

Syddansk Universitet

## Exercise training as treatment of neck pain among fighter pilots

Murray, Mike; Lange, Britt; Andersen, Christoffer Højnicke; Sjøgaard, Gisela

*Publication date:*  
2012

*Document version*  
Peer reviewed version

*Citation for published version (APA):*  
Murray, M., Lange, B., Andersen, C. H., & Sjøgaard, G. (2012). Exercise training as treatment of neck pain among fighter pilots. Abstract from European College of Sport Science, Bruges , Belgium.

### General rights

Copyright and moral rights for the publications made accessible in the public portal are retained by the authors and/or other copyright owners and it is a condition of accessing publications that users recognise and abide by the legal requirements associated with these rights.

- Users may download and print one copy of any publication from the public portal for the purpose of private study or research.
- You may not further distribute the material or use it for any profit-making activity or commercial gain
- You may freely distribute the URL identifying the publication in the public portal ?

### Take down policy

If you believe that this document breaches copyright please contact us providing details, and we will remove access to the work immediately and investigate your claim.

# Exercise training as treatment of neck pain among fighter pilots.

Murray M,<sup>1</sup> Lange B,<sup>1,2</sup> Andersen HC,<sup>1</sup> Sjøgaard G,<sup>1</sup>

<sup>1</sup>Institute of Sports Science and Clinical Biomechanics, University of Southern Denmark, Odense C, Denmark, <sup>2</sup>Department of Anesthesia and Intensive Care Medicine, Odense University Hospital, Sdr. Boulevard 29, 5000 Odense C, Denmark.

## Introduction

Neck and shoulder pain is a common complaint among fighter pilots and a growing aero-medical concern. Unfortunately, previous intervention studies have been unsuccessful in relieving such pain within this occupational group. The aim of this study was to investigate if an exercise intervention could reduce the high prevalence of neck pain among fighter pilots.

## Methods

F-16 pilots were randomized in a controlled intervention trial, to either an exercise-training-group (ET, n=27) or reference-group (REF, n=28). ET underwent 24 weeks of strength, endurance, and coordination training, 3 times a week, targeting deep and superficial neck muscles (see: [www.sdu.dk/f16pilots](http://www.sdu.dk/f16pilots)). REF received no training but was scheduled for corresponding training 6 months later. Main outcome: Three months prevalence of neck pain assessed on a ten point visual analog scale, VAS (0 corresponded to “no pain” and 10 to “pain at worst”). Compliance was evaluated by training diary as mean training sessions completed per week, and by questionnaire on a six-step scale, 1) regular, 2-3 times a week, 2) less regular, 1-2 times a week, 3) irregular, but > 4 times a month, 4) very irregular, 2-3 times a month, 5) seldom, trained but stopped, 6) no participation at all. Maximal Voluntary Isometric Contraction (MVC) and Rate of Force Development (RFD) for cervical flexion and extension were measured by strain-gauge transducers.

## Results

Prevalence of neck pain was significantly reduced in ET from baseline (mean  $\pm$  SD)  $2.0 \pm 0.4$  to follow-up  $1.0 \pm 0.2$ , change  $-1.0 \pm 0.4$  ( $P = 0.01$ ), but not in REF from  $2.1 \pm 0.4$  to  $2.3 \pm 0.4$  ( $P = 0.80$ ). Comparison between groups found the reduction significant ( $P = 0.01$ ). Compliance for ET according to the training diary was  $1.9 \pm 0.6$  times per week, and according to questionnaire 58% participated more than once a week (scale 1+2). Compliance according to the questionnaire correlated with registrations in the training diary ( $r = -0.745$ ,  $P = < 0.000$ ). MVC measures for cervical flexion and extension at baseline in ET were  $183.6 \text{ N} \pm 47.1$  and  $286.5 \text{ N} \pm 48.0$ , and in REF  $160.7 \text{ N} \pm 51.4$  and  $265.2 \text{ N} \pm 60.8$ , respectively. No significant differences were found between groups at follow-up for cervical flexion or extension. RFD for cervical-flexion increased significantly in ET from  $866.6 \text{ N/s} \pm 263.5$  at baseline to  $968.9 \text{ N/s} \pm 295.9$  at follow-up ( $P = 0.04$ ), but not in the REF group, from  $807.0 \text{ N/s} \pm 286.2$  to  $867.8 \text{ N/s} \pm 274.3$  ( $P = 0.33$ ). No difference was found between groups at follow-up.

## Discussion

The exercise intervention reduced neck pain among F-16 pilots with a modest effect size. Compliance according to the questionnaire correlated well with participation based on the training diary, but only 58% of the training group trained regularly once or more a week. Higher compliance may be requested to attain strength gain and larger effect size. The intervention incorporated deep neck muscle training, which may be an important factor in the success of the training regime.