Author's response to reviews

Title: Neuromusculoskeletal disorders in the neck and upper extremities among drivers of all-terrain vehicles - a case series

Authors:

Mr Borje Rehn (borje.rehn@arbetslivsinstitutet.se)
Tohr Nilsson (tohr.nilsson@lvn.se)
Prof Bengt Jarvholm (bengt.jarvholm@envmed.umu.se)

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PDF covering letter
Dear Editor,

We thank the referees for valuable comments on the manuscript. We have now made changes in the text according to their suggestions.

Used text types in this revision:
**Bold text** Place for text
*Italic text* Text in manuscript
*Underlined* Action made or highlighted clarification

**REVIEWER: ALEX BURDORF**

**General**

As pointed out, WBV exposure is inseparable from prolonged static posture in ATV operators, which are risk factors for neck and shoulder complaints. This is now explained in the text (Background third section ‘Despite differences in driving postures, operating ATVs may also involve prolonged seated postures, elevated arms, extreme wrist postures and pronated forearms. These types of risk factors constitute risk factors for the development of various neuromusculoskeletal disorders in the neck and upper extremities [19, 20].’). The reviewer suggests that pushing and pulling of heavy materials is common in these groups. We have no information that suggests that such activities are common among these ATV operators.

The exposure situation for the 4 groups is also described more clearly in the text and referred to, see above, and (Results 2 first sentences, Discussion first section last sentence and information in table 1 ‘Drivers of snowmobiles and snowgroomers were similar regarding the occurrence of asymmetrical and focal neuropathy although there are some differences between the ATV types concerning WBV characteristics and the seated posture of the driver (Rehn-Manuscript)’). WBV characteristics (rms-magnitude and dominant vibration direction) for the ATVs now included in table 1, and in the beginning of the Results ‘The dominant direction of vibration differed between the three ATV categories, Table 1. The exposure time was much longer for forest machine drivers.

**Major compulsory revisions**

1. a) The cases in this study all answered the standardised Nordic questionnaire where pain is reported from separated anatomical regions of the body such as the neck region, now explained in the text (Study population/Design) ‘The second step of the selection process restricted drivers and referents to those who had reported pain specifically in the neck region during the previous 12 months in the cross-sectional study (Standardised Nordic Questionnaire)’.

Revisions ’Neuromusculoskeletal disorder in the neck and upper extremities among drivers of all-terrain vehicles – a case series.’
b) The validity and reliability of the included tests are presented in review work by Nilsson (Nilsson T: Neurological diagnosis: aspects of bedside and electrodiagnostic examinations in relation to hand-arm vibration syndrome. Int Arch Occup Environ Health 2002,75, 55-67), which is now further explained in the text (Clinical assessment section 2). We mean that disorders in the neck and upper extremities are inseparable but determination of the most dominant disorder should be possible and the diagnostic process for neuromusculoskeletal disorders in this study was considered as good as can be (Discussion – aspect of validity). These features make specific diagnosing of chronic neuromusculoskeletal disorders difficult and use of the term ‘dominant’ disorder type rather than ‘pure’ disorder type may therefore be more accurate.

c) The paper doesn’t say that the disorder originates plainly from the any particular region of the body if the subject doesn’t have a specific diagnosis, which was only the case for a few subjects (e.g. CTS). Due to the phenomena with double crush and multiple crush, determination of the exact site of a neuromusculoskeletal may be difficult (Dellon A and Mackinnon S: Chronic nerve compression models for the double crush hypothesis. Ann Plast Surg 1991 – in the references) (Discussion – aspects of validity). It may also be difficult to determine the site of a neuromusculoskeletal disorder in the neck and upper extremities due to the phenomena of referred pain and double crush syndrome.

d) Reproducibility and validity now further discussed in the text (Discussion last sentence). Reproducibility of this type of investigation on a larger population may be questioned, since the methodology employed in this study was very detailed and time consuming, as well as dependent on the competency of an experienced physician. A low validity may lead to a low diagnostic precision meaning lower chance to detect differences. Thus, the risk of focal and asymmetric neuropathy may be underestimated in this study.

2. Selection bias described in the discussion – aspects of validity. Persons with certain disorders may have difficult to continue to work with ATV, e.g. rhizopatia, which may cause a different distribution of disorders among cases still at work.

3. Firm conclusions about risk factors and outcome are toned done in text, as suggested by the reviewer (discussion part in text – conclusion erased) and abstract (conclusion part). It is proposed that this persistent pain may be a result of exposure to shock-type seated WBV and unfavourable working postures. changed to ‘It seems as if exposure to shock-type WBV and appurtenant unfavorable postures in ATVs may be associated to peripheral nervous lesions."

(Discussion first part) Although drivers of forest machines had longer exposure times to seated WBV, there were fewer cases of asymmetrical and focal neuropathy compared to drivers of snowmobiles and snowgroomers which questions a trend between exposure and response.

(Discussion – Aspects of validity) Since exposure to WBV in ATVs is inherently associated with other ergonomic risk factors it is also difficult to draw firm conclusion about any single causative factor.

4. Since the exposure situation was suggested to be described more clearly, WBV characteristics (rms-magnitude and dominant vibration direction) for the ATVs now included in table 1.
**REVIEWER: PAUL MORONEY**

**Discretionary revisions**
1. Conclusion in the text is erased since it was suggested that it lacks impact and since the manuscript is excessively wordy. Further, the article is written in a more concise fashion, as suggested, excluding unnecessary details. The manuscript (excluding abstract) now contains 3137 words compared to 3708 words before revision.

2. The word “male” included in the abstract and text (study population/design, other clinical studies on neuromusculoskeletal disorders) since gender wasn’t explicit in the former manuscript.

3. Case description no 2 erased since it was proposed by the reviewer that it didn’t contribute very much to the article.

**Minor essential revisions**
The word ”Examinator” replaced by the word ”Examiner”

**Major compulsory revisions**
**Table 2.** The amount of referents with asymmetrical and focal neuropathy is 4/15 (27% prevalence) i.e. not a typographical error. The total number of subjects with a neuropathic disorder (pure or mixed) is 7, but 1 of the cases was diagnosed with central neuropathic pain and 2 cases had the diagnosis symmetrical painful polyneuropathy.

**Quality of written English**
The rewritten manuscript was reviewed by a native speaker with knowledge about the research field.