

**Name of Organizer:** Janis J Daly

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**Title of Symposium:** Insights into the Content of Successful Motor Training for Upper Limb Motor Recovery in Stroke Survivors

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**Description of submitted symposium:** Objectives: 1) Present lessons learned from the administration of high intensity, high dose, neurorehabilitation to induce motor recovery in moderately/severely impaired chronic stroke survivors (>6months post stroke). 2) Identify change in brain activations associated with significant recovery of upper limb coordination and function. Proposed Content: We will provide the following: promising results from several studies, with behavioral outcomes that include the following: Fugl-Meyer Coordination (FM), Arm Motor Ability Test, time domain (AMAT-T), and AMAT-F, as well as other functional and quality of life measures; changes in brain activation patterns in response to treatment, and the relationship of these brain activation changes to motor response to treatment; and insights into the content of the treatment that produced these promising results. Examples of results: 1) There was a clinically and statistically significant gain in FM and AMAT ( $p < .009$ ; e.g., mean FM gains of 8–11 points ( $\geq$  twice clinically significant improvement, which is 4.5)). 2) Those with significantly better function at baseline exhibited a decrease in brain activation in response to treatment, in ipsilesional primary motor and contralesional supplementary motor regions. In contrast, those with greater baseline impairment exhibited increase in brain activation in response to treatment. 3) There was a linear relationship between greater functional gain (AMAT-T) and increased activation in bilateral primary motor, contralesional primary and secondary sensory regions, and contralesional lateral premotor region, after adjusting for baseline AMAT, age, and time since stroke ( $p < .049$ ). 4) Measurable brain activation pattern changes were related to spasticity mitigation in response to treatment. Conclusions: Persistently moderate/severely impaired stroke survivors can recover clinically and statistically significant upper limb coordination and function in response to an intensive m

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**Length of time required for symposium?:** 80 minutes

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**Additional Presenters:** Svetlana Pundik, M.D. [sxp19@case.edu](mailto:sxp19@case.edu)

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**What is the role of each presenter?:** Daly: Moderator and presentation of content of motor learning methods and behavior results. Pundik: Presentation of results regarding brain changes in response to treatment and relationship to behavioral gains.

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**Objective 1:** 1. Identify learning principles that produced clinically and statistically significant improvement in upper limb function in moderately/severely impaired stroke survivors.

**Objective 2:** 2. Apply the learning principles to treatment formulation that can produce clinically and statistically significant improvement in upper limb function in moderately/severely impaired stroke survivors.

**Objective 3:** 3. Evaluate treatment response and apply the learning principles to treatment progression plan in a manner to produce clinically and statistically significant improvement in upper limb function in moderately/severely impaired stroke survivors.