Effort assessment of stroke patients in physiotherapy session by accelerometry and perceived exertion score: difference depending the cerebral lesion location.

Lacroix Justine¹, Daviet Jean-Christophe¹, Salle Jean-Yves¹⁻², Borel Benoit¹, Compagnat Maxence¹⁻², Mandigout Stéphane¹

1: Université de Limoges, EA 6310, HAVAE - Institut GEIST - Limoges, F-87060, France.
2: CHU Limoges, Hôpital J Rebeyrol, Pôle neuro-sciences tête et cou, Service de médecine physique et de réadaptation, Limoges, F-87042, France.

Introduction

The American Heart Association/American Stroke Association guidelines recommend monitoring the amount of physical activity and intensity to achieve potential health benefits while limiting risks for the patient. However, the intensity is not systematically controlled in rehabilitation because of the lack of a simple tool that could incite to do so.

Purpose: To determine whether perceived exertion, estimated by post-stroke patients, could correlate with effort intensity as measured by a wearable sensor. This would allow us to use perceived exertion to regulate task intensity during physiotherapy sessions.

Method

Population:
57 patients with hemispheric lesion (left (n=36) and right (n=21)):
- Aged 66 ± 17 years
- 38 ± 30 days post-stroke
- $58 \pm 25/100$ (Barthel index)

Material:
The intensity of physiotherapy sessions was evaluated by (1) the **Armband SenseWear** device continuously (in MET), positionned on the non-paretic triceps and (2) **the modified Borg CR10 scale** (from 0 to 10). At the end of the physiotherapy sessions , health professionals asked patients the following question: “Regarding the intensity of the effort you provided during the session, how would you rate on this scale?”

Results

No significant correlation was found between Borg scale score and measured effort intensity (mean ($r = - 0.04$, $p = 0.78$) or peak ($r = - 0.05$, $p = 0.70$)). This observation is identical within the 2 subgroups.

Characteristics of physiotherapy sessions	Total population (n = 57)	Group with left hemispheric lesion (n = 36)	Group with right hemispheric lesion (n = 21)	Difference between 2 groups (left and right)
Time session (minute)	72 ± 23	70 ± 23	77 ± 25	p = 0.29
Mean intensity measured by Armband (MET)	1.5 ± 0.5	1.6 ± 0.5	1.4 ± 0.4	p = 0.30
Peak intensity measured by Armband (MET)	3.8 ± 1.4	3.9 ± 0.5	3.7 ± 1.6	p = 0.50
Borg scale score (/10)	5.0 [0.5-8]	4.5 [0.5-8]	5.0 [2-8]	p = 0.02

Table: Perceived exertion and effort intensity measured in physiotherapy sessions in patients recovering from a stroke

Discussion and conclusion

While we found no relationship between perceived exertion and effort intensity measured by a wearable sensor, we identified consistent variations in perceived exertion estimates according the cerebral lesion location. In part, this difference can be explained because patients with right-hemisphere lesions are more commonly affected with cognitive disorders in attention, neglect, spatial perception, meta-cognition and anosognosia. Further work is needed to confirm this difference in the score of perceived exertion according to the hemispheric location of stroke and to identify explanatory factors for this difference.

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