Changes in muscle strength and morphology after muscle unloading in Special Forces missions.

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Abstract

The purpose of the present study was to determine the changes in maximal muscle strength, rapid force capacity, jumping performance and muscle morphology following a Special Forces military operation involving 8 days of muscle unloading. Nine male Special Forces soldiers were tested before (pre) and immediately after (post1) an 8-day simulated special support and reconnaissance (SSR) mission and after 3 h of active recovery (post2). Maximal muscle strength (MVC) and rate of force development (RFD) were measured along with maximal counter movement jump height (JH). Muscle biopsies were obtained from the vastus lateralis at pre and post1. Acute reductions were found in MVC (11%), JH (10%) and RFD (17-22%) after 8 days of muscle unloading (post1) (P≤0.05). Type IIX fiber type area% increased (P≤0.05) at post1 together with a tendency toward increased type IIX fiber type % (P=0.09) and decreased type I fiber type % (P=0.06), suggesting a transition toward a less fatigue-resistant fiber-type profile. In conclusion, short-term unloading during SSR missions led to marked reductions in mechanical muscle function and functional performance, which may be partly explained by the changes in muscle morphology. Future studies should identify intervention strategies to counter-act the observed impairments.

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