Pilot Questionnaire to Characterize Neck Pain Related to Forward Helmet Center of Gravity (U.S. Air National Guard)

13 Nov 2018

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I have no financial relationships to disclose.

I will not discuss off-label use and/or investigational use in my presentation.

The views expressed are those of the author and do not necessarily reflect the official policy or position of the Air Force, the Department of Defense, or the U.S. Government.
Neck pain is a significant factor impacting pilot performance and quality of life.

Neck pain in fighter pilots has been the subject of a great deal of research; however, no comprehensive solution space has been determined.

A questionnaire was developed within the Aeromedical Research Support Division of USAFSAM to better characterize the issue within the fighter population, as well as provide solution spaces that are currently being deployed.
Legacy Helmet Weights
All weights include O2 mask with ~3" hose (0.6 lb)

ADAM
9.34 lb
(4.25 kg)

HGU-55/P
2.67 lb
(1.21 kg)

w/ AN/AVS-9 NVGs
4.31 lb
(1.96 kg)

PNVG (4-tube)
4.88 lb
(2.22 kg)

PNVG Stowed
4.88 lb
(2.22 kg)

JHMCS (Day)
4.33 lb
(1.97 kg)

2" HVI Cable

JHMCS (Night)
4.81 lb
(2.19 kg)

w/ AN/AVS-9 & SIV

JHMCS (Night)
5.21 lb
(2.37 kg)

w/ PNVG & SIV

HMIT (Day)
4.77 lb
(2.17 kg)

12" HVI Cable

HMIT (Night)
3.95 lb
(1.80 kg)

12" HVI Cable – *No NVGs

* AN/AVS-9 NVGs add 1.1 lb; PNVGs add 1.5 lb

Not pictured modern USAF fighter aircraft helmets:
GenII = 4.93 lb; GenIII = 5.13 lb (includes partial O2 mask)
Center of Gravity Plots

1. ADAM Manikin Head
2. HGU-55/P, Mask
3. HGU-55/P, Mask, AN/AVS-9 NVGs
4. HGU-55/P, Mask, PNVGs
5. HGU-55/P, Mask, PNVGs Stowed
6. JHMCS (Day – with HMD), Mask, 2” HVI Cable
7. JHMCS (Night – no HMD), 49/49 NVGs, Step-in Visor, 2” HVI Cable
8. JHMCS (Night – no HMD), PNVGs, Step-in Visor, 2” HVI Cable
9. HMIT (Day), Mask, 12” HVI cable
10. HMIT (Night), Mask, 12” HVI cable – NO NVGS
11. GenII, Mask
12. Gen III, Mask

Knox Box Center of Gravity Criteria:
helmet weight limit = 4 lb for B-52 seat
center of gravity weight limit = 5 lb for ACES II seat
CGX: -0.8 to 0.5 in
CGZ: 0.5 to 1.5 in
(with respect to the ADAM manikin head’s anatomical coordinate system)
The Questionnaire

Date: [Cleared, SAF/PA, Case # 2018-0196, 12 Apr 2018]

1. Have you experienced mild pain daily or weekly, on any given day?
2. Have you experienced moderate pain daily or weekly, on any given day?
3. Have you experienced severe pain daily or weekly, on any given day?
4. Have you experienced very severe pain daily or weekly, on any given day?

15. Very severe back pain requires daily opiate pain medication.
16. Requires frequent pain medication.
17. Requires frequent pain medication.
18. Requires frequent pain medication.
19. Requires frequent pain medication.
20. Requires frequent pain medication.

21. Have you experienced pain while standing for long periods?
22. Have you experienced pain while walking for long periods?
23. Have you experienced pain while sitting for long periods?
24. Have you experienced pain while lying down for long periods?

25. Have you experienced pain while performing any activity that requires standing or sitting for long periods?
26. Have you experienced pain while performing any activity that requires bending or stretching?
27. Have you experienced pain while performing any activity that requires lifting or carrying heavy objects?
28. Have you experienced pain while performing any activity that requires repetitive movements?

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Preliminary Analysis Air National Guard Distribution

Neck Pain by Age

<table>
<thead>
<tr>
<th>Age</th>
<th>Percentage</th>
</tr>
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<tbody>
<tr>
<td>21-25</td>
<td>100%</td>
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<tr>
<td>26-30</td>
<td>90%</td>
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<td>31-35</td>
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<td>36-40</td>
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<td>41-45</td>
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<td>46-50</td>
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<td>&gt;51</td>
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<tr>
<td>Blank</td>
<td>30%</td>
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<tr>
<td>Total</td>
<td>20%</td>
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</table>
Have had to KIO missions completely due to neck pain and inability to continue the mission
I will maneuver the aircraft differently or not wear JHMCS (which is giving up a huge tactical edge even though I should because I know it will hurt my neck)
Do a circle circle fight instead of a 2 circle fight, or not execute 9k setup for perch BFM if CT flying
Preliminary Analysis Air National Guard Distribution

Pilots Reporting Improvement with Various Treatment (Fraction of All Pilots)

- Surgery
- Narcotics
- Other
- Osteopathic Manipulation
- Acupuncture
- Muscle Relaxers
- Physical Therapy
- Chiropractic Manipulation
- Massage
- Stretching
- Naproxen
- Rest

0.00% 10.00% 20.00% 30.00% 40.00% 50.00% 60.00% 70.00% 80.00% 90.00% 100.00%
• Out of our own pockets to get chiropractors to work on us; stim machines also
• I have heard of pilot going to chiropractors that are not covered with Tri-Care
• Most pilots in the squadron use several types of treatment outside military treatment facilities due to fear of being grounded
Some pilots have sought treatment through chiropractors, sports trainers, and massage therapy. I used to pay for my own massage and my back/neck never felt better; the problem with physical therapy is that by the time you get the appointment it has probably been 2 months since the pain got bad. WE NEED ONGOING CARE AVAILABLE AT THE SQUARON!!!
Questions