



# **FACULTY OF OCCUPATIONAL MEDICINE**

## **of the Royal College of Physicians**

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## **HAND ARM VIBRATION SYNDROME**

### **SYLLABUS**

This syllabus is intended to guide the training of occupational health care professionals in the requirements for health surveillance for a workforce exposed to hand-transmitted vibration, and in the diagnosis and management of an individual with HAVS. It is aimed at health professionals working in the UK occupational health setting, rather than in a medicolegal one.

#### **PRE-REQUISITE KNOWLEDGE**

A general understanding of occupational health is required. No specific knowledge of HAVS is assumed or necessary.

#### **FORMAT OF TEACHING**

To allow for student interaction, this subject best lends itself to small group teaching, using a combination of formal presentations and practical sessions. An appropriately designed distance learning course would also be suitable.

#### **METHODS OF ASSESSMENT**

Attendance at all sessions (or completion of all sections for distance learning) is required.

Suitable formal assessment, for example by MCQs or short answers, is required. This should include problem-based assessments, such as examining the ability to provide management advice based upon a clinical scenario or for a given Stockholm grading.

#### **LEARNING RESOURCES**

FOM Evidence Review 2004

FOM Lay Guidance 2004

HSE Guidance (2004) to the EU Physical Agents (Vibration) Directive

Handbook on Vibration (Griffin 1990. London, Academic Press)

Hand-Arm Vibration. A Comprehensive Guide for Occupational Health Professions 2<sup>nd</sup> ed.  
(Pelmeur and Wasserman 1998. OEM Medical Press)

<http://www.hse.gov.uk/vibration/information.htm>

<http://umetech.niwl.se/vibration/HAVHome.html>

[http://www.humanvibration.com/EU/VINET/html/final\\_report.htm](http://www.humanvibration.com/EU/VINET/html/final_report.htm)

<http://www.iiac.org.uk>

Guidance on Ethics for Occupational Physicians.5th Edition 1999. FOM

Good Medical Practice for Occupational Physicians. December 2001. FOM

## **CORE SYLLABUS**

### **Introduction (30 minutes)**

Background to HAVS

- definition of HAVS
- brief history of development of knowledge
- Faculty reports 1993, 2004
- prescribed disease
- RIDDOR reportable
- Vibration Regulations and HSE guidance 2001 and 2004

Epidemiology

- number of people exposed in UK
- prevalence of symptoms in UK
- ubiquity of exposures in UK
- examples of significantly exposed occupational groups

Overview of Health Surveillance (HSG61)

- why health surveillance is needed
- purpose of statutory health surveillance
- general criteria to be met for statutory health surveillance

Indications for health surveillance, when it is likely to be needed,

and also when it may *not* be appropriate

Context of health surveillance, as a part of the overall control measures

### **Legal (45 minutes)**

Relevant legislation and regulations

- HSWA 1974
- Management HSW Regulations 1999
- Control of Vibration at Work Regulations

Overall requirements of the Regulations

- assess the risk
- avoid or reduce the risk
- inform, train and consult workers
- provide health surveillance

Risk assessment

- factors to consider
- role of vibration measurement

## Exposure Action and Limit Values

- definitions
- units, and implications of time weighted measurements
- what the values are
- limitations, not 'safe' values
- short term exposures

## Risk control

- approaches to avoidance of exposure
- risk reduction measures

## Information and training of workers

- lay information sheet from Faculty
- role of health professionals in consultation with workers

## Health surveillance; statutory requirements

- purpose of health surveillance in HAVS
- record keeping
- confidentiality and communication with management
- provision of group data to management

## **Workplace vibration exposure (45 minutes)**

### Exposures and their measurement and reporting

- practicalities of vibration measurement
- terminology relating to vibration/acceleration (see legal section)
- accelerometers
- single axis versus tri axial measurements

### Relevant International/British Standards

- ISO 5349
- Machinery safety Regulations and vibration declaration
- considerations relating to standard testing of vibration emissions

### Illustrations of different types of tool causing hand transmitted vibration

- hand held tools
- hand fed machinery
- hand guided machinery
- examples of vibration measurements for different tools, including beneficial effects of maintenance

### Ergonomics of tool use

- importance of grip strength/ feed force as a factor in disease
- weight of tools and how to reduce/overcome this
- postural aspects of tool use
- manual handling aspects of jobs

## **Aetiology (30 minutes)**

### Exposure-response relationship

- the exposure response model in BS 6842 and the effects of duration of exposure and acceleration magnitude
- the ISO exposure response model, and the background to its derivation.
- limitations of the ISO model
- other general information on exposure response contained in the Annexes to ISO
- lack of detailed information on exposure-response relationship for the sensorineural and musculoskeletal components of HAVS

### Latency

- the concept of latency in relation to the onset of the vascular component
- the relationship between vibration magnitude and latent period for vascular effects, with examples

## **Pathophysiology (30 minutes)**

### Vascular component

- physiology of control of peripheral circulation
- local versus central hypothesis
- evidence of harm: larger vessels and capillaries
- changes in blood components

### Neurological

- skin receptor types
- innervation of receptors
- evidence of local damage to nerve fibres
- effects of pressure on larger nerve trunks
- carpal tunnel syndrome, ulnar nerve damage at the wrist
- differences between 'classical' entrapment carpal tunnel and CTS associated with HAVS

### Musculoskeletal component

- physiological effects of vibration on muscle,
- vibration tonic reflex
- reduction in grip strength
- aetiology, damage to nerve or muscle?

### Skeletal system

- bony outgrowths, bone vacuoles, osteoarthritis

### Evidence of reversibility, progress and prognosis

## **Health effects of hand-transmitted vibration (60 minutes)**

### Vascular: secondary Raynaud's phenomenon

- blanching of finger tips
- progression of symptoms with continuing exposure
- phases of a 'typical' episode of vasospasm
- triggers for vasospasm

Sensorineural including nerve entrapment

- initial onset often neurological
- altered thermal sensitivity
- effects on dexterity

Musculoskeletal symptoms

- impaired grip strength
- upper limb pain
- osteoarthritis

Other conditions

- Dupuytren's disease, sensorineural hearing loss

Overall impact of symptoms on functional ability and work/social life

### **Differential diagnosis (30 minutes)**

Prevalence of symptoms in non-exposed population

Vascular

- primary Raynaud's and Secondary Raynaud's disease including connective tissue disease eg scleroderma, trauma, occlusive vascular disease and hypersensitivity

Neurological

- carpal tunnel syndrome, diabetes mellitus etc.

Other

- hypothenar hammer syndrome, thoracic outlet syndrome etc.

### **Classification (45 minutes)**

General uses of classification

Consistency; longitudinal follow up; decisions on deployment; clinical audit; research

Stockholm Workshop Scale

- vascular. Limitations of the scale
- neurological. Limitations of the scale

The scales in practice

- pen pictures of typical symptoms at stages 2 and 3, Vascular and Neurological
- repeatability & agreement between observers

Other approaches

- Griffin scoring

## **Details of health surveillance programme (45 minutes)**

Setting up the programme

- overview of the programme
- roles of the varying parties
- training of the various parties
- communication with employer and workers, information and education for workers
- health records
- pitfalls

Pre employment assessment: evidence of preexisting vulnerability

Level 1 questionnaire, possible individual risk factors

Screening assessment, including frequency of assessment

Level 2, short questionnaire, (responsible person)

Level 3, occupational health nurse, (qualified person)

Level 4, occupational physician, (medical officer)

Referral methods

Level 5, standardised testing

## **Clinical assessment (60 minutes)**

Value of information recorded at lower tiers

Approach to the patient

- overview of symptoms
- free text record of symptoms
- questioning from standardised questionnaire
- the sections in the questionnaire

Clinical examination

- inspection
- tests

Standardised tests

- vascular
- neurological
- musculoskeletal

How to synthesis the information obtained to reach an overall classification

## **Management of cases of HAVS (60 minutes)**

Advice to employees and employers, including confidentiality issues

Prognosis and reversibility

- available options for therapeutic interventions

Measures to reduce ongoing vibration exposure

General advice on reducing the impact of the condition eg keeping warm, avoiding smoking, noise exposure

Accepted guidance on deployment action at Stage 2 and Stage 3

- special consideration for cases with rapid progression or other individual factors

Individual functional assessment, disability and judging fitness for work, including safety issues

Possible application of DDA?

Medicolegal and regulatory considerations

- reporting under RIDDOR with consent
- prescribed disease & industrial injuries benefit issues
- compensation / civil claim

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