TACSM Abstract

Acute Cardiovascular and Metabolic Responses to Three Modes of Treadmill Exercise in Older Adults with Parkinson's Disease

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ABSTRACT

Parkinson's disease (PD) is a neurodegenerative condition characterized by muscle tremors, rigidity and dyskinesis leading to balance and gait abnormalities that could alter physiologic responses during exercise. Locomotion on an aquatic treadmill (ATM) or anti-gravity treadmill (AGTM) may be a safe alternative to exercise on a traditional land treadmill (LTM) in those with PD. **Purpose**: To determine the acute cardiovascular and metabolic responses to three different modes of treadmill exercise in older adults diagnosed with Parkinson's disease. **Methods**: Eight adults diagnosed with PD (68 ± 3 years of age) completed one exercise session on an LTM, one session on an ATM, and one session on an AGTM at 50% body weight. Participants walked from 1 to 3 mph in 0.5 mph increments at 0% grade during each exercise session. Heart rate (HR), energy expenditure (EE), systolic blood pressure (SBP), and diastolic blood pressure (DBP) were measured at rest and during steady-state exercise at each speed on each treadmill. Rate of perceived exertion was also measured during steady-state exercise. Rate pressure product (RPP) was calculated. **Results**: All variables, with the exception of DBP, increased as speed increased across all treadmill modes ($p < 0.001$). Between treadmill modes across all speeds, EE was statistically different ($p = 0.025$). There was a significant interaction effect for mode and speed for HR ($p < 0.001$) and RPP ($p = 0.003$). At all speeds except 1.5 mph, HR was higher on the LTM versus the AGTM ($p < 0.05$). **Conclusion:** Exercising on an ATM or an AGTM elicits similar physiologic responses to exercise on an LTM in adults with PD.

Table 1: Heart rate response and rate pressure product at rest and at all speeds on each treadmill

			Treadmill Speed (mph)				
Variable	Treadmill Mode	Rest	1.0	1.5	2.0	2.5	3.0
HR (bpm)	LTM	73±11^{a}	84±17^{ab}	86±18^{bc}	92±16^{d}	99±16^{e}	107±18^{f}
	ATM	72±11^{a}	77±14^{a}	80±17^{ab}	83±17^{ab}	90±13^{b}	97±10^{b}
	AGTM	73±11^{a}	80±15^{ab}	83±16^{ac}	85±14^{cd}	88±13^{bcde}	93±15^{cde}
RPP	LTM	91±26^{ab}	106±32^{a}	112±38^{ab}	123±37^{b}	135±36^{c}	149±42^{d}
	ATM	89±14^{ab}	97±21^{a}	107±36^{ac}	106±27^{a}	118±28^{bc}	130±29^{c}
	AGTM	91±19^{a}	102±22^{ab}	108±25^{ac}	111±24^{c}	116±25^{bc}	126±28^{d}

Values are mean ± s.d. Means with the same superscript are statistically similar ($p > 0.05$). ATM = aquatic treadmill; AGTM = anti-gravity treadmill; LTM = land treadmill; HR = heart rate; RPP = rate pressure product.