Effect of Self-Regulated Exercise Intensity on Endothelial Function in Men with Coronary Artery Disease

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Abstract

Endothelial dysfunction refers to the physiological dysfunction of normal biochemical/biophysical processes undertaken by the endothelium that results in a reduced capacity to maintain homeostasis. This leads to the development of pathological inflammatory processes and vascular disease. Acute and chronic exercise have been shown to improve endothelial function in individuals with CAD. Allowing individuals to use effort perception to self-regulate their preferred intensity may encourage the development of intrinsic motivation, a central element in promoting adherence to exercise. Exertional feedback is commonly used to regulate the pace of many daily activities and is often done without conscious awareness. In a recent study it was found that 86% of women involved in aerobic exercise used effort perception exclusively to determine exercise intensity (1). The purpose of this study was to examine the effect of self-regulated exercise on endothelial function in men with CAD.

Methods

A total of 8 men with CAD (65.7 ± 4.5 y; VO2peak 28.0 ± 4.1 ml kg⁻¹ min⁻¹) visited the Vascular Research Unit (VRU) on 2 separate occasions. During the first visit, subjects undertook a maximal exercise test to determine VO2peak. During the second visit the subjects undertook a 20 min bout of self-regulated treadmill exercise. Endothelial function was assessed before and 1 h after the exercise session.

Visit 1: The maximal exercise test was undertaken on a treadmill using a ramp protocol. Breath by breath expired O2 and CO2 were measured using open circuit spirometry. Subjects were continuously monitored with a 12-lead ECG.

Visit 2: Subjects arrived at the VRU after an overnight fast. Endothelial dependent and endothelial independent dilatation were assessed before and 1 h after a 20 min bout of exercise at a self-regulated intensity (Figure 1).

Arterial diameter was assessed offline using custom designed software (Figure 2).

Results

Compared to baseline EDD was significantly increased at 1 min and 3 min post occlusion at 60 min following the acute bout of self-regulated exercise. There was no change in EID in response to the acute bout of exercise.

Figure 3. Flow Mediated Dilation at 1 min (A) nd 3 min (B) post occlusion

Conclusion

Compared to baseline, flow-mediated dilation was significantly increased at 60 min following 20 min of self-regulated exercise in patients with CAD.

Bibliography