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Dermatitis – diff. diagnosis I

eczema x dermatitis

- Allergic contact dermatitis
- Irritant contact dermatitis
- Microbial eczema
- Seborrheic dermatitis

- Atopic dermatitis

1. Allergic contact dermatitis

5 – 15% of all dermatoses

Prevalence – 1,5-3%

Incidence – 5-10 / 1000 per year

Hypersensitive reaction of the
IVth type according to Coombs & Gell

Allergic contact dermatitis

- **contact allergens** – molecules smaller than **500 D** – *penetration through the skin barrier*
- **binding of the molecule – hapten** - to pt's own proteins in the skin forms an **antigen** – with the molecular weight at least **5000 D**
- the conjugation of haptens with proteins happens in LC (**antigen presenting cells**)

Allergic contact dermatitis

Induction phase Penetration of allergen through stratum corneum Interaction with APC Phagocytosis of antigen

subsequent expression of antigen on the surface of LC Migration to regional lymphatic nodes and presentation of the antigen to naive

T-lymphocytes

Allergic contact dermatitis

Elicitation phase – in case of sensitization

proliferation of specific clone of effector

T-lymphocytes migration to the site of allergen penetration

Cytotoxic effect of T-lymphocytes releasing cytokines leading to inflammation

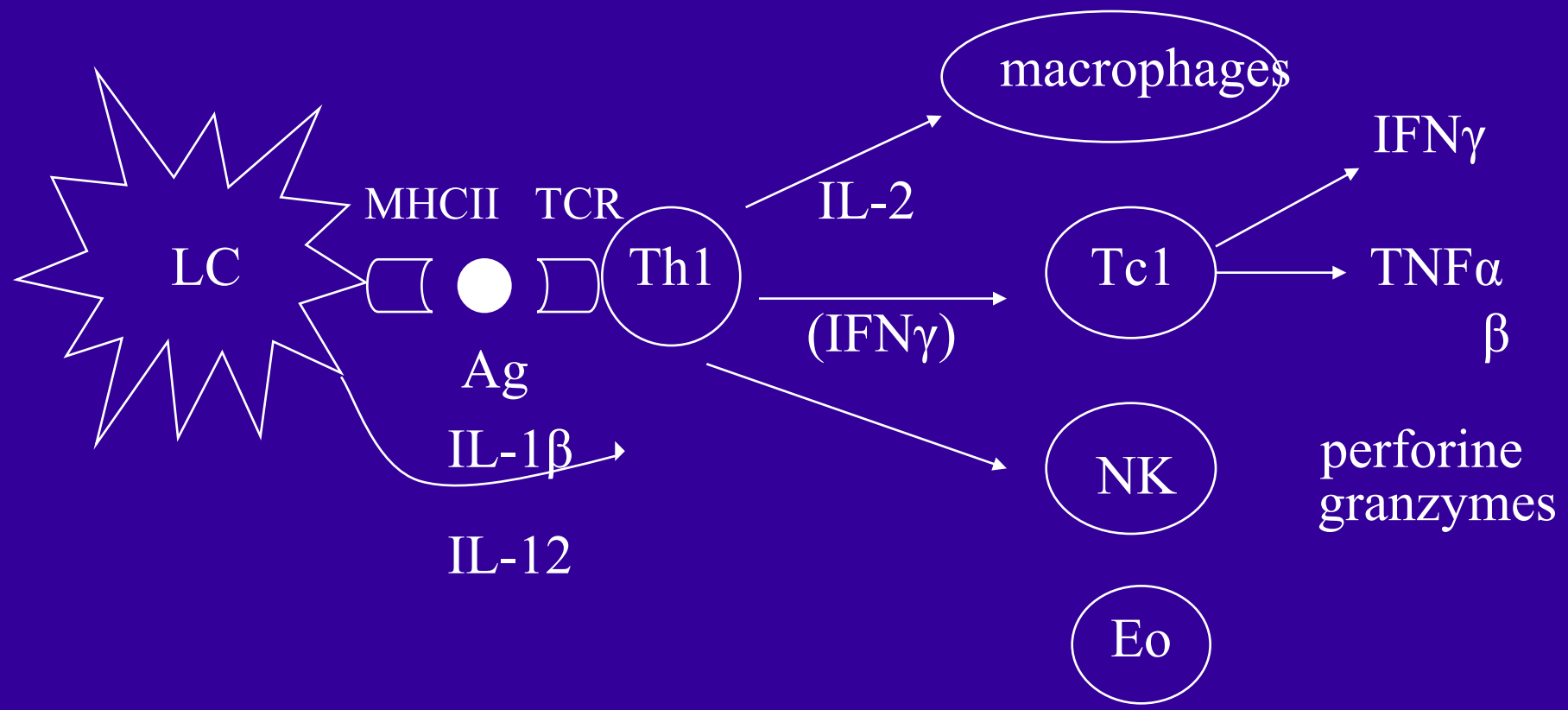
→ **allergic contact dermatitis**

Shortest time to sensitization: 5-14 days

migration of LC to regional LN takes about 5-24 hours

proliferation of T-lymphocytes: 5-10 days

Patophysiology of the late-type hypersensitivity



Allergic contact dermatitis

Factors influencing the ease of sensitisation:

- ◆ **Chemical structure of allergens**

- ◆ **Patient** – skin barrier status (fissures, maceration)
localisation (eyelids x soles)
age

- **Duration of hypersensitivity**

- survival time of memory T-lymphocytes
- character of allergens

European Standard Series

- **Potassium dichromate 0,5 % pet.**
- **Neomycin sulphate 20 % pet.**
- **Thiuram mix 1% pet.**
- **Paraphenylenediamine 1% pet.**
- **Cobalt chloride 1% pet.**
- **Caine mix III 10% pet**
- **Formaldehyde 1% aq.**
- **Colophony 20% pet.**
- **Hydroxyethylmethacrylate 2% pet.**
- **Balsam of Peru 25 % pet.**
- **N-isopropyl-N-phenyl-4-phenylenediamine 0,1% pet.**
- **Wool alcohols 20% pet.**
- **Mercapto mix 2% pet.**
- **Epoxy resin 1% pet.**
- **Paraben mix 16% pet.**

European Standard Series

- **P -4-t- butylphenol formaldehyde resin 1% pet.**
- **Fragrance mix 8% pet.**
- **Quaternium 15 1% pet.**
- **Nickel sulphate 5% pet.**
- **Kathon CG 0,01% aq.**
- **Mercaptobenzothiazole %pet.**
- **Sesquiterpenlactone mix 0,1% pet.**
- **Propolis 10% pet.**
- **Tixocortol-21-pivalate 0,1% pet.**
- **Budesonide 0,01% pet.**
- **Methyldibromoglutaronitrile (1,2-dibromo-2,4-dicyanobutane)**
- **Fragrance II mix 14% pet.**
- **Lylal 5% pet.**
- **Methylisothiazolinone 0,2% aq.**
- **Textile dye mix 6,6% pet.**

⋮
Most common contact allergens DVK
(2019)

1. nickel sulphate	16,1%
2. balzam of Peru	9,3%
3. Kathon	6,8
4. methylisothiazolinone	5,7%
5. epoxide resin	5,3%
6. PPD	5,0%
textile dye mix	5,0%
fragrance mix I	5,0%
cobalt chloride	5,0%
10. propolis	3,9%



Metal glasses



Metal ring

Allergic contact dermatitis – nickel



Metal watch



Metal button



Allergic contact dermatitis from **cobalt**
& **nickel** - coupled allergy



ACD to chromium from leather boots

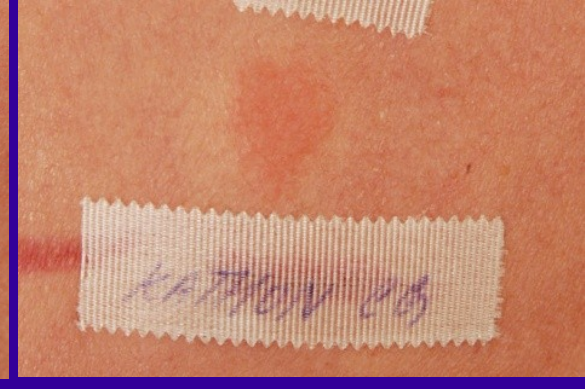


Kathon CG

Preservative, mixture of CMI and MI 3:1

- **cosmetics and other toiletries** (hair cosmetics, soaps, refreshing towels, toilet paper)
since 2015 in the EU allowed only in cosmetic products for short-term skin contact –rinse off, concentration up to 15 ppm
- **household preparations** (washing and cleaning preparations, polishes)
- **industry** (adhesives, water-based paints, latex paints, cooling fluids etc. - there is no concentration limitation!)

Possibility of group hypersensitivity with isothiazoline derivatives used in industry - benzisothiazolinone, octylisothiazolinone



Allergic contact dermatitis – **Kathon CG** (from cosmetic preparations), and to **methylisothiazolinone**, **octylisothiazolinone**



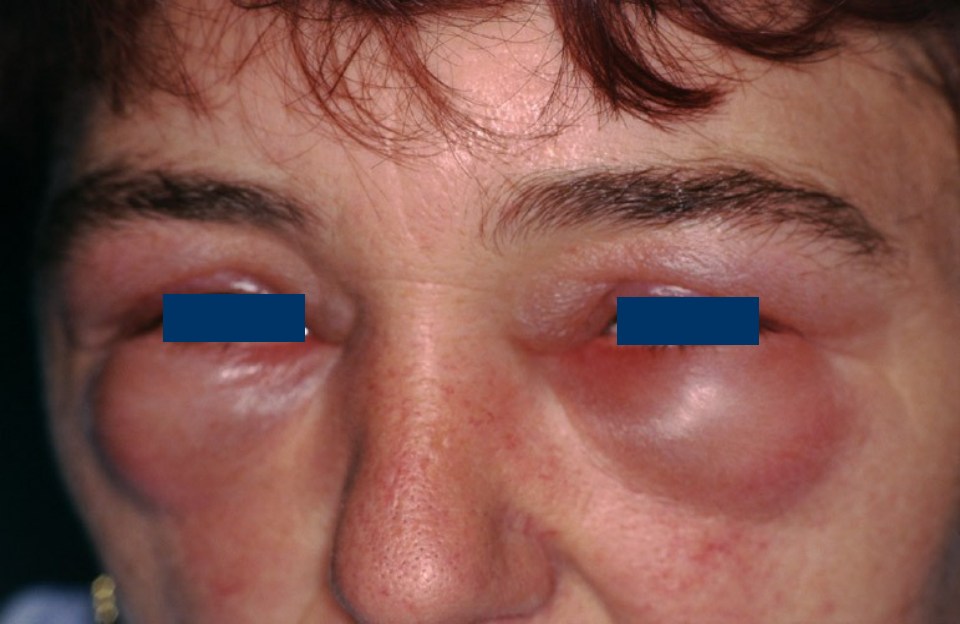
ACD - **IPPD**, antioxydant
of black rubber



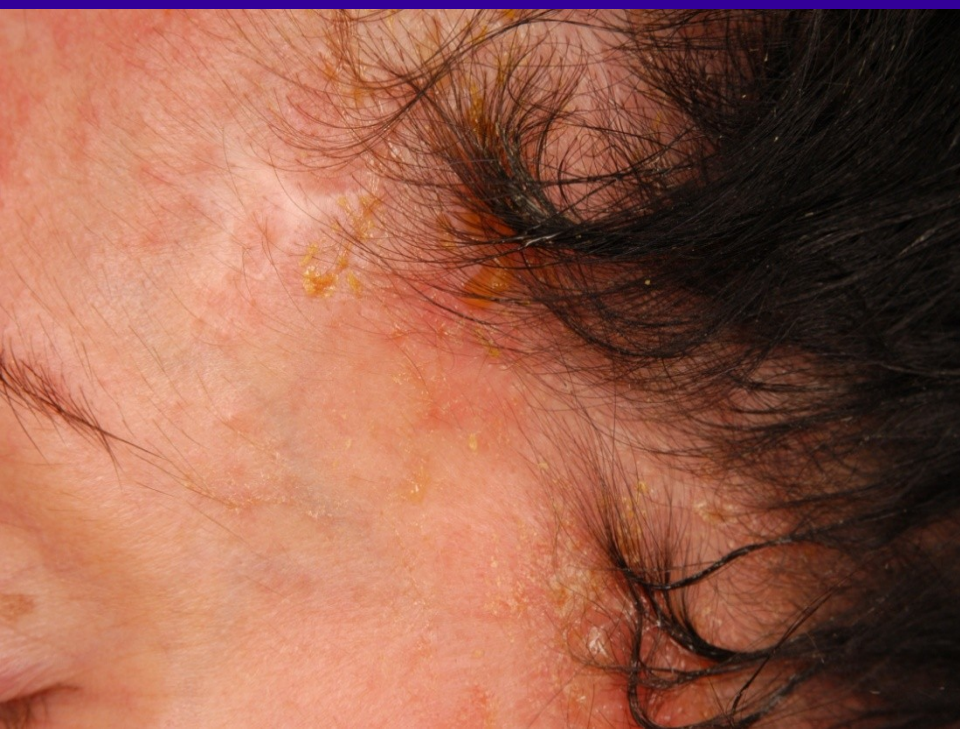
Tonometer, stethoscope
(nurse)



Rubber boot



ACD to **PPD** from hair dyes



Fragrances

Fragrance mix I

- ❖ Cinnamic aldehyde
- ❖ Cinnamic alcohol
- ❖ myl-cinnamic aldehyde
- ❖ Eugenol
- ❖ Isoeugenol
- ❖ Geraniol
- ❖ Hydroxycitronellal
- ❖ Oak moss absolute (Akranorin)
- Sorbitan sesquioleate (emulgator)

Frequency of sensitization:

worldwide

4,7-13,3%



ACD to fragrance (eau de toilette)





**Allergic contact
dermatitis—
fragrance —
cosmetic cream**



**Patch tests —
contact allergy to
fragrance and
cinnamic alcohol**

Shared components in natural products

Balsam of peru

- cinnamic alcohol
- cinnamic aldehyde
- cinnamic acid
- eugenol
- isoeugenol
- PABA
- benzylbenzoát
- benzaldehyd
- benzylalcohol
- colophony
- limonen
- vanillin

Fragrance-mix I:

- cinnamic alcohol
- cinnamic aldehyde
- cinnamic acid
- eugenol
- Isoeugenol
- α -amylcinnamoc aldehyde
- hydroxycitronellal
- geraniol
- oak moos absolute

Propolis:

- Cinnamic alcohol
- Cinnamic acid
- Vanillin
- Caffeic acid
- 3-hydroxy-cinnamic acid
- 3-methoxy cinnamic acid
- Dimethyl caffeic acid

Tea tree oil:

- terpinens
- d-limonen
- α -pinen
- 1,8-cineol
- δ -3-caren



Eczema contactum – propolis,
balsam of Peru α -amyl-cinnamic
aldehyde, colophony



Propolis

- natural product – a resinous mixture that honey bees collect from tree buds, sap flows, or other botanical sources.
- The chemical composition of propolis varies depending on season, bee species and geographic location.
- Propolis has approximately **50 constituents**, primarily resins and vegetable balsams (50%), waxes (30%), essential oils (10%), and pollen (5%).
- Propolis has antibacterial, fungicidal, antipruritic and antiinflammatory effects and promotes epithelisation



**Allergic contact
dermatitis–
propolis (folk medicine
preparations)**





Allergic contact
dermatitis—
propolis (folk medicine
preparations)



Corticosteroids

A - type Hydrocortisone:

D ring unsubstituted, C 20, C 21 unsubstituted or C 17, C 21 short chain (acetates or esters), possibly. C 21, thioester

B - type Triamcinolone acetonide:

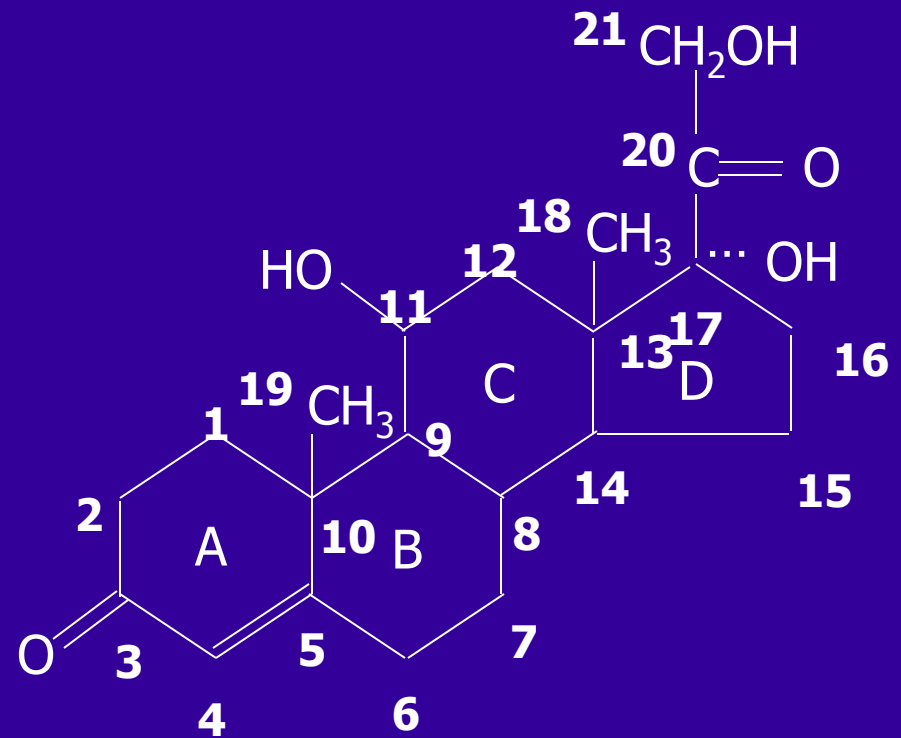
C 16, C 17 cis-ketal structure or diol structure

C - type Bethametasone:

C 16 methyl substitution

D - type Hydrocortisone butyrate:

C 17, and / or C 21 long ester chains, possibly. C 16 methyl substitution





Patch test—
contact
allergy to
Budesonide

Budesonide - Apulein ung, crm, liq, Pulmicort aer inh,
Pulmicort, Turbuhaler plv inh, Rhinocort spr nas

Budesonid 1%

Betamethasoni dipropioni 0,025%

72h.

ec. 2%

Budesonido, 0,025%

Rhinocort spray 72h.

ison ec. 1%

Hydrocortison



Drug eruption in patient sensitized to topical CS after systemic exposure to - Prednisone tbl



„new“ allergens

Ketoprofene – nonsteroidal antiinflammatory drug
derivative of propionic acid

Ketoprofene – **topical**

Fastum

Profenid gel

Ketonal crm

and others

systemic

Ketoprofen tbl,sup

Ketonal cap,sup amp i.m.

Ketonal forte tbl

Ketonal ret tbl

Profenid cap,tob,sup amp

Profenid 100 mg pro inf

Toprec tbl

Allergy potentiated by sun exposure – photocontact allergy



**Photocontact allergy - ketoprofene
(Fastum gel)**



**Patch test -
alergická reakce
na Fastum gel**



**Patch test -
alergická reakce na
ketoprofene**

**Photocontact allergy - ketoprofene -
generalizace (Fastum gel)**

Acrylates

- **Industry:** plastics, plexiglass, synthetic rubber, insulating materials, plasters, acrylic floors, adhesives, UV-cured paints, paints
Dentistry: composite fillings, orthodontic appliances
Bone cement: endoprostheses, osteosynthesis
Medical devices: spectacle frames, patches, hearing aids, insulin pumps...
- **Cosmetic industry:** cosmetic industry
acrylic nails, artificial eyelash adhesives

Acrylates

- Monomers - high sensitizing potential
Polymers (cured) do not sensitize
but: risk of sensitization by contact with monomers created by secondary depolymerisation



Tea Tree Oil

source: leaves of the tea tree (*Melaleuca alternifolia*)

occurrence: Australia, Spain, Portugal

use: folk /traditional/ medicine

effects: antiseptic

antifungal

antibacterial

Components of Tea Tree Oil

Mixture of mono and sesquiterpens

- | | | | |
|-----------------|---------|----------------|------------|
| ❖ Terpinen-4-ol | 30-45% | ❖ 1,8 Cineol | 0-15% |
| ❖ Terpinen | 10-28% | ❖ Cadinen | stopa-8% |
| ❖ Terpinen | 5-13% | ❖ Aromadendren | stopa-7% |
| ❖ Terpeneol | 1,5-8% | ❖ Sabinen | stopa-3,5% |
| ❖ Terpinolen | 1,5-5% | ❖ Globulol | stopa-3% |
| ❖ Pinen | 1-6% | ❖ Viridiflorol | stopa-1,5% |
| ❖ Cymene | 0,5-12% | ❖ β-Caren | stopa-0,2% |
| ❖ d-Limonen | 0,5-4% | | |



**Allergic contact dermatitis – tea tree oil
(cosmetic preparations)**



**Patch tests –
contact allergy to
tea tree oil and
other etheric oils**

Plant extracts

family of Compositae

main allergens - sesquiterpenolaktone

Extr. Chamomillae - chamomile

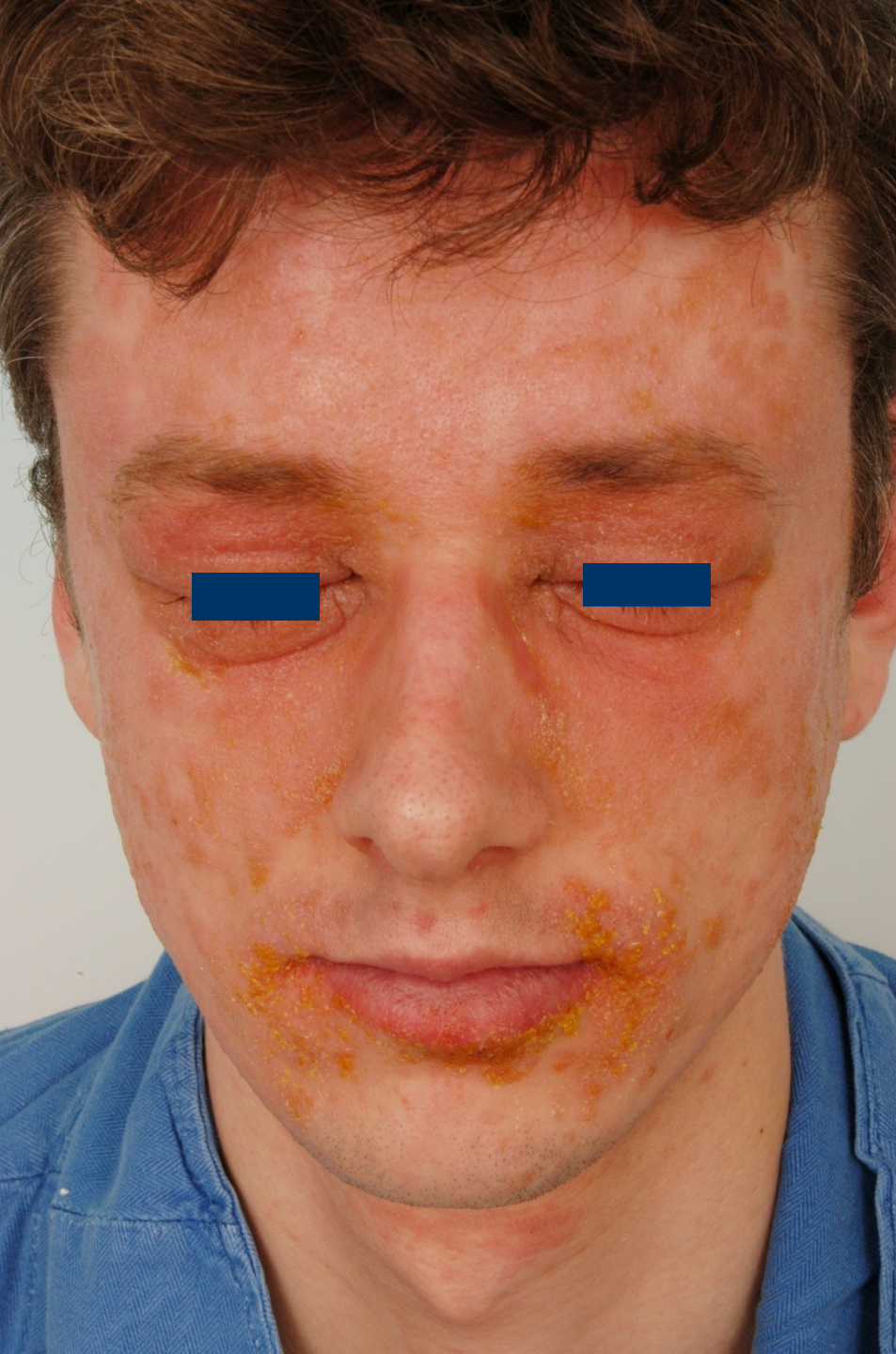
Extr. Calendulae - marigold

Extr. Arnicae - arnica

others:

Sunflower - Helianthus annuus,

Chrysanthemum, Cynia, Astra etc.



ACD to marigold (extr. Calendulae)

ACD to marigold in the terrain of atopic dermatitis





**Eczema contactum -
chloramphenicol, *extr.*
Chamomillae**



**Eczema atopicum et
contactum - *extr.*
Chamomillae**



**Eczema contactum -
Neomycin, *extr.*
Chamomillae**



2. Irritant contact dermatitis

- Nonallergic reaction
- Dose dependent
- Exposition to exogenous more or less toxic agent
- More common than allergic contact dermatitis



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Irritant contact dermatitis

Causes:

- **chemical agents:**
 - alkaline & acid solutions
 - Organic solvents (toluene...)
 - Detergents
 - Disinfectants
 - Food stuffs (fruit acids, mustard...)
 - Even water
- **physical agents:** UV radiation, heat, cold, mechanical factors

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Clinical picture

- Lesion sharply bordered
- Intensity depends on the toxicity of the substance (more toxic.. more acute reaction)
- Toxic agents:

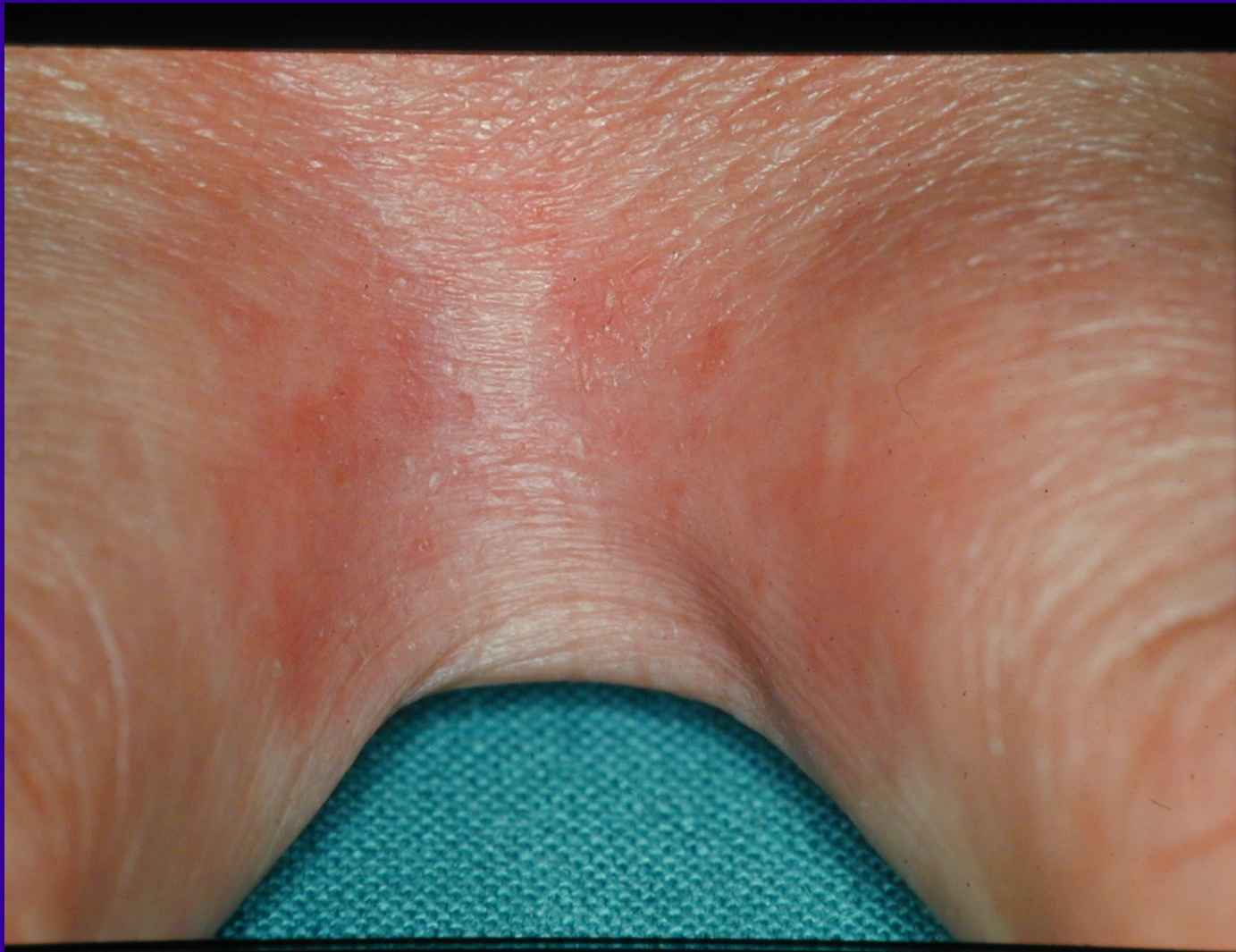
redness – swelling - blisters - necrosis

- Less toxic agents – chronic ICD

Redness, scales, lichenification, hyperkeratosis

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Acute ICD



Treatment of ACD & ICD

Topical corticosteroids

Class I - low potency CS

HCT acetate (HCT ung.), DXM acetate (DXM crm.)

Class II mid-potent CS

HCT butyrate (Locoid crm.,lotio), TMC acetonid (TMC crm.), alclomethason (Afloderm crm, ung.)

prednikarbate (Dermatop crm., ung.)

methylprednisolon aceponate (Advantan crm.)

Class III - potent CS

betamethasone dipropionate (Beloderm,Diprosone crm.)

fluocinolone acetonide (Gelargin gel,ung.)

momethason furoate (Elocom crm., ung., lotio)

Class IV – very potent CS

clobethasol propionate (Dermovate crm., ung)

Antihistamines, systemic corticosteroids – short courses

3. Microbial eczema

Allergy of IVth type to bacterial allergens –
mostly to Staph. aureus
appears mostly secondary:

in pyodermas, scabies, atopic dermatitis, ICD
around fistulas, stomias, in varicous terrain on legs
around sites of inflammation (chronic rhinitis, otitis)

variant: **nummular dermatitis** (coin shaped
patches and/or plaques) usually in patients with
focal bacterial infection (tooth granuloma, chronic
tonsillitis, chronic urogenital infections etc.



Microbial eczema



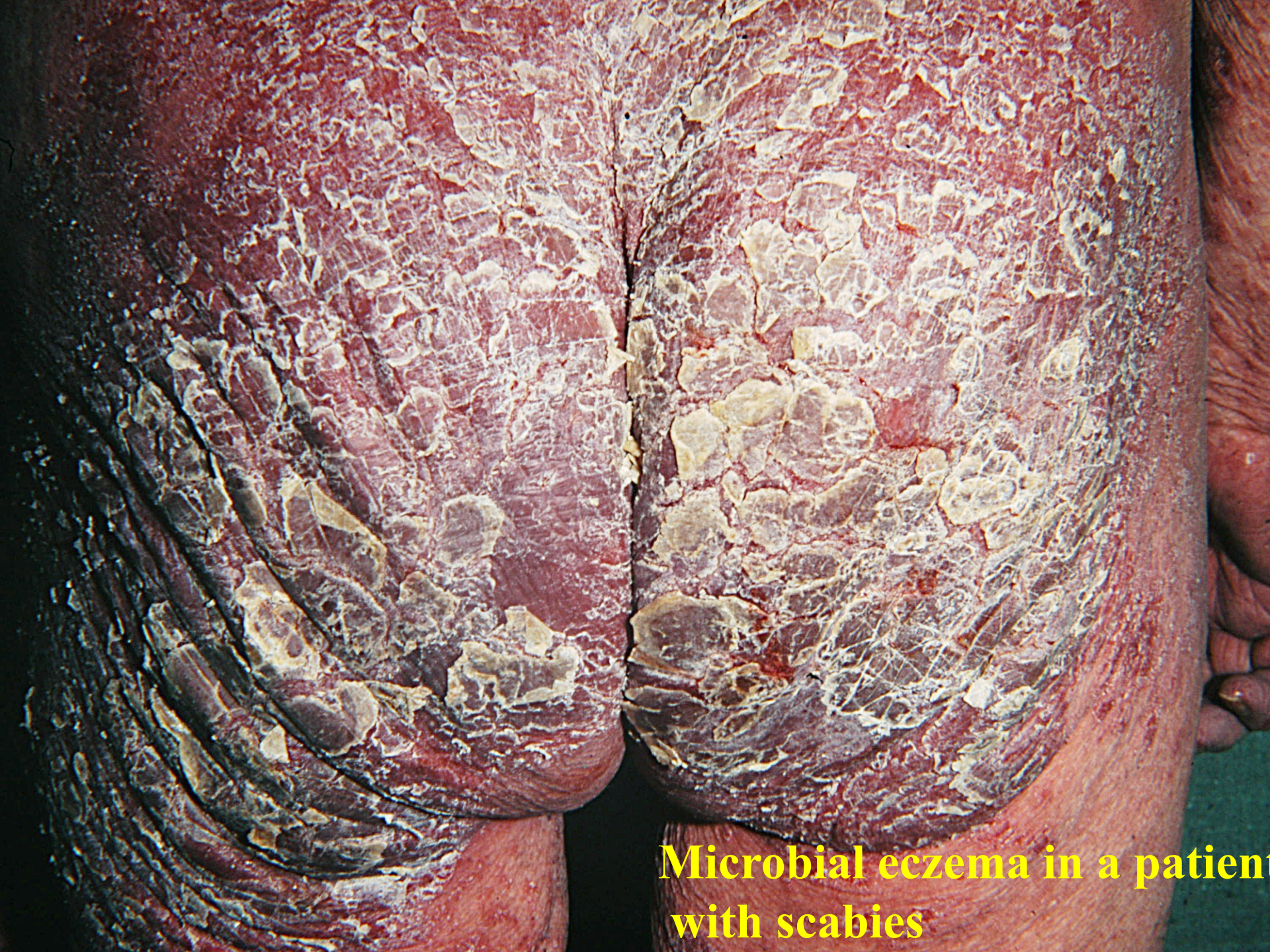
Microbial eczema



**Microbial eczema in patients with CVI
= varicous eczema**



**Microbial eczema in a patient
with chronic otitis**



**Microbial eczema in a patient
with scabies**

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Treatment of microbial eczema

Acute phase:

- Drying compresses
- Topical zinc preparations
- Topical corticosteroids in lotion base

Subacute and chronic phase:

- ATB paste, endiaron paste, tar preparations
- Combination with topical CS (TMC-E, Belogent, Fucicort)

Systemic ATBs

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4. Seborrheic dermatitis

- **localisation:** seborrheic predilection sites
- **etiology:** genetic predisposition, hormonal status
dysseborrhea – altered composition of sebum
Malassezia sp. = pityrosporon ovale
immunodeficiency - AIDS
depletion of zinc, comorbidities

Clinical picture: erythematous scaly lesions

Typical sites: scalp, eyebrows, nasolabial folds,
midchest region, around umbilicus, groins & axillae

- Subjective complaints: itching, burning





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Treatment of seborrheic dermatitis

- Topical imidazole antifungals + topical corticosteroids
- Topical immunomodulators (off label)
- Topical imidazole antifungals
- Topical preparation with zinc
- zinc supplementation
- Systemic antifungals

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