leg(s) through a trouser leg(s) (If never done circle 0)
5. Transfer using a hoist, including positioning sling (If never done circle 0)
6. Putting on underwear or continence pads
7. Positioning your leg(s) in bed using a positioning aid or pillow (If never done circle 0)
8. Cleaning behind your knee (knees)
9. Putting on your footwear

Section B

1. Turning in bed
2. Moving from lying to sitting
3. Being able to sit (including balance)
4. Transferring from bed to chair or wheelchair
5. Transferring from wheelchair to car
6. Moving from sitting to standing (including balance)
7. Standing (including balance)
8. Walking indoors (including balance)
9. Turning around (including balance)
10. Walking up stairs
11. Walking around obstacles or objects (including balance)
12. Walking over carpet
13. Walking outdoors
14. Walking over rough or uneven ground outdoors
15. Walking for half a mile or more

Leg Activity Measure

Leg Activity Participation
Symptoms
### Section C: Symptoms (impairments) and impact on your life (participation)

**In each column, please CIRCLE how severe the symptom was over the last 7 days.**

<table>
<thead>
<tr>
<th>Not at all</th>
<th>A little</th>
<th>Moderately</th>
<th>Severely</th>
<th>Extremely</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
</tbody>
</table>

1. **To what extent have you experienced pain or discomfort in your affected leg(s) or foot?**
   - 0
   - 1
   - 2
   - 3
   - 4

2. **To what extent have you experienced involuntary movements or leg spasms in your affected leg(s) (i.e. movements or abnormal limb postures that you can’t control)?**
   - 0
   - 1
   - 2
   - 3
   - 4

3. **To what extent have you experienced involuntary movements or leg spasms impacting on your comfort or sleep?**
   - 0
   - 1
   - 2
   - 3
   - 4

4. **To what extent have you experienced restricted range of movement (due to shortening of muscles or stiffness in joints) in your affected leg(s)?**
   - 0
   - 1
   - 2
   - 3
   - 4

5. **To what extent is it difficult for you (or your carer) to care for your affected leg(s) (e.g. positioning your leg, putting on underwear or pads, or washing between your legs)?**
   - 0
   - 1
   - 2
   - 3
   - 4

6. **To what extent has your affected leg(s) limited your daily activities (e.g. sitting, transferring, walking or doing stairs)?**
   - 0
   - 1
   - 2
   - 3
   - 4

7. **To what extent have involuntary movements or tightness of your leg(s) or foot interfered with your mobility or balance?**
   - 0
   - 1
   - 2
   - 3
   - 4

8. **To what extent has your affected leg(s) limited your normal activities with family, friends, neighbours or groups (e.g. social activities)?**
   - 0
   - 1
   - 2
   - 3
   - 4

9. **To what extent has your affected leg limited your work or other regular activities (e.g. hobbies)?**
   - 0
   - 1
   - 2
   - 3
   - 4

**Total Scores**

Totaling section A, B and C separately produces a total score for each sub-scale of the measure. The sub-scales should not be combined.
Methods

Psychometrics:

• Design:
  – Multicentre observational cohort study

• Setting
  – Conducted at three sites
  – Offering specialist spasticity management services

• Participants:
  – 64 people participated; mean age 50 years, ranging 18-84 years; half (n=32) were men.

• Analysis
  – Convergent and divergent correlations with other measures
  – Principal components analysis - dimensionality
  – Cronbach’s alpha - internal consistency
  – Test-retest agreement ranged - weighted Kappa
Results 1

• Expected convergent and divergent relationships
  – Rivermead Mobility Index (rho -0.87) and
  – Goal Attainment Scaling (rho -0.16).

• Principal components analysis (PCA) confirmed
  – ‘active function’,
  – ‘passive function’ and
  – ‘impact on life’ formed separate constructs

• Cronbach’s alpha was
  – Active: 0.86, Passive: 0.97, Impact: 0.87
Results 2

• Item level test-retest agreement ranged
  – 91-97% (weighted Kappa 0.75-0.95).
• Following treatment for spasticity
  – Physical interventions and botulinum toxin; n=64
    – ‘Passive function’ and ‘impact on life’ sub-scales identified significant difference (P = 0.005).
    – Significant difference was not shown for ‘active function’
Conclusion

Leg Activity measure (LegA):

• Reliable at different levels of ability.
• The LegA identified improvements following treatment
  – Minimal Clinically Important Differences need to be established
• Further work ongoing of the scaling properties of the sub-scales
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• The views expressed in this presentation are those of the authors and not necessarily those of the NHS, the NIHR or the Department of Health.