EXPOSURE-RELATED DIFFERENCES ON NECK AND TRUNK MUSCULOSKELETAL CHARACTERISTICS IN US ARMY HELICOPTER PILOTS

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INTRODUCTION: A high prevalence of nonspecific neck pain (NP) and low back pain (LBP) is reported among military helicopter pilots, especially in senior and master pilots. Due to exposures to physical stress during flight (altitude, noise, vibration, poor sitting posture (due to confined cockpit space), fatigue, night-vision goggle, and additional protective gears), pilots may gradually deteriorate their neck and trunk musculoskeletal characteristics that predispose them to NP/LBP. Therefore, the purpose of this study was to compare neck and trunk strength, flexibility, and posture among pilots with various flight-hours. METHODS: A total of 115 male helicopter pilots participated in laboratory testing and were divided into five groups based on total flight-hours (0-999hrs(n=61), 1000-1999hrs(n=22), 2000-2999hrs(n=17), 3000-3999hrs(n=8), and 4000+hrs(n=7)). Laboratory testing included isometric cervical muscular strength and isokinetic trunk muscular strength, cervical/lumbar spine active range-of-motion (ROM) and hip rotation passive ROM, forward head/shoulder posture, and pectoralis minor length. Strength values were normalized to body weight. Based on the tests for normality and equality of variance, appropriate one-way analysis of variance and post-hoc analyses were used to examine the group differences (p<0.05). RESULTS: When compared to the pilots with less than 1000 flight-hours, there were significant reductions in neck extension and lateral flexion strength and lumbar spine extension and lateral flexion ROM among the pilots with 3000+ flight-hours. Similarly, significant reductions in cervical spine extension and lateral flexion ROM and increase in pectoralis minor length were found in the pilots with 2000+ flight-hours (p<0.05). DISCUSSION: The current findings confirmed exposure-related musculoskeletal changes. Interestingly, cervical spine ROM and posture may be more sensitive to the exposure than neck strength and lumbar spine ROM. Clinically, it is important for clinicians and pilots to monitor their musculoskeletal characteristics and implement strategic intervention programs to
minimize those exposure-related declines at different stages of their career. Supported by USAMRMC #W81XWH-11-2-0097 (299 words)

Learning Objectives: 1. Modifiable musculoskeletal characteristics that are associated with individuals with NP/LBP are described. 2. Exposure-related differences (based on total flight-hours) in musculoskeletal characteristics are described.