

Title: Hydration status during a training course for Belgian Paratroopers

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Summary: The training of Belgian paratroopers is a challenge to prepare candidates to accomplish demanding military missions. To succeed in the training course, high-level performances are mandatory. It is well-known that adequate hydration is a prerequisite for optimal performances and recovery. The aim of the present study was to estimate hydration status during a training course for Belgian paratroopers.

Methods-Results: Urine Specific Gravity (USG) measurements were immediately performed at the scene by the same researcher using an ATAGO, PAL-USG-10s refractometer (Atago, Tokyo, Japan) on morning and evening urine, and this during 13 days. Following categories were used to classify soldiers' hydration status: well hydrated (USG < 1.010), minimally dehydrated (USG = 1.010-1.019), dehydrated (USG = 1.020-1.029), and seriously dehydrated (USG ≥ 1.030). Based on data of Southard et al. (1), we evaluated the drop in VO_{2max} in function of USG, with the equation VO_{2max} drop (ml.kg⁻¹.min⁻¹) = (USG-1,020)*1000*0,24; if USG ≤ 1,020 then VO_{2max} drop (ml.kg⁻¹.min⁻¹) = 0.

In total 36 male candidates participated to the study. Mean (SD) was for age 25,3 (4,27) years, for BMI 24,4 (1,83) kg/m², and for fat mass 11,9% (3,80). In total, 545 urine samples were collected and measured. Only 20 (4%) were well hydrated, 64 (12%) minimally dehydrated, 232 (43%) dehydrated and 229 (42%) were seriously dehydrated.

The VO_{2max} drop (ml.kg⁻¹.min⁻¹) with increasing USG can be described by the linear regression equation: VO_{2max} drop in ml.kg⁻¹.min⁻¹ = 194,82 x USG – 198,31 (R² = 0,95). This equation means for a USG of 1,030 a VO_{2max} drop of 2,4 ml.kg⁻¹.min⁻¹, and for a USG of 1,040 a VO_{2max} drop of 4,3 ml.kg⁻¹.min⁻¹.

Conclusions: As conclusion, hydration status during this training course was not optimal as indicated by the USG values, which means that the participants had to perform in suboptimal conditions. Dehydration causes a VO_{2max} drop, which can be problematic during a demanding military training for paratroopers. This emphasized the importance of individually tailored education and hydration approach.

Reference

1. Southard TL, Pugh JW. Effect of hydration state on heart rate-based estimates of VO_{2max} . J Exerc Physiol 2004;7:1.