EFFECT OF SEVEN OR THREE WEEKS ALTITUDE TRAINING DURING A FIVE MONTH TRAINING PERIOD ON HEMOGLOBIN MASS AND PERFORMANCE IN NATIONAL TEAM CROSS COUNTRY SKIERS

Wehrlin Jon1, Hallén Jostein2, Clénin German1, Villiger Beat3, Marti Bernard1

(Federal Institute of Sport, Section for Elite Sport1, Switzerland, Norwegian School of Sport Sciences2, Norway, Swiss Ski Federation3, Switzerland)

To compare the effects of two different volumes of altitude training during a five-month pre-season training period on erythropoiesis and performance in elite cross-country skiers, a control group (CG7; n=7) completed three one-week altitude training periods (ATP I-III), while the altitude group (AG7; n=7) lengthened ATP I and ATP III by two live high-train low (LHTL) weeks each. Due to illness in three subjects, only four AG7 athletes completed ATP III; their results are reported as AG4. Blood parameters were measured several times and performance parameters were measured before and after the five-month training period.

After ATP I, hemoglobin mass (Hbmass) and red cell volume (RCV) increased in AG7 by 4.3% (p<0.001) and 4.6% (p<0.001), respectively, while there was no change in these parameters in CG7. After ATP III, Hbmass increased further in AG4 (+6.8%; p<0.05) whereas no changes were seen in either AG7 or CG7. RCV decreased in CG7 (p<0.001), and remained unchanged in AG7 and AG4 after ATP III while mean corpuscular volume (MCV) decreased in all groups (AG7, p<0.001; CG7 and AG4, p<0.01). VO2max increased in AG7 (+6.4%; p<0.01) and was unchanged in CG7, while time to exhaustion (TTE) increased similarly in all groups. In conclusion, Hbmass increased by 4-5% after one three-week ATP and increased further with an additional three-week ATP several weeks later, despite decreased MCV and unchanged RCV. Seven altitude training weeks (3+1+3) during a five-month training period seem to increase aerobic performance more than three altitude training weeks (1+1+1).

Keywords: Altitude Training, Applied Physiology, Red Blood Cell

12th Annual Congress of the ECSS, 11–14 July 2007, Jyväskylä, Finland