Occupational Skin Disorders
Contact Dermatitis:

Irritant contact dermatitis syndrome (ICD).

1- Substance specifications (PH, solubility, physical type, concentration)
2- Environmental factors (temperature, pressure, humidity)
3- Personal factors (age, gender, ethnic, Atopy, previous skin disorders, affected area)

>\%80
Table 18-1. Examples of contact irritants and allergens.

<table>
<thead>
<tr>
<th>Irritants</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Soaps/detergents</td>
<td></td>
</tr>
<tr>
<td>Water</td>
<td></td>
</tr>
<tr>
<td>Acids/alkalis</td>
<td></td>
</tr>
<tr>
<td>Organic solvents</td>
<td></td>
</tr>
<tr>
<td>Metalworking fluids</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Allergens</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Chromate</td>
<td></td>
</tr>
<tr>
<td>Epoxy resins</td>
<td></td>
</tr>
<tr>
<td>Biocides</td>
<td></td>
</tr>
<tr>
<td>Fragrances</td>
<td></td>
</tr>
<tr>
<td>Formaldehyde</td>
<td></td>
</tr>
<tr>
<td>Rubber chemicals</td>
<td></td>
</tr>
<tr>
<td>Methacrylates</td>
<td></td>
</tr>
</tbody>
</table>
**Table 18-4.** Causes of phototoxic (photoirritant) reactions.

<table>
<thead>
<tr>
<th>Causes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coal tars</td>
</tr>
<tr>
<td>Furocoumarins: Psoralen; 8-methoxypsoralen; 4,5,8-trimethylpsoralen</td>
</tr>
<tr>
<td>Aminobenzoic acid derivative: Amyl-ortho-dimethyl-aminobenzoic acid</td>
</tr>
<tr>
<td>Dyes: Disperse blue 35</td>
</tr>
<tr>
<td>Drugs: Sulfonamides; phenothiazines; tetracyclines; thiazides</td>
</tr>
</tbody>
</table>
Specific types of cutaneous irritation:

1- Hydrofluoric acid burns.
   throbbbing pain, redness, swelling, paleness, necrosis, demineralization.
   Treatment: washing, removal of clothes, Ca++, Mg++, NH4+.
   Ca Gluconate injection (local & 5mm beyond). Debridment,
   Ca Gluconate IV injection.
   Serum Ca++ monitoring. EKG. (2.5% Body surface, Death)
III. HF Skin Exposure

- Assess for pain
- Assess for redness/whiteness of skin/blisters
- Assess area of burn

If >25 in² or 160 cm² then risk for serious systemic toxicity is present
2-Cement Burns.
Alkali, Boots, Gloves, Hurry, Necrosis, Scar.
Grade 6 (12/100%) ocular surface burn following injury with cement powder.

3-Fiberglass dermatitis:
Seizing agents & ACD.
Folds, Sweat, Scabies.
Dx.
SL. Hardening & Resistance.
5-Allergic Contact Dermatitis:
Very important. Leave the job.
Type 4.
4 Days (Induction). 24-48 Hours.
Only skin No Mucus membrane.
Rash, Erythema, Pruritus, Papule, Vesicule, Bullae.
Scalp, palm & sole, Interdigit, Eyelids, But Axilla.
DDx:
Atopic dermatitis
Psoriasis
Pustular eruptions of Soles & palms
Herpes simplex & zoster
Id reaction (Trichophyton on feet)
Dyshidrotic & nummular eczema
Drug eruptions
ICD
Photoallergic reactions:
Immunologic, Less common than phototoxic, UVA.
Photopatch test, Chin & upper eyelids.

**Positive Test** = Erythema + Mild edema + Numerous & small closely set vesicles.

---

**Table 18-7.** Patch test interpretation codes.

| 1 + | Weak reaction, nonvesicular, erythema, mild infiltration |
| 2 + | Strong reaction, erythema, edema, vesicles           |
| 3 + | Extreme reaction, spreading, bullous, ulcerative     |
| 4   | Doubtful, faint erythema only                         |
| 5   | Irritant reaction                                    |
| 6   | Negative                                             |
| 7   | Excited skin reaction                                |
| 8   | Not tested                                           |
phototoxic contact dermatitis from rue
(Ruta graveolens)
in a gardener

photoallergic contact dermatitis due to the (oral) use of chlorthiazide
**Table 18-6.** Causes of photoallergic reactions.

<table>
<thead>
<tr>
<th>Halogenated salicylanilides</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tetrachlorosalicylanilide</td>
</tr>
<tr>
<td>3,4,5-tribromosalicylanilide</td>
</tr>
<tr>
<td>4,5-dibromosalicylanilide</td>
</tr>
<tr>
<td>Phenothiazines: Chlorpromazine, promethazine</td>
</tr>
<tr>
<td>Fragrances: Musk ambrette</td>
</tr>
<tr>
<td>Optical brighteners (stilbenes)</td>
</tr>
<tr>
<td>Sunscreens: PABA esters</td>
</tr>
<tr>
<td>Compositae plants</td>
</tr>
</tbody>
</table>

**Table 18-9.** Additional occupational series for patch testing.

<p>| Hairdressing                                  |
| Bakery                                       |
| Dental                                       |
| Epoxy                                        |
| Fragrance                                    |
| Isocyanate                                    |
| Oils and cooling fluid                       |
| Methacrylates: dental, nails, printers       |
| Photographic chemicals                       |
| Plant                                        |
| Plastics and glueles                          |
| Rubber additives                              |
| Textile colors and finish                    |</p>
<table>
<thead>
<tr>
<th>No.</th>
<th>Allergen</th>
<th>Application</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Potassium dichromate 0.5% petrolatum (pet)</td>
<td>Tanning leather, cement</td>
</tr>
<tr>
<td>2.</td>
<td>4-Phenylenediamine base 1% pet</td>
<td>Azo dye intermediate, hair dye</td>
</tr>
<tr>
<td>3.</td>
<td>Thiuram mix 1% pet</td>
<td>Rubber accelerator, fungicides</td>
</tr>
<tr>
<td>4.</td>
<td>Neomycin sulfate 20% pet</td>
<td>Antibiotic in creams</td>
</tr>
<tr>
<td>5.</td>
<td>Cobalt(II) chloride hexahydrate 1% pet</td>
<td>Metal</td>
</tr>
<tr>
<td>6.</td>
<td>Benzocaine 5% pet</td>
<td>Local anesthetic in creams</td>
</tr>
<tr>
<td>7.</td>
<td>Nickel sulfate hexahydrate 5% pet</td>
<td>Metal</td>
</tr>
<tr>
<td>8.</td>
<td>Cloquinol 5% pet</td>
<td>Synthetic anti-infective agent</td>
</tr>
<tr>
<td>9.</td>
<td>Colophony 20% pet</td>
<td>Pine resin, adhesives, printing ink</td>
</tr>
<tr>
<td>10.</td>
<td>Paraben mix 16% pet</td>
<td>Preservatives in creams</td>
</tr>
<tr>
<td>11.</td>
<td><em>N</em>-Isopropyl-2-phenyl-4-phenylenediamine (IPPD)</td>
<td>Black rubber chemical</td>
</tr>
<tr>
<td>12.</td>
<td>Wool alcohols 30% pet</td>
<td>Ointment base in creams</td>
</tr>
<tr>
<td>13.</td>
<td>Mercapto mix 2% pet</td>
<td>Rubber additives</td>
</tr>
<tr>
<td>14.</td>
<td>Epoxy resin 1% pet</td>
<td>Resin in adhesives, paint, insulation</td>
</tr>
<tr>
<td>15.</td>
<td>Balsam of Peru 25% pet</td>
<td>Fragrance and flavoring agent</td>
</tr>
<tr>
<td>16.</td>
<td>4-tert-Butylphenoxymethoxide resin (PTBP) 1% pet</td>
<td>Resin in adhesives</td>
</tr>
<tr>
<td>17.</td>
<td>2-Mercaptobenzothiazole 2% pet</td>
<td>Rubber chemical</td>
</tr>
<tr>
<td>18.</td>
<td>Formaldehyde 1% aqueous (aq)</td>
<td>Disinfectants, cosmetic preservatives</td>
</tr>
<tr>
<td>19.</td>
<td>Fragrance mix 8% pet</td>
<td>Fragrances</td>
</tr>
<tr>
<td>20.</td>
<td>Sesquiterpene lactone mix 0.1% pet</td>
<td>Plants</td>
</tr>
<tr>
<td>21.</td>
<td>Quaternium 15 1% pet</td>
<td>Formaldehyde releaser</td>
</tr>
<tr>
<td>22.</td>
<td>Primin 0.01% pet</td>
<td>Main allergen in primula dermatitis</td>
</tr>
<tr>
<td>23.</td>
<td>5-Chloro-2-methyl-4-isothiazolin-3-one 0.01% aq</td>
<td>Preservative in oils and creams</td>
</tr>
<tr>
<td>24.</td>
<td>Budesonide 0.01% pet</td>
<td>Nonhalogenated steroid</td>
</tr>
<tr>
<td>25.</td>
<td>Tixocortol-21-pivalate 0.1% pet</td>
<td>Topical steroids (hydrocortisone)</td>
</tr>
</tbody>
</table>
Operational definition of occupational ACD.

1- History
2- Priority.
3- Same morphology.
4- Provocative use test.(PUT).
5- Repeat open application test,(ROAT).
   Inner aspect of arm, 2 times daily for 7-28 days,

Treatment:
Wet dressing (Burow`s ), GCS topical & oral.
Oral Anti histamine & ABS but not local.
4-Pigmentary changes: Melanosis & Leukoderma. Px. Acral.

**Table 18-5.** Chemicals causing leukoderma.

<table>
<thead>
<tr>
<th>Chemical</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hydroquinone</td>
</tr>
<tr>
<td>Monobenzylether of hydroquinone</td>
</tr>
<tr>
<td>Monomethylether of hydroquinone</td>
</tr>
<tr>
<td>Para-tertiary-butylphenol</td>
</tr>
<tr>
<td>Para-tertiary-butylcatechol</td>
</tr>
<tr>
<td>Para-tertiary-amylphenol</td>
</tr>
<tr>
<td>Para-isopropylcatechol</td>
</tr>
</tbody>
</table>
Figure 1: Management of contact dermatitis: the operational plan

- **Occupational skin disease**
  - **Categorie NOD**
    - **Severity**
      - Gr 1
        - GP
        - No cure after 6 weeks
        - Dermatologist
      - Gr 2
        - GP
        - No cure or relapse after 12 weeks
        - Dermatologist
      - Gr 3
        - GP
  - **Categorie OD**
    - **Severity**
      - Gr 1
        - GP
        - No cure after 6 weeks
        - Dermatologist
      - Gr 2
        - GP & OP
        - No cure after 6 weeks
        - Dermatologist
      - Gr 3
        - OP & Dermatologist
        - No cure after 8 weeks
        - Occupational (academic) centre

**Key**
- NOD: Non-occupational dermatitis
- OD: Occupational dermatitis
- GP: General practitioner
- OP: Occupational physician

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6-Contact Urticaria:

1- Nonimmunologic (Non allergic):

Gardeners: Insects, caterpillar hair.
Cooks: fruits, fish, meat,
Medical personnel: Alcohol, Dimethyl sulfoxide.

2- Immunologic (Allergic) contact urticaria:

Latex, Type I, All devices containing Latex. Mild symptoms to DEATH.
Kiwi, Banana, Skin prick test (CPR), Test with glove.

FDA Law.
Biological Causes:

1-Bacterial Diseases:
Staphylococcal & Streptococcal Infections.

- Wound infections
- Furunculosis
- Paronychia
- Atopy & Staph colonization

(Food industry)
**Cutaneous Mycobacterial infections:**
Inoculation of MT hominis. Prosector`s wart, (Pathologists).
Necrogenic wart, Anatomic tubercle, (Surgeon, Morgue attendants).
Butcher, Farmers (Bovis).
Difficult smear & culture.
Warty plaque, SL, Scar.

**Atypical Mycobacterial infections:**
M. Marinum, (fish tanks & Pools).
Papule + clear exudation.
Treatment = Rifampin or Etambutol.
DDX Sporotrichosis.
Anthrax:
Inhaled Anthrax

anthrax spores in surrounding air

Anthrax Spores

Lungs

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Erysipeloid:
2-Viral Diseases:
Herpes Simplex. Most common, HSV, Jobs,
Viral Warts.
HPV, 35 Types, Jobs, Hands, Needs a wound.

Molluscum contagiosa.
Boxers, Wrestlers, …
Orf.
Parapox virus, S.L. Jobs.
Always on fingers. Fever, LN.
E.M. Like Eruption after 10-14 days.
3-Fungal Infections:

Candida:
Most common, Albicans, Hands, Nails, Inter digits. Glove.
Risk Factors.
Dermatophytes:
Trichophyton mentagrophytes: (Tinea pedis & manus)
Microsporum canis: Pets.
Microsporum gypseum: (Soil)
Onychomycosis:
Dermatophyte
Sporotrichosis:
Sporothrix schenckii, Soil,
1-Fixed, limited to inoculation area, Nodular, ulcerative.
2-Nodular, more common, enlarges slowly, Nodular lymphangitis.
Treatment = Solution of KI. In severe cases Amphotericin.
4-Parasitic Diseases.
Protozoa:
A: Cutaneous Leishmaniasis.
B: Helminths:
Larva migrans,
Arthropods: Toxin—Allergy—Irritation. Outdoor workers.

A: Scabies. Crowded, Contagious.
Physical Causes:

1- Mechanical Trauma:

Friction
Callus-Trauma- Fissure-Infection. Disability.
2-Heat:
Burns.
Miliaria:
Retention, Itch, Intense, Crystallina, Rubra (ACD), Profunda (Exhaustion)
Intertrigo:
Folds, Infection, 3\textsuperscript{rd} \& 4\textsuperscript{th} Spaces, Jobs.
Heat urticaria.
Acne & Acne rosacea.
HSV.
Cold:
Frostbite.
Vasocostriction, Numbness, Redness, White, Swellen, Necrosis, Side effects: Raynaud`s & SCC.
Treatment.
Jobs.
Chilblains (Perniosis):
Extr�ities, Vasomotor instability, Red-Blue, Swelling.
Treatment.
**Vibration Syndrome:**
Raynaud`s, White or Dead fingers.
Pale—Cyanosis—redness.
Clumsy hands.
Disability rate.
30—300 Hz.
Acroosteolysis,(Vinyl Chloride Disease): Tank, Raynaud`s, Lytic lesions, Scleroderma.
Ionizing Radiation:
Jobs, Acute or Chronic.
Acute radiodermatitis=1000 R.(48 hours Then Again)
Redness—edema—white
General symptoms.Some days.
Redness—echymosis—bullae—
Severe pain—New skin(Atrophy)
Chronic radiodermatitis: 300-800 R/week. (Total 5000-6000 R)
Atrophy + Telangectasia + Hypopigmentation
Video Display Terminals.
No ionizing radiation, or EMF. Ergonomic problems.
**Occupational Acne:**

**Oil Acne (Folliculitis):**
- Jobs, Sites, Comedons, pustules.

**Acne Cosmetica.**

**Acne mechanica.**

**Acne tropical.** *(TREATMENT)*

**Acne McDonald`s.*

---

**Table 18-2.** Examples of acne in the workplace.

<table>
<thead>
<tr>
<th>Type</th>
<th>Occupation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cosmetic acne</td>
<td>Actors, models, cosmetologists</td>
</tr>
<tr>
<td>Acne mechanica</td>
<td>Auto and truck mechanics, athletes, telephone operators</td>
</tr>
<tr>
<td>Ultraviolet acne</td>
<td>Models, lifeguards</td>
</tr>
<tr>
<td>Oil acne</td>
<td>Machinists, auto mechanics, fry cooks, roofers, petroleum refinery workers,</td>
</tr>
<tr>
<td></td>
<td>rubber workers, highway payers</td>
</tr>
</tbody>
</table>
Chloracne:
Yellow cyst, Halogenated materials.
Nails, Meibomian glands, neuritis, hepatitis.
Treatment.

Table 18–3. Chloracne-producing chemicals.

<table>
<thead>
<tr>
<th>Category</th>
</tr>
</thead>
<tbody>
<tr>
<td>Polyhalogenated naphthalenes</td>
</tr>
<tr>
<td>Polyhalogenated biphenyls</td>
</tr>
<tr>
<td>Polyhalogenated dibenzofurans</td>
</tr>
<tr>
<td>Contaminants of polychlorophenol compounds:</td>
</tr>
<tr>
<td>herbicide 4, 5-T</td>
</tr>
<tr>
<td>Contaminants of 3, 4-dichloroaniline and related herbicides</td>
</tr>
<tr>
<td>Dichlorodiphenyltrichloroethane (DDT) (crude trichlorobenzene)</td>
</tr>
</tbody>
</table>
Occupational skin Cancer.

Causes:
1-U.V.
SCC & BCC, A(320-400) B(290-320) C(100-290).
Jobs.
Melanoma.
Xeroderma pigmentosa.
2-P.A.H.
Phothosensitization, Synergism.
3-Arsenic.
Arsenicalism, Jobs,
4-Ionizing Radiation.
5-Trauma. Scar, Repeated.
Figure 2: Workplace approach

1. Elimination of source
2. Enclosing of source
3. Modelling the environment
4. Separation of workplace
5. Personal protection

the lower..., the better...
What questions do you have?