Effects of repeated whole-body cryotherapy on rheological properties of blood in trained and untrained older men

Kubica Jadwiga¹, Szymura Jadwiga², Wiecek Magdalena³, Maciejczyk Maciej³, Szygula Zbigniew⁴, Wisniowski Zdzislaw⁵

¹Ph.D. Student, Faculty of Physical Education and Sport, University of Physical Education, Krakow, Poland
²Department of Clinical Rehabilitation, Faculty of Motor Rehabilitation, University of Physical Education, Krakow, Poland,
³Department of Physiology and Biochemistry, Faculty of Physical Education and Sport, University of Physical Education, Krakow, Poland,
⁴Department of Sports Medicine and Human Nutrition, Faculty of Physical Education and Sport, University of Physical Education, Krakow, Poland,
⁵Department of Bioinformatics and Telemedicine, Jagiellonian University Medical College, Krakow, Poland

The aim of the study was to compare rheological properties of blood resulting from repeated whole-body cryotherapy (WBC) in trained and untrained older men. The study included 10 long distance runners and 10 untrained men of age about 60 years old. There was no difference between compared groups in age, body height and body mass. Subjects were exposed to 24 WBC applications every second day (3 min at -130°C). Venous blood was sampled prior first, after 24 exposure to WBC, one week and two weeks after completion of WBC exposure. After regular WBC exposure mean elongation index (EI) was significantly higher in both groups at shear stress levels 0.58 Pa and from 2.19 Pa to 59.97 Pa. Comparison of trained and untrained men showed significantly higher mean EI in trained men at shear stress levels from 0.58 Pa to 59.97 Pa. We observed no significant changes in mean values of aggregation indices (AI, %), the half time (T1/2, s) and amplitude and total extent of aggregation (AMP, arbitrary units) between both groups and in comparison to baseline level. After regular exposure to WBC the level of fibrinogen (g/l) was significantly lower, and mean hemoglobin concentration (g/l) was significantly higher in untrained men, the level of hematocrit (%) was significantly lower in both groups. The study revealed positive effects of WBC on the rheological properties of blood, manifested by increase in erythrocyte deformability.

Keywords: elongation index, aggregation index, physical activity.