Contact Dermatitis
Diagnosis & Management
What do you expect from this session?

- Case Sharing
- Clinical Approach to Hand Eczema Mimics
- Management of Contact Eczema

You never see, You never know.
The more you see, the more you know.
Scenario 1
Symmetrical Vesicular Eruption on the Palms

A 30-year-old woman presented with a pruritic vesicular eruption on the palms for 5 days duration. She did not have a fever or other systemic symptoms. No known recent contact with anyone who had a similar rash.

Physical examination revealed multiple vesicles on the palms with faint surrounding erythema. There was no fluctuance, induration, warmth, scaling, or exudate.
Which one of the following is the most likely diagnosis?

A. Dyshidrotic eczema
B. Herpetic whitlow
C. Id reaction
D. Palmoplantar pustulosis
E. Secondary syphilis
Dyshidrotic Eczema

- aka pompholyx
- Symmetrical crops of intensely itchy sago grain-like vesicles
- Resolves in 3-4 weeks with residual scaling
- Content: clear vesicles instead of pustules
- Affects the palms, sides of the fingers & soles of the feet
Herpetic Whitlow

- Grouped vesicles on the lateral edge of the thumb
  - Unilateral
  - Painful
  - Umbilicated vesicles

- Common in persons who come in contact with saliva, such as dental hygienists and children who suck their thumbs
Id Reactions

- aka autosensitization eczema
- Symmetrical, pruritic vesicular eruptions on the lateral aspect of the fingers
- Occur in the presence of an inflammatory process, eg: Tinea pedis infection or stasis dermatitis, at a distant site
- Resolve with treatment of the inciting inflammatory process
Palmoplantar Pustulosis

- A type of localized form of pustular psoriasis
- Chronic recurrent erythematous vesicular-pustular on erythematous base on the palms and/or soles
- The pustules contain a sterile infiltrate, consisting of neutrophils & eosinophils
- Very persistent and often resistant to treatment
Palmoplantar Pustulosis

- Topical treatment
  - Intermittent ultra-potent topical steroids
  - Combination Calcipotriol + Betamethasone Dipropionate
  - Crude coal tar ointment
  - Emollients

- If severe disease and interferes with function, refer to dermatologist

- Possible treatments include phototherapy, acitretin, methotrexate, ciclosporin, biologic

- Do not prescribe oral corticosteroids
Secondary Syphilis

- Caused by *Treponema pallidum*, occurs 1-6 months post initial infection
- Symmetrical reddish-brown rash maculo-papulo-nodular
- Distributed over palms, soles, entire body and mucous membranes
- Painless
- Non-pruritic
Secondary Syphilis

- May have systemic signs and symptoms
  - Fever
  - Sore throat
  - Lymphadenopathy (painless)
  - Weight loss
  - Myalgia
  - Fatigue
Scenario 2
Scaly & Cracking Hands
Which one of the following is the most likely diagnosis?

A. Contact dermatitis  
B. Palmar psoriasis  
C. Tinea manuum  
D. Hand eczema  
E. Secondary syphilis
Allergic Contact Dermatitis

- Acute, unexpected eczema
- Repeated exposure to the allergen → chronic disease
- Asymmetrical bizarre distribution and morphology
- Affected areas may clearly relate to contact with an allergen
- Eczema may spread to previously unaffected areas
Irritant Contact Dermatitis

- Affects all of us from time to time
- Reflects injury to the epidermis by water, detergents, solvents, friction, acids, alkalis, body fluids & chemical
- Loss of barrier function → affected skin is prone to further injury
- Occupational hand dermatitis is mainly due to irritant dermatitis
- Mild to severe pruritus
- Rash confined to injured skin
- Dryness (mild) to blisters (severe)
Palmoplantar Psoriasis

- Well demarcated erythematous scaly plaques
- Isolated finding or associated with typical plaques of psoriasis elsewhere
- ± Fissuring
- ± Psoriatic nail changes
- ± Scalp involvement
Palmoplantar Psoriasis

- **Mild**: topical agents
  - Calcipotriol ointment
  - Ultrapotent topical steroids intermittently
  - Thick emollient barrier creams
- **Combination therapy**
Palmoplantar Psoriasis

- Phototherapy / Systemic therapy may be helpful but is only warranted for severe disease
Hand Eczema Vs PPP

- More itch
- Vesicles
- Patchy dryness
- Less well dermacated
Tinea Manuum

- Asymmetrical
- Unilateral
- Elevated border
- Slowly extending edge
- Involving skin creases

Positive mycology
Hand Eczema

- Inflammation of the skin that confined to Hands

- Epidemiology of hand eczema
  - 7% - 12% of the general population
  - Point prevalence 12% (HCW\(^2\))
  - Lifetime prevalence 35% (HCW\(^2\))
  - 17% to 50% (nurses\(^1\))
  - Female > Male
  - 80% of cases are due to contact dermatitis (ICD)

\(^1\)Dulon 2008, Lampel HP 2007, Smith D R 2005
\(^2\)Kristina S. Ibler 2012
In Reality……

Figures are higher than this due to the well known phenomenon of under-diagnosis and under-reporting of occupational diseases for fear of job loss¹

¹Diepgen 2002; Meding 1987; Smit 1993
Occupational Contact Dermatitis

- Contact dermatitis is the most common type of occupational skin disease and normally occurs on hand.
- Highly affecting hairdresser, cooks, nurses, housewives, builders, cleaning personnel → related to wet works.

Most common symptoms:
- Erythema (redness)
- Itching
- Dryness
- Cracks (fissures)
- Blisters (vesicles)

Burden of hand eczema:
- Impacting Quality of Life (QoL)
- Complained about painful fissures and blisters
- Change of job / job loss
- Increase in sick leave
- Embarrassed
- Stop hobby

Clinical Presentation of Contact Dermatitis

1. Allergic Contact Dermatitis
2. Irritant Contact Dermatitis
3. Contact Urticaria

Itching (eczematous) eruption localized to the spot where the allergen comes in contact with the skin
Contact Dermatitis
Irritant contact dermatitis

- No specific recognition of a foreign substance
- Reaction of the immune system towards skin damage
- Subtoxic-degenerative ICD
  - Cumulation of repetitive subclinical damage
  - Overburden of repair mechanisms
- Acute toxic reactions
  - Significant damage of the skin
  - Induction of a relatively rapid cellular inflammatory reaction
  - Clinical features of eczema

Contact Dermatitis
Irritant contact dermatitis

Exogenous causes of ICD in Occupational Dermatology Clinic, Skin and Cancer Foundation, Australia (total patient 621 patients over 1993-2002)
Contact Dermatitis
Allergic contact dermatitis

**Pathophysiology**

- Allergen recognized by T cells
- Release of immune mediators
- Initiation of the cellular inflammatory infiltrate
- Process duration: typically 2–3 days
- Requirement of sensitization (usually not noticed)
- Persistence of effector T cells in the body for a long time (years!)
- Quick re-activation at the site of renewed allergic contact

In vitro assays for contact allergen identification

<table>
<thead>
<tr>
<th>Occupations</th>
<th>Allergens</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hairdressers and barbers</td>
<td>Nickel, Detergents, Hair dyes</td>
</tr>
<tr>
<td>Bakers</td>
<td>Sulfites, cinnamon, flour mites</td>
</tr>
<tr>
<td>Florist</td>
<td>Flower, Detergents</td>
</tr>
<tr>
<td>Construction and cement workers</td>
<td>Chromium</td>
</tr>
<tr>
<td>Electroplaters</td>
<td>Chromium, nickel, gold, silver, tin, glove</td>
</tr>
<tr>
<td>Dental technicians</td>
<td>Rubber, latex, acrylates,</td>
</tr>
<tr>
<td>Machinists</td>
<td>Cutting fluids, cobalts, germicidal agents</td>
</tr>
<tr>
<td>Cooks</td>
<td>Raw protein, glove, detergents, onion, fruits etc</td>
</tr>
<tr>
<td>Housekeepers, cleaners, restaurants</td>
<td>Detergents, gloves, solvents</td>
</tr>
<tr>
<td>Food processing industries</td>
<td>Raw protein, Glove, detergents</td>
</tr>
<tr>
<td>Wood processors</td>
<td>Varnishes, wood preservatives, resins, sawdust</td>
</tr>
<tr>
<td>Leather industries</td>
<td>Chromium, Dye</td>
</tr>
</tbody>
</table>
# Contact Dermatitis
## Differentiation Between ICD vs ACD

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Irritant</th>
<th>Allergy</th>
</tr>
</thead>
<tbody>
<tr>
<td>At risk</td>
<td>Anyone, especially if repeated exposure and occupational exposure</td>
<td>Previously sensitized and genetically predisposed</td>
</tr>
<tr>
<td>Mechanism</td>
<td>Nonimmunologic, direct tissue damage</td>
<td>Immunologic, delayed type hypersensitivity reaction</td>
</tr>
<tr>
<td>Concentration of offending agent</td>
<td>High dose</td>
<td>Low dose</td>
</tr>
<tr>
<td>Common causative agents</td>
<td>Water, soap, solvents, detergents, acids, bases</td>
<td>Poison ivy, poison oak, metals, cosmetics, medications, rubbers</td>
</tr>
<tr>
<td>Risk if atopic</td>
<td>Increased</td>
<td>Decreased</td>
</tr>
<tr>
<td>Symptoms</td>
<td>Burning, stinging, soreness</td>
<td>Itching</td>
</tr>
<tr>
<td>Morphology</td>
<td>Erythema, edema, desquamation, fissures</td>
<td>Erythema, edema, vesicles, papules, lichenification</td>
</tr>
<tr>
<td>Onset</td>
<td>Minutes to hour</td>
<td>Hours to days</td>
</tr>
<tr>
<td>Histology</td>
<td>Neutrophilic infiltrates</td>
<td>Lymphocytic infiltrates</td>
</tr>
</tbody>
</table>

*J Allergy Clin Immunol 2010; 125; S138-49*
CONTACT URTICARIA
Contact Urticaria

- Wheal formation following contact with agents encountered at work
- Clinical Presentations:
  - Erythema and edema
  - Urticaria or angioedema
- Time sequence: relationships, remits with absence from work and recur on returning to work
- Allergens:
  - Latex, raw proteins, corn starch, antibiotics, fruits, vegetables, acrylates, epoxy resins
Contact Urticaria

Contact Urticaria from fruits and vegetables

Courtesy of Niels Hjorth, M.D.
Skin Patch Testing
Patch test

- Mainstay of diagnosis
- Sensitivity and specificity 70-80%


- Reproduction of allergic contact dermatitis by applying allergen to the skin at standardized concentrations in an appropriate vehicle under occlusion

- Reading on Day 2, Day 4

Shehade SA et al. Epidemiological survey of standard series patch test results and observations on day 2 and day 4 readings. Contact Dermatitis 1991

- Additional Day 6 or 7 reading will pick up 10% more positives especially neomycin, tixocotol pivalate, nickel

Jonker MJ, Bruynzeel DP. The outcome of an additional patch test reading on day 6 or 7. Contact Dermatitis 2000.

ALWAYS INTERPRET PATCH TEST RESULTS WITH RELEVANT HISTORY & CLINICAL FINDINGS
Patch test & Photopatch test

Role: To detect contact allergens & photo-allergens

Allergen series:
1. Standard European series
2. Medicament series: antibiotics and steroids
3. Cosmetic series
4. Dental series
5. Shoe
6. Hairdressing series
7. Rubber series
8. Cosmetic series
9. Etc
Photocontact Dermatitis

Photo-allergens that are activated with exposure to UV light and causes contact dermatitis

Common allergens:

1. Sunscreen: Oxybenzone, PABA
2. Balsam of Peru, Perfume mix
3. Promethazine hydrochloride
4. Chlorpromazine hydrochloride
5. Diphenhydramine hydrochloride
IQ Chamber
The improved Test Chamber
For efficient and accurate Patch Testing
developed by Chemotechnique Diagnostics
Allergens Exposure

1. While doing your daily activities
2. Work-related diseases: occupational contact dermatitis

- Cause of the skin disease
- Aggravation of an underlying skin disease
  - Endogenous hand eczema
  - Pompholyx
  - Xerosis / ichthyosis
  - Id reaction due to fungal infection
Right: Nickel dermatitis on the earlobe

Left: Nickel dermatitis from tiny metal parts of a plastic watchband
Nickel dermatitis from belt
Right: Nickel dermatitis from jeans buttons

Left: Nickel dermatitis from spectacle frames
Chromate dermatitis on L wrist from a leather watch strap. When the watch was moved to R wrist, dermatitis appeared on the R wrist.
Chromate dermatitis from leather in work shoes
PATCH TEST CHAMBER: inert qualities
To avoid inactivation, modification and absorption of allergen during contact with the surface of the test chamber

Finn Chamber (Aluminium) on Scanpore Tape  
Additive free polyethylene plastic
Preparation of Patients

- Should not take any cortisone (topical / systemic) that can altering the immune system during the test
- Avoid exposure of the back to the sunlight
- During the time the patches remain on the back the patient should not shower, perform hard work or do exercise that will result in sweating
- Fill in the *Patient record form* of the series tested → facilitates to keep track of your patients test results
Preparation of Haptens

- Can be preloaded on IQ Ultra™ for up to 2 weeks
- Storage in the refrigerator
- Do not preload liquid haptens and volatile substances such as acrylates or fragrances
Testing own products

- Chemical substances at work: read the MSD (Material safety data sheet)
- Litmus paper to detect excessive acidity and alkalinity
  Do not test if pH < 3 or pH > 10
- Own products: cream, ointments and gels can be applied neat or as is under occlusion
Patch test site

- Upper back or upper arm
- Should not have sunburn or dermatitis in this area
- Should not apply topical steroids at least 1 week prior to patch testing
- No alcohol or soap to clean the area as they may cause irritation under the tape
Patch Test Procedure

1. Prepare on tray: Finn chamber on scanpore tape
2. Strip the cover to expose the finn chamber
3. Half fill each finn chamber
   Do not touch the edge
4. Move from Lt to Rt
   (Lt most chamber is intended to be pasted at the upper end)
5. For liquid allergens, use filter paper (insert in chamber and wet the filter paper). Do them last to prevent it from drying up
PATCH TEST ALLERGENS
FINN CHAMBER ON SCANPOR TAPE (HYPOALLERGENIC)
FINN CHAMBER: ALUMINIUM
PHOTOPATCH TEST
Patch Test Procedure

6. Apply on the back with slight pressure from the lower end moving up to the upper end

7. Number your allergens - top most of tape

8. Use a marker - mark at both side of the chamber

9. Advice not to wet the back

If on steroid - avoid doing patch test
If on antihistamine- at present - no contraindication
No application of steroid cream on the back
PATCH TEST READING
Use the IQ Ultra Reading Plate to facilitate the reading
Patch Test Reading

- Ideally by same person
- Immediately after removal of patches, there may be erythema from the stripping action of tape
- Must be allowed to settle and reading is done after 1 hr
- Reading of the test is preferably performed at
  - Day 3
  - Day 5
  - +/- Day 7 after test application for haptens (May show delayed reactions)
| Day 1: | Apply patch test |
| Day 2: | (Shine with UVA for photopatch test) |
| Day 3: | Remove Patch Test |
| Day 3: | First reading |
| Day 4: | (Optional – can do reading) |
| Day 5: | Final reading |
| Day 7: | (Optional - steroid allergy) |
Patch test reading

Readings:

± or ? Doubtful reaction (minimal/marginal)
+
Weak (non-vesicular) reaction
++
Strong (edematous or vesicular) reaction
+++ Extreme reaction
IR Irritant reaction
**IR Irritant reaction**
Discrete patchy erythema without infiltration
Confined to the contact site
Better with removal of culprit
Patch Test Reading

This is irritant reaction.
Due to 2% Cetavlon lotion
Note the well defined erythema, the shape of finn chamber. If the allergen leak over the edge, the adjacent area also become erythematous

Plate 9  Irritant reaction to monoethanolamine with necrosis of the skin and scab formation.
?+ Doubtful reaction
Faint macular
Homogenous erythema
No infiltration
Plate 1  Doubtful patch test reaction (?): macular erythema.
Plate 2  Weak positive patch test reaction (+1): indurated erythema.
Plate 3  Strong positive patch test reaction (+2): papules and vesicles.
Plate 4 Extremely strong patch test reaction (+3): confluent vesicles and bullae.
Allergens which can produce late reactions: extra reading at D6 or D7

May give an additional information in 7 to 8% of patients

- Nickel sulfate
- Neomycin sulfate
- Tixocortal-21-pivulate, steroids
- para-phenylenediamine
- Cobalt chloride
- Thiomersal
- P-tertiarybutylphenol formaldehyde resin
- Methylchloroisothiazoline
- Methylidothiazoline
Suspected Steroid Allergy

- Tixocortal-21-pivulate → hydrocortisone allergy
- Budesonide → Betamethasone allergy
Hand Eczema Management & treatment

General recommendation for HD according to its severity

- **Steroid** is still the **first-line and mainstay treatment** for hand dermatitis
- It’s important to keep hands **moisturized, clean and well protected especially at workplace** throughout the day

*English J. et al. Hand Dermatitis. European Handboörk of Dermatological Treatment*
Control the flare with potent TCS or systemic CS. Treat any infection. Find cause and identify allergen.

**MILD HD**
- TCS 4-8 weeks
  - Improved
  - Not improved
    - Maintain with TCS prn*
      - Improved
      - Not improved
        - Education
          - Check compliance
          - Increase potency of TCS 4-8 weeks
        - TCS moderate to super potent
          - Improved
          - Not improved*
            - Consider treatment as moderate HD
              - Improved
              - Not improved
                - Maintain with TCS prn*
          - Maintain with TCS prn*
            - Improved
            - Not improved

**MODERATE HD**
- TCS moderate to super potent
  - Improved
  - Not improved*
    - Consider phototherapy, or treatment as severe HD
      - Improved
      - Not improved
        - Maintain with TCS prn*
          - Improved
          - Not improved*
            - Education
              - Alitretinoin
              - Phototherapy
            - Cyclosporine

**SEVERE HD**
- Potent or super potent TCS 4-8 weeks (2 weeks if superpotent)
  - Improved
  - Not improved*

The algorithm suggests treatments that:
- Have an approved indication for this disease state, or
- Have evidence based literature to support their use for this disease state, or
- Have significant positive clinical experience that justifies their use for this disease state, based on expert opinions

German S1-Guideline “Occupational skin products: skin protection, skin care and skin cleansing”

Confirmed the proven benefit of combined application of protective creams and skin care products in prevention of work-related contact dermatitis.

“3-Pillar Model”: Protect – Cleanse - Repair

<table>
<thead>
<tr>
<th>Protects</th>
<th>Cleanse</th>
<th>Repair</th>
</tr>
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<tbody>
<tr>
<td>Protects the skin against irritant during work</td>
<td>Removes dirt and aggressive substances without causing skin irritation</td>
<td>Restores and regenerates the skin barrier after work</td>
</tr>
</tbody>
</table>

The goal of treatment is to restore the normal skin barrier and protect the skin from future injury.

Suggested Step-care: Management of Hand Eczema

Integrative skin protection

Protect
Cetaphil Gentle Cleanser

Cleanse
Nutraplus Protect Hand Cream

Repair
Nutraplus Repair Hand Cream

Medicate
Efficort Cream / Lipocream
THANK YOU