Australian Government
Repatriation Medical Authority

REPATRIATION MEDICAL AUTHORITY

STATEMENT OF REASONS

S 196B(9) *VETERANS' ENTITLEMENTS ACT 1986*

DECISION NOT TO AMEND THE CURRENT STATEMENT OF PRINCIPLES CONCERNING CERVICAL SPONDYLOSIS FOLLOWING A REVIEW

Instrument No. 67 of 2014

PART I INTRODUCTION

1. The Repatriation Medical Authority (the Authority) pursuant to subsection 196B(9) of the *Veterans' Entitlements Act 1986* (the VEA), has decided not to amend Statement of Principles concerning cervical spondylosis, Instrument No. 67 of 2014, following an investigation which was notified in the *Commonwealth of Australia Gazette* on 7 May 2019.

2. Having carried out the investigation as notified, the Authority concluded that the sound medical-scientific evidence available to it, including the new sound medical-scientific evidence, is sufficient to justify the inclusion of factors relating to carrying loads positioned between the neck and shoulder in Statement of Principles Instrument No. 66 of 2014. However the sound medical-scientific evidence available to it, including the new sound medical-scientific evidence, is insufficient to justify inclusion of factors concerning carrying loads positioned between the neck and shoulder in Statement of Principles Instrument No. 67 of 2014.

PART II BACKGROUND TO THE INVESTIGATION

3. A request dated 13 March 2019, was received from a representative of a veterans' organisation, seeking a review into the association between "carriage of weights on the shoulders or back forcing the head and neck forward or left and right" and cervical spondylosis. In support of the request, the applicant provided a copy of a Veterans Review Board submission for a finding of cervical spondylosis contending that the applicant suffered trauma to the cervical spine as his head was forced sideways when mailbags (25-30 kgs) were dropped from a height of 8-12 inches onto his shoulder.

4. This request was similar to a previous request for review by an applicant to the Specialist Medical Review Council (SMRC) in 1 February 2006 concerning the Statements of Principles Instrument Nos. 33 and 34 of 2005 concerning cervical spondylosis. That applicant stated that:

> During his ten year of service in the Australian Navy the Applicant was required to carry heavy loads in excess of 25 kg from the ships stores to the ships galley. He submitted that the loads were carried on the shoulders (the Council took this to be a reference to the shoulder girdle), and supported by the head, whilst climbing vertical steps in a moving and pitching ship.

5. On 4 July 2011 the SMRC declared that:

> The sound medical-scientific evidence available to the RMA is insufficient to justify an amendment of the Statements of Principles to include a factor or factors in respect of: a) carrying loads on the shoulder girdle and the resulting effect on the neck; and/or b) repetitive movement either separate to, or in conjunction with, loads on the head.
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> It also recommended that:

> The RMA carry out a new investigation to find out whether there is sound medical-scientific evidence to justify including a factor of factors in respect of: carrying loads on the shoulder girdle and the resulting effect on the neck; and/or repetitive movement either separate to, or in conjunction with, loads on the head.
>
> …and for the purposes of the investigation, consider asking the Secretary of the Department of Veterans' Affairs (DVA) under section 196C(2) of the VEA to:
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> carry out research (including any test or experiment) to obtain, confirm, or disprove, specific information about the prevalence of cervical spondylosis in service personnel and any potential association with carrying loads on the shoulder girdle and the resulting effect on the neck and/or repetitive movement either separate to, or in conjunction with, loads on the head; and to forward a report to the RMA.

6. In their reasons for decision the SMRC also reviewed a study of meat porters by Schroter et al (1971)[1] which was appended to their review and stated that:

> The Council considered that the findings from this study point to (as opposed to merely leaving open) the relevant association between carrying loads on the shoulder girdle, and repetitive movement either separate to, or in conjunction with, loads on the head and cervical spondylosis.

7. The subsequent RMA investigation in 2014 on cervical spondylosis, considered the issue of carrying loads on the neck or shoulders but did not directly refer to the Schroter et al (1971) study, but noted the study by Hagberg et al (1987)[2] referred to this study. This investigation was notified as a focussed investigation of cervical spondylosis and carrying a load between the neck and shoulder.

8. On 9 April 2019, having regard to the above, the Authority decided under subsection 196B(7A) of the VEA, to review the contents of the Statements of Principles, Instrument Nos. 66 and 67 of 2014, to find out if there was new information in respect of "carrying loads positioned between the neck and shoulder" as a factor in cervical spondylosis.

9. The investigation notice was signed by the Chairperson of the Authority on 26 April 2019 and was gazetted in accordance with section 196G of the VEA in the *Commonwealth of Australia Gazette* on 7 May 2019. Submissions were invited from persons and organisations wishing to make a submission by 19 July 2019.

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[1] Schroter G (1959). The role of occupational stress in the pathogenesis & exacerbation of osteochondrosis & spondylosis of the cervical spine. Das Deutsche Gesundheitswesen. January 22. 14(4): 174-177. German language article, no abstract.

[2] Hagberg M, Wegman DH (1987). Prevalence rates and odds ratios of shoulder-neck diseases in different occupational groups. British Journal of Industrial Medicine. September. 44(9): 602-610.

PART III SUBMISSIONS RECEIVED BY THE AUTHORITY PURSUANT TO SECTION 196F

10. There were seven additional submissions describing carrying stores on the shoulder and neck up and down ladders and stairways aboard naval vessels. No sound medical-scientific evidence was provided to support these anecdotal accounts.

PART IV EVIDENCE/INFORMATION AVAILABLE TO THE REPATRIATION MEDICAL AUTHORITY

11. The following information was available to the Authority:

    11.1. The information held by the Authority and obtained during its previous considerations leading to the determination of Statements of Principles concerning cervical spondylosis, Instrument Nos. 66 and 67 of 2014.

    11.2. A search of the published literature using PubMed for cervical spondylosis AND load yielded 99 articles of which 14 were relevant; cervical spondylosis AND porters yielded 5 articles of which zero were relevant; cervical spondylosis AND carrying yielded 43 articles of which five were relevant; cervical spondylosis AND lifting yielded 27 articles of which zero were relevant; cervical spondylosis AND packs yielded zero articles; cervical spondylosis AND bag yielded 12 articles of which nil were relevant; cervical spondylosis AND occupation yielded 42 articles of which two were relevant; and cervical spondylosis AND biomechanics which yielded 126 articles of which one was relevant.

    11.3. A search of the published literature using PubMed for ((cervical osteoarthritis) OR (neck osteoarthritis)) AND load yielded 50 articles of which zero were relevant; ((cervical osteoarthritis) OR (neck osteoarthritis)) AND carrying yielded nine articles of which two were relevant; ((cervical osteoarthritis) OR (neck osteoarthritis)) AND lifting yielded four articles of which one was relevant; ((cervical osteoarthritis) OR (neck osteoarthritis)) AND packs yielded zero articles; ((cervical osteoarthritis) OR (neck osteoarthritis)) AND occupation yielded 16 articles of which one was relevant.

    11.4. A briefing paper concerning cervical spondylosis prepared for presentation to the Authority by a Medical Researcher of the Secretariat.

PART V SOUND MEDICAL-SCIENTIFIC EVIDENCE

12. The Statements of Principles are determined on the basis of the available "sound medical-scientific evidence" as defined in section 5AB(2) of the VEA which states:

> "*Information about a particular kind of injury, disease or death is taken to be* ***sound medical-scientific evidence*** *if:*
>
> *(a) the information:*
>
> *(i) is consistent with material relating to medical science that has been published in a medical or scientific publication and has been, in the opinion of the Repatriation Medical Authority, subjected to a peer review process; or*
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> *(ii) in accordance with generally accepted medical practice, would serve as the basis for the diagnosis and management of a medical condition; and*

(b) in the case of information about how that kind of injury, disease or death may be caused - meets the applicable criteria for assessing causation currently applied in the field of epidemiology."

PART VI REASONS FOR THE DECISION

13. The applicant requested a focused investigation of cervical spondylosis with respect to:

    13.1. Trauma to the neck when loads such as mailbags fall on the neck or shoulders from a height of 30 cm during loading.

    13.2. Carrying loads on the neck, shoulder or back forcing the head and neck forward or left and right e.g. large bags/jerrycans/ammunition boxes/infantry packs and general stores;

Trauma to the neck

14. The first request for trauma to the neck from falling mailbags, is already covered by existing factors concerning trauma to the cervical spine, namely clauses 6(f) and 6(s).

Carrying loads partially on neck

15. Loads are not normally 'carried' directly on the neck, unless the load is carried on the head or on the forehead. There are existing factors for carrying loads on the head whilst upright, clauses 6(i), 6(v); and 6(h), 6(u). There were nine cross-sectional studies which supported the association between head load carrying and cervical spondylosis (Oguntona 2014, Badve et al 2010, Mahbub et al 2006, Echarri et al 2005, Escharri et al 2002, Jager et al 1997, Jumah et al 1994, Joosob et al 1994, and Bremner et al 1968) though the study of Nepalese porters which carry the load on the forehead with a namlo strap was protective (Bista et al 2008).

16. However there are also loading circumstances in which part of the carried load rests upon the surface of the neck skin and hence may contribute to cervical spine loading. There was only one study in the published literature which directly considered the side cervical spine loading and cervical spondylosis. The systematic review by Hagberg et al (1987) mentioned this study as a German cross-sectional study by Schroter (1959, 1971) which investigated the association between 54 meat carriers (compared with 100 industrial workers) and found a significant strong positive association with cervical spondylosis (OR 8.4, 95% CI 4.5-16).

17. An examination of the Schroter et al (1971) study showed a significant (p=0.001) association between meat portering (compared with controls who were tradesmen or and factory workers) and cervical spondylosis with all cervical spine vertebral levels except C6. The Schroter et al (1971) study noted that the meat porters had been working in this industry for ten years and that meat portering involves carrying the load on the head as well as partly on the side of the neck. The earlier Schroter (1959) article was a cross-sectional study of cervical spondylosis in heavy load carriers, office workers, miners, and dentists.

18. Note that based on the Schroter et al (1971) and Hult (1954) articles, the Blom-Audroff et al (1992) review stated that the German Federal Government planned to introduce a

new occupational disease for cervical spondylosis due to carrying heavy loads on the shoulders for many years being No. 2109. A recent examination of the website for the German Federal Institute for Occupational Safety and Health (BAUA) showed that there was an existing causal factor No. 2109, for "intervertebral disc diseases of the cervical spine caused by many years of carrying heavy loads on the shoulders, that have forced the cessation of all activities or may be causal for the development, deterioration or resurgence of the disease". This factor is used for German occupational insurance, and occupational health and safety prevention purposes.

19. The Swedish cross-sectional study by Hult (1954) showed that heavy industry (which also included meat carriers) had a significantly higher prevalence of cervical spondylosis compared with light industries. In addition the cross-sectional studies discussed above on head loading and cervical spondylosis probably also contained a contribution from side neck loading given the extensive bulk of some of the carried loads.

20. There is biological plausibility for meat carrying and cervical spondylosis due to the meat carcass causing lateral flexion of the neck and transfer of part of the carcass load through the side of the neck to the cervical spine.

21. There is limited evidence that carrying part of a load on the side of the neck such as with meat carriers is associated with cervical spondylosis though the seminal German study that studied the association also noted that the meat was partly carried on the head as well which is a confounding factor. It was also noted that meat portering is a unique occupational task and that in the epidemiological study in question the duration of the employment was ten years.

Carrying loads on shoulders or back

22. Loads can be carried on the shoulders and back by backpacks, shoulder satchels but also by the Asian flexible carrying poles and the milkmaid's yolk. A PubMed search for satchel or pole or yolk AND ((cervical spondylosis) OR (cervical osteoarthritis)) yielded nil articles. A PubMed search for backpack OR pack AND ((cervical spondylosis) OR (cervical osteoarthritis)) also yielded nil articles. A PubMed search for neck strain OR cervical strain AND carrying yielded 50 articles of which four were relevant. These articles related to methods of carrying loads on the head in developing countries and load carrying by school children.

23. Physiologically it was noted that carrying a backpack results in the head being flexed forward and in the trapezius muscle being repetitively activated (Chen et al 2018). Additionally there are reports in the literature that backpack carrying is associated with neck discomfort (Knapik et al 2012, and Birrell et al 2007). However though there is some trapezius muscle contraction and discomfort, this muscle contraction is physiological and there is insufficient evidence in the published literature to indicate that any of the backpack load is transferred to the cervical spine.

24. There was also a solitary pathological animal experiment by Wada et al (1992) on rabbits which found that repetitive electrical stimulation of the trapezius muscle in Japanese white rabbits was associated with histological evidence (but not radiological evidence) of early cervical spondylosis (intervertebral disc changes).

25. There was also a partly analogous situation in humans with local or generalised cervical dystonia and cervical spondylosis reported in several case reports and case series (Konrad et al 2004). However these cases were associated with asymmetric muscle action which is not directly applicable to backpack load carriage, but may relate to shoulder satchel/carrying pole/milkmaid's yoke types of load carriage.

26. There is insufficient evidence of an association between backpack load carriage and cervical spondylosis. There is insufficient evidence of an association between shoulder satchel, carrying pole or milkmaid's yolk load carriage and cervical spondylosis.

PART VII SUMMARY AND CONCLUSIONS

27. The first request for trauma to the neck from falling mailbags, is already covered by existing factors concerning trauma to the cervical spine, namely clauses 6(f) and 6(s).

28. There is insufficient evidence of an association between backpack load carriage and cervical spondylosis and there is insufficient evidence of an association between shoulder satchel, carrying pole or milkmaid's yolk load carriage and cervical spondylosis.

29. With respect to the load carriage between the neck and shoulder, overall, the results of the available studies indicate that the evidence is too limited to permit a judgement of a probable or convincing causal relationship between cervical spondylosis and carrying loads positioned between the neck and shoulder, but supports a judgement of a possible causal relationship. An association has been observed between this activity and cervical spondylosis, but the evidence is limited in quality or quantity.

30. The VEA requires that the same body of evidence be assessed according to two different standards of proof. For assessment under the reasonable hypothesis standard (s 196B(2)) the VEA requires that the sound medical-scientific evidence must indicate or point to a causal association between a risk factor related to t
and the disease in question. On the other hand, for the balance of probabilities standard (s 196B(3)), the sound medical-scientific evidence must show that it is more probable than not that there is a causal association between a risk factor related to t
and the disease. In this matter the distinction between those standards of proof is significant.

31. The available sound medical-scientific evidence indicates or points to a causal association between "carrying loads positioned between the neck and shoulder" and cervical spondylosis, such being sufficient to support a judgement of a possible causal association. The reasonable hypothesis standard is met and factors will be included in that Statement of Principles.

32. However, as detailed in the reasons set out above, the sound medical-scientific evidence does not show that it is more probable than not that there is a causal association between "carrying loads positioned between the neck and shoulder" and cervical spondylosis. The available evidence is therefore insufficient to support a judgement of a probable causal association between "carrying loads positioned between the neck and shoulder" and

cervical spondylosis, and the balance of probabilities standard cannot be met. In these circumstances no factors can be included in that Statement of Principles.

PART VIII DECISION NOT TO AMEND INSTRUMENT NO. 67 OF 2014

33. At its meeting on 2 October 2019 the Authority decided not to amend the balance of probabilities Statement of Principles in respect of cervical spondylosis for the purposes of subsections 196B(3) and (8) of the VEA as the Authority concluded, for the reasons set out above, that the sound medical-scientific evidence available to it, including the new sound medical-scientific evidence, is insufficient to justify an alteration of the existing factors:

    (i) for *neck trauma* in clauses 6(f) and 6(s) in the balance of probabilities Statement of Principles already determined in respect of cervical spondylosis; and

    (ii) for *carrying loads on the head* in clauses 6(h) and 6(u) in the balance of probabilities Statement of Principles already determined in respect of cervical spondylosis.

34. At its meeting on 2 October 2019 the Authority decided not to amend the balance of probabilities Statement of Principles in respect of cervical spondylosis for the purposes of subsections 196B(3) and (8) of the VEA as the Authority concluded, for the reasons set out above, that the sound medical-scientific evidence available to it, including the new sound medical-scientific evidence, is insufficient to justify the inclusion of factors relating to *carrying loads on the shoulder* or *carrying loads positioned between the neck and shoulder* in the balance of probabilities Statement of Principles already determined in respect of cervical spondylosis.

Professor Nicholas Saunders AO
Chairperson
Repatriation Medical Authority

18 October 2019

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