Pedometer Accuracy in Lower Limb Amputees: A Pilot Study

Gary Guerra[1], John D. Smith[1], Patricia Holmes[1], Ed Khu[2], Imelda Pena[2]

[1]Texas A & M University - Kingsville, San Antonio, [2]Specialty Prosthetics and Orthotics of Texas

Int J Exerc Sci 2(1): S7, 2009. To date there have been no studies examining the accuracy of the pedometer on lower limb amputees. **PURPOSE**: To measure the accuracy of pedometers in lower limb amputees. **METHODS**: Four participants (Table 1) had their height and weights measured and were then fitted with a Velcro Walk4Life™ pedometer belt (Walk4Life Inc, Plainfield, IL) around the waistline at the hip. They were then fitted with two pedometers: a SW-701 Digiwalker™ (NEW-LIFESTYLES, Inc., Lee's Summit, MO) spring-levered pedometer on the anterior mid-line of the right hip and a New-Lifestyles® NL-800 (NEW-LIFESTYLES, Inc., Lee's Summit, MO) piezoelectric pedometer just laterally to the SW-701. They then engaged in three walking trials, two on the treadmill at a slower and faster tolerable walking speed for three minutes each, and one over ground for 200m at a self-selected pace. At the end of each trial pedometer counts and actual step counts from a hand tally were recorded. Pedometer error was calculated as [((pedometer steps-actual steps)/actual steps) * 100]

Table 1. Participant Characteristics

	Participant			
	1	2	3	4
Age	33.6	40.7	39.9	61.4
Height (cm)	182.8	165.1	180.3	162.5
Weight (kg)	129.1	58.8	84.5	78.2
Duration Worn (months)	18.0	12.0	12.0	60.0
Amputee Classification*	RBK	RAK	LAK	LBK
Prosthetic Type	Freedom Foot	Otto Bock	C-Leg	Renegade Foot

* Right Below Knee (RBK), Right Above Knee (RAK), Left Above Knee (LAK), Left Below Knee (LBK)

RESULTS: Error was highest in the SW during the slowest walking speeds (14.5 % and 14.6% lower than actual counts in two participants) and was lowest in the NL at the higher walking speeds (3.7% and no error in two participants) during the treadmill trials. Ground walking trials produced least error in all subjects (~1.5%). Subject four was not able to walk at speeds above 2. 5 mph and thus walked on the treadmill at 1.0 and 1.5 mph. Participant two was not able to walk on the treadmill at 3 mph and rain kept participant four from performing the ground-walking trial. **CONCLUSION**: This pilot study suggests the potential of the pedometer in accurately counting steps in lower limb amputees. There is clearly some discrepancy in those who cannot walk at faster speeds, as indicated by subject four. Research is continuing to examine if right or left amputation, above or below knee amputation, and if prosthetic type affects the pedometer accuracy.