

**HAND ARM
VIBRATION**



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Espace Prouvé,
Nancy, France

A Delphi Study to Address a Number of Issues Relating to the Practical Management of Hand– Arm Vibration Syndrome and Carpal Tunnel Syndrome in the Workplace

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Produced documents on

- Hand Arm Vibration Syndrome
- Carpal Tunnel syndrome and work with Hand held Vibrating Tools
- Staging of HAVS
- Dupuytren's disease
- Use of Photography
- Whole Body Vibration

In preparation

- Impact Vibration
- WBV and pregnancy
- Nerve conduction studies



SOM HAVS Delphi study

What are Delphi studies

The aim of a Delphi study is to review a number of specific issues relating to a topic about which there is no definitive evidence, and to reach consensus statements



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Overview

- Authors plus other participants
- 8 streams

1. Primary Raynaud's phenomenon (PRP)
2. Frequency of health surveillance
3. Criteria for vascular staging
4. Dupuytren's disease
5. Use of monofilaments
6. Use of quantitative tests
7. Peripheral neuropathy and sensorineural HAVS
8. Carpal tunnel syndrome



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Overview topics – Dr Roger Cooke

1. Use of monofilaments
2. Dupuytren's disease
3. Carpal tunnel syndrome
4. Use of quantitative tests

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The use of monofilaments – consensus

- ✓ **Consensus** Age and occupational group should be considered when interpreting results of monofilament testing (92% agreement)
- ✓ **Consensus** that given the paucity of normative data for Semmes Weinstein monofilament perception (SWM) perception in occupational groups, the 0.2 g-f cut off of normality should not automatically be increased for manual workers (100% agreement)
- ✓ **Consensus** that where finger tips are clearly thickened and the distribution of loss of sensory perception is symmetrical, this could be reflected in the interpretation of the SWM results (100% agreement)



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Dupuytren's disease – consensus

- ✓ **Consensus** that cases of DD should not necessarily be restricted from vibration exposure at time of initial diagnosis regardless of severity or functional impairment (100% agreement)
- ✓ **Consensus** that cases of DD should have enhanced health surveillance/periodic observations (e.g. every 6–12 months) to determine the onset of contracture and the need for referral (82% agreement)
- ✓ **Consensus** that restricting work with vibrating tools should be considered when functional impairment is such that it affects their ability to do work tasks or causing risk to others (91% agreement)



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Carpal tunnel syndrome – lack of consensus

- No consensus regarding the need for nerve conduction studies before confirming a diagnosis of CTS
- No consensus whether cases of CTS should be restricted from using hand held vibratory tools until investigation and treatment is complete
- No consensus whether cases of a recurrence of CTS should be permanently restricted from vibration exposure



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The use of quantitative testing

- ✓ **Consensus** that quantitative sensory testing (QST) may play a useful role in refining a sensorineural grading of 2sn into “early” or “late”
- ✓ **Consensus disagreement** that quantitative testing including thermal aesthesiometry and vibrotactile threshold measurement is required for all cases of HAVS (**100% agreement**)
- **No consensus** as to whether reduced sensory perception in HAVS can be staged by using only one quantitative sensory test (monofilaments)



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Overview topics – Dr Cornelius Grobler

1. Criteria for vascular staging of HAVS
2. Frequency of health surveillance for Stage 2 HAVS
3. Peripheral neuropathy and sensorineural HAVS
4. Primary Raynaud's phenomenon (PRP) and hand-transmitted vibration

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Criteria for vascular staging – consensus

- ✓ **Consensus** that extent of blanching, should over-ride frequency of attacks when staging vascular component of hand-arm vibration syndrome (HAVS) on the Stockholm Workshop scale (100% agreement)
- ✓ **Consensus** that photographic evidence should be considered to check extent of blanching, and to confirm diagnosis of vascular component of HAVS (100% agreement)
- ✓ **Consensus** that absence of photographic evidence should not mean a presumptive diagnosis of HAVS should be discounted or overturned, if there is a history of sufficient exposure, and anamnesis of cold induced distal circumferential finger blanching



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Frequency of health surveillance Stage 2 HAVS - consensus

- ✓ **Consensus** that following a new diagnosis of Stage 2 hand-arm vibration syndrome (HAVS), the frequency of Tier 4 health surveillance (physician assessment) should be increased to 6 monthly until there is no progression in symptoms if exposed to hand-transmitted vibration (HTV) (100% agreement)
- ✓ **Consensus** that where there is a 2-year period in which Stage 2 HAVS does not progress, health surveillance can revert to yearly as Tier 4 (physician) or Tier 3 (occupational health advisor) assessment if exposed to HTV (100% agreement)
- ✓ **Consensus** that individuals with Stage 2 HAVS who ceased the exposure to HTV, need Tier 4 assessment (physician) for 2 years and if there is no progression of symptoms in 2 years, there is no need for ongoing health surveillance



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Peripheral neuropathy and sensorineural HAVS - consensus

Consensus that people with peripheral neuropathy/neurological symptoms similar to neurological hand-arm vibration syndrome (HAVS)

- ✓ can work with hand-transmitted vibration (HTV)
- ✓ should be advised of possible risks of further neurological loss in hands/fingers due to HTV
- ✓ have surveillance every 6 months for first two years (clinician trained in detecting and diagnosing HAVS), if no evidence of progressive neurological deficit in the first two years, then annual health surveillance if working with HTV



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Peripheral neuropathy and sensorineural HAVS - consensus

- ✓ **Consensus** that employees with diabetes mellitus (DM), should not be excluded from exposure to HTV in order to mitigate legal risks for an employer associated with the diagnosis of a late stage of neurological HAVS (100% agreement)



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Peripheral neuropathy and sensorineural HAVS – no consensus

People with diabetes mellitus (DM), are at higher risk of CTS [1]

- No consensus whether or not people with DM should have quantitative sensory testing at baseline (before exposure to HTV) and then at regular intervals if working with HTV

1. Zimmerman, M et al. Carpal Tunnel Syndrome and Diabetes—A Comprehensive Review. J. Clin. Med. 2022, 11(6), 1674; <https://doi.org/10.3390/jcm11061674>



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Primary Raynaud's phenomenon (PRP) – consensus

Consensus that those with a history of PRP who want to work with hand-transmitted vibration (HTV), or those diagnosed with PRP at health surveillance:

- ✓ can work with HTV
- ✓ to limit exposure to HTV to below $2.5 \text{ m}^2 \text{ A}(8)$ and as low as reasonably practicable
- ✓ to have enhanced health surveillance, including annual review of photographic evidence (blanching)



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Primary Raynaud's phenomenon (PRP) – consensus

Consensus that the following are indicative of PRP rather than hand-arm vibration syndrome (HAVS):

- ✓ age of onset below 30 years
- ✓ a positive family history and involvement of feet and/or other peripheries (100% agreement)
- ✓ symmetrical blanching

✓ Consensus that asymmetrical blanching primarily involving the trigger fingers and leading hand, is more suggestive of HAVS than PRP



SOM HAVS Delphi Study

Primary Raynaud's phenomenon (PRP) – consensus

- ✓ **Consensus** that symmetrical blanching of all fingers on both hands, needs further investigation if aged over 30 and if no family history of PRP (exclude autoimmune disease, medication etc.)
- ✓ **Consensus** vascular HAVS generally results from significant vibration exposure, alternative diagnoses including PRP should be considered in those with short duration lifetime exposure (< 5years)
- ✓ **Consensus** those with blanching and possible CTS requires investigation and treatment of CTS prior to making diagnosis of HAVS or PRP



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Topics of unanimous consensus (1)

- ✓ Tier/level and frequency of health surveillance for Stage 2 HAVS cases
- ✓ Interpretation of Semmes Weinstein monofilament perception for manual workers
- ✓ Role of quantitative testing in health surveillance for HAVS
- ✓ Vascular staging of HAVS and the role of photographic evidence



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Topics of unanimous consensus (2)

- ✓ Diabetes mellitus/ peripheral neuropathy and HTV exposure
- ✓ FHx of Primary Raynaud's phenomenon with involvement of feet/peripheries and likelihood of HAVS
- ✓ Dupuytren's disease and HTV exposure



SOM HAVS Delphi study - Topics for further research

Carpal Tunnel syndrome and HTV:

- The role of nerve conduction studies in health surveillance?
- Restrict people with CTS from HTV until investigation and treatment completed?
- Permanently restrict people with a recurrence of CTS from exposure to HTV?

Diabetes Mellitus and HTV:

- Role of quantitative testing in health surveillance?



SOM HAVS Delphi Study - conclusions

The Delphi study findings on hand arm vibration syndrome and carpal tunnel syndrome are relevant to occupational health and safety practitioners in industries with high exposure to hand transmitted vibration (HTV) and will contribute to consistency of

- Assessment
- Investigation and
- Workplace management of cases



SOM HAVS Delphi study - Correspondence

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