BIOGRAPHICAL SKETCH

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NAME: Balser, David

eRA COMMONS USER NAME (credential, e.g., agency login): DYBALSER

POSITION TITLE: Fellow Physician

EDUCATION/TRAINING *(Begin with baccalaureate or other initial professional education, such as nursing, include postdoctoral training and residency training if applicable. Add/delete rows as necessary.)*

INSTITUTION AND LOCATION	DEGREE (if applicable)	END DATE MM/YYYY	FIELD OF STUDY
Georgia Institute of Technology, Atlanta, GA	BS	05/2007	Biology
New York University, New York, New York	MD	05/2015	N/A
University of Minnesota, Minneapolis, MN	Resident	06/2022	Physical Medicine and Rehabilitation
MetroHealth Rehabilitation Institute, Cleveland, OH	Fellow	present	

A. Personal Statement

I am a fellow physician in spinal cord injury with a research focus on neuroplasticity in neuromodulation. My research endeavors started with brain injury data analysis under Dr. Uzma Samadani in New York University, where I learned the start-to-finish process of data entry and analysis with conventional statistics, resulting in a first author publication. I continued working with this PI after graduating from medical school while offering my services to neurosurgical interventional trials to expand my research skillset. I coordinated a complex investigational device study in collaboration with Dr. Darrow, Dr. Samadani, and Dr. Krassioukov's research groups assessing novel volitional lower extremity movement after epidural spinal cord implantation in complete thoracic spinal cord injury, which resulted in high impact publications in this emerging field. I have gained direct experience in seeking grants, developing protocols, training staff, managing IRB and FDA compliance with a device study, data management, statistical analysis, and collaborative publication. The next step in my career is to develop a rehabilitation focused multidisciplinary project with neurosurgery and physical therapy to discover the potential benefits of combining epidural neuromodulation with modern rehabilitation mechanisms like exoskeleton therapy and adaptive sports. I require the guidance and experience to manage clinical trials in this area as an independent principal investigator to prepare and execute trial protocols that are not only feasible but well designed. I want my work to serve as a seminal example of solid trial design and a compelling foundation of future evidence-based rehabilitation. Ongoing and completed projects that I would like to highlight include:

1. Hoglund BK, Zurn CA, Madden LR, Hoover C, Slopsema JP, Balser D, Parr A, Samadani U, Johnson MD, Netoff TI, Darrow DP. Mapping Spinal Cord Stimulation-Evoked Muscle Responses in Patients With Chronic Spinal Cord Injury. Neuromodulation. 2022 Dec 12; PubMed PMID: 36517395.
2. Peña Pino I, Hoover C, Venkatesh S, Ahmadi A, Sturtevant D, Patrick N, Freeman D, Parr A, Samadani U, Balser D, Krassioukov A, Phillips A, Netoff TI, Darrow D. Long-Term Spinal Cord Stimulation After Chronic Complete Spinal Cord Injury Enables Volitional Movement in the Absence of Stimulation. Front Syst Neurosci. 2020;14:35. PubMed Central PMCID: PMC7340010.
3. Darrow D, Balser D, Netoff TI, Krassioukov A, Phillips A, Parr A, Samadani U. Epidural Spinal Cord Stimulation Facilitates Immediate Restoration of Dormant Motor and Autonomic Supraspinal Pathways after Chronic Neurologically Complete Spinal Cord Injury. J Neurotrauma. 2019 Aug

1;36(15):2325-2336. PubMed Central PMCID: PMC6648195.

4. Greer N, Balser D, McKenzie L, Nicholson H, MacDonald R, Rosebush C, Senk A, Tonkin B, Wilt TJ. Adaptive Sports for Disabled Veterans [Internet] Washington (DC): Department of Veterans Affairs (US); 2019Feb. Available from: http://www.ncbi.nlm.nih.gov/books/NBK554909/ PubMed PMID: 32181998

B. Positions, Scientific Appointments and Honors

Positions and Scientific Appointments

2022 -	Fellow Physician, MetroHealth Rehabilitation Institute, Cleveland, OH
2018 - 2022	Resident Physician, Department of Rehabilitation Medicine, University of Minnesota, Minneapolis, MN
2015 - 2018	Research Assistant, MINNEAPOLIS MEDICAL RESEARCH FDN, INC., Minneapolis, MN
2015 - 2018	Research Assistant, MINNEAPOLIS VA HEALTH CARE SYSTEM, Minneapolis, MN

Honors

2022	Scientific Paper Presentation - Best Paper Award, American Academy of Physiatry
2021	“Best in Show” Award for Asynchronous Presentation, UMN Best Practices in Health Science Education
2012	Medical Student Summer Research Fellowship, American Heart Association
2011	Medical Student Summer Research Scholarship, American Academy of Neurology

C. Contribution to Science

1. Epidural neuromodulation for spinal cord injury: Before and during my Physical Medicine and Rehabilitation residency, I was the researcher and research coordinator working in Dr. Darrow's laboratory to develop a phase II clinical trial assessing the efficacy of epidural spinal cord stimulators in restoring volitional movement in complete spinal cord injury. I substantially contributed to the grant and regulatory applications resulting in a state funded, IRB and FDA approved high risk device study. I also served as the PI for the VA arm of the study. Our research showed evidence of novel volitional lower extremity function, both visible on video and demonstrated on EMG, as well as noticeable positive effects in autonomic dysfunction discovered by our collaborators in Dr. Krassioukov's lab.

    a. Hoglund BK, Zurn CA, Madden LR, Hoover C, Slopsema JP, Balser D, Parr A, Samadani U, Johnson MD, Netoff TI, Darrow DP. Mapping Spinal Cord Stimulation-Evoked Muscle Responses in Patients With Chronic Spinal Cord Injury. Neuromodulation. 2022 Dec 12; PubMed PMID: 36517395.

    b. Peña Pino I, Hoover C, Venkatesh S, Ahmadi A, Sturtevant D, Patrick N, Freeman D, Parr A, Samadani U, Balser D, Krassioukov A, Phillips A, Netoff TI, Darrow D. Long-Term Spinal Cord Stimulation After Chronic Complete Spinal Cord Injury Enables Volitional Movement in the Absence of Stimulation. Front Syst Neurosci. 2020;14:35. PubMed Central PMCID: PMC7340010.

    c. Darrow D, Balser D, Netoff TI, Krassioukov A, Phillips A, Parr A, Samadani U. Epidural Spinal Cord Stimulation Facilitates Immediate Restoration of Dormant Motor and Autonomic Supraspinal Pathways after Chronic Neurologically Complete Spinal Cord Injury. J Neurotrauma. 2019 Aug 1;36(15):2325-2336. PubMed Central PMCID: PMC6648195.

2. Epidemiology and risk factors of chronic subdural hematoma: I was the data scientist and statistician of research efforts by Dr. Samadani's lab to characterize risk factors and management of subdural hematoma in veterans. Our lab characterized a larger burden of chronic subdural hematomas in the VA than the civilian population, which demonstrated a need for further studies in prevention and management that served as preliminary data for a successful Clinical Science Research & Development award. I created a database of head CTs in the VA that were later used to assess the

patterns of cerebral atrophy in Alzheimer's disease and chronic subdural hematoma.

a. Bin Zahid A, Balser D, Thomas R, Mahan MY, Hubbard ME, Samadani U. Increase in brain atrophy after subdural hematoma to rates greater than associated with dementia. J Neurosurg. 2018 Dec 1;129(6):1579-1587. PubMed PMID: 29498578.
b. Balser D, Farooq S, Mehmood T, Reyes M, Samadani U. Actual and projected incidence rates for chronic subdural hematomas in United States Veterans Administration and civilian populations. J Neurosurg. 2015 Nov;123(5):1209-15. PubMed Central PMCID: PMC4575892.
c. Balser D, Rodgers SD, Johnson B, Shi C, Tabak E, Samadani U. Evolving management of symptomatic chronic subdural hematoma: experience of a single institution and review of the literature. Neurol Res. 2013 Apr;35(3):233-42. PubMed Central PMCID: PMC4564993.
d. Yang AI, Balser DS, Mikheev A, Offen S, Huang JH, Babb J, Rusinek H, Samadani U. Cerebral atrophy is associated with development of chronic subdural haematoma. Brain Inj. 2012;26(13-14):1731-6. PubMed Central PMCID: PMC5189658.

3. Traumatic brain injury biomarkers: I was a senior researcher in Dr. Samadani's traumatic brain injury research lab, recruiting research participants in an acute hospital setting with acute brain injury and training lab assistants in clinical assessment and lab draws. We determined the applicability of a sport concussion assessment tool to an emergency population in addition to providing blood biomarker data eventually used to develop the Banyan biomarkers for mild traumatic brain injury.

a. Bin Zahid A, Hubbard ME, Dammavalam VM, Balser DY, Pierre G, Kim A, Kolecki R, Mehmood T, Wall SP, Frangos SG, Huang PP, Tupper DE, Barr W, Samadani U. Assessment of acute head injury in an emergency department population using sport concussion assessment tool - 3rd edition. Appl Neuropsychol Adult. 2018 Mar-Apr;25(2):110-119. PubMed PMID: 27854143.

Complete List of Published Work in My Bibliography:
https://www.ncbi.nlm.nih.gov/myncbi/david.balser.1/bibliography/public/