



Department of Social Security

**Social Security Administration Act 1992**

# **Hand Arm Vibration Syndrome (Vascular and Neurological Components Involving the Fingers and Thumb)**

Report by the Industrial Injuries Advisory Council in accordance with Section 171 of the Social Security Administration Act 1992 on the question whether Hand Arm Vibration Syndrome should be prescribed.

*Presented to Parliament by the Secretary of State for Social Security*

*by Command of Her Majesty*

*May 1995*

LONDON : HMSO

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APRIL 1995

## **INDUSTRIAL INJURIES ADVISORY COUNCIL**

*The Rt Hon Peter Lilley  
Secretary of State for Social Security*

Dear Secretary of State

### **Hand Arm Vibration Syndrome (Vascular and Neurological Components Involving the Fingers and Thumb)**

The Council has completed its investigation into Hand Arm Vibration Syndrome (HAVS) and I am enclosing its report. Hand Arm Vibration Syndrome (HAVS) has now replaced the previously used term Vibration White Finger (VWF) which is already on the prescribed list of occupational diseases for which Industrial Injuries Disablement Benefit is payable. The VWF prescription covers the vascular effects (blanching and numbness) of vibration on the fingers and thumb. The Council's report recommends that the condition should now be prescribed as HAVS and should cover the well recognised neurological effects as well as the already prescribed vascular effects of vibration.

The prescription of VWF has a long and complex history. Between 1954 and 1984 the Council produced four reports on the condition, culminating in the prescription of the disease in 1985. Scientific and medical knowledge of the condition have improved since then and the Council considers that this should now be reflected in the way the condition is covered in the legislation. The Council also recommends that the syndrome should be linked to a list of tools, or rigid materials held against these tools, rather than a list of prescribed occupational exposures as at present. The Council considers that introducing such a list would recognise that the use of a tool may not be confined to a particular industry, and that current working practices make it more likely that a worker is exposed to a range of tools than was previously the case. Identifying tools instead of occupations is therefore a more realistic approach to prescription for this condition.

The Council recognises that bringing the present prescription of VWF into line with current medical and scientific knowledge could increase the administrative costs of the industrial injuries scheme whilst perhaps producing few additional payments of benefit as it seems likely that many HAVS assessments will fall below the 14% disability threshold for payment of benefit. However, the Council is also aware that a small assessment for HAVS could be aggregated with another award, to satisfy the 14% rule or to increase a current benefit payment for another industrial injury. In any case, the recognition of the condition both in the prescribed list and for the individual has important preventative implications for the industries and employees involved.

Yours sincerely,

Professor J M Harrington, CBE  
*Chairman*

8 November 1994



# Report on Hand Arm Vibration Syndrome (Vascular and Neurological Components involving the Fingers and Thumb)

## Background to the Enquiry

1. The history of the prescription of vibration white finger (VWF) has been long and tortuous. The question whether VWF should become a prescribed disease was addressed in Council reports in 1954, 1970 and 1975.
2. A report in 1954 (Cmd 9347) rejected prescription on the following grounds:–
  - “(i) The difficulty of distinguishing between occupational and non-occupational cases.
  - (ii) The difficulty of deciding and defining the occupational cover to be given.
  - (iii) The problems of diagnosing the condition and assessing the disablement resulting from it.
  - (iv) The triviality of the disablement in the great majority of cases.”
3. In 1965 the then Minister of Social Security asked the Council to consider the evidence again. The Council was asked to advise on: “the question whether diseases of bones, joints, muscles, blood vessels or nerves of the hand, arm or shoulder caused by vibrating machines should be prescribed under the National Insurance (Industrial Injuries) Act 1965.”
4. An interim report (Cmnd 4430) in July 1970 referred to the considerable amount of research into VWF then in progress in the UK and abroad, including the Stewart and Goda report commissioned by the Council. A final report was delayed until all this work was concluded.
5. The final report (Cmnd 5965) in March 1975, whilst acknowledging that “vibrating tools do lead to a condition in the fingers (VWF) which affects several thousands of people” recommended against prescription. The main problem identified was the lack of any objective clinical tests that would reliably:
  - (i) establish the existence of VWF;
  - (ii) determine its origin;
  - (iii) enable a reasonably accurate assessment of disablement to be made.
6. The report also referred to the comparative triviality of disablement in most cases, which would not justify setting up a scheme, even if a satisfactory one were possible.
7. In December 1978 the General Secretary of the Trades Union Congress wrote to the then Secretary of State for Social Services requesting that another formal reference should be made to IIAC. This request was supported by detailed accounts of evidence collected by 14 Unions whose members included those most involved in the use of vibrating tools. A further full enquiry was initiated as a result of this referral.
8. The Council called for written and oral evidence. The outcome of this enquiry was the report “Vibration White Finger” (Cmnd 8350), September 1981. This recommended that more severe cases of VWF be prescribed in relation to a list of specified tools. It also emphasised the need for occupational history-taking in the assessment of VWF. The Council promised to keep the situation under review.

## Reasons for Current Review

9. The present prescription of VWF concerns the specific disorder of the vascular system. In May 1986 a workshop under the auspices of the International Commission on Occupational Health (ICOH) Scientific Committee on Health Effects of Physical Environmental Factors was held in Stockholm. Its remit was to consider the "Symptomatology and diagnostic methods in the hand arm vibration syndrome". At the Stockholm Workshop conclusive evidence was presented that exposure to vibration causes neurological disturbances as well as blanching of the fingers. The Council has therefore adopted the term HAVS for this report. In doing so we are concerned only with the peripheral vascular and neurological changes that affect the fingers and thumb, and any disablement these symptoms cause or suggest, rather than any other disorders that have been suggested as coming within the general definition of the syndrome.

10. The Stockholm Workshop also undertook a major revision of the Taylor-Pelmear scale that formed the basis for previous grading systems. Four main changes emerge:—

- (i) the syndrome was divided into two major parts – vascular and neurological
- (ii) each hand was staged separately
- (iii) seasonal variation in symptoms was discounted
- (iv) the requirement for a change of job for the severest grade was discounted.

11. Thus the international consensus reached about HAVS, in Stockholm, went much further than the current prescription of VWF. The Council considered that a formal review was required. In particular, three questions require attention:—

- (i) In view of the recognition that HAVS has neurological and vascular features, should the present prescription of the diseases (VWF) be extended?
- (ii) Should the list of relevant occupational exposures be extended?
- (iii) Is there scope to improve the operation of the scheme in relation to this disease and the diagnostic difficulties that it presents?

## Method of Enquiry

12. IIAC's study was announced by means of a press release in January 1991. Written evidence was requested on all aspects of HAVS. Oral evidence was also taken from Professor M Griffin of the Institute of Sound and Vibration Research, Professor W Taylor, previously of the University of Dundee, Dr L Tyler and Dr K McGeogh, of Babcock Energy PLC.

13. In addition, a Working Group set up by the Faculty of Occupational Medicine (FOM) of the Royal College of Physicians of London in 1991, under the Chairmanship of Dr Tyler, to look at HAVS has now reported and addressed some of its conclusions to this Council.

## Statutory Conditions for Prescription

14. The conditions that must be satisfied before a disease may be prescribed in relation to any employed earners are set out in section 108(2) of the Contributions and Benefits Act 1992, (formerly section 76(2) of the Social Security Act 1975). This requires that the Secretary of State for Social Security should be satisfied that the disease:—

- (a) ought to be treated, having regard to its causes and incidence and any other relevant considerations, as a risk of their occupations and not as a risk common to all persons; and
- (b) is such that, in the absence of special circumstance, the attribution of particular cases to the nature of the employment can be established or presumed with reasonable certainty.

In other words, a disease can only be prescribed if there is a recognised risk to workers in a certain occupation and the link between disease and occupation can be reasonably presumed or established in individual cases.

### Review of the Evidence Received

15. The Council received written and oral evidence from the individuals and organisations listed in Appendix 1 – particular importance has been attached to the FOM's report. Evidence was also received from many individual HAVS sufferers. The Council wishes to thank all those who contributed to this enquiry.

16. Within the large volume of evidence that the Council has acquired, there is considerable consensus on a number of issues. The evidence will be discussed under three broad headings; the scope of the disease definition, the operation of the scheme given the diagnostic criteria, and the relevant occupations.

#### *Defining the disease*

17. Clinically, there is general agreement that HAVS can have at least two separate components – the vascular and the neurological. An affected individual may exhibit one or both system effects. The vascular effects of blanching with extension of the areas affected with time and continued exposures are already prescribed. The neurological effects of numbness, tingling, reduced tactile discrimination and loss of dexterity are not currently included in the prescription. There is universal agreement that they should be. Indeed the internationally agreed Stockholm Classification (1986) is now the most widely used method of grading HAVS (Appendix 2).

18. Whilst some reports suggest that central nervous system and musculo-skeletal effects can also be detected, there appears to be no clear consensus on their relationships to exposure to vibration.

#### *Diagnosing the condition*

19. The assessment of a case of HAVS requires careful review. The view of many was that a standardised questionnaire, along the lines of that recently published by the Faculty of Medicine, should be used as part of that assessment. Careful history taking is essential for reliable diagnosis. In particular it is essential to establish that the first occurrence of blanching (Raynaud's phenomenon) or of neurological symptoms occurred **after** the first use of a vibrating tool.

20. There are many tests that have been used to diagnose and assess Vibration White Finger. Many are of questionable reliability, are of little use for screening procedures, do not discriminate enough in themselves and are insufficiently objective. Specialised tests for screening have been proposed and these include:–

- (a) Vascular
  - Doppler
  - Cold provocation
  - Finger systolic blood pressure, following cooling
- (b) Neurological
  - Aesthesiometry
  - Vibro tactile thresholds
  - Temperature thresholds
  - Other neurophysiological tests

21. In assessing the vascular effects of vibration the Doppler test has not proved particularly valuable although it can demonstrate the patency of the peripheral vascular tree. The cold provocation test is much in vogue but requires careful standardisation of the test conditions and accurate temperature measurements. The specificity and sensitivity of both tests are considered by some to be unacceptably low. Instruments for measuring blood pressure, following cooling, in the finger are available, reliable, and easy to use.

22. The neurological tests require specific and often expensive apparatus. Of these tests the aesthesiometer (which measures the ability of the individual to feel a widening gap) is relatively cheap and appears to be quick, easy and repeatable. The other useful test instrument is the vibrometer (which operates in a way analogous to audiometry in that subjects are asked to indicate at what amplitude they can feel a range of vibration frequencies).

23. We have also received evidence that grip strength can be used as a reliable test of reduced neuro-muscular function. There are a number of instruments available commercially to test grip strength and there are tables of normative data. This may be of particular value in assessing disability.

24. We have been advised that the most reliable tests are finger systolic blood pressure, following cooling, for the vascular conditions, and vibrometry for the neurological conditions. Finger systolic blood pressure, following cooling, is a simple test although the equipment is not readily available and is expensive. There are a number of vibrometers on the market and several experimental machines including one that the inventor estimates takes about an hour to learn to use, and 15 minutes for tests to be carried out.

25. A full range of tests requires specialist units and can take 2.5 hours to complete for each subject. Such lengthy procedures are quite inappropriate for prescription purposes but the use of a screening questionnaire as a first step in the assessment procedure has much merit.

26. Finally on the clinical issue, attention needs to be paid to prognosis and reversibility of symptoms. There is some evidence to suggest that following cessation of exposure to vibration, symptoms and signs of HAVS may improve although this may take longer than three years to be seen. This is more likely with the vascular than the neurological component. The potential for change may be related to the age of the individual and the period of exposure after the onset of symptoms. There is no doubt that continual exposure carries a significant risk of deterioration.

#### *Relevant Exposure*

27. The question of relevant exposure to vibration is a much more difficult matter. The type of tool or material being held, the strength and angle of grip, the posture involved, the dose and duration of vibration and the frequency of the vibration are all important. Many witnesses considered the current terms of prescription based on particular industries to be too restrictive and too specific.

28. They agreed that prescription based on vibration measurement of a list of **specific** tools was not practical and that extension of the scheme to **groups** of tools needed to be considered. The Council supports this view that recognises that the use of a tool may not be confined to a particular industry and that current working practices are more likely to expose a worker to a range of tools than was previously the case.

29. Tools that are powered by hand are very unlikely to produce sufficient vibration to cause any damage. For a machine to be added to the prescribed list of tools it must, as an intentional part of its operation, have parts that move rapidly so causing vibration. The movement has to be driven by a source of power such as pneumatic or hydraulic power or to be powered by a motor. As a result of the operation of the machine, vibrations have to be transferred to the hand either directly in the case of hand held machines, or via the rigid material that is being worked on.

30. The usage, tools and exposures currently prescribed are listed in Appendix 3. The Council considered that it would be more appropriate to classify certain types of tool with a less restrictive classification of the use (although for most of the tools the occupational usage is quite specific) and to include, for the purpose of prescription, hand held materials that vibrate as a result of being brought into contact with the tools listed. The proposed reclassification appears as Appendix 4.



31. The Council is convinced that the strength of the scientific evidence is now sufficient to alter the definition of the condition and to extend prescription and that it is possible to evaluate the claimants effectively using a questionnaire of symptoms, relevant clinical tests and an appropriate history of exposure. Such an evaluation will enable the Stockholm Classification to be used to assess:–

- loss of faculty — total or partial loss of function of an organ of the body
- and
- disability — the inability to perform certain functions.

The process of adjudication thereafter will establish disablement – the overall inability to perform the normal activities of life.

### The Logic of Prescription

32. In our earlier reports we noted that the level of disablement, based on an assessment of the whole person is slight and we were unable to recommend prescription partly for this reason, but mainly because there was no reliable way of assessing the condition. The assessment of the vascular effects was made possible by the development of the Taylor-Pelmear scale. The new Stockholm scale improves the assessment of the vascular conditions and provides an assessment of the neurological effects. There are agreed diagnostic tests for both conditions, as well. The proposed changes in prescription bring the medical definition in line with current medical knowledge, and bring into the assessment of disability the probably more serious neurological effects.

### Recommendations for Change in Terms of Prescription

33. The Council recommends that:–

- the prescribed list of occupational diseases should be extended to include the peripheral vascular and neurological effects of Hand Arm Vibration Syndrome on the thumb and fingers;
- the neurological effects will include numbness, tingling in the fingers and reduced sensibility. (With continued exposure these effects may become permanent and be accompanied by pain, reduced temperature sensation with reduced strength and impaired manual dexterity);
- The Stockholm Classification for HAVS should be used; (see Appendix 1)
- A standardised questionnaire should be used in the assessment process;
- Finger systolic blood pressure, following cooling, and vibrometry should be used as the principle diagnostic tests; (Other tests may be of value in assessing levels of disability, but are not reliable enough to make the initial diagnosis.)
- The list of prescribed occupational exposures (Appendix 3) should be replaced by the tools listed in Appendix 4 and rigid materials held against such tools.

### Compliance Cost Assessment

34. Altering the medical description of the condition should not increase, significantly, the present numbers of claims for VWF. The bulk of the work is likely to be in reassessing current awards for VWF to take account of the neurological effects on the hands. This is unlikely to require fresh employment enquiries to be undertaken and, in any event, the additional cost to business of providing new or additional information is likely to be negligible when spread across all the employers involved.

### Prevention

35. The risk of HAVS can be minimised by good work practices. Where possible, tasks that entail exposure to hand/arm vibration should be eliminated. If this is not

possible, then steps should be taken to assess and control risk to health as far as is reasonably practicable – for example by dampening the transmission of vibration to the arm. Workers who are regularly exposed to hand/arm vibration should undergo medical surveillance, and should they develop features of HAVS, their work routine should be reviewed. The Health and Safety Executive have recently published guidance on HAVS.

**Evidence received from:**

Bakers Food and Allied Workers Union

GMB

Professor M J Griffin

Dr G Holt

Dr E Houseley, Edinburgh

Dr K L McGeogh

Nuclear Electric

Royal College of Physicians

Professor W Taylor\*

Dr L Tyler

Trades Union Congress

UCATT

Dr D S Chatterjee

Working Group of the Faculty of Occupational Medicine

\* The Council notes, with regret, the death of Professor Taylor on 29 April 1994.

**Stockholm Scales**

## 1. Vascular Component

STAGE	GRADE	DESCRIPTION
0		No attacks
1	MILD	Occasional attacks affecting only the tips of one or more fingers.
2	MODERATE	Occasional attacks affecting distal and middle (rarely also proximal) phalanges of one or more fingers.
3	SEVERE	Frequent attacks affecting all phalanges of most fingers.
4	VERY SEVERE	As in stage 3, with tropic changes in the finger tips.

## 2. Neurological Component

STAGE	DESCRIPTION
OSN	Vibration-exposed but no symptoms.
1SN	Intermittent numbness with or without tingling.
2SN	Intermittent or persistent numbness, reduced sensory perception.
3SN	Intermittent or persistent numbness, reduced tactile discrimination and/or reduced tactile discrimination and/or manipulative dexterity.

**List of occupational exposures currently prescribed for prescribed diseases  
All.**

- (a) the use of hand-held chain saws in forestry; or
- (b) the use of hand-held rotary tools in grinding or in the sanding or polishing of metal, or the holding of material being ground, or metal being sanded or polished, by rotary tools; or
- (c) the use of hand-held percussive metal-working tools, or the holding of metal being worked upon by percussive tools, in riveting, caulking, chipping, hammering, fettling or swaging; or
- (d) the use of hand-held powered percussive drills or hand-held powered percussive hammers in mining, quarrying, demolition, or on roads or footpaths, including road construction; or
- (e) the holding of material being worked upon by pounding machines in the manufacture of shoes.

**List of occupational exposures recommended for prescription***Percussive metal-working tools*

Riveting tools (hammers and dollies)  
 Caulking tools  
 Chipping hammers  
 Fettleing tools  
 Drilling tools (including hammer drills)  
 Pneumatic hammers  
 Impact wrenches  
 Swaging tools  
 Metal-shearing and cutting machines  
 Needle guns  
 Nibbling machines and shears  
 Impact screwdrivers

*Grinders and other rotary tools*

Pedestal grinders  
 Hand-held portable grinders, (including angled grinders) sanders and polishers  
 (including floor polishers)  
 Flex-driven grinders  
 Flex-driven polishers (including floor polishers)  
 Rotary burring tools  
 Rotary tagging machines  
 Reamers  
 Fixed finishers  
 Engraving pens

*Stone working, mining, road construction and road repair*

Hammers (including jack-hammers and kango-hammers)  
 Rock (etc) drills  
 Road breaking tools  
 Road reinstating tools

*Forest, Garden and Wood-Working Machinery*

Chain saws  
 Anti-vibration chain saws  
 Electrical screwdrivers  
 Brush saws  
 Mowers and shears  
 Hardwood cutting machinery  
 Barking machines  
 Stump grinders  
 Hedge trimmers  
 Rotary hoes  
 Hand held or hand fed circular saws

*Other processes and tools*

Drain suction machines  
 Nut runners  
 Pounding-up (pound seat) machines  
 Concrete-vibrating pokers  
 Concrete vibro-thickeners  
 Concrete levelling vibrotables  
 Jigsaws  
 Scabblers  
 Vibratory rollers





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