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Proposed session: Physical exercise as an intervention for brain disorders

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Physical exercise, whether endurance or resistance type, and independent of a large range of parameters, has been shown repeatedly to evoke a wide variety of benefits both for healthy individuals and for individuals afflicted over a broad spectrum of neurologic and neuropsychiatric disorders and neuroimmune conditions. Physical exercise, which implies all activity that generates a force through muscular activity that disrupts a homeostatic state, presents inestimable benefits for general measures of fitness and function, quality-of-life, physical strength and endurance and may be characterized on the basis of type, intensity, frequency and duration. It has been defined as a planned, structured physical activity with the purpose of improving one or more aspects of physical fitness and functional capacity. Systematic, regular exercise offers a non-pharmacologic, non-invasive and available intervention with manifest advantages for cerebral integrity during aging, restoration of motor, emotional and cognitive functional domains and alleviation of symptom profiles thereby enhancing brain health and plasticity. Regular exercise/exertion promotes neuro-immune functioning and facilitates prevention of heart conditions, cardiovascular diseases, type II diabetes and obesity, and psychological health improvements, such as in depressiveness, all of which may exacerbate the brain disorder condition. Long-term exercise benefits brain functioning through increasing cerebral blood flow and oxygenation, mobilizing growth factors and synaptic plasticity, and the facilitation of performance through neurotransmitter release and turn-over. In controlled clinical studies, the implementation of exercise programs for patients presenting neurodegenerative disorders has improved daily activity, motor performance, ambulation, overall functional independence and care-giver burden. In the laboratory, regular aerobic physical exercise (e.g. running-wheel) induces plasticity-related changes in the brain that include synaptogenesis, neuronal arborization, enhanced glucose utilization, angiogenesis and neurogenesis.

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