

SUPPORTING RETURN TO WORK & PREVENTION: “WORKPLACE PRESCRIPTIONS” FOR WORKERS WITH OCCUPATIONAL DISEASE

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Centre for
Research Expertise
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Research that makes a Difference



Objectives

- For 2 common occupational diseases:
 - Contact dermatitis
 - Hand-arm vibration syndrome
- Consider what we know
 - Disease, outcomes, return to work and prevention
- “Workplace prescription”



Contact Dermatitis

Contact Dermatitis

What is it?

- Dermatitis (inflammation of the skin) caused by skin contact with chemicals or physical agents

Contact Dermatitis

Types

- Irritant contact dermatitis - ICD
 - Chemical or physical agent causes direct damage to skin
 - Acute – chemical burn, acid
 - Chronic – exposure to irritant over longer period of time

Contact Dermatitis

ICD causes

- Water – wet work
- Acids, alkalis
- Soaps, cleansers, detergents
- Solvents
- Oils, greases, cutting fluids
- Plants, animals
- Fibreglass
- Trauma

Contact Dermatitis

Types

- Allergic
 - Caused by an allergic reaction
 - Contact urticaria – hives - CU
 - Immediate reaction
 - Mediated by antibodies

Contact Dermatitis

CU causes

- Plants
- Animals
- Metals

Contact Dermatitis

Types

- Allergic
 - Caused by an allergic reaction
 - Contact dermatitis – eczema - ACD
 - Delayed reaction
 - Mediated by cells

Contact Dermatitis

ACD causes

- Plants
- Metals
- Accelerators, antioxidants
- Resins
 - Epoxy
 - Acrylate
 - Phenolformaldehyde
 - Organic dyes
 - Biocides, germicides

Contact Dermatitis

How common is it?

- In many Western countries, most common occupational disease
- Hand dermatitis in general population
 - 10% prevalence over 1 year
- Workplace studies
 - 20% of workers in wet work environments have hand dermatitis

Contact Dermatitis

How common is it?

- Sectors with higher prevalence
 - Construction
 - Health care
 - Services – food, hospitality
 - Manufacturing and automotive
 - Agriculture

Contact Dermatitis

How common is it?

- Under-recognition and under-reporting
 - The challenge of making the link between workplace exposure and hand dermatitis
 - Physicians don't ask about work history
 - 50%-67% minimal, 3% detailed information
 - Workers spend a lot of time in the health care system before being diagnosed
 - Length of time with rash – 25m (1m-156m)
 - 8 (1-90) visits to GP, 5 (1-50) to dermatologist

Contact Dermatitis

Diagnosis

- Irritant CD
 - History of exposure and appropriate clinical findings
- Allergic CD
 - History of exposure and appropriate clinical findings
 - Patch testing
 - Standardized method
 - Exposure to allergen at non-irritant concentration

Contact Dermatitis

Treatment

- Medical treatment - systematic review
- ICD treatment – disease outcome
 - Good to fair quality evidence for lipid-rich moisturizers
- ACD treatment – disease outcome
 - Good to fair evidence for moderate to high potency steroids

Contact Dermatitis

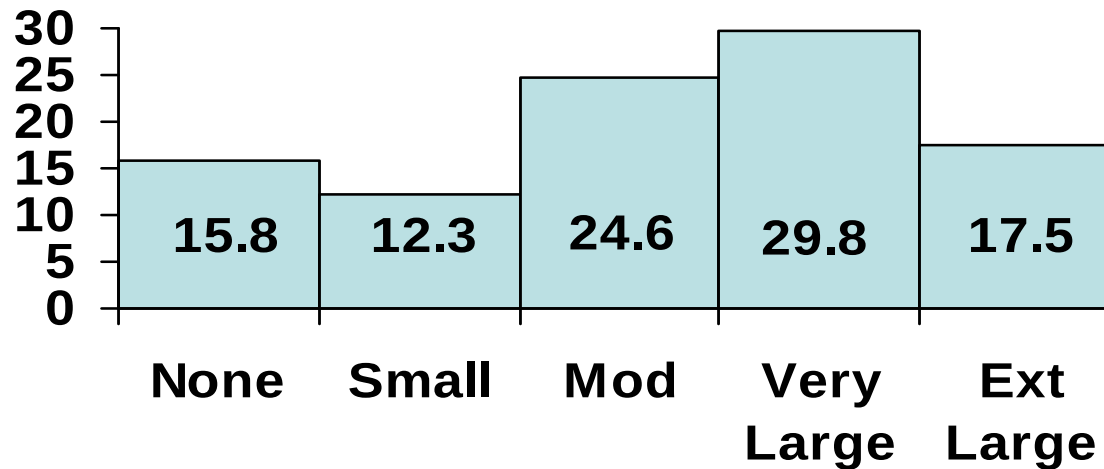
Outcomes – importance of early recognition

- Disease outcomes - Toronto study
 - 40% continued to have a rash
 - 20% moderate to severe
 - Time of diagnosis important to outcome
 - Those with rash for less than 1year – 53% improved
 - Those with rash for greater than 1 year – 23% improved
- UK Epiderm reporting
 - 16% failed to improve
 - Lack of improvement associated with longer exposure to causative agent

Contact Dermatitis

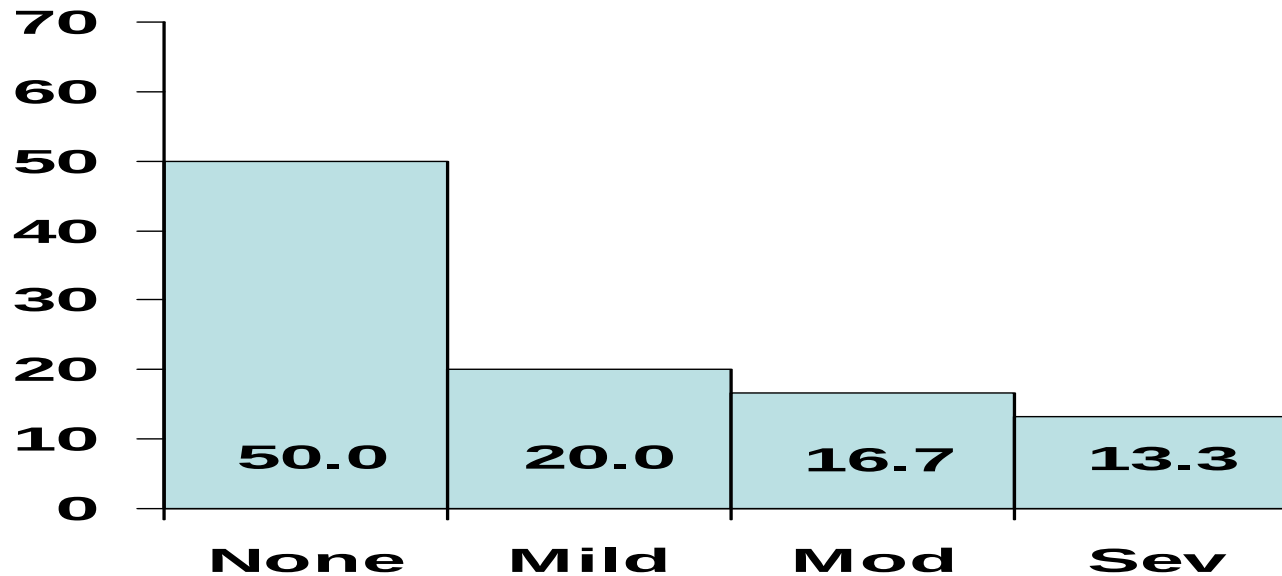
Outcomes – Quality of Life

- Workers with hand dermatitis



Contact Dermatitis

Outcomes – Tuck position



Contact Dermatitis

Outcomes - employment

- Toronto studies
 - 6 months follow-up
 - Lost time in past year – 35%
 - Lost time > 3 month – 12%
 - Not working 9%
 - Changed job 19%
 - Minimum 2 year follow-up
 - Lost time – 69%
 - Lost time > 1 month – 35%
 - Not working 22%
 - Changed job 57%

Contact Dermatitis

Outcomes - employment

- UK Epiderm reporting
- 20% not working
- 35% less than 3 weeks off work
- 11% greater than 1 year off work

Contact Dermatitis

Prevention - Barriers

- Lack of awareness
- Complacency
- Prevention strategies not implemented as need to be to be effective
 - Training
 - Decreasing exposure
 - PPE
 - Skin care



Hand Arm Vibration Syndrome

Hand-arm Vibration Syndrome

What is it?

- Hand Arm Vibration Syndrome (HAVS)
 - Vascular, neurological and musculoskeletal pathology in the fingers/hands/arms due to hand-transmitted vibration.
 - Symptoms: cold intolerance, painful attacks of cold-induced finger blanching, finger numbness and tingling, loss of sensation, decreased finger dexterity, decreased grip strength.

Hand-arm Vibration Syndrome

Vascular Effects



Hand-arm Vibration Syndrome

Vascular Effects

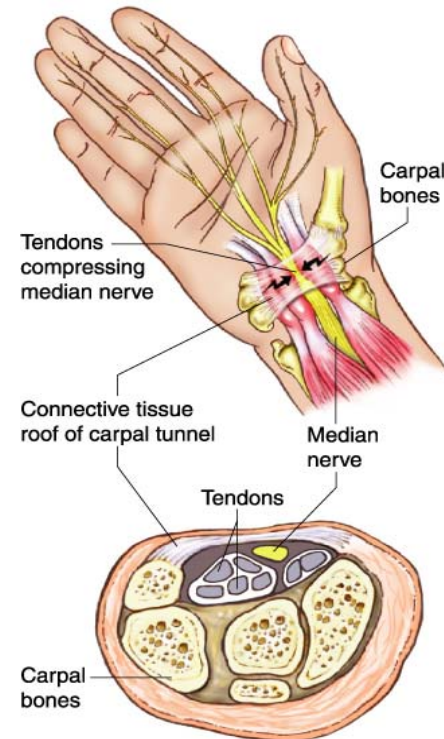
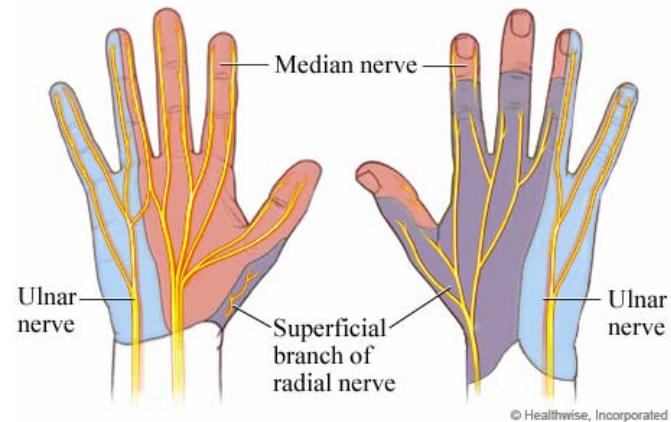


Hand-arm Vibration Syndrome

Neurological Effects

Two types of neurological problems:

- Distal abnormalities (fingers)
 - Digital sensory neuropathy
 - Sensory receptors
- Proximal abnormalities (compression neuropathies)
 - Median neuropathy
 - Ulnar neuropathy



Hand-arm Vibration Syndrome

Musculoskeletal Effects

- Strong evidence that working with vibrating tools is associated with musculoskeletal disorders
- Associated outcomes:
 - Duputyren's contracture
 - Decreased Grip Strength
 - Upper extremity muscle / joint pain
 - Osteoarthritis – wrist, elbow, shoulder
 - Osteoporosis of hand / wrist bones
 - Bone cysts



Hand-arm Vibration Syndrome

What causes it?

Industry	Examples of tools
Construction	Jackhammers, hammer drills, concrete breakers, grinders
Mining	Jackleg drills, stoper drills
Forestry	Chainsaws
Automotive assembly	Impact wrenches, riveting guns
Foundries	Grinders, chipping guns
Metalworking trades	Sanders, buffers

Hand-arm Vibration Syndrome

How common is it?

UK - Medical Research Council survey of 1997-1998 gave prevalence estimate of 288,000 workers

US - Prevalence estimate 725,000 workers affected

Canada – Demographically similar to US and UK, based on relative population, perhaps 72,000 -144,000 prevalent cases

Palmer *et al.* Hand-transmitted Vibration: Occupational exposures and their health effects in Great Britain HSE 1999

NIOSH Current Intelligence Bulletin No. 38: vibration syndrome. Cincinnati, OH: U.S. Department of Health and Human Services, Public Health Service, Centers for Disease Control. Publication No. 83-110.

Hand-arm Vibration Syndrome

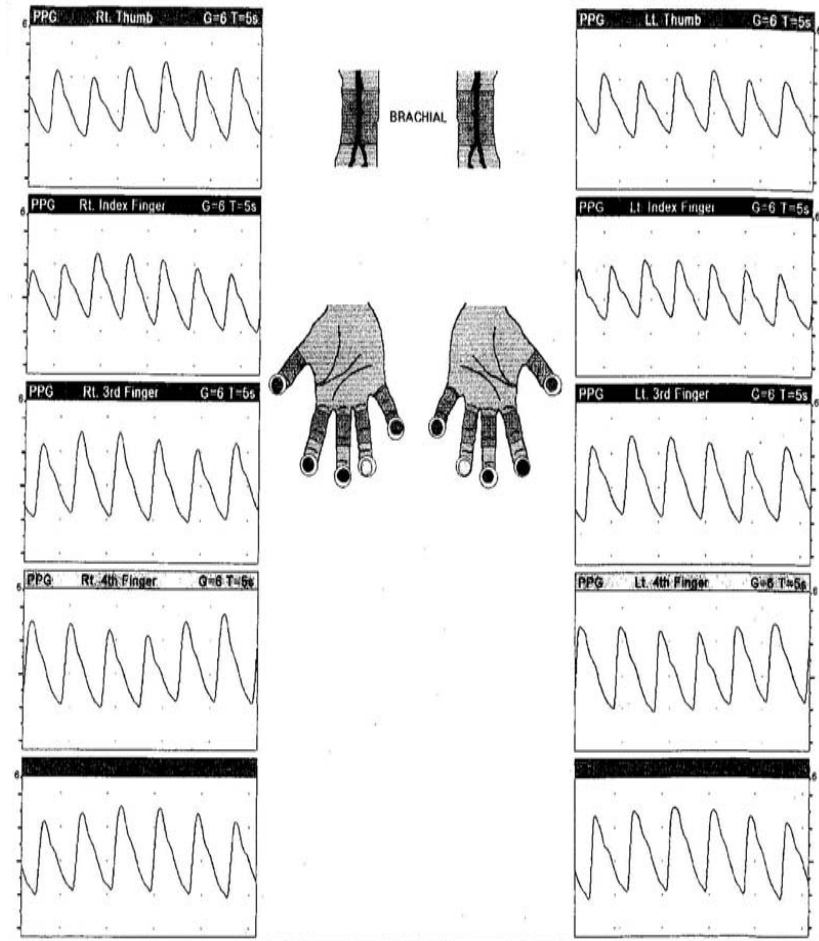
How do we diagnose it?

- Medical & Occupational History
- Physical Examination
- Investigations
 - Blood tests to rule out similar conditions
 - Vascular
 - Doppler exam of upper and lower extremities
 - Thermometry after cold water immersion
 - Cold provocation digital plethysmography
 - Neurological
 - Nerve conduction test
 - CPT or a combination of VPT & TPT
 - Musculoskeletal
 - Grip strength
 - Pinch strength
 - Finger / Hand Dexterity
 - Purdue pegboard

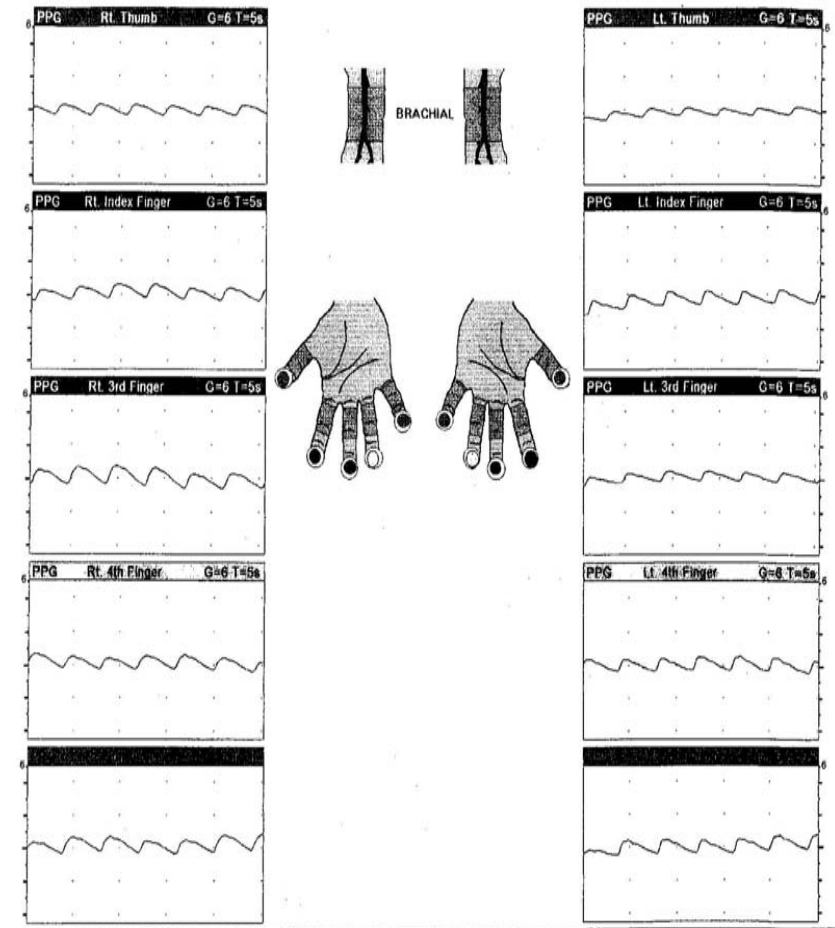
Hand-arm Vibration Syndrome

How do we diagnose it?

ROOM TEMPERATURE



POST COLD STRESS



Hand-arm Vibration Syndrome

How do we diagnose it?



Motor Nerve	Stimulate	Record	Amplit. (mV)	CV (m/sec)	Dlat (msec)
L Median	Wrist	Thenar	12.7 (≥6)	55 (≥53)	4.4 (≤4.0)
R Median	Wrist	Thenar	13.4 (≥6)	52 (≥53)	4.5 (≤4.0)
L Ulnar	Wrist	Hypothena	9.8 (≥8)	54 (≥53)	2.9 (≤3.1)
R Ulnar	Wrist	Hypothena	10.1 (≥8)	58 (≥53)	3.1 (≤3.1)
Sensory Nerve	Stimulate	Record	Amplit. (uV)	CV (m/sec)	Dlat (msec)
R Median	Palm	Wrist	23 (≥45)	(≥56)	2.4 (≤2.4)
L Median	Palm	Wrist	37 (≥45)	(≥56)	2.1 (≤2.4)
R Median	Wrist	D2	10 (≥18)	(≥57)	4 (≤3.6)
L Median	Wrist	D2	14 (≥18)	(≥57)	3.8 (≤3.6)
R Ulnar	Palm	Wrist	NR (≥13)	(≥53)	(≤2.2)
L Ulnar	Palm	Wrist	15 (≥13)	(≥53)	2.3 (≤2.2)
R Ulnar	Wrist	D5	10 (≥13)	(≥56)	3.7 (≤3.1)
L Ulnar	Wrist	D5	6 (≥13)	(≥56)	3.5 (≤3.1)
R Radial	Forearm	Wrist	24 (≥20)	(≥49)	2.6 (≤2.9)

Hand-arm Vibration Syndrome

What happens to workers with HAVS?

- HAVS generally has a poor prognosis
- Vascular
 - Only 30% of cases stage 0 or 1 show recovery after cessation of exposure
 - Workers with SWS vascular stage 3 or 4 do not tend to recovery even with removal from exposure
- The neurological component of the condition tends to be irreversible

Hand-arm Vibration Syndrome

What happens to workers with HAVS?

Quality of Life / Disability

- All symptoms of HAVS affect quality of life
 - Pain and neurological symptoms greatest predictors of disability
- % of people reporting “difficulties in usual activities”
 - General population 10%
 - Carpal Tunnel Syndrome 22%
 - Hand Arm Vibration Syndrome 31%

House et al. Upper extremity disability in workers with hand-arm vibration syndrome. Occupational Medicine (Oxford). 2009;59(3):167-73.

Sauni et al. J. Quality of life (EQ-5D) and hand-arm vibration syndrome. International Archives of Occupational & Environmental Health 2012;83(2):209-16.

Hand-arm Vibration Syndrome

What happens to workers with HAVS?

Management

Vascular

- Dress warmly, avoid cold ambient conditions
- Smoking cessation
- Optimize management of other cardiovascular risk factors
- Calcium channel blockers

Neurological

- Conventional treatment options for compression neuropathies

Musculoskeletal

- Conventional treatment options for tendonopathies, osteoarthritis
- Surgical referral for Dupuytren's if significant impairment

Hand-arm Vibration Syndrome

What happens to workers with HAVS?

Return to Work

- Most workers with HAVS can return to work if proper controls are put into place at the workplace

Source - Use low vibration tools (purchasing policy)
 Tool maintenance

Admin - Education
 Frequent breaks
 Task rotation

PPE - Anti-vibration gloves



Workplace Prescription



Workplace Prescription

- Traditionally, physicians write a letter to referring physician, outlining diagnosis and treatment and provide the patient with verbal advice and possibly a copy of letter
- Treatment may include medications plus advice about workplace changes
- How do the workplace recommendations make it to the workplace?

Contact Dermatitis

Workplace Prescription

- Develop a personalized workplace prescription containing recommendations for the workplace
- Initially done for contact dermatitis, then HAVS

Contact Dermatitis

Workplace Prescription - CD

- Objectives
 - Obtain information from workers and employers regarding the key components of a WP
 - Develop a prototype WP
 - Obtain information from employers to develop a final version of the WP

Contact Dermatitis

Workplace Prescription-CD

- Initial interview results
- Patients
 - Would be useful
 - Most would be comfortable sharing with workplace
 - Be very specific
 - Short, easy to read

Contact Dermatitis

Workplace Prescription-CD

- Initial interview results
- Employers
 - Would be useful
 - Be very specific
 - Short
 - Issue raised of recommending products not approved by employer

Contact Dermatitis

Workplace Prescription-CD

St. Michael's

Inspired Care.
Inspiring Science.

WORKPLACE RECOMMENDATIONS FOLLOWING DERMATOLOGY ASSESSMENT

Patient's Name: _____

Physician: _____

Date: _____

EXPOSURE MODIFICATIONS		SKIN CARE MANAGEMENT SUGGESTIONS	
NO Exposure ☐ _____ ☐ _____ ☐ _____ ☐ _____	Hand Washing ☐ _____ ☐ _____ ☐ _____ ☐ _____	What to Use ☐ alcohol hand rubs ☐ non-foaming cleanser ☐ lukewarm water ☐ Other (specify): _____	Additional Information ☐ Cetaphil Cleanser ☐ CeraVe Cleanser ☐ rinse /dry thoroughly (including spaces between fingers) ☐ avoid wearing rings ☐ refer to allergen information sheets
		Treatment ☐ moisturizer ☐ skin diary ☐ follow up with physician if worsens ☐ prescribed medication	☐ apply before work ☐ apply after each break ☐ apply after work ☐ apply after each hand washing ☐ CeraVe Moisturizing Cream ☐ CeraVe Moisturizing Lotion ☐ Cetaphil _____ ☐ Prevox ☐ Other (specify): _____
REDUCE as much as possible ☐ wet work ☐ prolonged glove use (>20 minutes) ☐ fragranced products ☐ harsh products for hand washing (gritty soaps, solvents, etc.) ☐ mechanical irritation (friction, trauma, heavy use of hands, etc.) ☐ extreme heat or cold ☐ Other (specify): _____	Gloves ☐ single-use (disposable) ☐ multi-use (re-useable) ☐ cotton liner ☐ nitrile ☐ natural rubber/latex ☐ vinyl ☐ accelerator-free ☐ anti-impact ☐ other (specify): _____	☐ hands should be clean prior to donning gloves ☐ discard after each use ☐ discard at first sign of damage ☐ discard at first sign of sweating ☐ discard after 20 minutes ☐ review donning/doffing techniques ☐ N-Dex Free ☐ Other: _____	
Workplace Modifications ☐ return-to-work/stay-at-work with no changes ☐ return-to-work /stay-at-work with modifications ☐ return-to-work with graduated # of hours: _____ ☐ maximum # of back-to-back shifts: _____ Other strategies: ☐ reduce duration of exposure (eg., job rotation) ☐ use of long-handled tools (eg., brush, sponge, scoops etc.) ☐ Other: _____	Other Personal Protective Equipment ☐ protective arm sleeves ☐ disposable gown/coveralls ☐ face shield		

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Contact Dermatitis

Workplace Prescription-CD

- Feedback from employers
 - No concerns with prototype
- Implementation study underway
- 50 workers being seen in our clinic
- 25 received WP, 25 did not
- One month follow-up

Hand-arm Vibration Syndrome

Workplace prescription study

- Importance of Knowledge Translation
 - In the UK, the number of workers claiming disability benefits for HAVS has progressively decreased. This has been attributed to increased awareness of HAVS prevention strategies amongst employers and workers.¹
- HAVS in Construction Sector
 - Hand-arm vibration exposure is a significant hazard in the construction and there appears to be a general lack of awareness of HAVS and its prevention in construction.²
 - Problem: there exists a gap in physician-employer communication regarding prevention recommendations

1. Heaver et al. Hand-arm vibration syndrome: a common occupational hazard in industrialized countries. J Hand Surg Eur 2011;36(5):354-63.
2. National Research Council (U.S.). Construction Research at NIOSH: Reviews of Research Programs. National Academy Press, 2009.

Hand-arm Vibration Syndrome

Workplace prescription study

Objective of the study:

- To develop a “workplace prescription” to address the communication gap between occupational health practitioners and employers.
- Purpose of the “workplace prescription” is to enable workers diagnosed with HAVS to remain actively employed and to reduce the risk of their condition worsening in the future.

Hand-arm Vibration Syndrome

Workplace prescription study

Study Methods:

1. A literature review was conducted to determine the most effective workplace factors that should be implemented to enable workers with HAVS to safely return to work
2. Interview guides were generated for workers and employers.
3. Seven workers and two employers were interviewed. Participants were asked for their input on the content and the format of the WP.
4. Interview responses were reviewed for common themes.
5. The common themes identified in the interviews were combined with the results of the literature review to develop a prototype WP.
6. Employers were then re-interviewed to validate the content and face validity of the prototype WP and a final WP was then produced.

Hand-arm Vibration Syndrome

Workplace prescription study

Patient Interview Guide

1. Do you have a rough idea of what a Workplace Prescription is?

If yes, can you then do you have any questions?

If no, then can I clarify anything?

2. Did you understand the recommendations made by the occupational health clinic about controlling exposure to hand arm vibration at work?

If yes; please describe what you thought the most useful information was:

If no; what information was not clear?

3. Do you think that the development of a “workplace prescription” be useful to you? If yes, why? If no, why not?

4. What information would you like to be included in the “workplace prescription” to help you RTW or to stay working? For example: type of anti-vibration glove, frequency of breaks, need to dress warmly, the employer developing tool maintenance schedules, etc.

5. How would you like the information to be presented (ask for specifics re: format, language, etc.)? For example; size of page (8 ½ x11 or 3x5 like a medical prescription), name of worker on prescription, general recommendations or very specific recommendations for the worker, etc.)

Hand-arm Vibration Syndrome

Workplace prescription study

Employer interview guide

1. Do you have a rough idea of what a Workplace Prescription is?

If yes, can you then do you have any questions?

If no, then can I clarify anything?

2. Do you think that a “workplace prescription” would be something you would find useful in your daily practice?

If yes, why?

If no, why not?

3. To help the employee diagnosed with hand-arm vibration syndrome stay working or RTW, what information do you think would be useful to include in a “workplace prescription”?

4. What do you think is an effective way for information to be presented (i.e., format)? For example; size of page (8 ½ x11 or 3x5 like a medical prescription), name of worker on prescription, general recommendations or very specific recommendations for the worker, etc.)

5. Do you have any concerns about implementation of a workplace prescription at your workplace?

Hand-arm Vibration Syndrome

Workplace prescription study

Study Results:

- 8/9 interviewees felt WP useful tool to facilitate return to work.
- Identified control measures
 - engineering controls (tool maintenance, low vibration tool purchasing policy)
 - administrative controls (education, breaks, task rotation, work practices)
 - personal protective equipment (anti-vibration gloves)
- The WP should be
 - short (ideally single 8½x11 page)
 - two sections; one general (controls), one specific (limitations and restrictions)

HAND-ARM VIBRATION WORKPLACE RECOMMENDATIONS

1. The following recommendations apply to all workers who use hand-operated vibrating tools:

Reduce tool vibration	☐ Use low vibration tools / purchase anti-vibration tools in the future ☐ Ensure tools are well maintained with regular maintenance schedules/maintenance policy										
Reduce vibration exposure at the worker	☐ Use ISO/ANSI Certified Anti-Vibration Gloves when possible										
Provide educational programs to workers	☐ Keep fingers, hands and the body warm ☐ Keep hands and fingers away from cold exhaust air ☐ Grip tools as lightly as possible consistent with safe working practices ☐ Avoid smoking (nicotine constricts the blood vessels which reduces the circulation in the hands and fingers)										
Prevent continuous exposure by taking short breaks or by using regular task rotation.	☐ Take short breaks ☐ Use regular task rotation ACGIH Threshold Limit Values (TLVs) for exposure of the hand to vibration in X, Y, or Z direction <table><thead><tr><th>Total Daily Exposure Duration (hours)</th><th>Maximum value of frequency weighted acceleration (m/s^2) in any direction*</th></tr></thead><tbody><tr><td>4 to less than 8 hours</td><td>4</td></tr><tr><td>2 to less than 4 hours</td><td>6</td></tr><tr><td>1 to less than 2 hours</td><td>8</td></tr><tr><td>less than 1 hour</td><td>12</td></tr></tbody></table> *Information on acceleration generally available from tool manufacturers or internet based databases	Total Daily Exposure Duration (hours)	Maximum value of frequency weighted acceleration (m/s^2) in any direction*	4 to less than 8 hours	4	2 to less than 4 hours	6	1 to less than 2 hours	8	less than 1 hour	12
Total Daily Exposure Duration (hours)	Maximum value of frequency weighted acceleration (m/s^2) in any direction*										
4 to less than 8 hours	4										
2 to less than 4 hours	6										
1 to less than 2 hours	8										
less than 1 hour	12										

2. Due to a medical condition, the following recommendations are advised:

☐ Limitations:

☐ Restrictions:

Printed name (worker)

Signature & date

Printed name (health care professional) Signature & date

Clinic Stamp



Research that makes a Difference

Hand-arm Vibration Syndrome

Workplace prescription study

Implementation study underway:

- Began August of 2012
- Prospective cohort design randomizing 60 workers into intervention and control groups.
- Aims to determine the effectiveness of the HAVS “workplace prescription” based on various RTW and symptom based metrics.



Summary

- Contact dermatitis and HAVS are common
- Importance of early recognition and diagnosis
- Best strategy is prevention
- If a worker develops CD or HAVS, how do we improve stay at work or RTW?
 - Workplace prescription as one possible method to improve communication



<http://creod.on.ca>