

Summary

Traumatic damage to the cervical spinal cord has a dramatic impact on determinants affecting cardiovascular fitness. In tetraplegia, in addition to diminished skeletal muscle function, impaired sympathetic cardiovascular innervation together with a dysfunction of catecholamine release is typically present. Individuals with tetraplegia are at a high risk of long-term inactivity, which increasingly contributes to the development of common civilization diseases. The aim of the current dissertation project is to investigate the cardiovascular fitness in males with cervical spinal cord injury (n=20) as compared to able-bodied males (n=27). Both groups completed exercise testing on an arm-crank ergometer. Arterial blood pressure response to exercise, peak oxygen consumption and peak heart rate were the primary outcome variables. In the first part of the study, a graded maximal arm-crank ergometer test to the subjective exhaustion was performed for the inter-group peak exercise comparison. The peak power dramatically differs between the groups and could be an important confounding factor limiting the evaluation of a physiologic response related to the equivalent physical loading. Therefore, in the second part of the study, individuals of the control group completed a second graded arm-crank ergometer test matched to the average workload protocol previously completed by individuals with tetraplegia. During the second part of the study, the same physiologic measures were recorded.

Arterial blood pressure did not increase following peak arm crank exercise in males with cervical spinal cord injury whereas the systolic blood pressure in the control group significantly increased in response to the peak exercise and after the completion of the tetraplegic's workload protocol. Some males with tetraplegia appeared to be at risk of severe hypotension following high intensity exercise, potentially limiting the ability to progressively increase and maintain high intensity exercise. The peak oxygen consumption in individuals with tetraplegia was 59% and the peak heart rate was 73% of the control group values, respectively. Some techniques to compensate for the cardiovascular impairments are discussed with a general aim to mobilize blood from the lower extremities and the splanchnic area. The study also highlights the limitation of current clinical examination of individuals with spinal cord lesion in assessing autonomic function preservation.