1 Abstract

In recent years, only a few studies have reported negative effects of skin tattoos on sweat parameters. Since tattoos are widespread among soldiers and a restriction in thermoregulation in military situations can have serious consequences, this study investigated local sweat rates and sweat sodium concentration of tattooed skin vs non-tattooed skin.

Nineteen (16m/ 3f) tattooed soldiers completed an incremental treadmill test to exhaustion in a controlled laboratory setting. Absorbent patches were applied at tattooed (TAT) and non-tattooed contralateral site (NTAT), as well as two non-tattooed control sites (CON_1/CON_2), to determine local sweat rate (SR) and sweat sodium concentration (Na^+).

There was no significant difference in SR [mg cm^{-2} min^{-1}] between TAT vs. NTAT (Mean±SD: 1.30 ± 0.63; 1.36 ± 0.70; p = 0.396) or between CON_1 vs. CON_2 (Mean±SD: 1.37 ± 0.66; 1.38 ± 0.75; p=0.925). Na^+ [mmol L^{-1}] did not differ between TAT vs. NTAT (Mean±SD: 73.70 ± 41.96; 76.92 ± 45.25; p=0.795) or CON_1 vs CON_2 (Median (IQR): 73.44 (45.74-93.85); 76.98 (51.49-102.17); p=0.460).

Skin tattoos do not alter local sweat rate or local sweat sodium concentration during an incremental treadmill test to exhaustion in a laboratory setting. The need for individual recommendations and special fluid strategies for tattooed soldiers could not be proven for now.

Keywords: Thermoregulation, Eccrine glands, Military fitness, Exercise, Fluid loss