Occupational Skin Disease

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Why is the skin important?

- Controls loss of moisture
- Protects against injury
- Protective barrier against harmful substances
- Reduces harmful effects of UV radiation
- Acts as a sensory organ - touch, temperature
- Helps regulate body temperature
- Produces vitamin D
- Helps detect and protect against infections
DERMATOSIS is any skin disease due partially or wholly to the individuals occupation
Occupational skin diseases - classification

- Subtypes of contact eczema/dermatitis
  - allergic contact dermatitis
  - irritant contact dermatitis
  - contact urticaria
  - photoallergic and phototoxic reactions
- Contact acne and folliculitis
- Depigmentation and hyperpigmentation
- Infections
- Tumours
  - benign
  - malignant
Occupations causing dermatoses

- Agriculture
- Catering
- Chemical industry
- Cleaning
- Construction
- Electronics
- Fishing
- Hairdressing
- Health care
- Horticulture and floristry
- Metalworkers
- Mining
- Office workers
- Painting
- Photographic processing
- Printing
- Tanning
- Woodworking etc, etc
Incidence and prevalence work-related skin disease

- Difficult to ascertain

- Some reporting schemes
  - ie, The Health and Occupation Reporting Network (THOR) and EPIDERM in UK

- Likely to be massive under-reporting

- Higher levels reporting in Occupational Physicians when compared to Dermatologists
Occupations with highest incidence of dermatitis (UK)

- Florists - 109 cases per 100,000 workers per year
- Hairdresser and barbers - (81 cases per 100,000 workers per yr)
- Beauticians - (73 cases per 100,000 workers per yr)
- Cooks - (61 cases per 100,000 workers per yr)
- Metal working machine operatives - (54 cases per 100,000 workers per yr)
ASCC, Occupational Contact Dermatitis in Australia, April 2006
Causal agents most commonly reported during 2012-2016

- Soaps and cleaners
- Wet work
- Rubber chemicals and materials
- Personal protective equipments (PPE)
- Preservatives

Source: THOR (SWORD) scheme, University of Manchester
Figure 2: Contact dermatitis: causal agents most commonly reported to THOR (EPIDERM) during 2007-2011 and 2012-2016

- Soaps and cleaners
- Wet work
- Rubber chemicals and materials
- Personal Protective Equipment (PPE)
- Preservatives
- Bleaches and sterilisers
- Nickel
- Fragrances and cosmetics
- Resins and acrylcs

Average annual cases

HSE, Work-related skin diseases in Great Britain 2017
HSE, Work-related skin diseases in Great Britain 2017
Common causes of contact dermatitis

**IRRITANT**

- Alkalis
- Cleaning agents
- Organic solvents
- Metalworking fluids
- Physical factors

**ALLERGIC**

- Chromates
- Nickel
- Rubber accelerators
- Adhesives
- Plants
- Dyes
- Biocides
Endogenous

Irritant

Allergic
Contact dermatitis – useful clues

- “Explosive” onset
- Sudden exacerbations
- Primary localisation on face or hands
- Failure of sustained response to topical steroids
- Unusual distribution
- Relationship to work - ie worse on return to work after holiday
- Adult onset
- Work - exposure to irritants/sensitisers
- Hobbies, home exposures
Contact dermatitis - features

- **Acute**
  - Erythema
  - Vesiculation
  - Weeping
  - Swelling

- **Chronic**
  - Dryness
  - Lichenification
  - Fissuring
• Direct damage to skin cells when substance applied to skin in sufficient concentrations and for sufficient time

• Most irritants probably overwhelm skin barrier and repair mechanisms

• Acute, or chronic after repeated exposure

• Range of severity – mild to severe

• Often multiple causes
• Extent of reaction dependant upon type, concentration and properties of irritant

• Skin takes several months to heal or regain former resistance

• Can persist long after contact with original cause has ceased

• Can cause permanent damage to skin
• “Term “dermatitis” is a misnomer

• Although there may frequently be an inflammatory component, I see skin changes as probable (or likely) DAMAGE to skin
Chemicals can pass through skin …

- Lipophilic substances
- Solvents
- Pesticides
- Biocides
- Mercury
- PCB’s
- PAH’s
- Isocyanates

*(from Dr J Cherrie, IOM, UK)*
Factors affecting absorption

Table 2  Factors affecting the amount of chemical that is absorbed through the skin

- **Exposure factors**
  - Type of task
  - Duration
  - Area of skin exposed
  - Use of protective clothing
  - Concentration of the chemical
  - Hygiene: washing and wearing of contaminated clothing

- **Chemical factors**
  - Molecular weight
  - Solubility in water
  - Solubility in oils
  - Structure
  - Irritancy
  - Presence of other chemicals

- **Skin factors**
  - Skin thickness
  - Skin type and condition
  - Anatomical location of exposure
  - Temperature and humidity
  - Occlusion
  - Skin perfusion
  - Hairiness, pore density and sweating
  - Skin metabolism

(from Dr J Cherrie, IOM, UK)
Irritant contact dermatitis

- Most common reaction

- Dry, itchy, irritated areas on skin, usually the hands.

- Irritation from using gloves and possibly by exposure to other workplace products and chemicals.

- Can also result from repeated hand washing and drying, incomplete hand drying, use of cleaners and sanitizers, and exposure to powders added to the gloves.

- **No investigation** - clinical diagnosis
Diagnosis of irritant contact dermatitis

• History of exposure to irritants?

• Temporal association between the exposure and the dermatitis?

• Dermatitis localised to the site of primary contact?

• Is there any better explanation for the dermatitis?
Risk factors for irritant contact dermatitis

- Hand dermatitis before age 15
- Persistent body eczema in adulthood
- Persistent dry itchy skin

If all 3 risk factors present then 80% will get hand dermatitis in dry jobs, and 90% in wet jobs.
• Most individuals with irritant dermatitis can continue in their work with slight modification of duties or exposures and with treatment.

• However, atopics have a poor prognosis if they develop a superimposed contact dermatitis (irritant or allergic) and tend not to improve upon leaving their occupation.
Individuals with high risk of atopy

- Have a high risk of hand dermatitis in any job

- The dermatitis will be worse in a job with exposures to irritants.

- Ceasing work may not improve their dermatitis.
Contact allergic dermatitis

- Sensitiser is a substance that can cause allergic response
- Sensitisation may arise with small quantities of allergen
- Response usually specific to one agent
- Sensitised individual develops rash each subsequent exposure to small amounts of substance
- Initiation of sensitisation may occur on first contact with allergen or after many years
• Sensitisation persists indefinitely

• May get irritant and allergic types together

• Type 4 immunological reactions (cell mediated)

• Slow onset - 48 hours after contact with allergen

• Rash usually in area of contact with skin

• Patch testing
Patch testing

- Sensitivity and specificity 75 - 85%
- Apply antigen to the skin at standardised concentrations in an appropriate vehicle and under occlusion
- Standard series of antigens, ie rubber mix, fragrance mix
- Read at 24, 48 and 96 hours
Management of allergic contact dermatitis is that of ceasing exposure.
Wet work - interdigital eczema
Allergic dermatitis - body spray
Irritant dermatitis - cement
Allergic dermatitis - footwear
Contact urticaria

- Not really a type of dermatitis/eczema

- Immunological reactions (type 1) latex

- Non-immunological cobalt platinum salts hairdressing

- Can lead to eczema

- Exposures at even very low levels can trigger allergic reactions in some sensitized individuals
• Reactions can produce **various symptoms**:

  o Mild reactions - skin redness, hives, or itching.

  o More severe reactions may involve respiratory symptoms such as runny nose, sneezing, itchy eyes, scratchy throat, and asthma (difficult breathing, coughing spells, and wheezing).

  o Rarely, shock may occur; but a life-threatening reaction is seldom the first sign of latex allergy. Such reactions are similar to those seen in some allergic persons after a bee sting.
• Itching, burning and wheal formation at site of contact

• Rapid onset of symptoms - usually within minutes but up to 30 minutes

• May get generalised urticaria or anaphylaxis / anaphylactic symptoms
Investigations for type 1 allergy

- Blood test - EAST

- Skin Prick testing

  Intradermal puncture of allergen

  Positive reaction is urticarial weal

  Histamine control

- Use test - apply glove soaked in water or saline
Prognosis contact dermatitis

Studies confirm poor long-term prognosis

No differences between irritant or allergic causes

Risk factors for poorer prognosis:
- atopy
- severity
- age over 40
(under 25 age group fare much better)
• Cvetkovski study, 2006
  Western Australia - follow up 12 months
  41% improved after 12 months
  25% persistently severe
  34% unchanged with minimal or mild to moderate disease

• Meding study, 2005
  Sweden - 12 year follow up 1987-1999
  85% reported skin symptoms after 1987
  82% occupational changes
  44% changed jobs
  15% retired from all work
Latex

• Milky white substance produced by certain trees and plants

• Rubber can exist in latex form

• “Latex” (rubber) gloves contain many compounds
Allergies to latex/rubber - background

• Increasing prevalence:
  
  Increased glove usage
  Universal precautions
  Increasing allergenicity in populations

• Prevalence (UK)
  
  Type 1  0.5% HCW’s
  Type 4  up to 10 % HCW’s
Problems with rubber gloves

- Irritation
- Allergies
  - Type 1: natural rubber protein only
  - Type 4: accelerators, dyes, pigments, binding agents, etc (Thiurams account for 40 - 50% reactions)
Management of skin issues at work

Same as for any substance at work:

- Recognition
- Evaluation
- Control
- Monitoring
Recognition/Evaluation

- Hazard data sheets
- High index of suspicion
- Early recognition
- Workplace monitoring
Control

• Organisational approach with stakeholder engagement

• Hierarchy of control:
  Elimination
  Substitution
  Engineering controls
  Local controls
  Behaviour changes
  PPE

• Health monitoring
  Skin checks
Monitoring ..... and even more monitoring !!
Organisational interventions

- Policies
- Procedures
- Information
- Training
- Occupational Health services
- Skin conservation programme
- Alternative substances, gloves, etc
- Purchasing policy - “hypoallergenic”
- Opportunities for redeployment
- Advisory groups for larger organisations
Intervention and treatment

- Irritant contact dermatitis: principally involves protection of skin from irritants (avoidance, substitution, protection)

- Allergic contact dermatitis: principally involves identification of allergen and then avoidance of allergen, ie, gloves without additive
• Early recognition

• Early treatment

• Reduction/avoidance of contact with irritant/allergen

• Glove choice - “latex-free” if type 1 allergy

• Moisturise

• May need strong steroids
• Very common problem in workforce

• Under-recognised

• Prognosis not good at all

• Management involves multifaceted individual and organisational approach

• Occupational Health professionals can make huge difference
Thanks for listening