

CORRECTION

Open Access



# Correction to: Characterization of stroke-related upper limb motor impairments across various upper limb activities by use of kinematic core set measures

Anne Schwarz<sup>1,2\*</sup> , Miguel M. C. Bhagubai<sup>2</sup>, Saskia H. G. Nies<sup>3</sup>, Jeremia P. O. Held<sup>1</sup>, Peter H. Veltink<sup>2</sup>, Jaap H. Buurke<sup>2,4</sup> and Andreas R. Luft<sup>1,3</sup>

## Correction to: Journal of NeuroEngineering and Rehabilitation (2022) 19:2

<https://doi.org/10.1186/s12984-021-00979-0>

In Table 2 of this article [1], the 2nd and 3rd column name were mistakenly interchanged; this should appear as shown in this Correction (Table 2).

Also, the significance for Table 4 were mistakenly interchanged, figure 4 should appear as shown in this Correction (Fig. 4).

The original article has been corrected.

### Author details

<sup>1</sup>Vascular Neurology and Neurorehabilitation, Department of Neurology, University Hospital Zurich, University of Zurich, Zurich, Switzerland. <sup>2</sup>Biomedical Signals and Systems (BSS), University of Twente, Enschede, The Netherlands.

<sup>3</sup>Cereneo, Center for Neurology and Rehabilitation, Vitznau, Switzerland.

<sup>4</sup>Roessingh Research and Development B.V., Enschede, The Netherlands.

Accepted: 30 June 2022

Published online: 12 July 2022

The original article can be found online at <https://doi.org/10.1186/s12984-021-00979-0>.

\*Correspondence: [anne.schwarz@usz.ch](mailto:anne.schwarz@usz.ch)

<sup>1</sup> Vascular Neurology and Neurorehabilitation, Department of Neurology, University Hospital Zurich, University of Zurich, Zurich, Switzerland  
Full list of author information is available at the end of the article



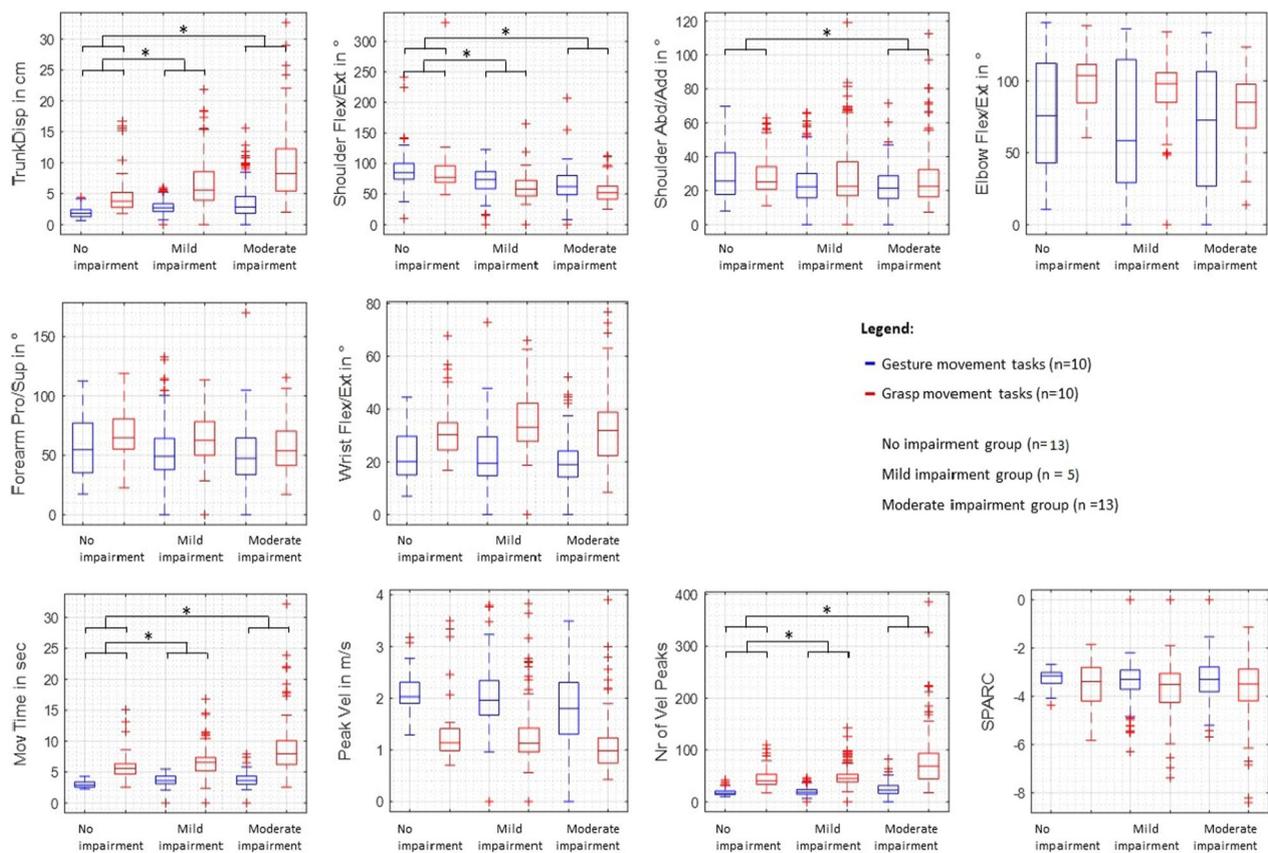
© The Author(s) 2022. **Open Access** This article is licensed under a Creative Commons Attribution 4.0 International License, which permits use, sharing, adaptation, distribution and reproduction in any medium or format, as long as you give appropriate credit to the original author(s) and the source, provide a link to the Creative Commons licence, and indicate if changes were made. The images or other third party material in this article are included in the article's Creative Commons licence, unless indicated otherwise in a credit line to the material. If material is not included in the article's Creative Commons licence and your intended use is not permitted by statutory regulation or exceeds the permitted use, you will need to obtain permission directly from the copyright holder. To view a copy of this licence, visit <http://creativecommons.org/licenses/by/4.0/>. The Creative Commons Public Domain Dedication waiver (<http://creativecommons.org/publicdomain/zero/1.0/>) applies to the data made available in this article, unless otherwise stated in a credit line to the data.

**Table 2** Participant characteristics

Characteristic	Mild impairment (N = 5)	No impairment (N = 13)	Moderate impairment (N = 13)
Gender, female/male	2/3	5/8	5/8
Mean age (SD), years	65.75 (10.72)	60.69 (11.58)	62.85 (13.43)
Mean body height (SD), cm	169.41 (7.47)	172.85 (8.97)	174.77 (12.92)
Mean BMI (SD), kg/m <sup>2</sup>	23.26 (2.18)	27.92 (3.92)	26.02 (4.46)
Paretic body side, left/right	–	5/8	7/6
Months since stroke*	–	24 (18–34)	13 (9–29)
Initial stroke severity NIHSS*	–	10 (6–15)	6 (6–10)
MoCA (0–30)*	–	26 (24–28)	27 (26–28)
MAS sum of the upper extremity (0–14)* <sup>†</sup>	–	1 (0–1)	3 (2–4)
EmNSA-UE (0–40)*	–	39 (38–40)	38 (36–38)
FMMA-UE (0–66)*	–	55 (53–59)	40 (37–42)
FMMA-UE arm subsection (0–36)*	–	30 (29–33)	22 (21–24)
FMMA-UE wrist subsection (0–10)*	–	7 (6–8)	6 (5–6)
FMMA-UE hand subsection (0–14)*	–	14 (13–14)	9 (5–10)
FMMA-UE coordination subsection (0–6)*	–	5 (4–5)	4 (3–4)

*BMI* Body Mass Index, *EmNSA* Erasmus modified version of the Nottingham Sensory Assessment, *FMMA-UE* Fugl-Meyer Motor Assessment of the Upper Extremity, *MAS* modified Ashworth Scale, *MoCA* Montreal Cognitive Assessment, *NIHSS* National Institutes of Health Stroke Scale, *L* left, *SD* standard deviation. \*Values are presented in median (interquartile range); <sup>†</sup>MAS scores between 1 and 2 for seven muscle groups

### Comparison of core-set metrics between gesture and grasping total tasks by no, mild and moderate impairment groups



**Fig. 4** Effects of the task and impairment group on core set kinematics. *Abd/Add* abduction/adduction, *Flex/Ext* flexion/extension, *Pro/Sup* pronation/supination, *Mov* movement, *SPARC* spectral arc length, *TrunkDisp* trunk displacement, *Vel* velocity. \* indicates significant effects between the no, mild, and/or moderate impairment group for both gesture and grasp movements

#### Reference

- Schwarz A, Bhagubai MMC, Nies SHG, Held JPO, Veltink PH, Buurke JH, Luft AR. Characterization of stroke-related upper limb motor impairments across various upper limb activities by use of kinematic core set measures. *J NeuroEngineering Rehabil.* 2022;19:2. <https://doi.org/10.1186/s12984-021-00979-0>.

#### Publisher's Note

Springer Nature remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.