

# Physical Activity Interventions for Cardiovascular Health After SCI

Adapted and Updated by John Ferrara, SPT and Rachel Tappan, PT, DPT, NCS from SCI SIG Newsletter article authored by: Sue Ann Sisto, PT, PhD, FACRM and Kazuhiro Sabat, BS

## Fact Sheet

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## *Why is physical activity beneficial for managing cardiovascular health in people with SCI?*

Physical activity is one component to decreasing the risk for cardiovascular disease (CVD) in people with spinal cord injury (SCI) and in the general population. Individuals with SCI should participate in  $\geq 150$  minutes/week of physical exercise, if possible.<sup>1</sup>

Maximal oxygen uptake ( $VO_{2max}$ ) can increase with training, and lipid profiles have been shown to decrease following regular exercise. Studies suggest that abnormal metabolic and musculoskeletal changes in persons with SCI can be partially reversed by utilizing upper extremity (UE) exercises, functional electrical stimulation (FES) cycling or a combination of both.<sup>2,3</sup>

## *Effects of Upper-Body Arm Ergometry on CVD Markers in People with SCI<sup>2,4-6</sup>*

- Moderate intensity UE exercise performed for 30-45 minutes, 3 times per week for 8-12 weeks was correlated with improvements in abnormal fasting lipid profiles in individuals with SCI.<sup>2,4</sup>
- Activity/rest interval-type exercise at the following parameters may also have benefits in lipid and glycemic profiles:<sup>5</sup>

Exercise Parameters (de Groot et al 2003)	
Type	Moderate intensity arm exercises
Frequency	3x/week for 8 weeks
Time	Intervals of 3 minutes at moderate intensity with 2 minutes of rest for duration of 1 hour
Intensity	70-80% of Heart Rate Reserve

- Individuals with SCI at T5 and above may have an abnormal heart rate response to aerobic exercise. This is due to the lack of sympathetic nervous system activation to the heart decreasing cardiac output and heart rate response as well as decreased venous return from the lower limbs.<sup>9</sup>
- Due to constraints in autonomic control for individuals with SCI at T5 or higher, an increase in perceived exertion may not correlate with an increase in HR/BP with exercise.<sup>6</sup> The Borg Rating of Perceived Exertion (RPE) scale (Figure 1) may provide insight into perception of effort as an adjunct or alternative for monitoring intensity of exercise. Consider a target RPE rating of 12-15/20.<sup>10</sup>

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Borg RPE Scale	
6	
7	Very, very light
8	
9	Very light
10	
11	Fairly light
12	
13	Somewhat hard
14	
15	Hard
16	
17	Very hard
18	
19	Very, very hard
20	Maximum exertion

Figure 1: Borg Rating of Perceived Exertion (RPE) Scale

## *Effects of Functional Electrical Stimulation (FES) Cycling in People with SCI*<sup>7,8</sup>

- FES cycling in previous research has shown reversed muscle atrophy, increased muscle mass, increased endurance and improvements in isometric strength, lower limb circulation and vasodilatory capacity.<sup>7,8</sup>
- While FES equipment and training is available at specialized SCI rehabilitation centers, it is not readily available to public. Resources are strongly needed to facilitate this type of training for health and wellness promotion post-SCI.
- Furthermore, more research is needed to confirm the benefits in CVD prevention, as well as other age-related chronic illnesses such as diabetes, arthritis and respiratory disease in the SCI population.

## *Patient Resources*

From SCI Model Systems Knowledge Translation Center about exercise after SCI: <https://msktc.org/sci/factsheets/exercise-after-spinal-cord-injury>

### References:

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