

## ASSESSING THE IMPACT OF FORWARD CENTER OF GRAVITY HELMETS ON THE REPORT OF CERVICAL PAIN AMONGST F-15C PILOTS

*ÉVALUATION DE L'IMPACT DU CENTRE AVANT DES CASQUES DE GRAVITÉ SUR LE RAPPORT DE LA DOULEUR CERVIQUE ENTRE LES PILOTES F-15C*

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**Introduction:** Cervical pain is a common complaint amongst fighter pilots. With the growing use of helmets with added equipment to enhance situational awareness often comes an increase in helmet mass and a forward center of gravity (CG), potentially placing the wearer at risk of cervical pain and injury. We sought to prospectively assess the impact of forward CG helmet use in reported cervical pain amongst a cohort of F-15C pilots.

**Methods:** An Institutional Review Board-approved, Health Insurance Portability and Accountability Act-compliant, prospective study was undertaken with 21 male F-15C pilots. For twelve weeks, pilots logged pre- and post-flight pain using the Numerical Rating Scale (NRS), whether the forward CG joint helmet mounted cueing system (JHMCS) was employed, maximum +Gz experienced, and sortie duration. We also recorded pilot age, total high-G hours, any history of prior neck problems, and measured cervical range of motion. Pain with and without JHMCS was compared using paired t tests and correlations assessed with Pearson or Spearman coefficients.

**Results:** Mean flight-related pain increased by 0.729 on numeric rating scale with JHMCS and 0.517 without ( $P = 0.005$ ). Flexed neck posture coupled with JHMCS use correlated with increased pain ( $r = 0.489$ ,  $P = 0.029$ ). Higher number of previously reported neck problems correlated with pain when using JHMCS ( $r = 0.474$ ,  $P = 0.040$ ). Age, maximum +Gz per sortie, total high +Gz hours flown, and hours per sortie did not correlate.

**Discussion:** Mission-related neck pain was significantly worse with JHMCS in the setting of a flexed neck posture or a history of prior neck problems. To our knowledge, this is the first prospective evaluation of cervical pain risk factors amongst fighter pilots using forward CG helmets. This information will help inform cervical pain countermeasure development.