Göteborg, 2023

UPPER EXTREMITY FUNCTIONING IN INDIVIDUALS WITH SPINAL CORD INJURY - FROM BODY FUNCTIONS TO PARTICIPATION

Akademisk avhandling

Som för avläggande av medicine doktorsexamen vid Sahlgrenska akademin, Göteborgs universitet kommer att offentligen försvaras i Hälsovetarbacken, hus 2, i Lokal 2119, Arvid Wallegrens backe, den 20 oktober 2023, kl. 9.00

av Lamprini Lili

Fakultetsopponent:

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Avhandlingen baseras på följande delarbeten

I. Lili, L., Sunnerhagen, K. S., Rekand, T. & Alt Murphy, M. Quantifying an upper extremity everyday task with 3D kinematic analysis in people with spinal cord injury and non-disabled controls. Front. Neurol. 12, 755790. https:// doi. org/ 10. 3389/ fneur. 2021. 755790 (2021).

II. Lili, L., Sunnerhagen, K. S., Rekand, T. & Alt Murphy, M. Associations between upper extremity functioning and kinematics in people with spinal cord injury. J. Neuroeng. Rehabil. 18, 147. https:// doi. org/ 10. 1186/ s12984- 021- 00938-9 (2021).

III. Lili, L., Sunnerhagen, K. S., Rekand, T. & Alt Murphy, M. Independence and upper extremity functioning after spinal cord injury: a cross-sectional study Scientific Reports. (2023) 13:3148. https://doi.org/10.1038/s41598-023-29986-y (2023).

IV. Lili, L., Sunnerhagen, K. S., Rekand, T. & Alt Murphy, M. Self-perceived autonomy in participation related to independence in daily life and upper extremity activity capacity in individuals with spinal cord injury. In manuscript.

SAHLGRENSKA AKADEMIN

INSTITUTIONEN FÖR NEUROVETENSKAP OCH FYSIOLOGI

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ABSTRACT

Background: A spinal cord injury (SCI) can lead to a range of impairments in various body functions, including the function of upper extremity, with severity varying from mild to severe. Long-term consequences for functioning and disability are a dynamic result of the injury characteristics and various other factors, requiring further knowledge regarding upper extremity functioning.

The overall aim of this thesis was to enhance the knowledge of upper extremity functioning across various domains of the International Classification of Functioning, Disability, and Health in individuals with SCI.

Methods: In this thesis, 29 individuals with established cervical or thoracic, complete or incomplete SCI were recruited alongside 54 non-disabled controls. Assessments used were: kinematics during a 'drinking task,' grip strength, Action Research Arm Test (ARAT), Sollerman Hand Function Test (SHFT), Box & Block Test (BBT), International SCI Upper Extremity Data Set (ISCI-Hand and ISCI-Shoulder), Spinal Cord Independence Measure (SCIM), Impact on Autonomy and Participation.

Results: Wrist angle, alongside movement time (MT) or smoothness, explained 82% and 77% of variance in ARAT and SHFT, respectively, reaching 91% together with hand proprioception. Wrist angle alone explained 59% of ISCI-Hand. MT, smoothness ($r \geq 0.6$), and grip strength ($r \geq 0.5$) correlated with SCIM-self-care, feeding, dressing, as well as with ARAT, BBT, and ISCI-Hand (r 0.52-0.76). SCIM-mobility items correlated similarly. Independence in respiration management correlated with MT (r -0.53), smoothness (r -0.50), BBT (r -0.56), and toilet use solely with MT (r -0.66). Most participants (68%–88%) reported restricted autonomy in participation in outdoors, family role, and indoors. Indoor autonomy correlated (r 0.72) with SCIM-self-care and SCIM-mobility (r 0.60), while problematic work autonomy correlated (r 0.55) with SCIM-respiration/sphincter management.

Conclusions: This thesis underscores the significance of addressing upper extremity functioning in individuals with SCI within rehabilitation medical practises while considering multiple aspects of functioning and disability.

Keywords: activity, auttonomy, capacity, functioning, participation, performance, spinal cord injury, upper extremity.

ISBN: 978-91-8069-357-8 (TRYCK)
ISBN: 978-91-8069-358-5 (PDF)

http://hdl.handle.net/2077/76811