

HAND-ARM VIBRATION SYNDROME (HAVS)



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WHAT IS HAND-ARM VIBRATION? HAND-ARM VIBRATION IS THE TRANSFER OF VIBRATION FROM A TOOL OR WORKPIECE TO A WORKER'S HANDS AND ARMS. THE LEVEL OF HAND-ARM VIBRATION IS DETERMINED BY MEASURING THE ACCELERATION OF THE TOOL OR OBJECT GRASPED BY THE WORKER. What Is Hand-Arm Vibration Syndrome (HAVS)? Hand-arm vibration

syndrome is a disease that involves circulatory disturbances, sensory and motor disturbances and musculoskeletal disturbances. While it has been known since the beginning of the 20th century that vibration effects the hands and arms, it was not until 1983 that scientists agreed on a definition of HAVS that includes the circulatory, nervous and musculoskeletal systems.

WHAT IS THE CAUSE OF HAVS?

Daily exposure to hand and arm vibration by workers who use vibrating tools powered by compressed air, gasoline or electricity (eg. powered hammers, jackhammers, chisels, chainsaws, sanders, grinders, riveters, breakers, drills, compactors, sharpeners and shapers) can cause physical damage to the hands and arms. Some of the trades/industry in which workers are at risk include construction, forestry, foundry, quarry, shipyard, railroad, assembly manufacturing, mining and agriculture.

WHAT ARE THE SYMPTOMS OR SIGNS OF HAVS?

- Bluish discoloration (*cyanosis*) of the skin of fingers and hands.
- Whitening (blanching) of fingertips after cold or damp exposure (*known as Raynaud's phenomenon*).
- Numbness, with or without tingling happens, before, during or after blanching.
- Attacks, more common in winter, but eventually may occur year round.
- Palms of the hands are rarely affected.
- Sense of touch and pain perception reduced, sometimes forever.
- Decreased grip strength, and inability to sustain muscle power.

WHAT CAN HAPPEN IF SYMPTOMS ARE IGNORED?

The tingling and numbness in the fingers, and loss of grip strength can cause problems with using objects, and they may slip from the hands.

There can be serious interference with work, home activities and hobbies. Some activities (*particularly in the cold*) may have to be avoided to prevent the vessel spasms, which cause pain.

TREATMENT

- Restore immediate circulation to blanched fingers, by putting the hands in warm water or swinging the arms, or do other exercises that increase blood flow.
- Wear warm, dry clothes and maintain core body temperature (*eg. wear a vest*).
- There is no therapy at present for neurological symptoms other than removal from vibration exposure, but improved circulation may help with nerve recovery.
- See your doctor for specific screening tests and assessment.
- Since vibrating tools usually create noise, get your hearing checked as well.
- Since damage is progressive, often removal from exposure to vibration is the best way to prevent further damage.

- Stop smoking.
- Some cardiac drug (eg. *Beta-Blockers*) increase vaso-spasms, whereas others (*Felodipine or Nifedipine*) will improve peripheral circulation. Check with your physician.

HOW MANY PEOPLE WHO ARE EXPOSED TO HAND-ARM VIBRATION WILL EXPERIENCE PROBLEMS?

Studies show that, depending on the conditions of exposure, 6 to 100 percent of workers can suffer from HAVS after using vibrating power tools. On average, about 46 percent get HAVS symptoms.

Raynaud's Phenomenon can occur from 0% to 14% with a mean of 5.4%, in workers who are not exposed to hand-arm vibration because it may be caused by other diseases, e.g. constitutional white finger (Raynaud's disease) or scleroderma. The high incidence of HAVS in the hand-arm vibration exposed group clearly confirms an association between HAVS and exposure to hand-arm vibration from handheld vibrating tools or objects.

HOW SOON AFTER USING THE TOOL DO SYMPTOMS APPEAR?

HAVS is a chronic and progressive disorder and the time from first exposure to vibration and the blanching of fingertips in the cold (latent interval) can vary from a few months to several years. At the beginning stages, blanching and tingling may occur only occasionally and be ignored. Often, it is only diagnosed at later stages when it can really interfere with activities, including work. This makes PREVENTION the key to managing vibrating tool exposures and health effects.

Just as important is how long it takes acute symptoms to disappear. There appears to be a threshold in middle age. Symptoms that appear at about this time take longer to resolve or may not at all.

The circulation and neurological components of HAVS may develop independently. If exposure to vibration is discontinued, the vascular (circulatory) effects of HAVS can often be reversed but full recovery from neuropathy (disease of the nerves) is less likely to happen.

HOW CAN HAVS BE PREVENTED?

Reducing the incidence of HAVS requires numerous actions.

Table 1: Recommendations to prevent HAVS.

GROUP	ACTION
Joint Health & Safety Committee	<ul style="list-style-type: none"> ■ Ask management to provide safe hand tools, and regular maintenance of the tools ■ Measure vibration exposure ■ Get technical advice ■ Get medical advice ■ Warn exposed workers ■ Provide full training to exposed workers ■ Review exposure times and provide adequate rest breaks away from vibrating tools (eg. <i>Reduce exposure hours, decrease the number of days exposed to vibrating tool by job rotation</i>) ■ Have a policy on removal/reduction of vibration from the workplace
Tool Manufacturers	<ul style="list-style-type: none"> ■ Measure tool vibration ■ Design tools to minimize vibration ■ Use ergonomic design to reduce grip force, awkward posture, etc. ■ Design tools to keep hands warm (eg. <i>Heated handles, relocate air vents</i>) ■ Provide guidance on tool maintenance ■ Provide warning of dangerous vibration levels
Physicians	<ul style="list-style-type: none"> ■ Perform routine medical checks of those at risk ■ Record all signs and reported symptoms ■ Warn workers of health risks ■ Advise on what happens because of exposure, and prevention strategies ■ Inform JHSC and Workplace Safety & Insurance Board when appropriate

HOW CAN WORKERS BE TRAINED TO AVOID HAVS

The Joint Health & Safety Committee should establish a preventive and training program for all workers at risk and include the following information:

- How to recognize symptoms like finger tingling, numbness and finger blanching.
- The critical need to report any symptoms immediately.
- The possible serious health effects of overtime, shiftwork and double shifts.
- Role of proper tool maintenance (*poorly dressed grinding wheels or worn bearings can have higher vibration acceleration levels than a new or well maintained tool*).
- The need for immediate reporting of poorly functioning tools.
- Ergonomic aspects of tool use and the relation to correct body posture.
- The need to avoid unnecessary vibration exposure, by proper tool handling.
- The need to wear gloves, particularly anti-vibration (a/v) ones.
- The need for whole body warmth and especially warm dry hands.
- The correct design and fit, and use of personal protective equipment.
- The use of work/rest schedule, job rotation and exercises which can maintain blood circulation.
- An understanding of vibration exposure levels from tools used.
- Information on appropriate WSIB claims reporting.

REFERENCES

Pelmear PL & Wasserman DE. 1998. *Hand-Arm Vibration: A Comprehensive Guide for Occupational Health Professionals*. 2nd ed. Boston: OEM Health Information Inc.

Griffin, M. 1990. *Handbook of Human Vibration*. London: Academic Press.

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If you need further assistance, call the Occupational Health Clinic for Ontario Workers Inc. Closest to you.

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