Transilvania University of Brasov

ADMISSION TO DOCTORAL STUDIES
2024-2025
Session September 2024

Interdisciplinary Doctoral School (SDI)

Field of doctoral studies:
MEDICINE
PhD supervisor:
Professor Roxana Steliana Miclăuș, MD, PhD

TOPICS FOR THE ADMISSION TO DOCTORAL STUDIES

TOPIC 1: *titlu prezumtiv în limba engleză (altă limbă de circulație internațională, după caz)*

Standardization of the integration of advanced technologies in the rehabilitation of the patient with central motor neuron syndrome: a solution for the efficiency of the functional rehabilitation of the upper limb.

Content / Main aspects to be considered - în engleză (limba străină) -*se va adapta/ completa/elimina, după caz*

Background and importance of rehabilitation for patients with central motor neuron syndrome.

2. Literature review: - Definition of central motor neuron syndrome and its impact on upper limb functionality. - Evaluation of advanced technologies such as robotics, virtual reality, functional electrical stimulation and telemedicine. - Analysis of previous studies, highlighting the benefits and limitations of these technologies. - Review of existing rehabilitation standards and protocols.

3. Research systematization: - Research objectives and hypotheses. - Research methodology, including study design, population and sample, technologies used, measurement instruments and intervention protocols.

4. Data analysis and interpretation - Analysis plan and indicators of success, such as improvement in functional scores and reduction in disability.

5. Practical and theoretical implications: - Contribution to knowledge and practical applicability of research results.

Bibliografie recomandată:

1. Cheng, I. K. Y., et al. (2017). Neuronavigated high-frequency repetitive transcranial magnetic stimulation for chronic post-stroke dysphagia: A randomized controlled study. Journal of Rehabilitation Medicine, 49(6), 475-481.

2. Hesse, S., et al. (2011). Combined transcranial direct current stimulation and robot-assisted arm training in subacute stroke patients: An exploratory, randomized multicenter trial. Neurorehabilitation and Neural Repair, 25(9), 838-846.

3.Tokutake, K., Takeuchi, M., Kurimoto, S., Saeki, S., Asami, Y., Onaka, K., Saeki, M., Aoyama, T., Hasegawa, Y., & Hirata, H. (2022). A Therapeutic Strategy for Lower Motor Neuron Disease and Injury Integrating Neural Stem Cell Transplantation and Functional Electrical Stimulation in a Rat

Model. International journal of molecular sciences, 23(15), 8760. https://doi.org/10.3390/ijms23158760
4. Hohl, K., Giffhorn, M., Jackson, S. et al. A framework for clinical utilization of robotic exoskeletons in rehabilitation. J NeuroEngineering Rehabil 19, 115 (2022). https://doi.org/10.1186/s12984-022-01083-7
5. Errante, A., Saviola, D., Cantoni, M. et al.Effectiveness of action observation therapy based on virtual reality technology in the motor rehabilitation of paretic stroke patients: a randomized clinical trial. BMC Neurol 22, 109 (2022). https://doi.org/10.1186/s12883-022-02640-2
6. Cano Porras, D., Siemonsma, P., Inzelberg, R., Zeilig, G., & Plotnik, M. (2018). Advantages of virtual reality in the rehabilitation of balance and gait: Systematic review. Neurology, 90(22), 1017–1025. https://doi.org/10.1212/WNL.0000000000005603
7. Spanakis, M., Xylouri, I., Patelarou, E., & Patelarou, A. (2022). A Literature Review of High-Tech Physiotherapy Interventions in the Elderly with Neurological Disorders. International journal of environmental research and public health, 19(15), 9233. https://doi.org/10.3390/ijerph19159233
8. Chien, W. T., Chong, Y. Y., Tse, M. K., Chien, C. W., & Cheng, H. Y. (2020). Robot-assisted therapy for upper-limb rehabilitation in subacute stroke patients: A systematic review and meta-analysis. Brain and behavior, 10(8), e01742. https://doi.org/10.1002/brb3.1742
9. Barrientos, A., & Del Cerro, J. (2019). Robotics in medicine. La robótica en medicina. Medicina clinica, 152(12), 493–494. https://doi.org/10.1016/j.medcli.2019.02.001
10. Calabrò, R. S., Sorrentino, G., Cassio, A., Mazzoli, D., Andrenelli, E., Bizzarini, E., Campanini, I., Carmignano, S. M., Cerulli, S., Chisari, C., Colombo, V., Dalise, S., Fundarò, C., Gazzotti, V., Mazzoleni, D., Mazzucchelli, M., Melegari, C., Merlo, A., Stampacchia, G., Boldrini, P., … Italian Consensus Conference on Robotics in Neurorehabilitation (CICERONE) (2021). Robotic-assisted gait rehabilitation following stroke: a systematic review of current guidelines and practical clinical recommendations. European journal of physical and rehabilitation medicine, 57(3), 460–471. https://doi.org/10.23736/S1973-9087.21.06887-8
11. Ranzani, R., Lambercy, O., Metzger, J. C., Califfi, A., Regazzi, S., Dinacci, D., Petrillo, C., Rossi, P., Conti, F. M., & Gassert, R. (2020). Neurocognitive robot-assisted rehabilitation of hand function: a randomized control trial on motor recovery in subacute stroke. Journal of neuroengineering and rehabilitation, 17(1), 115. https://doi.org/10.1186/s12984-020-00746-7
12. Dehem, S., Gilliaux, M., Stoquart, G., Detrembleur, C., Jacquemin, G., Palumbo, S., Frederick, A., & Lejeune, T. (2019). Effectiveness of upper-limb robotic-assisted therapy in the early rehabilitation phase after stroke: A single-blind, randomised, controlled trial. Annals of physical and rehabilitation medicine, 62(5), 313–320. https://doi.org/10.1016/j.rehab.2019.04.002

Prerequisites / Remarks: *se va adapta /completa/elimina, după caz*

TOPIC 2: *titlu prezumtiv în limba engleză (altă limbă de circulație internațională, după caz)*

Standardization of the integration of advanced technologies in the rehabilitation of the patient with central motor neuron syndrome: a solution for the efficiency of the functional rehabilitation of the lower limb.

Content / Main aspects to be considered - în engleză (limba străină) -*se va adapta /completa/elimina, după caz*

1. Background and importance of rehabilitation for patients with central motor neuron syndrome.

2. Literature review: - Definition of central motor neuron syndrome and its impact on lower limb functionality. - Evaluation of advanced technologies such as robotics, virtual reality,

functional electrical stimulation and telemedicine. - Analysis of previous studies, highlighting the benefits and limitations of these technologies. - Review of existing rehabilitation standards and protocols.

3. Research systematization: - Research objectives and hypotheses. - Research methodology, including study design, population and sample, technologies used, measurement instruments and intervention protocols.

4. Data analysis and interpretation - Analysis plan and indicators of success, such as improvement in functional scores and reduction in disability.

5. Practical and theoretical implications: - Contribution to knowledge and practical applicability of research results.

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4. Hohl, K., Giffhorn, M., Jackson, S. et al. A framework for clinical utilization of robotic exoskeletons in rehabilitation. J NeuroEngineering Rehabil 19, 115 (2022). https://doi.org/10.1186/s12984-022-01083-7

5. Errante, A., Saviola, D., Cantoni, M. et al.Effectiveness of action observation therapy based on virtual reality technology in the motor rehabilitation of paretic stroke patients: a randomized clinical trial. BMC Neurol 22, 109 (2022). https://doi.org/10.1186/s12883-022-02640-2

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7. Spanakis, M., Xylouri, I., Patelarou, E., & Patelarou, A. (2022). A Literature Review of High-Tech Physiotherapy Interventions in the Elderly with Neurological Disorders. International journal of environmental research and public health, 19(15), 9233. https://doi.org/10.3390/ijerph19159233

8. Chien, W. T., Chong, Y. Y., Tse, M. K., Chien, C. W., & Cheng, H. Y. (2020). Robot-assisted therapy for upper-limb rehabilitation in subacute stroke patients: A systematic review and meta-analysis. Brain and behavior, 10(8), e01742. https://doi.org/10.1002/brb3.1742

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function: a randomized control trial on motor recovery in subacute stroke. Journal of neuroengineering and rehabilitation, 17(1), 115. https://doi.org/10.1186/s12984-020-00746-7
12. Dehem, S., Gilliaux, M., Stoquart, G., Detrembleur, C., Jacquemin, G., Palumbo, S., Frederick, A., & Lejeune, T. (2019). Effectiveness of upper-limb robotic-assisted therapy in the early rehabilitation phase after stroke: A single-blind, randomised, controlled trial. Annals of physical and rehabilitation medicine, 62(5), 313–320. https://doi.org/10.1016/j.rehab.2019.04.002

Prerequisites / Remarks: *se va adapta /completa/elimina, după caz*

TOPIC 3: *titlu prezumtiv în limba engleză (altă limbă de circulație internațională, după caz)*

Advanced technologies versus standard proprioceptive rehabilitation methodology in lumbar vertebral disc pathology

Content / Main aspects to be considered - în engleză (limba străină) -*se va adapta /completa/elimina, după caz*

1. Background and importance of rehabilitation in lumbar vertebral disc pathology.
2. Literature review: - Description of lumbar vertebral disc pathology, causes and symptoms. - Evaluation of standard rehabilitation methods such as physical therapy, therapeutic exercises and patient education. - Analysis of advanced technologies such as robotics, virtual reality, functional electrical stimulation and inertial sensors. - Comparing the efficiency and limitations of these technologies with traditional methods.
3. Research systematization - Research objectives and hypotheses. - Research methodology, including study design, population and sample, technologies used, measurement instruments and intervention protocols.
4. Data analysis and interpretation - Analysis plan and indicators of success, such as improvement in pain and function scores.
5. Practical and theoretical implications- Contribution to knowledge and practical applicability of research results.

Bibliografie recomandată:

1. Du, W., Li, H., Omisore, O. M., Wang, L., Chen, W., & Sun, X. (2018). Co-contraction characteristics of lumbar muscles in patients with lumbar disc herniation during different types of movement. Biomedical engineering online, 17(1), 8. https://doi.org/10.1186/s12938-018-0443-2
2. Hebert, J. J., Fritz, J. M., Thackeray, A., Koppenhaver, S. L., & Teyhen, D. (2015). Early multimodal rehabilitation following lumbar disc surgery: a randomised clinical trial comparing the effects of two exercise programmes on clinical outcome and lumbar multifidus muscle function. British journal of sports medicine, 49(2), 100–106. https://doi.org/10.1136/bjsports-2013-092402
3. Tsai, Y. C., Hsu, W. L., Kantha, P., Chen, P. J., & Lai, D. M. (2024). Virtual reality skateboarding training for balance and functional performance in degenerative lumbar spine disease. Journal of neuroengineering and rehabilitation, 21(1), 74. https://doi.org/10.1186/s12984-024-01357-2
4. Kinel, E., Roncoletta, P., Pietrangelo, T., & D'Amico, M. (2022). 3D Stereophotogrammetric Quantitative Evaluation of Posture and Spine Proprioception in Subacute and Chronic Nonspecific Low Back Pain. Journal of clinical medicine, 11(3), 546. https://doi.org/10.3390/jcm11030546
5. Abbasi, S., Hadian Rasanani, M. R., Ghotbi, N., Olyaei, G. R., Bozorgmehr, A., & Rasouli, O. (2020). Short-term effect of kinesiology taping on pain, functional disability and lumbar

proprioception in individuals with nonspecific chronic low back pain: a double-blinded, randomized trial. Chiropractic & manual therapies, 28(1), 63. https://doi.org/10.1186/s12998-020-00349-y
6. Remer, F., Keilani, M., Kull, P., & Crevenna, R. (2023). Effects of whole-body vibration therapy on pain, functionality, postural stability, and proprioception in patients with subacute and chronic non-specific low back pain: a systematic review. Wirkungen von Ganzkörper-Vibrationstherapie auf Schmerzen, Funktionalität, posturale Stabilität und Propriozeption bei Patienten mit subakuten und chronischen Rückenschmerzen: eine systematische Übersicht. Wiener medizinische Wochenschrift (1946), 10.1007/s10354-023-01026-4. Advance online publication. https://doi.org/10.1007/s10354-023-01026-4
7. Tong, M. H., Mousavi, S. J., Kiers, H., Ferreira, P., Refshauge, K., & van Dieën, J. (2017). Is There a Relationship Between Lumbar Proprioception and Low Back Pain? A Systematic Review With Meta-Analysis. Archives of physical medicine and rehabilitation, 98(1), 120–136.e2. https://doi.org/10.1016/j.apmr.2016.05.016
8. Paolucci, T., Fusco, A., Iosa, M., Grasso, M. R., Spadini, E., Paolucci, S., Saraceni, V. M., & Morone, G. (2012). The efficacy of a perceptive rehabilitation on postural control in patients with chronic nonspecific low back pain. International journal of rehabilitation research. Internationale Zeitschrift fur Rehabilitationsforschung. Revue internationale de recherches de readaptation, 35(4), 360–366. https://doi.org/10.1097/MRR.0b013e328356427c
9. Trampas, A., Mpeneka, A., Malliou, V., Godolias, G., & Vlachakis, P. (2015). Immediate Effects of Core-Stability Exercises and Clinical Massage on Dynamic-Balance Performance of Patients With Chronic Specific Low Back Pain. Journal of sport rehabilitation, 24(4), 373–383.

Prerequisites / Remarks: *se va adapta /completa/elimina, după caz*

PhD supervisor:

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PhD Program Coordinator – Doctoral Domain MEDICINE

Professor Petru Iulian Ifteni, MD, PhD