

NECK AND SHOULDER MUSCLE FATIGUE IN PILOTS FLYING ON EUROFIGHTER AIRCRAFT

LA FATIGUE DES MUSCLES DU COU ET DES ÉPAULES EN PILOTES VOLANT SUR UN EUROFIGHTER

G Chini, M Lucertini, R Vitalone, A Silvetti, E Lucertini, F Draicchio
INAIL, Monte Porzio Catone, Italy,
giorgia.chini@gmail.com

Introduction: Jet pilots undergo very high neck stress due to high level accelerations. Several papers show the association between high +Gz forces and neck injuries in fighter pilots, as reported in a review from Cockwell. According to Snijders, these forces are particularly harmful when neck flexion gets over 15°. Furthermore weight and shape of the helmet and seat-back angle are to be taken into account. Albano found an increased risk (6,9% every 100 hours of total flying time) due to F-16 aircrafts' backward reclined seat. Our study aims to evaluate neck and shoulder muscle fatigue in jet pilots.

Methods: Two experienced jet pilots were enrolled in the study. sEMG activity of neck and shoulder muscles was recorded before and soon after a flight on European Fighter Aircraft (EFA). Muscle activity was recorded bilaterally from Sternocleidomastoid, Upper and Middle Trapezius muscles. The sEMG Joint Analysis of the Spectrum and Amplitude (JASA) fatigue plots (Luttman), which analyzes temporal changes of amplitude and frequency of the sEMG signals, were calculated on root mean square values (rms) and mean frequency of the power spectrum (MNF).

Results: The main finding of this study is that, by means of JASA fatigue plot, we observed more fatigue events in both the right and left neck and shoulder muscles in the examined pilots soon after the flight.

Conclusions: It is possible to conclude that by studying sEMG fatigue parameters, it is possible to obtain more detailed information about neck stress and to provide insight towards helmet and seat design improvements. The reduction in some of the causative factors for neck pain may help to increase the career longevity of jet pilots, reducing the work compensation cost and the costs associated with training new aircrew.