

# +Gz-related Neck Pain among F-16 Fighter Pilots in Denmark

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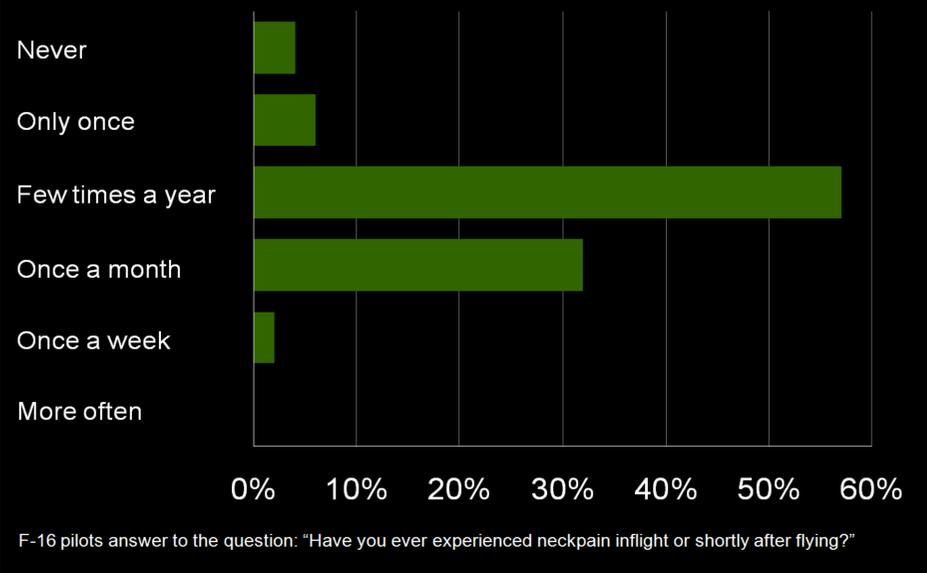
THE MODERN AIR COMBAT ARENA has changed considerably in recent years. With the implementation of Helmet Mounted Cueing Systems (HMCS) and Night Vision Goggles (NVG) the pilots in high performance aircraft face new challenges. Big effort has been put in the development of lighter helmets to reduce the load onto the cervical spine of the pilots. Now the helmets, due to the new equipment, are getting heavier again. At +9Gz the relative load of the pilots head, helmet, mask, visor and helmet mounted devices can get as high as 50-60kg.



**Method:** A questionnaire used in the Norwegian Air force was modified by the author and a Flight Safety Officer with 14 years of F-16 experience and distributed to Danish fighter pilots flying the F-16 actively in 2006 and present at Fighter Wing Skrydstrup in January and/or February 2007. More than 50 surveys were administered, with 100% full responses.

**Results:** 96% of the fighter pilots had some degree of neck trouble. 85% had experienced neck pain within the last year. Head movements most frequent contributing to pain events was rotation up to the right 59% and rotation up to the left 55%.

## Neckpain Prevalence



Average amount of G-load when in-flight pain episodes occurred was +6.8Gz (range +3.5Gz - +9Gz). Only two pilots had experienced radiating sensations out into the upper extremities. The reports of right sided versus left sided pain was almost significant ( $0.05 < p < 0.1$ ) which may be due to cockpit ergonomics in the F-16.

**Conclusion:** Neck pain is a major problem among fighter pilots. Countermeasure strategies require additional research. In 2008 an interventional PhD. study, with the main goal to investigate the effect of **intelligent training** on neck pain among fighter pilots, was approved.

## Pain pattern

