2AD1 An effect of exercise training related to cardiovascular responses to lower body negative pressure.

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Purpose We examined how exercise training influences circulatory dynamics of peripheral blood flow which determines cardiovascular response to change in posture. **Method** After all the measurements were stabilized, the subject, wearing only shorts beforehand, stayed quiet for one hour, and was placed in the LBNP box as he lied down in a supine position with the lower body below iliac crest inside it. After some more rest, LBNP was applied randomly for five minutes either at level of 150 or of 300 mm H_2O. **Results** There was no significant difference in the volumes of finger blood flow at rest between the athletes and the non-athletes, whereas the volume of forearm blood flow for the non-athletes was significantly higher than that of the athletes. Significant difference in finger blood flow was not observed at rest, during application of LBNP, and at recovery between the two groups, whereas there were significant differences in forearm blood flow at rest, during the LBNP application, and at recovery between the two groups. **Discussion** In those real situations, endurance training seems to bring a greater advantage over non-endurance training from the point of thermoregulation because muscle blood flow can be mobilized in a greater quantity against baro-reflex and cutaneous blood flow can be preserved so that it can be used for heat dissipation in dynamic exercise.

2AD2 **Relationship among physical fitness, autonomic nervous activity and a substrate of cardiac arrhythmia in orthostatic dysregulation**

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Purpose: Orthostatic dysregulation (OD) is caused by an insufficiency in the regulation of the circulatory system associated with a reduction in autonomic nervous function. **Methods:** Autonomic nervous activity during standing-up motion was measured in OD subjects, and relationships between autonomic nervous abnormality, physical fitness items and fetal arrhythmia were investigated using signal averaged electrocardiography, pulse wave velocity (PWV), and the QT dispersion of an electrocardiogram. The subjects were a group of junior and senior high school and university students of 30 subjects. The physical fitness test was used to evaluate physical fitness. For autonomic nervous activity, a spectral analysis of heart rate and blood pressure variability was carried out. Heart rate data were analyzed based on low frequency components (LF power), high frequency components (HF power), LF/HF ratio and very low frequency components (VLF power). **Results:** The rates of change in a parameter for sympathetic nervous activity were significantly higher in the non-OD group than in the OD group. The rate of change in QT dispersion immediately after standing up was significantly higher in the OD group than in the non-OD group. The PWV was significantly higher in the OD group than in the non-OD group. However, the late potential was not found in the both groups. The rate of change in VLF power after standing up was significantly higher in the OD group than in the non-OD group. The rate of change in 1/f fluctuation after standing up was significantly lower in the OD group than in the non-OD group. In the physical fitness measurements, 20-m shuttle run (go-and-back persistent run) was poor in the OD group. **Discussion:** Abnormal autonomic nervous activity, orthostatic sympathetic nervous activity responses were poor in the OD cases. Moreover, the predictive index of fetal arrhythmia, QT dispersion, was increased, suggesting the presence of a local delay in cardiac conduction. In OD cases, PWV was high and VLF power was increased, suggesting that a substrate for a cardiac accident had been produced in the OD cases.

Key words: Orthostatic dysregulation, Autonomic nervous activity, Cardiac accident, Heart rate variability