

Effects of Physical Activity on Recovery after a Transient Ischemic Attack

Justin Arnold

Mentors: Dr. Roy Hamilton, Dr. Kelly Sloane

Background

Approximately 200,000 to 500,000 cases of Transient Ischemic Attack (TIA) present to the ED annually in the US. Also referred to as a mini stroke, TIAs present similarly to stroke including symptoms such as slurred speech, unilateral weakness, numbness, and blurred vision. As opposed to stroke where injury occurs to the brain, TIA is temporary in symptoms and without damage or bleeding to internal brain structures; despite the transient physical symptoms, up to one third of patients with TIA experience impairments in cognition, such as memory and attention. Patients experiencing a TIA are also at high risk of recurrent TIA or stroke. Physical activity has been associated with improved cardiovascular and cerebrovascular health.

These studies evaluate the effects physical activity such as aerobic exercise on cognitive impairments after TIA and stroke events..

Methods

Clinical Study: We are enrolling patients who present to the Emergency Department with a diagnosis of TIA.

- Undergo testing of cognition, mood and physical activity using online platform, Cognitron, at 4 time points during the first year after the TIA event.
- Will evaluate the association of physical activity with cognitive performance after TIA.

Figure 1: Screenshot of Montreal Cognitive Assessment Test

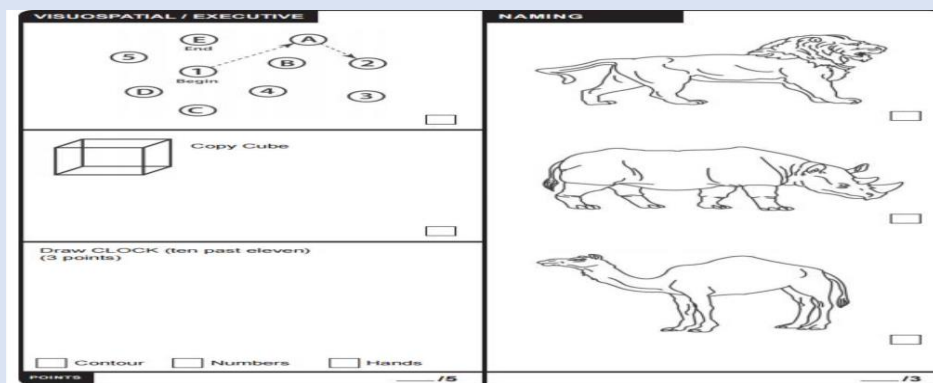


Figure 2: Screenshot of Godin Physical Activity Questionnaire

Godin Leisure-Time Exercise Questionnaire

1. During a typical 7-Day period (a week), how many times on the average do you do the following kinds of exercise for more than 15 minutes during your free time (write on each line the appropriate number).

	Times Per Week
a) STRENUOUS EXERCISE (HEART BEATS RAPIDLY) (e.g., running, jogging, hockey, football, soccer, squash, basketball, cross country skiing, judo, roller skating, vigorous swimming, vigorous long distance bicycling)	_____
b) MODERATE EXERCISE (NOT EXHAUSTING) (e.g., fast walking, baseball, tennis, easy bicycling, volleyball, badminton, easy swimming, alpine skiing, popular and folk dancing)	_____
c) MILD EXERCISE (MINIMAL EFFORT) (e.g., yoga, archery, fishing from river bank, bowling, horseshoes, golf, snow-mobiling, easy walking)	_____

Review: We conducted a systematic search of the literature using electronic databases MEDLINE and EMBASE for human studies published in English or Chinese in peer-reviewed journals. Studies were selected for inclusion according to the following criteria:

- recruitment of stroke survivors ≥ 18 years old
- randomized controlled trials that included a clearly defined control condition and an experimental condition aimed to increase PA (aerobic exercise, resistance training, or physiotherapy),
- duration of training > 4 weeks to provide sufficient time for benefits to accrue
- included a validated neuropsychological test of cognition with data reported at baseline and post-intervention.

Results

Clinical Study: we have obtained IRB approval and have begun enrolling patients.

Review: Studies were grouped into common themes and categories: Physical Therapy Based Interventions, strength resistance training, and recreational activities and cognitive function. Underlying physiologic mechanisms for the relationship between cognitive performance and physical activity are explored including: mediation by brain derived neurotrophic factor, arterial stiffness and nitric oxide. There exists many knowledge gaps and future research should aim to address the diversity of participants in terms of sex and race, but also in heterogeneity of stroke conditions, generalizability of interventions, and variability in time after stroke.

Conclusions

Physical activity is a modifiable risk factor for vascular disease and has also emerged as an important predictor of stroke recovery, both physically and cognitively. We are currently investigating the impact of physical activity on recovery after transient ischemic attack.

References

- EI-Tamaway et al. - *Aerobic exercises enhance cognitive functions and brain derived neurotrophic factor in ischemic stroke patients*-
 Quaney et al.- *Aerobic exercise improves cognition and motor function poststroke*-

