

Effects of Muscle Fatigue on Proprioception in the Elbow Joint of Both the Upper Limbs

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Proprioception is a cumulative neural input to the Central Nervous System from specialized nerve endings called mechanoreceptors. The brain unconsciously utilizes this to provide constant sensory input to achieve desired movements. Fatigue on the other hand is defined as the inability of the muscle to produce minimum power output to complete a full range of motion and the reduced functional capacity due to fatigue increases the perception of task completion.

Purpose: The purpose of the present study was to evaluate the effects of muscle fatigue on proprioception in the elbow joint of 28 college-aged individuals (12 males and 16 females; 24.64 ± 3.2 years).

Methods: The subjects were seated with eyes-closed, passive and active elbow flexion angles were measured before and after weighted arm curls that continued until muscle fatigue resulted. Pre and post joint angles were measured with goniometry (123.86 ± 3.47 and 130.46 ± 11.94 degrees, respectively). SPSS software was used to run a paired sample t-test to measure the errors in joint angles.

Results: Findings suggest a significant difference ($p=0.004$) in proprioceptive recall of arm position following muscular fatigue. Suggesting that muscular fatigue may influence a person's perception of where their limb may or may not be positioned but interestingly found no statistically significant difference while dominance of the limbs was taken into consideration.

Conclusion: Our results suggest that once a mobility muscle reaches fatigue, the unconscious ability to recall a previous body position is significantly impaired. A better understanding of the neurological factors of fatigue and its effects on proprioception has the potential to be a useful tool for injury prevention and performance enhancement.