

# The relationship between physical activity facility proximity and leisure-time physical activity in persons with spinal cord injury

Kelly P. Arbour, Ph.D.<sup>\*</sup>, Kathleen A. Martin Ginis, Ph.D.  
The SHAPE-SCI Research Group

*Department of Kinesiology, Centre for Health Promotion and Rehabilitation, McMaster University, Hamilton, Ontario, Canada, L8S 4K1*

## Abstract

**Background:** Within the general able-bodied population, proximity of one's home to physical activity facilities is modestly associated with physical activity behavior. Currently, no research has examined whether facility proximity is related to physical activity among persons living with disabilities.

**Objective:** To examine (1) the level of agreement between perceived and actual proximity to accessible physical activity facilities and (2) the relationship between facility proximity (perceived and actual) and leisure-time physical activity (LTPA) among persons with spinal cord injury (SCI). It was hypothesized that (1) perceived and actual proximity measures would exhibit low agreement and (2) a small, positive relationship would emerge between proximity (perceived and actual) and LTPA.

**Methods:** Data from 50 Ontario residents living with SCI (70% male; 52% tetraplegia) were collected for proximity and LTPA. Perceived facility proximity was determined by a self-report "YES" versus "NO" presence measure, while actual facility proximity was assessed using Geographical Information Systems. An SCI-specific instrument, the PARA-SCI, was used to measure LTPA.

**Results:** Low agreement levels were found between perceived and actual proximity. LTPA status (active versus inactive) was shown to moderate the relationship, with higher agreement levels found for participants who reported engaging in mild or heavy LTPA versus their inactive counterparts, but only for the 30-minute wheeling boundary. Contrary to hypothesis, people living within a 30-minute wheel from an accessible facility were less likely to engage in heavy LTPA than were people who did not have an accessible facility located within a 30-minute wheel. No significant associations were found between LTPA and perceived proximity.

**Conclusions:** Living in close proximity to a facility that provides accessible programming and equipment does not necessarily translate into greater physical activity behavior. Crown Copyright © 2009 Elsevier Inc. All rights reserved.

*Keywords:* Physical activity facilities; Spinal cord injury; Proximity; Accessibility

Accumulating evidence suggests that the proximity of one's home to physical activity facilities is modestly associated with physical activity behavior [1-8]. In general, people who live in close proximity to fitness and recreational centers report greater physical activity than do people who do not. However, these conclusions are derived from studies that were conducted in persons without disabilities. It is unknown whether proximity to physical activity facilities plays a significant role in leisure-time physical activity (LTPA) among individuals living with a disability. Therefore,

the current study examined the relationship between proximity to accessible physical activity facilities and LTPA among persons with a specific type of disability—a spinal cord injury (SCI).

Proximity to physical activity facilities has generally been assessed using two types of measures: (1) subjective perceptions and (2) quantitative instruments that are based on direct observation or existing Geographical Information Systems (GIS) databases [9]. Subjective perceptions of proximity are useful for providing information on people's awareness of existing physical activity facilities and perceptions regarding barriers and facilitators to using these facilities [10]. Meanwhile, quantitative instruments provide researchers with objective data on the actual location of the facilities relative to people's residences. Given the reported difficulties of subjectively estimating distance [11,12], quantitative instruments are increasingly being used, in conjunction with subjective perceptions, to provide a better understanding of the importance of proximity to physical

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<sup>\*</sup> Corresponding author: Faculty of Physical Education and Health, University of Toronto, 55 Harbord Street, Toronto, Ontario, Canada M5S 2W6. Fax: (416) 971-2118. (K.P. Arbour).

E-mail address: [kelly.arbour@utoronto.ca](mailto:kelly.arbour@utoronto.ca) (K.P. Arbour).

activity—related facilities [13]. Therefore, these two types of proximity measures were used in the present study.

Studies of the relationship between perceived and actual proximity have found overall slight-to-fair levels of agreement between the two types of measures ( $\kappa$  [kappa] = 0.00-0.30 [10,12]). However, poor measurement correspondence may be partly to blame for the low  $\kappa$  values. For example, in Sallis et al.'s [8] study, the subjective proximity measure (i.e., a composite measure of perceived accessibility [cost, social requirements], and perceived proximity) did not match the objective proximity measure (i.e., number of facilities within 5 km of participants' homes). Consequently, the authors were unable to show a significant relationship between the two proximity measures. In contrast, Jilcott et al. [10] found a moderate correlation between measures of perceived facility distance and objective GIS-determined distance, both of which were assessed using equivalent scale units (i.e., miles). Additionally, Jilcott et al. [10] found higher agreement for perceived existence of neighborhood fitness facilities and GIS-measured existence of facilities within a 1-mile ( $\kappa$  = 0.14) versus a 2-mile ( $\kappa$  = 0.09) walk from one's home, suggesting a better match between perceptions and GIS-determined proximity measures for shorter versus longer distances from one's home [11,12]. Consistent with this finding, a higher percentage of adolescent girls perceived access to recreational facilities that were located within ½ mile of their homes than facilities situated greater than 1 mile from their homes [14]. Together, these findings suggest that the strength of agreement between perceived and actual proximity measures may depend on the measurement correspondence and the distance between the facility and one's home.

An additional factor that may influence the strength of agreement is physical activity status. People who are active may be more aware of the physical activity opportunities within their neighborhood and, consequently, have more accurate perceptions of these environmental supports than their inactive counterparts [cf., 13]. However, studies that have examined the relationship between physical activity status and the two types of proximity have shown mixed results. While Kirtland et al. [12] found lower agreement among inactive ( $\kappa$  = 0.16) than among active respondents ( $\kappa$  = 0.35), Jilcott et al. [10] were unable to show consistently higher agreement levels among the more active women in their sample. However, Jilcott et al.'s sample were part of a larger physical activity intervention, and the agreement levels between the two proximity measures tended to be higher for the intervention group (ICC = 0.41) than for the controls (ICC = 0.10), suggesting that level of physical activity may indeed moderate the relationship between perceived and actual proximity. As such, physical activity status was examined as a moderator in the present study.

We also investigated the relationship between facility proximity (perceived and actual) and LTPA. A number of

studies have identified positive, albeit modest, associations between LTPA and both perceived [3,10,14,15], and actual [1,2,4-7,16] proximity to physical activity facilities. There is also indication that the association may be stronger when proximity is measured subjectively rather than objectively [5,8,10,14]. However, the strength of association tends to be small [e.g., 5,10,14]. Moreover, all of these studies were conducted among individuals without disabilities. To our knowledge, no study has examined whether perceived and actual proximity to an accessible physical activity facility is related to LTPA in persons living with SCI.

Thus, the purposes of the present study were to (1) examine the level of agreement between perceived and actual proximity to accessible neighborhood physical activity facilities among persons with SCI; (2) determine whether the agreement level between the two proximity measures varies as a function of physical activity status; and (3) determine the relationship between perceived and actual proximity to accessible physical activity facilities and LTPA among persons with SCI. In line with previous research in persons without disabilities [8,10,12], it was hypothesized that the perceived and actual proximity measures would exhibit a low level of agreement. Consistent with previous physical activity and proximity research [12], our second hypothesis was that active participants would exhibit higher agreement levels between perceived and actual proximity than inactive participants. Finally, given the small associations between perceived proximity and LTPA in persons without disabilities [5,10,14], in combination with the novelty of LTPA and proximity research in persons with disabilities, our final hypothesis was that both types of proximity measures would be positively related to LTPA, although the strength of associations would be small.

## Methods

### *Participants*

This cross-sectional study utilized data from an 18-month, prospective investigation of the physical activity patterns and predictors in people with traumatic SCI (Study of Health and Physical Activity of People with Spinal Cord Injury [SHAPE-SCI]) [17]. SHAPE-SCI is currently the largest multicenter, epidemiological study of physical activity in the SCI population, involving a total of 695 individuals recruited from four regional SCI rehabilitation and research centers in Ontario, Canada. At each site, participants were recruited primarily from a database of patients with SCI who had given consent to be contacted for research purposes, as well as through advertisements in local newspapers and SCI-relevant publications, presentations at events for people with SCI, mailings to SCI community groups, clinics, and word-of-mouth. Baseline LTPA and perceived proximity data from 50 SHAPE-SCI

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