



EDITORIAL

SCI & Exercise

## Exercise for people with SCI: so important but difficult to achieve

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Before the COVID-19 pandemic began, the 2020 ISCoS conference was going to be held in Tokyo during the Paralympics. This would have brought the two worlds of Sir Ludwig Guttmann together. Guttmann was the first president of ISCoS and first editor of what is now called *Spinal Cord*. In the 1940s he introduced sport and exercise as mandatory activities for his patients with a spinal cord injury (SCI) and started to organize the Stoke Mandeville Games, which have evolved into the Paralympics. Guttmann believed in the power of sport to change lives, and viewed it as integral to helping those with a physical disability build physical and mental strength. Since the SCI world and Paralympics would meet in Tokyo, this was the perfect time to launch a special issue on SCI & Exercise.

Today, science supports the role of exercise as a means of becoming healthy and fit in people with SCI and its role in improving performance of daily life activities [1], return to work [2], and even quality of life [3]. In 2007, the American College of Sports Medicine launched the vision of Exercise is Medicine (EIM). EIM is a global health initiative to make physical activity assessment and promotion standard clinical care for people of all abilities (<https://www.exerciseismedicine.org/>). The COVID-19 pandemic adversely impacted physical activity/participation levels, as fitness centers were closed and people were

encouraged or required to stay home (and indoors) to limit transmission of the virus.

The EIM vision might even be more important for people with SCI since they have higher rates of physical and mental health problems and are among the least active segments of society [4]. Although there are evidence-based exercise guidelines for people with SCI [5], achieving target amounts of exercise seems to be very hard [6]. Individuals with SCI frequently report lack of time as a barrier to sport participation [7]. The time burden of participation includes “getting to/from” the sporting location, getting on/off the equipment, as well as the actual participation. Development of time-efficient and effective exercise programs that can be conducted at home is thus critical.

One such time-efficient program is High Intensity Interval Training (HIIT), which has shown positive results in the general population and has been performed by people with SCI as well. HIIT workouts are typically 10 to 30 min in duration and involve alternating bouts of intense exercise and low-intensity recovery. However, the question remains whether this high intensity training mode is feasible and safe for people with SCI. A narrative review by Astorino, Hicks, and Bilzon [8] addresses the state of the science of potential effectiveness and tolerability of HIIT in persons with SCI. McMillan et al. [9] evaluated the effectiveness of HIIT by comparing the physiological response of energy expenditure matched HIIT and continuous steady-state moderate-intensity exercise. Koontz et al. [10] round out the trio with a home-based HIIT intervention.

Home or community-based exercise interventional studies are needed to establish “real-world” effectiveness and to overcome the transportation and time barriers inherent in participating in laboratory-based interventions. Five different home-based exercise/physical activities are represented in this issue. All five have three features in common, provision of exercise equipment, specific physical activity targets, and provision of support or guidance to achieve the targets. All other study design facets are highly varied.

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This special issue also includes papers focused on specific training modes, i.e., functional electrical stimulation and locomotor training, and whether these training modes elicit exercise responses that may be effective in improving fitness. One paper focuses on the challenges to perform graded exercise tests in a heterogeneous group with different levels of physical functioning, which is necessary for developing and evaluating exercise programs. Two papers focus on key challenges when conducting studies, namely recruitment and adherence. We hope readers of *Spinal Cord* enjoy reading this special issue on *SCI & Exercise*, which is particularly relevant now because COVID-19 adversely impacts our physical activity.

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