

**Keywords:** effects, health; exposure; health; Kosovo; peace-keeping; uranium

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### Body Heat Balance During Interval Exercise in a Cold Environment

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**Introduction:** The effect of simultaneous changes in exercise and ambient temperature on body heat balance and physiological strain was studied.

**Methods:** The exercise/rest periods were either 10/10 minutes or 30/30 minutes, and the total duration of the protocol was 120 min. Exercise (walking 6 km/h on a treadmill with a slope of 2°) was performed in a cold environment (-15°C, air velocity 2.5 m/s). The resting periods were spent sitting at +10°C, air velocity 0.2 m/s, wearing the same clothing worn during exercise. The subjects were seven voluntary, healthy young men. They were wearing Finnish military winter clothing (M91, thermal insulation about 2 clo) and a rucksack (12 kg). The subjects were allowed to drink water freely during the rest periods.

**Results:** Data are given as mean  $\pm$ SE. The mean skin temperature was 31.7  $\pm$ 0.2°C during the 10/10 schedule and 31.3  $\pm$ 0.3°C during the 30/30 schedule. The deep body temperature was 37.5°C on average during both schedules. At the end of the last exercise period, oxygen consumption was 33.5  $\pm$ 0.9 ml/min/kg in the 10/10 schedule and 32.4  $\pm$ 3.8 ml/min/kg in the 30/30 schedule. During the exercise periods, heart rate was 150 beats/min on average for both schedules. The amount of perspiration was similar during the 10/10 schedule (809  $\pm$ 118 g) and the 30/30 schedule (777  $\pm$ 81 g). The fluid intake was greater ( $p = 0.01$ ) during the 10/10 schedule (457  $\pm$ 121 g) than during the 30/30 schedule (141  $\pm$ 41 g). The accumulation of perspiration in the subjects' clothing was greater ( $p = 0.02$ ) during the 30/30 schedule (392  $\pm$ 32 g) than during the 10/10 schedule (353  $\pm$ 28 g).

**Conclusion:** The body heat balance and physiological strain were similar comparable in both exercise/rest schedules. The fluid intake was greater during the 10/10 minutes exercise/rest schedule, while the amount of perspiration was similar for the two schedules. The accumulation of perspiration in the subjects' clothing was greater during the 30/30 schedule. The longer continuous period in a cold environment (30 min.) could have led the perspiration to condense inside the clothing, thus reducing the capacity for evaporation. These findings suggest that specific instructions for clothing type and fluid intake are needed for different combinations of exercise and rest in changing ambient temperatures.

**Keywords:** clothing; cold; evaporation; exercise; fluid; heat; perspiration; rest; temperature

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### Military Fitness Class of Finnish 18-Year-Old Men: Prediction of Military Fitness Class at Call-Up

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**Introduction:** Military service lasting from 6 to 12 months is obligatory for Finnish men. They undergo a medical examination during the spring of the year they turn 18 years of age. The purpose of the examination is to obtain a preliminary assessment of their fitness class for military service. A call-up board confirms the fitness class the following autumn. The percentage of releases ranged between 7.5% and 10.8% in 1990–1998. During the same period, 6.0–8.6% of those who were regarded as capable of beginning their military service were discharged during the period of service due to health problems, mostly related to their mental health. The aim of this study was to develop methods for more accurate screening at the time of call-up.

**Materials and Methods:** The basic population of the study is the about 32,000 Finnish men who were born in 1981 and thus, had their obligatory call-up in 1999. At the time of their call-up, they completed two questionnaires: 1) the Conscript Screen; and 2) the P2-test that was developed for the use by the Finnish Military Forces. The Conscript Screen is a 25-item questionnaire developed by one of the authors (KP). The P2-test includes scales assessing the leadership capabilities of the conscript, and includes the following scales of the Minnesota Multiphasic Personality Inventory (MMPI): 1) lie; 2) infrequency; 3) correction; 4) hypochondriasis; 5) psychopathic deviate; 6) psychasthenia; and 7) schizophrenia.

**Results:** Preliminary results suggest a strong statistical correlation ( $p < 0.0001$ ) between the risk of being released from military service at the call-up either temporarily or permanently using the Conscript Screen and most of the scales of the P2-test.

**Conclusions:** There should be some test to evaluate the suitability of conscripts for military service at call-up. The two tests described are valuable tools at conscription.

#### References

Parkkola K: Predicting failure in the compulsory conscript service. A follow-up study of the predictive value of the structured conscript interview and the conscript screen (in Finnish, English summary). *Annales Medicinæ Militaris Fenniae* 1999;74:1 Suppl.

**Keywords:** Conscript Screen; conscripts; fitness; mental health; military; Minnesota Multiphasic Personality Inventory (MMPI); screening

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### Displaced Stress Fractures of the Femoral Shaft

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**Introduction:** Military trainees often are affected by displaced stress fractures of lower extremities. The displacement of a long bone fatigue fracture is a rare but serious injury. The most common sites of stress fractures are the tibia, metatarsal bones, and the calcaneus. The incidence of fatigue fractures reported among military conscripts during the training period ranges from 3–4% up to 64%, depending on the exact nature of the training. The proportion of femoral shaft stress fractures out of all stress fractures studied ranges from 3–5% up to 25–43% in military conscripts, and from 3–7% up to 14–21% in athletes. The purpose of this study was to scrutinize the incidence, the etiologic factors, and the morphologic characteristics of displaced femoral shaft fatigue fractures over a 20-year period, in order to evaluate the chances of preventing prolonged morbidity caused by these injuries in healthy conscripts during their basic military training.