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

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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 1 year – 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

- None: 50.0%
- Mild: 20.0%
- Mod: 16.7%
- Sev: 13.3%
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
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:
  – Dupuytren’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?

<table>
<thead>
<tr>
<th>Industry</th>
<th>Examples of tools</th>
</tr>
</thead>
<tbody>
<tr>
<td>Construction</td>
<td>Jackhammers, hammer drills, concrete breakers, grinders</td>
</tr>
<tr>
<td>Mining</td>
<td>Jackleg drills, stoper drills</td>
</tr>
<tr>
<td>Forestry</td>
<td>Chainsaws</td>
</tr>
<tr>
<td>Automotive assembly</td>
<td>Impact wrenches, riveting guns</td>
</tr>
<tr>
<td>Foundries</td>
<td>Grinders, chipping guns</td>
</tr>
<tr>
<td>Metalworking trades</td>
<td>Sanders, buffers</td>
</tr>
</tbody>
</table>
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


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?
Hand-arm Vibration Syndrome

How do we diagnose it?
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%


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

<table>
<thead>
<tr>
<th>Patient's Name:</th>
<th>Physician:</th>
<th>Date:</th>
</tr>
</thead>
</table>

#### Exposure Modifications

<table>
<thead>
<tr>
<th>No Exposure</th>
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<tbody>
<tr>
<td>☐</td>
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<td>☐</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Reduce as much as possible</th>
</tr>
</thead>
<tbody>
<tr>
<td>☐ wet work</td>
</tr>
<tr>
<td>☐ prolonged glove use (&gt;20 minutes)</td>
</tr>
<tr>
<td>☐ fragranced products</td>
</tr>
<tr>
<td>☐ harsh products for hand washing (gritty soaps, solvents, etc.)</td>
</tr>
<tr>
<td>☐ mechanical irritation (friction, trauma, heavy use of hands, etc.)</td>
</tr>
<tr>
<td>☐ extreme heat or cold</td>
</tr>
<tr>
<td>☐ other (specify):</td>
</tr>
</tbody>
</table>

#### Hand Washing

- What to Use
  - ☐ alcohol hand rubs
  - ☐ non-foaming cleanser
  - ☐ lukewarm water
  - ☐ other (specify):

- Additional Information
  - ☐ CeraVe Cleanser
  - ☐ CeraVe Moisturizing Cream
  - ☐ Ceraphil Moisturizing Lotion
  - ☐ Ceraphil
  - ☐ Prevei
  - ☐ other (specify):

- ☐ prescribed medication

#### Skin Care Management Suggestions

- ☐ moisturizer
- ☐ skin diary
- ☐ follow up with physician if worsens

- ☐ apply before work
- ☐ apply after each break
- ☐ apply after work
- ☐ apply after each hand washing
- ☐ CeraVe Moisturizing Cream
- ☐ Ceraphil Moisturizing Lotion
- ☐ Ceraphil
- ☐ Prevei
- ☐ other (specify):

#### Other Personal Protective Equipment

- ☐ protective arm sleeves
- ☐ disposable gown/overalls
- ☐ 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

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.
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:

<table>
<thead>
<tr>
<th>Reduce tool vibration</th>
<th>Reduce vibration exposure at the worker</th>
</tr>
</thead>
<tbody>
<tr>
<td>□ Use low vibration tools / purchase anti-vibration tools</td>
<td>□ Use ISO/ANSI Certified Anti-Vibration Gloves when possible</td>
</tr>
<tr>
<td>in the future</td>
<td></td>
</tr>
<tr>
<td>□ Ensure tools are well maintained with regular maintenance</td>
<td></td>
</tr>
<tr>
<td>schedules/maintenance policy</td>
<td></td>
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</tbody>
</table>

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/s²) 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

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
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