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Cortical motor excitability and cognitive function in young adults born very prematurely

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The advent of technology in neonatal care units has increased the survival rate of premature infants. However, there is still room to better understand the deleterious impacts of prematurity on brain and cognition over lifespan, including the early adulthood that has poorly been studied to date. This study tested the mechanism of interhemispheric inhibition (IHI reflecting the integrity of callosal function) and intra-cortical inhibition (ICI reflecting synaptic organization for planning the action) along with the cognitive function in young adults born very prematurely (PT). 13 PT (17±25yo, born ≤ 32 weeks gestational age -GA) were compared to 12 young adults born at term (20±25yo). IHI and ICI were tested with transcranial magnetic stimulation of the primary motor cortex of hand. As compared to the term group, the PT had less occurrence of IHI ($p < 0.0001$), longer IHI latencies (inter hemispheric transfer, $p = 0.004$), shorter IHI duration ($p < 0.0001$), less excitability in the non-dominant hemisphere ($p = 0.001$), and less ICI (37.5% in PT group vs. 100% in terms). This suboptimal regulation between hemispheres and intra-cortical motor function was paralleled by difficulties to sustain attention in PT as assessed by neuropsychological testing. This study suggests that brain function known to be impaired in PT children and adolescents remained suboptimal at early adulthood and may explain some minor cognitive impairment detected. These brain indicators of a long-term influence of prematurity should be used earlier to test the efficacy of rehab programs on modules recognized to be specifically impaired in adulthood.

Biography

Annabelle Denis is a PhD candidate in Clinical Neuropsychology at Laval University. She specializes in Pediatric Neuropsychology and works with children and adolescents who present with neurodevelopmental disorders. Her research focuses on the long-term effects of premature birth in early adulthood. She is particularly interested in identifying therapeutic interventions that reduce the functional and cognitive impairments associated with prematurity. She has received studentships of the Centre Interdisciplinaire de Recherche en Réadaptation et Intégration Sociale (CIRRIIS) and by the Fond de recherche du Québec- Société et culture (FQRSC).

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