

분당차병원 피부과
신정우

흔한 피부 습진, 어떻게 감별하고 치료할까?

1. Contact dermatitis

2. Atopic dermatitis

3. Seborrheic dermatitis

Contact dermatitis

Contact Dermatitis

- among the most common inflammatory dermatological conditions
- exposure to exogenous substances → immune response → inflammation in the skin and/or mucous membranes

| Type of contact dermatitis | Primary immunological mechanisms | Examples of culprits | Evaluation technique examples |
|--|--|--|--|
| Allergic ^a | Type IV hypersensitivity reaction | Metals, fragrances, preservatives, dyes, adhesives, topical medications (for example, antibiotics), rubber accelerators and antioxidants | Patch testing, repeat open application test/use test |
| Photoallergic | Type IV hypersensitivity reaction; requires light exposure (primarily on the ultraviolet A spectrum) | Chemical sunscreens, NSAIDs, fragrances | Photopatch testing |
| Irritant | Direct cellular damage | Soaps and detergents, water, acids, alkalis, adhesives, solvents, oils | No routine testing available; it is a diagnosis of exclusion |
| Photoirritant (also called phototoxic) | Direct cellular damage; requires light exposure (primarily on the ultraviolet A spectrum) | Plants and fruits, medications | No routine testing available |
| Protein | Type I and type IV hypersensitivity reactions | High-molecular-weight proteins, especially food proteins such as in vegetables ³⁷³ , spices ³⁷⁴ , animal protein ^{375,376} , wheat ³⁷⁷ and milk ^{378,379} ; other substances include enzymes ³⁸⁰ and latex ³⁸¹ and cross-reactivity has been described between several protein sources ³⁸² | Short-term occluded patch testing (may be done on finger or palm), prick-prick testing, skin-prick testing |

+) Occupational CD encompasses all types of CD

Contact dermatitis

➤ Irritant contact dermatitis

- ✓ 직접 세포 독성
- ✓ 선천면역

➤ Allergic contact dermatitis

- ✓ 제 4형 과민반응
- ✓ 선천면역 반응 + 적응면역

➤ Photoirritant CD and photoallergic CD

- ✓ UVA 등 광노출이 필요함.
- ✓ ICD, ACD 기전과 동일

➤ Protein contact dermatitis

- ✓ 제1형 + 제4형 과민반응
- ✓ 밀, 우유, 라텍스 등 단백질에 대한 과민반응

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Allergic contact dermatitis

이전에 감작된 물질에 노출되었을 때 유발되는 제4형 지연과민반응

➤ **Sensitization**

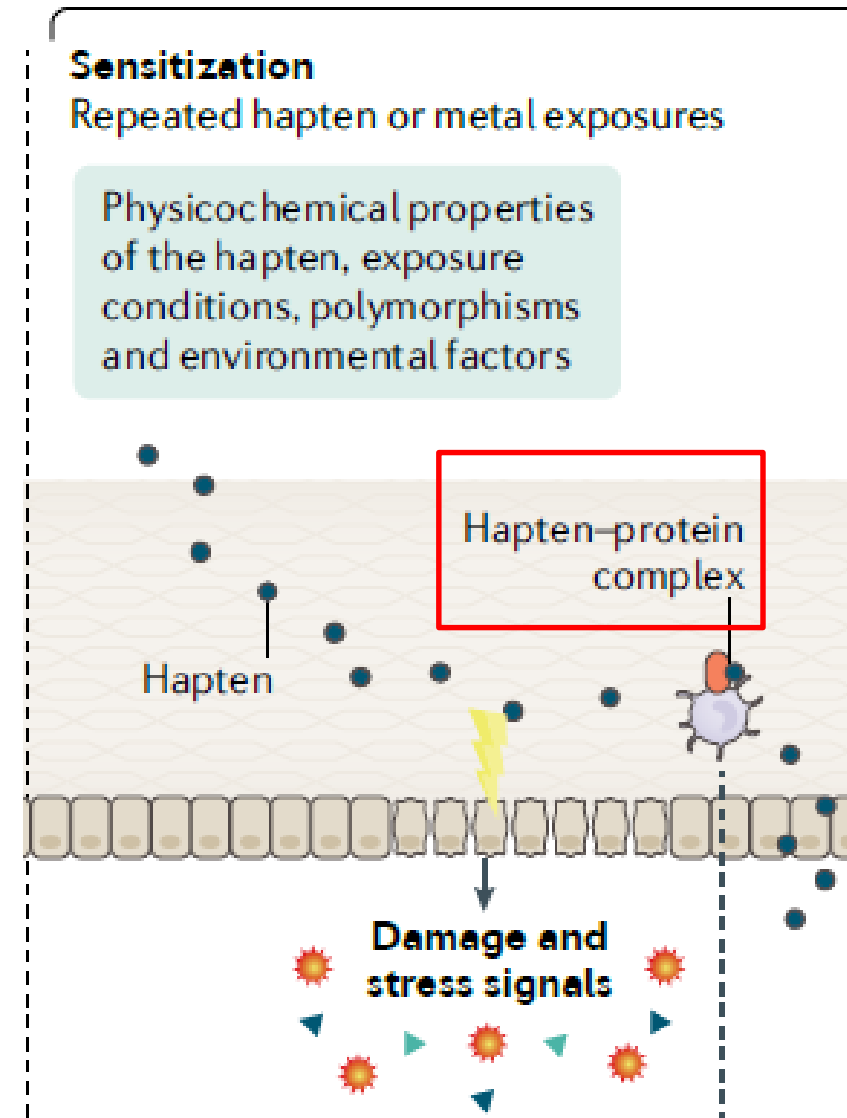
- ✓ permeation of the allergen into the skin
- ✓ formation of **hapten–self- protein complexes**
- ✓ local inflammatory milieu
- ✓ **efficient T cell priming by migratory skin dendritic cells (DCs)**

➤ **Elicitation**

- ✓ Subsequent exposure to the chemical
- ✓ **localization to the skin and reactivation of hapten- specific effector and memory T cells**
- ✓ **kill haptenized keratinocytes**
- ✓ local erythema and epidermal spongiosis

Allergic contact dermatitis

1> Initial sensitization: the formation of **hapten– self- protein complexes**



Trends in allergens

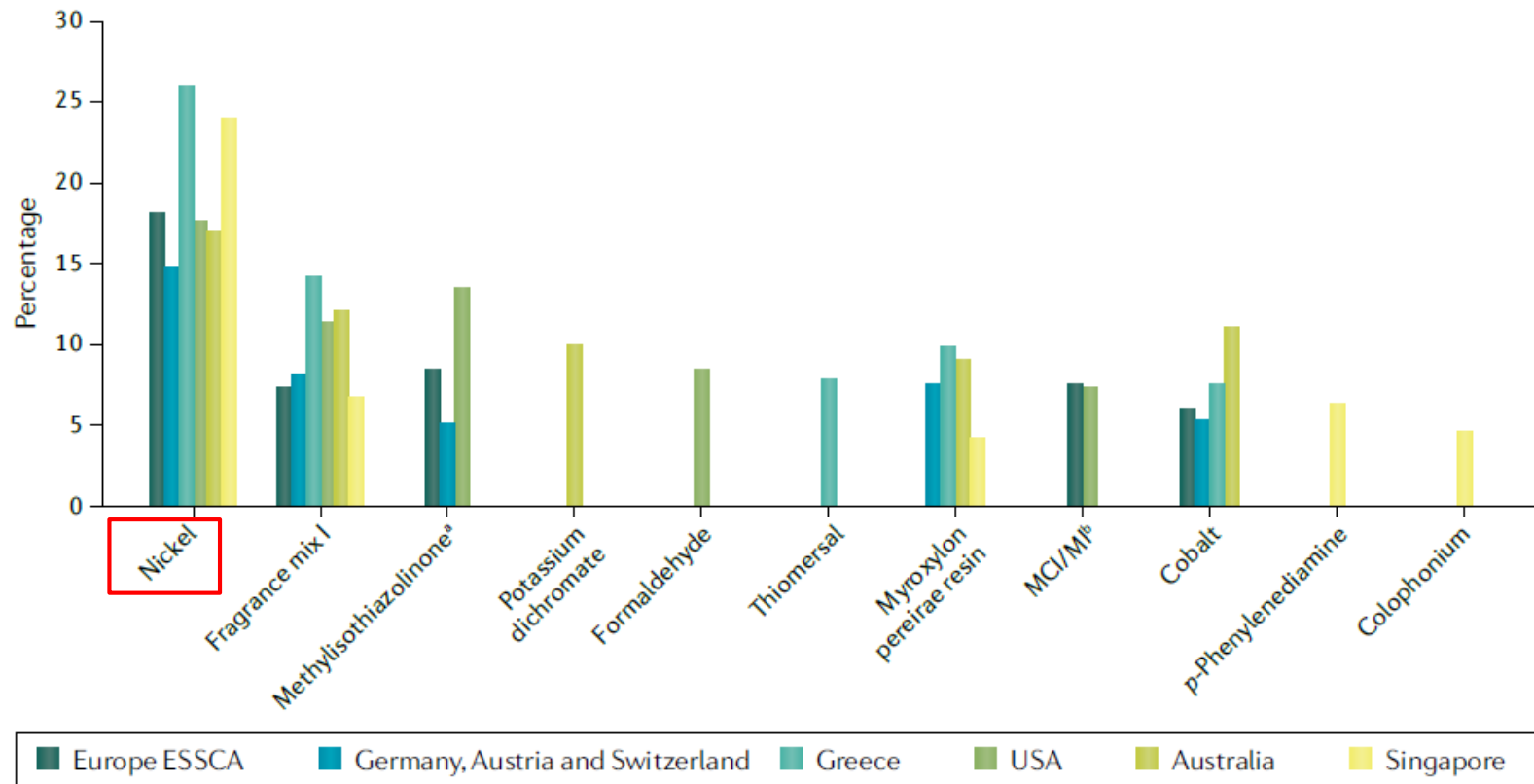


Fig. 1 | Top sensitizers in various regions worldwide. Prevalence of the most common allergens among various locations. Nickel is the most commonly identified contact allergen worldwide, followed by methylisothiazolinone or fragrance mix I, depending on the region. The presented data is based on studies from Europe (12 countries, time period 2013–2014)⁴⁴, Germany, Austria and Switzerland (2007–2018)³⁸³, Greece (2010–2016)³⁸⁴, North America (2015–2016)⁴, Australia (2001–2010)⁴⁸ and Singapore (2009–2013)³⁸⁵. ^aCombined average of percentage of patients sensitized to methylisothiazolinone 0.02%, 0.05% or 0.2%. ^bCombined average of percentage of patients sensitized to methylchloroisothiazolinone/methylisothiazolinone (MCI/MI) 0.01% or 0.02%. ESSCA, European Surveillance System on Contact Allergies.

| Allergen | KCDRG (1983~1985) N=937 | KCDRG (1986~1993) N=2326 | KCDRG (2009~2010) N=795 | KCDRG (2015~2016) N=214 |
|--------------------------------------|----------------------------|-----------------------------|----------------------------|----------------------------|
| Nickel sulfate | 12.9 | 17.9 | 34.1 | 28.5 |
| Thimerosal | 6.7 | 5.7 | 12.6 | 6.1 |
| Cobalt chloride | NA | 13.8 | 11.1 | 17.3 |
| o-Phenylenediamine | 7.3 | 3.4 | 8.4 | 7.5 |
| p-tert butylphenolformaldehyde resin | 1.0 | 2.4 | 6.2 | 5.1 |
| Potassium dichromate | 11.8 | 11.3 | 5.6 | 8.9 |
| Carba mix | NA | 1.4 | 5.6 | NA |
| Fragrance mix | NA | 12.9 | 5.2 | 9.3 |
| Colophony | NA | 3.3 | 4.3 | 1.9 |
| Tniuram mix | 3.2 | 2.6 | 3.7 | 0.9 |
| Black rubber mix | 2.7 | 1.0 | 3.5 | NA |
| Epoxy resin | 1.2 | 2.5 | 3.3 | NA |
| Wool alcohols | 3.0 | 3.3 | 2.9 | 0.9 |
| Kathon CG | NA | NA | 2.9 | 1.4 |
| Neomycin sulphate | 7.6 | 7.2 | 2.6 | 2.3 |
| Barsam of Peru | 7.0 | 4.7 | 2.6 | 4.2 |
| Paraben mix | 3.4 | 2.5 | 2.5 | 0.5 |
| Formaldehyde | 4.4 | 4.8 | 2.4 | 0.9 |
| Quaternium 15 | 2.9 | 1.9 | 2.1 | 0.5 |
| Caine mix | NA | NA | 2.0 | NA |
| Ethylenediamine dihydrochloride | 1.4 | 1.3 | 1.7 | NA |
| Mercapto mix | 2.3 | 2.2 | 1.7 | 0.5 |
| Mercaptobenzothiazole | NA | NA | 1.5 | 0 |
| Quinolone mix | NA | 1.8 | 1.3 | NA |

nickel sulfate 금속

Thimerosal 방부제

cobalt chloride 금속

Phenylenediamine 염색약

p-tert butylphenolformaldehyder resin 접착제

potassium dichromate 시멘트, 유리, 가죽

fragrance mix 향료

Korean Contact Dermatitis Research Group (KCDRG), not available (NA)

Nickel Allergy

- 1. Choose jewelry carefully.** It's common for a nickel allergy to develop from wearing jewelry containing nickel. Earrings, earring backs and watches are some of the biggest culprits; however necklaces, rings and bracelets containing nickel can also trigger symptoms. To avoid exposure, only wear jewelry that is nickel-free, hypoallergenic, or made from metals such as surgical-grade stainless steel, 18-, 22-, or 24-karat yellow gold, pure sterling silver, or platinum. In addition, wear watchbands made of leather, cloth or plastic.
- 2. Check your clothing.** It's also common for belt buckles, bra hooks, and metal buttons, zippers and snaps to contain nickel. If your clothing has these, replace them with ones that are plastic or plastic-coated. You can also create a barrier between these items and your skin by coating the items with clear nail polish. However, the nail polish will need to be re-applied often.
- 3. Cover electronics.** Recent reports suggest that some electronic devices, including cell phones, laptops, and tablets, may contain nickel. To avoid exposure, always use a protective cover on your electronic devices.
- 4. Substitute household objects containing nickel with objects made of other materials.** Examples include brass keys, titanium-coated or stainless-steel razors, pots and pans with silicone handles, and titanium or plastic eyeglass frames.
- 5. Avoid foods containing nickel if you are extremely sensitive to nickel.** Some foods that contain high amounts of nickel include soy products—such as soybeans, soy sauce, and tofu—licorice, buckwheat, cocoa powder, clams, cashews, and figs.

Allergen of the Year by American Contact Dermatitis Society

Awards [\[edit \]](#)

- 2023 - Lanolin
- 2022 – [Aluminum](#)
- 2021 – Acetophenone azine
- 2020 – Isobornyl acrylate ^{[2][3]}
- 2019 – Parabens (Non) Allergen^[4]
- 2018 – [Propylene Glycol](#)^[5]
- 2017 – Alkyl Glucoside^[6]
- 2016 – [Cobalt](#)^[7]
- 2015 – [Formaldehyde](#)^[8]
- 2014 – [Benzophenones](#)^{[9][10]}
- 2013 – [Methylisothiazolinone](#)^[11] - This chemical is used as a preservative in many cosmetics, lotions, and makeup removers; some of its side effects include flaky or scaly skin, breakouts, redness or itchiness, and moderate to severe swelling in the eye area.
- 2012 – [Acrylate](#)^{[12][13]}
- 2011 – [Dimethyl fumarate](#)^{[14][15]} - Dimethyl fumarate is the chemical associated with 'poisoned chairs' and 'toxic sandals'.
- 2010 – [Neomycin](#) (antibiotic)^{[16][17]}

CONTACT ALLERGEN OF THE YEAR

Aluminum—Allergen of the Year 2022

Bruze, Magnus MD, PhD; Netterlid, Eva PhD; Siemund, Ingrid MD, PhD

Author Information

Dermatitis: 1/2 2022 - Volume 33 - Issue 1 - p 10-15

doi: 10.1097/DER.0000000000000836

Aluminum

- **allergen-specific immunotherapy (ASIT)^{9–17} and aluminum-containing vaccines.^{7,11,18–34}** Other aluminum sources such as **antiperspirants/deodorants,^{7,35–37}** astringent solutions,^{38,39} and elemental aluminum⁴⁰

Table 1

Vaccines licenced in the US containing aluminum in adjuvants [4]

| Vaccines with aluminium adjuvant | Vaccines without aluminium adjuvant |
|--|-------------------------------------|
| DTP (diphtheria-tetanus-pertussis vaccine) | Inactivated Polio Virus |
| DTaP (diphtheria-tetanus-acellular pertussis vaccine) | Measles vaccine |
| Hib (Haemophilus influenzae type b) conjugate vaccines (not all) | Mumps vaccine |
| Pneumococcal conjugate vaccine | Rubella vaccine (MMR), |
| Hepatitis B vaccines | Varicella vaccine |
| All combination DTaP, Tdap, Hib | Influenza vaccines |
| Hepatitis B vaccines | |
| Hepatitis A vaccines | |
| Human Papillomavirus vaccine | |
| Anthrax vaccine | |
| Rabies vaccine | |

[Open in a separate window](#)

Injection site pruritic nodule

또는

데오도란트 바른 자리의 습진

Management of Allergic contact dermatitis (ACD)

- **First-line treatments of ACD**

- **avoidance of allergens**, skin care education, personal protective equipment, emollients and soap substitutes, protective cream, **topical corticosteroids**, topical tacrolimus/pimecrolimus, local and systematic application of antibiotics, oral prednisone, and alitretinoin.

- **Second-line treatments**

- ultraviolet therapy (PUVA, UVB), azathioprine, methotrexate, acitretin, and low-nickel diet

Corticosteroid Classification & Cross-reactivity

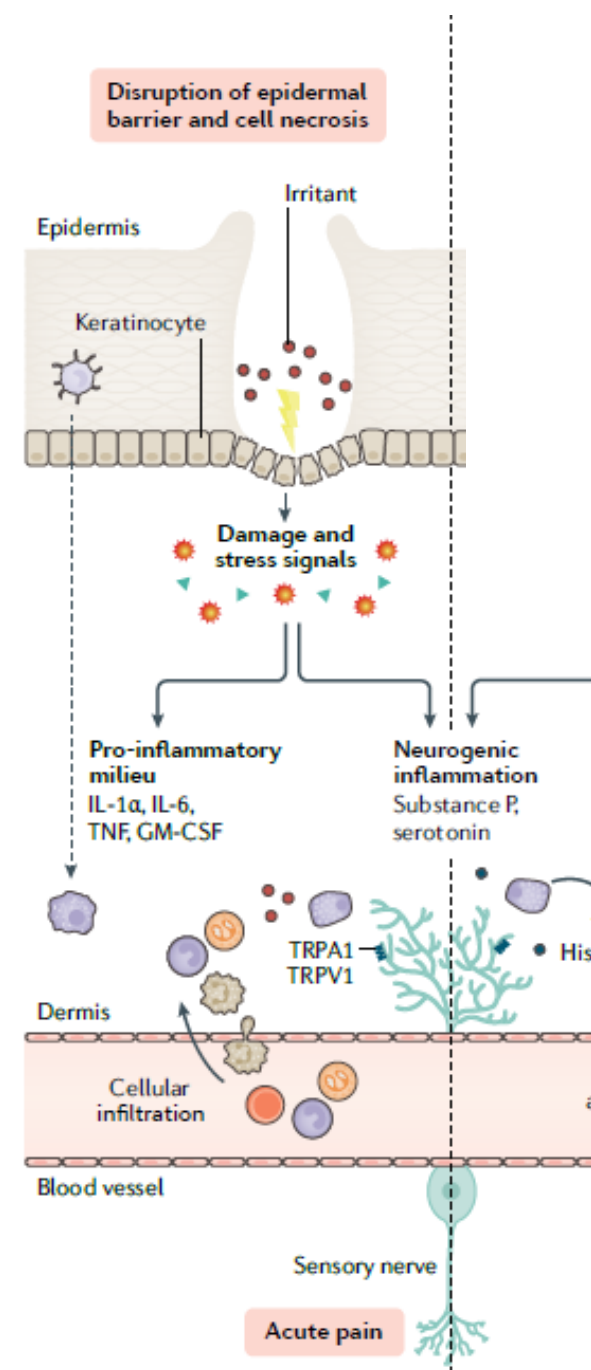
| GROUP | 1 | 2 | 3 |
|------------------------|--|--|---|
| Typical members | Budesonide Cloprednol Cortisone acetate Dichlorisone acetate Difluprednate Fludrocortisone acetate Fluorometholone Fluprednisolone acetate Hydrocortisone Hydrocortisone aceponate Hydrocortisone acetate Hydrocortisone-17-butyrate Hydrocortisone-21-butyrate Hydrocortisone hemisuccinate Isofluprednone acetate Mazipredone Medrysone Methylprednisolone aceponate Methylprednisolone acetate Methylprednisolone hemisuccinate Prednicarbate Prednisolone Prednisolone caproate Prednisolone pivalate Prednisolone sodium metasulphobenzoate Prednisolone succinate Prednisone Tixocortol pivalate Triamcinolone | Amcinonide Budesonide (R-isomer)^ Desonide* Fluchloronide Flumoxonide Flunisolide Fluocinolone acetonide Fluocinonide Halcinonide* Triamcinolone acetonide Triamcinolone benetonide Triamcinolone diacetate Triamcinolone hexacetonide | Alclomethasone dipropionate Beclomethasone dipropionate Betamethasone Betamethasone 17-valerate Betamethasone dipropionate Betamethasone sodium phosphate Clobetasol propionate Clobetasone butyrate Cortivazol* Desoxymethasone Dexamethasone Dexamethasone acetate Dexamethasone sodium phosphate Diflucortolone valerate Diflorasone diacetate Flumethasone pivalate Fluocortin butyl Fluocortolone Fluocortolone caprylate Fluocortolone pivalate Fluprednidene acetate Halomethasone Meprednisone* Fluticasone propionate Mometasone furoate |

^ may exceptionally only cross react with the acetonides

Irritant Contact Dermatitis

외부 자극 물질에 의해 **피부 장벽기능이 손상**되며 유발되는 피부염

- release of **stress- associated molecular patterns and DAMPs** by injured cells
- sensed by receptors of the **innate immune system**
- release of a myriad of **chemokines, proteases , and derivatives of arachidonic acid metabolism**
- Irritants may also excite **nociceptors**
- release of **vasoactive peptides**
- producing **acute pain and neurogenic inflammation**
- **vasodilation and the infiltration of diverse leukocytes** from the blood into the skin, which further amplify the reaction



Irritant Contact Dermatitis

➤ **How chemicals cause skin irritation are poorly understood**

- ✓ vary from the disorganization of the lipid bilayers of cell membranes to the damage of epidermal barrier proteins

➤ **Corrosives (부식성 물질)**

- ✓ acids, bases or detergents
- ✓ trigger an **intense cell necrosis**
- ✓ causing major disruption of the skin barrier
- ✓ **irreversibly damage** of the skin beyond repair

➤ **Irritant substances (자극물질)**

- ✓ **reversible local inflammatory reaction caused by the innate immune system**
- ✓ Water or solvent
- ✓ minimal and reversible effects on epidermal cells
- ✓ require repetitive applications before an ICD reaction occurs

Irritant Contact Dermatitis

- Damage to the epidermis -> **Barrier disfunction**

- **Clinical manifestations**
 - ✓ erythema, induration and oedema, painful and burning areas of skin

- **Resolution of inflammatory reaction**
 - ✓ removal of the offending agent
 - ✓ elimination and replacement of injured or dead cells by skin repair processes

Covid: School hand-washing 'damaging children's skin'

🕒 16 March 2021



<https://www.bbc.com/news/uk-england-lincolnshire-56415838>



JORDAN FERRIS

Jordan Ferris' daughter Grace has been left with bleeding hands because of the eczema

- **First-line treatments**
 - **physical protection of skin**, protective cream/emollient, **topical corticosteroids**, and topical tacrolimus/pimecrolimus.
- **Second-line treatments**
 - ultraviolet therapy (PUVA (psoralen + UVA), UVB), and bexarotene gel
- **Third-line treatments**
 - Superficial radiation therapy and oral alitretinoin

Atopic dermatitis

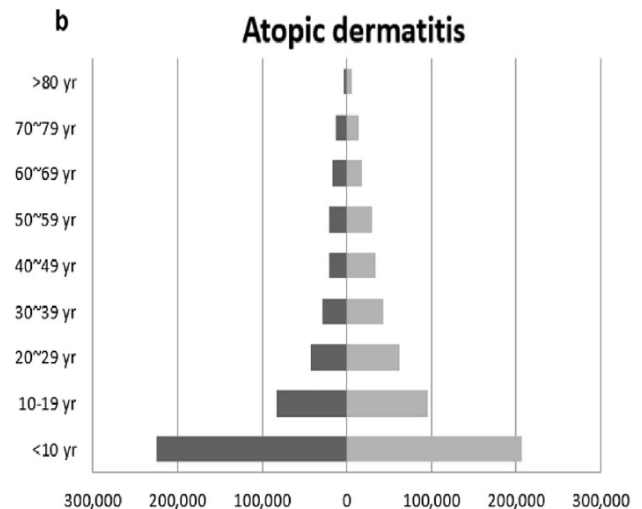
아토피피부염이란?

- 주로 유아기 혹은 소아기에 시작되는 만성 재발성의 염증성 피부질환으로
소양증(가려움증)과 피부건조증, 특징적인 습진을 동반

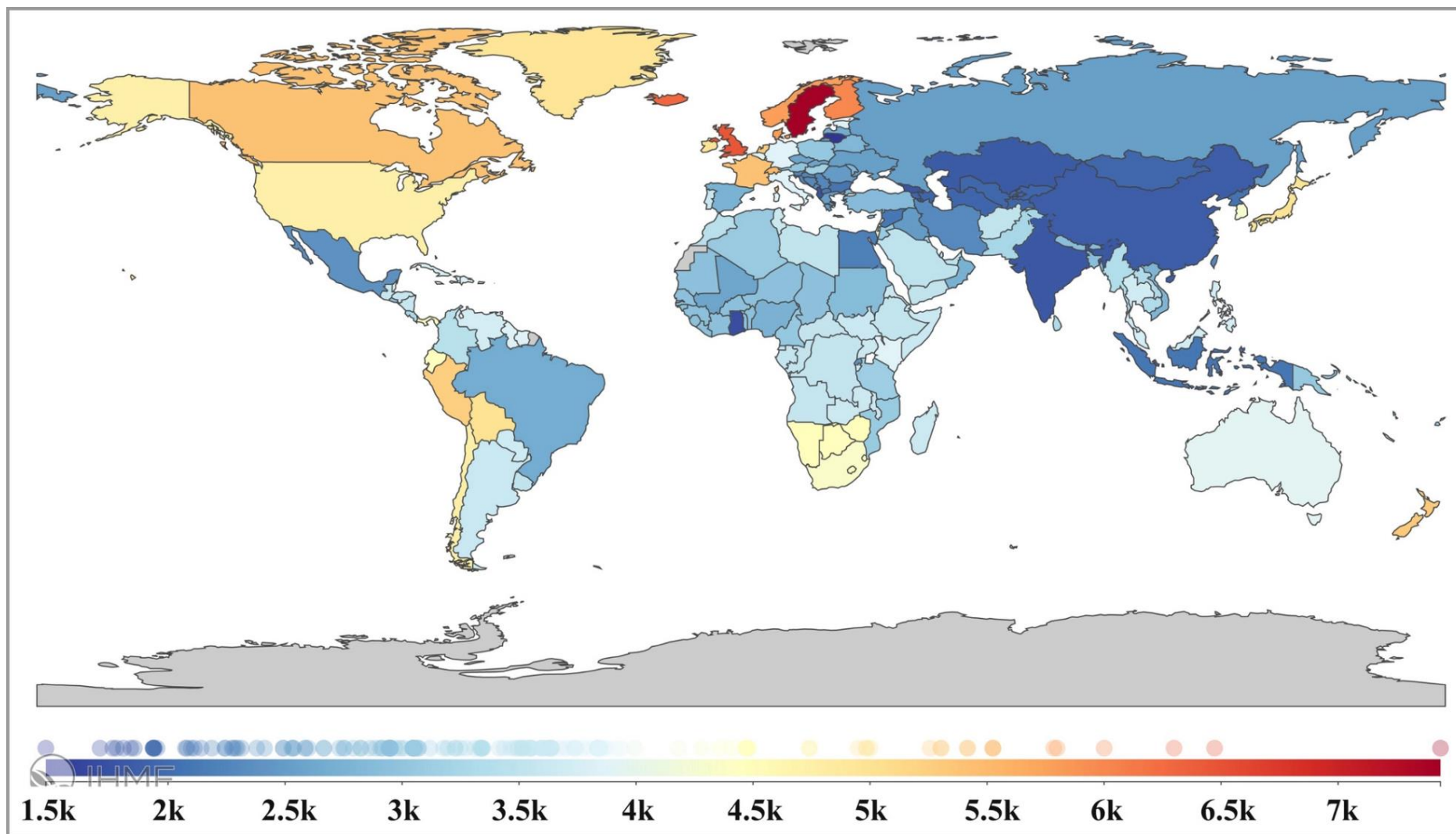
Prevalance of AD

- Prevalence ranging from 7.2 to 22.6%,
 - In adults : 1%-3%
 - In children : 10%-20%
- Primarily a disease of **early childhood**
- Since 1960s, the prevalence of AE has increased more than **3-fold**

| ISSAC (The International Study of Asthma and Allergies in Childhood)-KOREA | 6-12 years | 12-15 years |
|--|------------|-------------|
| 1995 | 7.3% | 3.9% |
| 2000 | 10.7% | 6.1% |

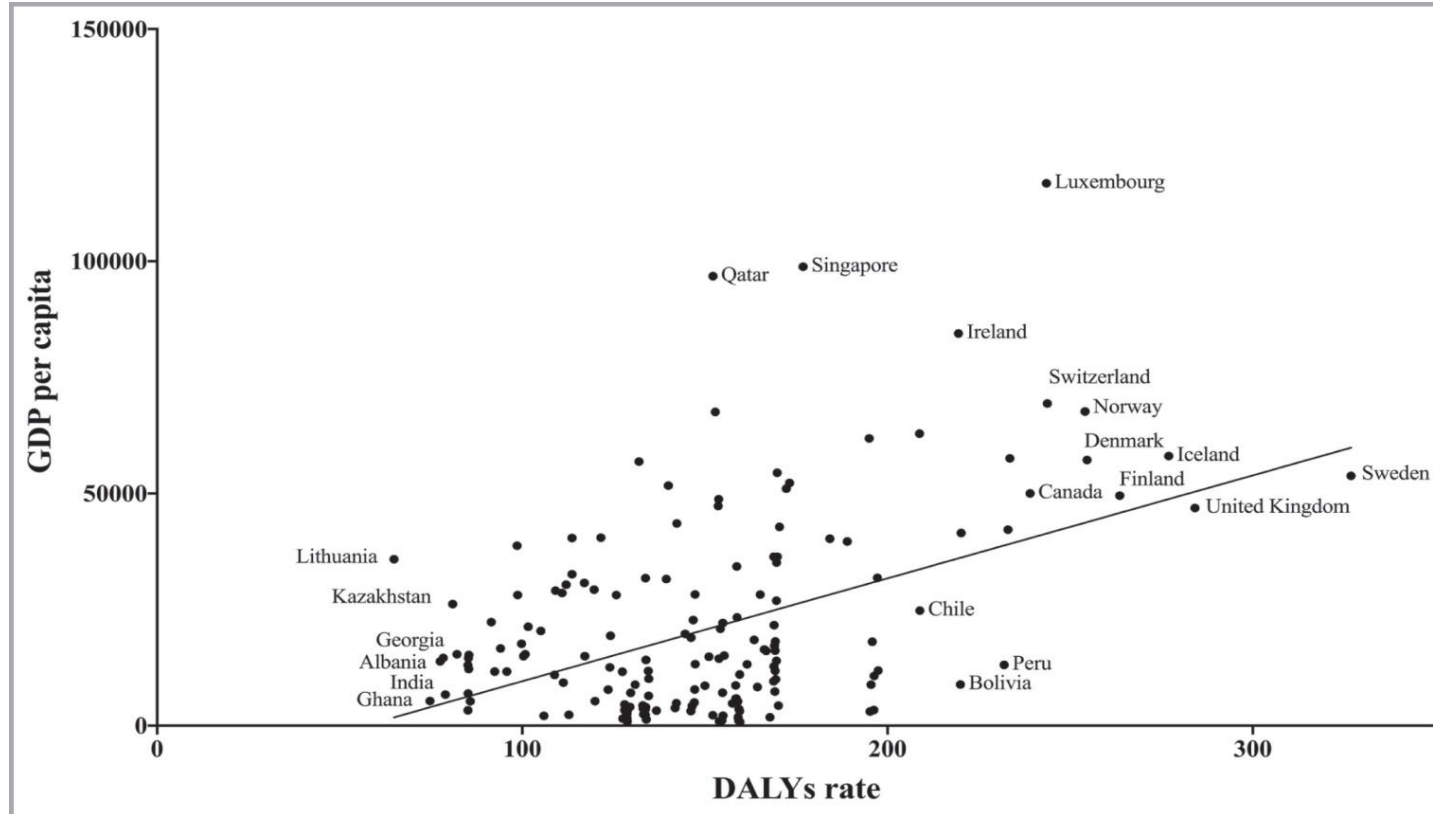


Allergy Asthma Immunol Res. 2016;8(3):181-190
Allergy Asthma Immunol Res. 2015 Mar;7(2):101-5
Acta Derm Venereol. 2013;93:438-41
Eur Clin Respir J. 2015; 2: 10.3402/ecrj.v2.24642



Global Burden of Disease project 2017 data

DALY of AD correlates with GDP



The disability-adjusted life year (DALY): a measure of overall disease burden, expressed as the number of years lost due to ill-health, disability or early death.

Hanifin and Rajka's diagnostic criteria, 1980

Major 3개, Minor 3개

Limitation

- 일부 항목은 매우 드물거나 특이적이지 않음
- 백인에서만 나타나기도
- 측정자 간 차이가 큼

| | Patients | Controls |
|---|-------------------|----------|
| Major features | | |
| (1) Pruritus | 100 | — |
| (2) Chronic or chronically relapsing dermatitis | 100 | — |
| (3) Typical distribution of skin lesion | 91.7 | — |
| (4) Personal and/or family history of atopy | 80.1 | 18.7* |
| Minor features | | |
| (1) Xerosis | 85.2 | 11.3* |
| (2) White dermographism | 84.2 | 0.7* |
| (3) Hand and/or foot dermatitis | 81.9 | — |
| (4) Dennie-Morgan infraorbital fold | 78.1 | 49.3* |
| (5) Itch when sweating | 77.6 | 12.0* |
| (6) Anterior neck folds | 75.2 | 54.7* |
| (7) Food intolerance | 74.4 | 6.7* |
| (8) Intolerance to wool | 71.3 | 29.3* |
| (9) Course influenced by emotional factors | 68.4 | — |
| (10) Immediate skin test reactivity | 66.8 ¹ | NE |
| (11) Elevated serum IgE | 65.7 ² | NE |
| (12) Tendency toward cutaneous infection | 65.3 | 9.4* |
| (13) Cheilitis | 56.9 | 12.7* |
| (14) Orbital darkening | 53.4 | 7.3* |
| (15) Ichthyosis and/or keratosis pilaris | 52.8 | 8.7* |
| (16) Early age of onset | | |
| up to 6 months | 48.1 | — |
| up to 3 years | 75.9 | — |
| up to 5 years | 82.9 | — |
| (17) Recurrent conjunctivitis | 24.5 | 11.3* |
| (18) Nipple eczema | 23.1 | 2.0* |
| (19) Pityriasis alba | 20.8 | 4.0* |
| (20) Anterior subcapsular cataracts | 14.3 ³ | NE |
| (21) Keratoconus | 0.0 ¹ | NE |

NE = No examination. *p < 0.001. For patient results, 100% = 481 patients, unless indicated otherwise.

¹ 100% = 404 patients.

² 100% = 286 patients.

³ 100% = 323 patients.

보다 간단한 진단기준!

United kingdom working party, 1994

Table 1. UKWP criteria for AD in children

sensitive



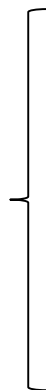
Must have:

- An itchy skin condition in the last 12 months

Plus three or more of:

- Onset below age 2^{*}
- History of flexural involvement
- History of a generally dry skin
- Personal history of other atopic disease[†]
- Visible flexural dermatitis as per photographic protocol

specific



감별진단

- 옴: 겨드랑이, 사타구니, 손목, burrow, 밤에 특히 심한 가려움증
- 지루피부염: 두피, 귀 뒤, 노란 지루성 인설, 생후 6개월 이내
- 접촉피부염: 특정 접촉부위 반복
- 어린선: 어릴 때부터, 주로 편쪽, 진물, 염증성 병변은 드뭄.
- 건선: 비교적 뚜렷한 경계, 하얀 인설, 발병 연령
- 광과민성 피부염: 햇빛 노출 부위



〈그림. 연령별 아토피피부염 증상〉



보건복지부
MINISTRY OF HEALTH & WELFARE



대한의학박회
Korean Academy of Medical Sciences

소아기

- 얼굴은 오히려 덜 침범
- 팔오금, 오금, 목 같이 접히는 부위에 뚜렷한 병변
- 건조한 형태

유아기:

- 뺨이나 이마, 머리
- 몸통이 거칠고 건조
- 팔다리는 접히는 부위보다는 팔다리의 바깥쪽
- 진물이나 가피(딱지) 형태의 급성 병변의 양상



① 유아기



② 소아기



③ 청소년/성인기

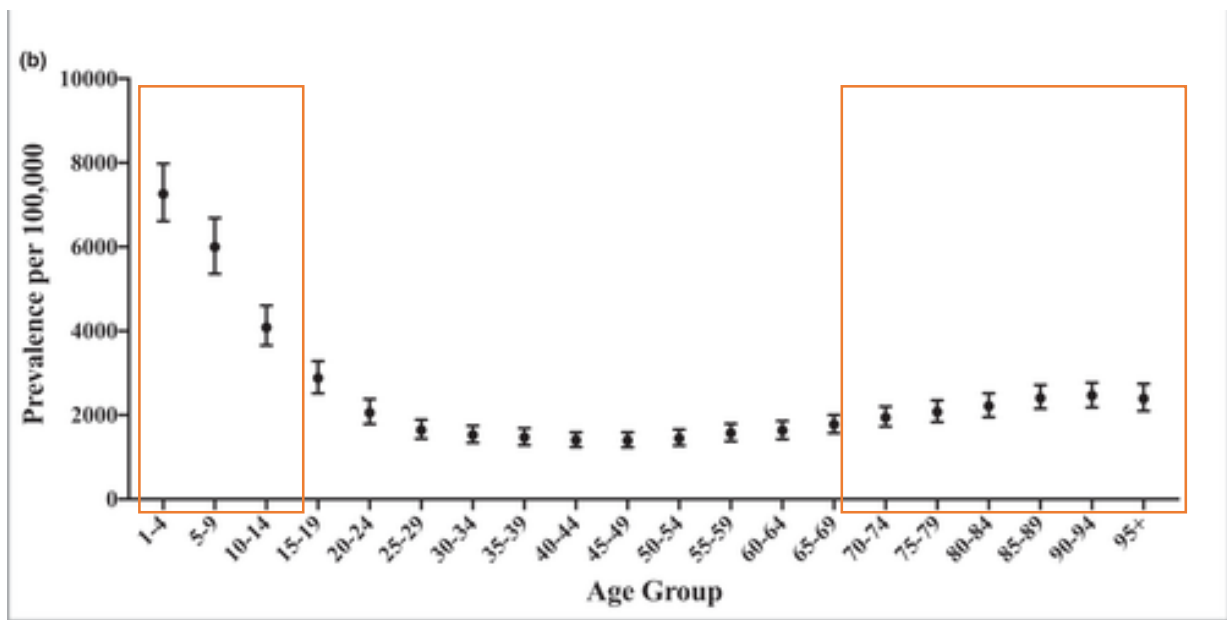
성인기

- 오랫동안 긁어 피부가 두껍게 보이는 현상(태선화)
- 접히는 부위 뿐 아니라 얼굴이나 손도 흔히 침범

Global burden of Disease
: Comprehensive global study—analysing 286 causes of death, 369 diseases and injuries, and 87 risk factors in 204 countries and territories

The Global Burden of Disease (GBD) Study

Atopic Dermatitis
: **highest disease burden among skin diseases** as measured by disability-adjusted life-years (DALYs)



2012~2017년 아토피 진료실인원 현황

| 구 분 | 아토피 진료실인원(명) | | | | | | |
|--------|--------------|-----------|---------|---------|---------|---------|-------------------|
| | 2012년 | 2013년 | 2014년 | 2015년 | 2016년 | 2017년 | 12년 대비 17년 증가율 |
| 계 | 995,558 | 1,008,823 | 977,761 | 950,518 | 954,252 | 932,483 | -6.3% |
| 19세 이하 | 659,151 | 655,077 | 609,918 | 576,272 | 556,818 | 526,538 | -20.1% |
| 20세 이상 | 336,407 | 353,746 | 367,843 | 374,246 | 397,434 | 405,945 | 20.7% |

[표-2] 2012~2017년 아토피 인구10만명 당 진료실인원 현황

| 구 분 | 아토피 인구10만명 당 진료실인원 (명) | | | | | | |
|--------|------------------------|-------|-------|-------|-------|-------|-------------------|
| | 2012년 | 2013년 | 2014년 | 2015년 | 2016년 | 2017년 | 12년 대비 17년 증가율 |
| 계 | 2,005 | 2,018 | 1,943 | 1,883 | 1,880 | 1,831 | -8.7% |
| 19세 이하 | 6,121 | 6,215 | 5,921 | 5,743 | 5,683 | 5,529 | -9.7% |
| 20세 이상 | 865 | 897 | 919 | 925 | 970 | 980 | 13.3% |

※ 국민건강보험공단 제출자료, 정준숙의원실 재구성

- Morphologic AD phenotypes**

- Nummular or discoid dermatitis
- Prurigo nodularis
- Erythroderma
- Lichenified dermatitis
- Follicular/papular dermatitis
- Dyshidrosis or Pompholyx

Phenotype

Differential diagnoses

(a) Nummular (discoid) dermatitis



- Plaque psoriasis
- Mycosis fungoides
- Parapsoriasis
- Tinea corporis
- Allergic contact dermatitis (ACD)
- Xerotic (asteatotic) dermatitis
- Stasis dermatitis

(b) Prurigo nodularis (PN)



- Prurigo nodularis can also be associated with:
- Chronic kidney disease
 - Diabetes mellitus
 - Psychiatric disorders
 - Infections
 - Neuropathic diseases

(c) Erythrodermic



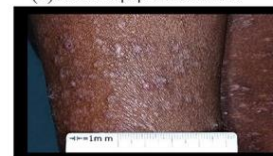
- Psoriasis
- Seborrheic dermatitis
- Allergic Contact Dermatitis
- Irritant contact dermatitis
- Pityriasis rubra pilaris
- Sezary syndrome
- Drug reactions

(d) Lichenoid dermatitis



- Lichen planus

(e) Follicular/papular dermatitis



- Keratosis pilaris
- Phrynodema (vitamin A deficiency)
- Lichen spinulosus
- Lichen nitidus
- Pityriasis rubra pilaris

(f) Dyshidrosis or Pompholyx



- Contact dermatitis
- Adverse drug reactions
- Pustular psoriasis
- Vesicular tinea pedis/tinea manus
- Scabies
- Herpes simplex
- Hyperkeratotic orthergic hand eczema
- Bullous disorders (pemphigoid, pemphigus, epidermolysis bullosa)



LETTER TO THE EDITOR

The atopic dermatitis spectrum disorder. Recognizing the clinical heterogeneity in patients with atopic related skin conditions in order to improve therapeutic decision-making and outcomes: an expert panel consensus statement

Table 1. Example of conditions included in the atopic dermatitis spectrum.

| |
|--|
| Chronic hand eczema (excluding contact dermatitis) |
| Nummular eczema |
| Follicular eczema |
| Lichenoid eczema |
| Dyshidrosis |
| Prurigo nodularis |
| Lichen simplex chronicus |
| Nipple eczema |
| Asteatotic eczema |
| Gestational eczema |
| Eczema of older adults or atopic dermatitis of the elderly (excluding mycosis fungoides) |
| Eyelid dermatitis (excluding contact dermatitis) |

The list is not comprehensive and may include other conditions.

Table 2. Atopic dermatitis consensus statements.

1. Atopic dermatitis (AD) is a condition with varied clinical presentations and heterogeneous phenotypes. There is currently no gold standard test or biologic marker that can be used for diagnosis. In reality, AD exists as a spectrum in which seemingly distinct dermatologic disorders can present as a manifestation of atopic dermatitis.
2. While disorders such as prurigo nodularis, hand dermatitis, and others may be distinct entities, the underlying etiology for many of these is atopic dermatitis.
3. AIM statement: This consensus group aims to recognize the diversity of AD presentations across seemingly separate phenotypes and propose to re-categorize them as belonging to the AD spectrum disorder.
4. Diseases often exist in a spectrum, some of which are already officially recognized as such in ICD-10 (e.g. autism spectrum disorder)
5. AD spectrum manifests in many different ways. Within this AD spectrum disorder, many entities are related on several different domains – such as histology, associated disorders, response to therapy, and others.
6. Some examples of entities that can be considered within the AD-spectrum include: prurigo nodularis, chronic hand eczema (excluding contact dermatitis), lichen simplex chronicus, nummular eczema, follicular eczema, lichenoid eczema, dyshidrosis, nipple eczema, asteatotic eczema, gestational eczema, eczema of older adults (excluding mycosis fungoides), eyelid dermatitis (excluding contact dermatitis).
7. The extent of overlap among these conditions includes, but is not limited to, clinical overlap, epidemiologic overlap, histologic overlap, comorbidity overlap, treatment response overlap, and pathophysiologic/immunologic overlap. Conditions need not overlap in every respect to be considered part of the AD spectrum.
8. Recognition of AD-spectrum disorder as a valid categorization will lead to timely access to AD- specific treatment, support and improved patient outcomes.

Atopic dermatitis spectrum disorder

: 아토피피부염이 기저질환일 수 있으며, 아토피 피부염 치료제가 효과적일 수 있는 질환들

(a) Treatment of atopic dermatitis: adult

- For every grade, *additional* therapeutic options are given
- Add antiseptics / antibiotics in cases of superinfection
- Consider compliance and diagnosis, if therapy has no effect
- Refer to full text for restrictions, especially for treatment marked with ¹
- Licensed indication are marked with ², off-label treatment options are marked with ³

**SEVERE:
SCORAD >50 / or
persistent eczema**

Hospitalization;
short course of cyclosporin A^{1,2}, dupilumab ²,
short course of oral glucocorticosteroids ^{1,2};
longer course of systemic immunosuppression: methotrexate ³,
azathioprin ³, mycophenolate mofetil ³; PUVA 1; alitretinoin ^{1,3}

**MODERATE:
SCORAD 25-50 / or
recurrent eczema**

Proactive therapy with topical tacrolimus ² or class II or class III
topical glucocorticosteroids ³, wet wrap therapy, UV therapy (UVB
311 nm, medium dose UVA1),
psychosomatic counseling,
climate therapy

**MILD:
SCORAD <25 / or
transient eczema**

Reactive therapy with topical glucocorticosteroids class II ² or
depending on local cofactors:
topical calcineurin inhibitors ², antiseptics incl. silver ²,
silver coated textiles ¹
topical crisaborole ³

**BASELINE
Basic therapy**

Educational programmes,
emollients, bath oils,
avoidance of clinically relevant allergens
(encasings, if diagnosed by allergy tests)

(b) Treatment of atopic dermatitis: children

- For every grade, *additional* therapeutic options are given
- Add antiseptics / antibiotics in cases of superinfection
- Consider compliance and diagnosis, if therapy has no effect
- Refer to full text for restrictions, especially for treatment marked with ¹
- Licensed indication are marked with ², off-label treatment options are marked with ³

SEVERE: SCORAD >50 / or persistent eczema

Hospitalization;
dupilumab ^{1,2};
course of systemic immunosuppression: cyclosporin A ³,
methotrexate ³, azathioprin ³,
mycophenolate mofetil ^{1,3}

MODERATE: SCORAD 25-50 / or recurrent eczema

Proactive therapy with topical tacrolimus ² or class II or class II
topical glucocorticosteroids ³, wet wrap therapy,
UV therapy ¹ (UVB 311 nm),
psychosomatic counseling,
climate therapy

MILD: SCORAD <25 / or transient eczema

Reactive therapy with topical glucocorticosteroids class II ² or
depending on local cofactors:
topical calcineurin inhibitors ², antiseptics incl. silver ²,
silver coated textiles ¹
topical crisaborole ³

BASELINE Basic therapy

Educational programmes,
emollients, bath oils,
avoidance of clinically relevant allergens
(encasings, if diagnosed by allergy tests)

Cyclosporin

- Calcineurin inhibitor
- **First choice of systemic anti-inflammatory drugs**
- ***Side effects***
 - Acute and chronic nephrotoxicity, hypertension, infections, gingival hyperplasia, elevated blood lipids, liver enzymes and bilirubin
 - Dose dependent and observed more frequently in adults than in children
 - Close monitoring of serum creatinine, blood pressure and protein in the urine is obligatory
- Start with 3 mg/kg/day and raised up to 5 mg/kg/day
- Concomitant topical treatment with TCI or TCS is recommended

Other systemic anti-inflammatory drugs

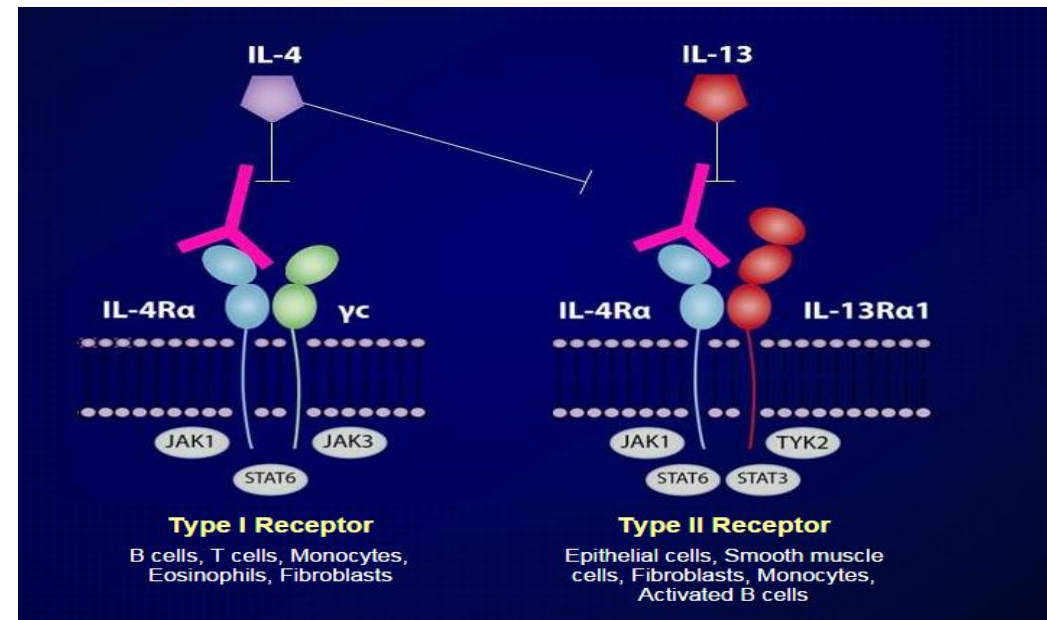
- Systemic corticosteroids
- Methotrexate
- Azathioprine
- MMF

Phototherapy

- Narrow band UVB
 - Suppress immune response in the skin
 - Reduce microbial colonization
 - Combination of UV light with TCI or cyclosporin is not recommended

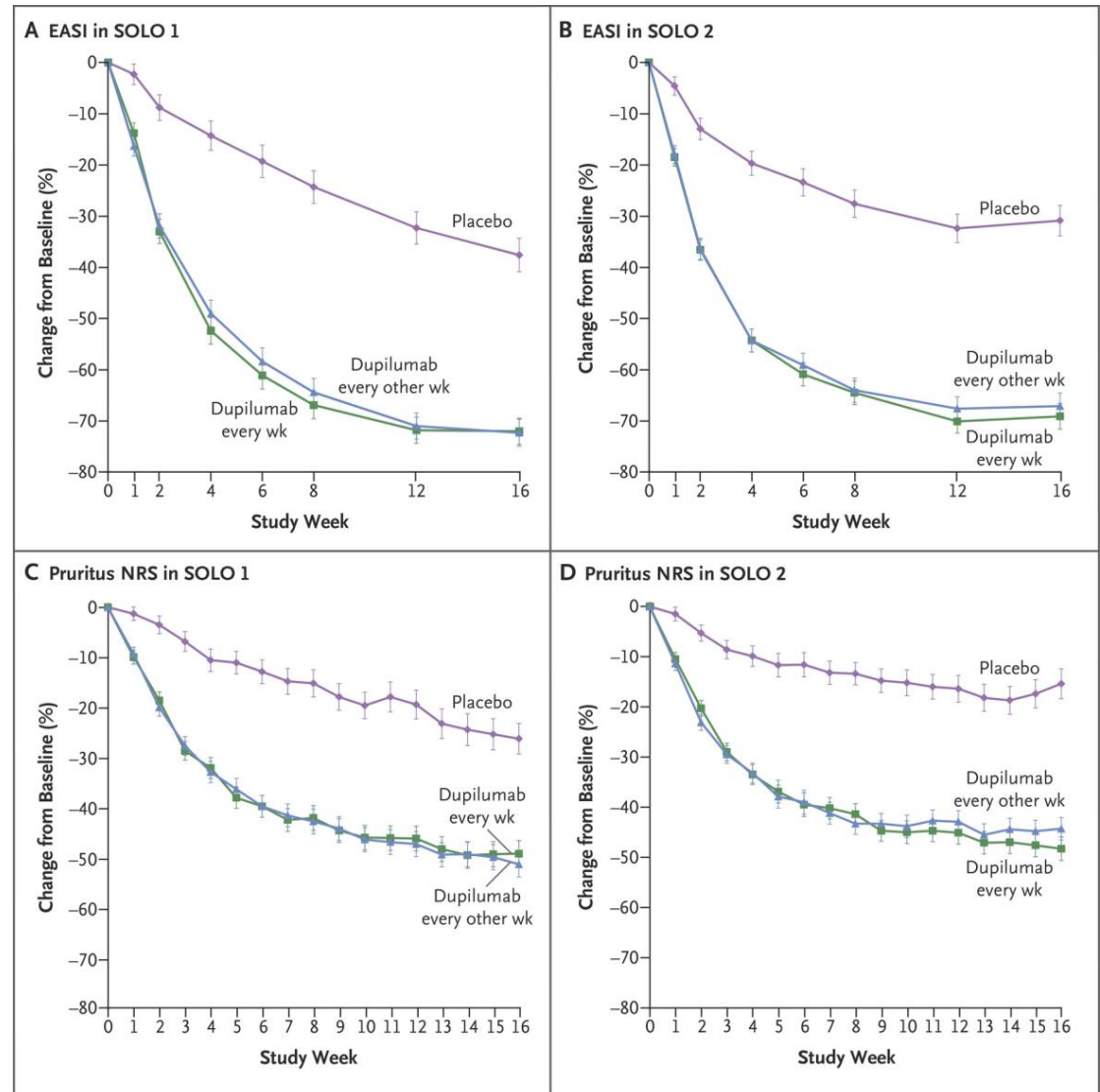
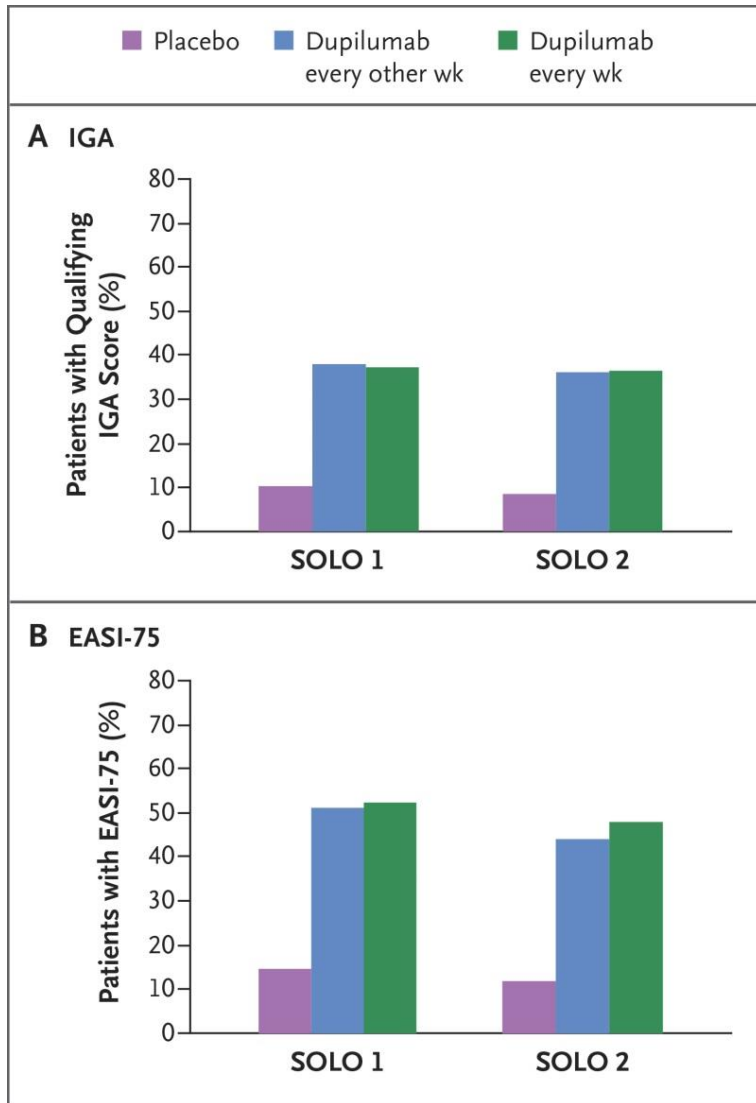
Dupilumab

- Fully-human, high affinity ($K_D=30$ pM) monoclonal antibody against the alpha subunit of the interleukin 4 receptor (IL-4R)
- IgG4 isotype
- Blocks action of IL-4 and IL-13 at Type I and II receptors
- No evidence of antibody-dependent, complement- or cell-mediated cytotoxicity
- Route of administration: subcutaneous



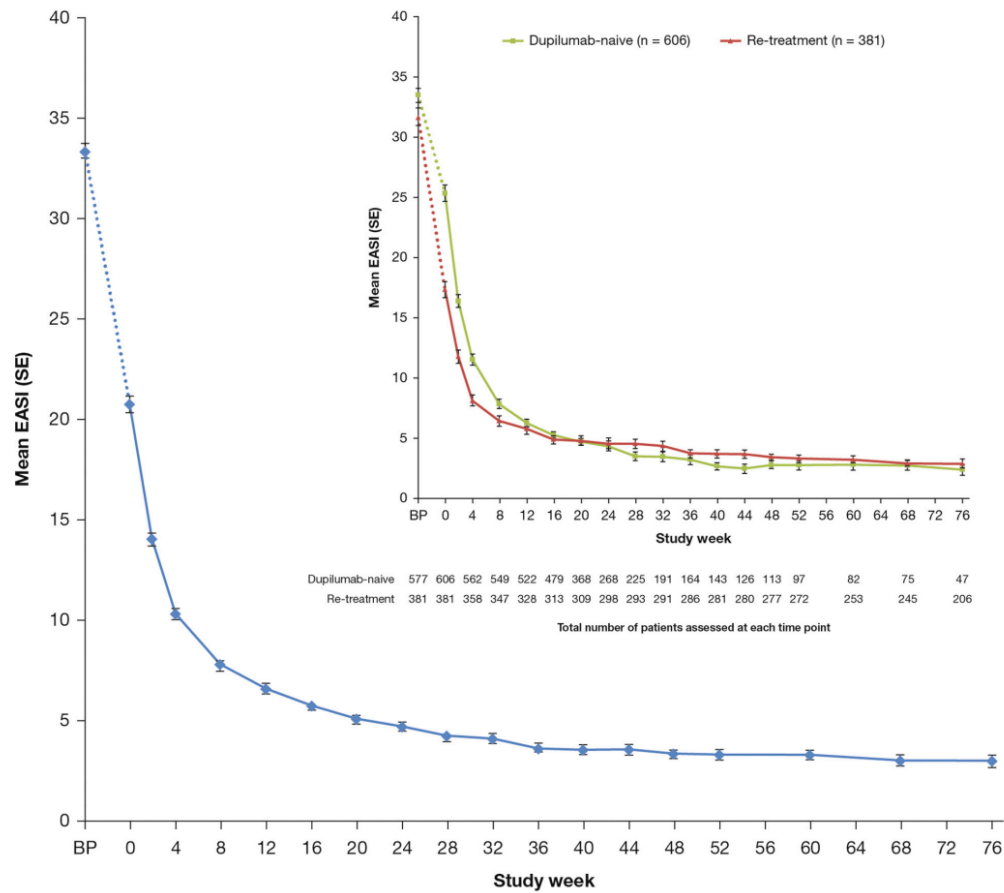
N Engl J Med. 2016 Dec 15;375(24):2335-2348

N Engl J Med. 2014 Jul 10;371(2):130-9



Phase 3 trials, *N Engl J Med.* 2016 Dec 15;375(24):2335-2348

Dupilumab shows long-term safety and efficacy in patients with moderate to severe atopic dermatitis

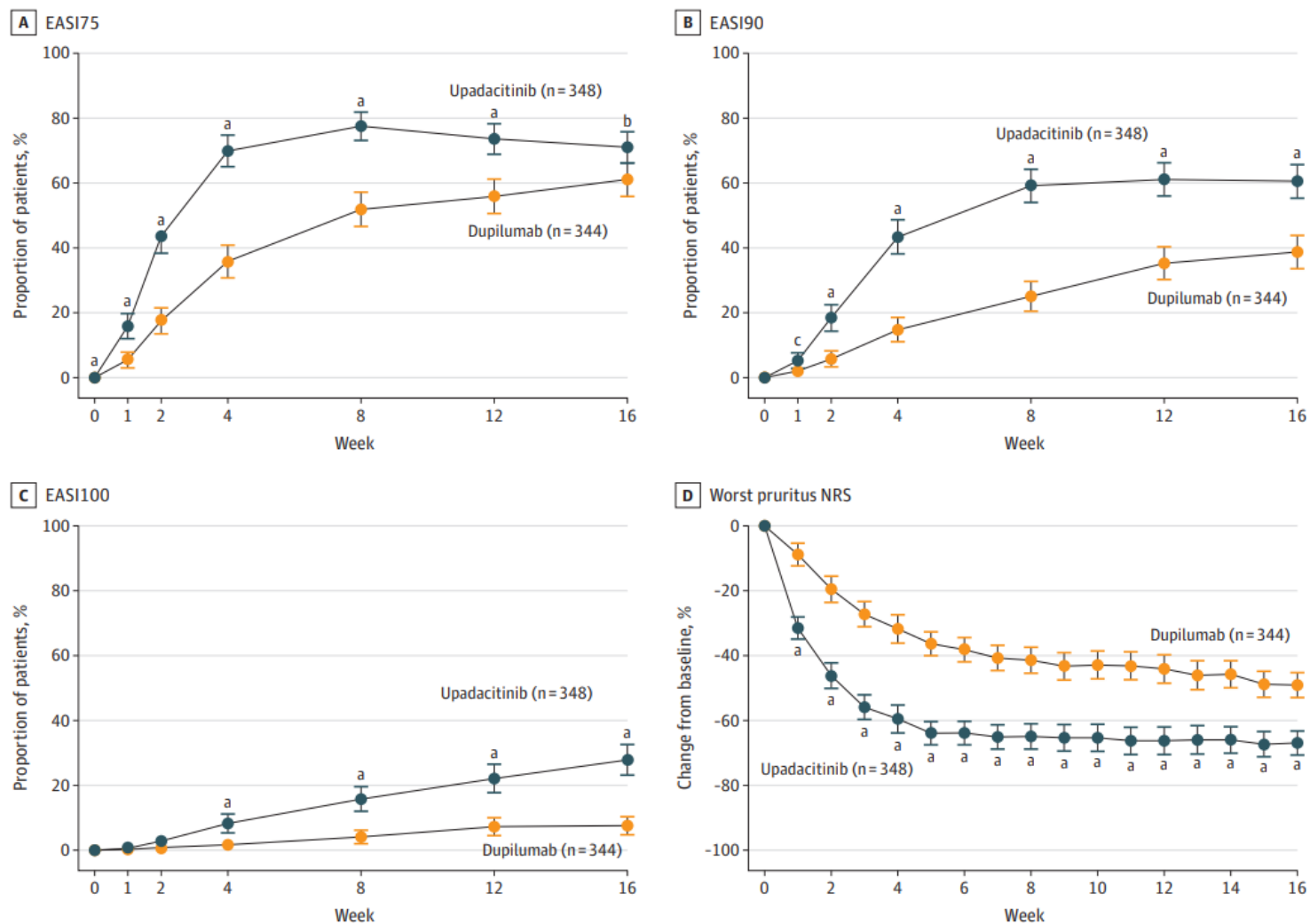


JAK inhibitor

- Baricitinib: 올루미언트 (Olumiant[®], Lilly)
- Upadacitinib: 린보크 (Rinvoq[®], AbbVie)
- Abrocitinib: 시빈코 (CIBINQO[®], Pfizer)

692 patients

Figure 2. Efficacy Over Time



Dupilumab/JAK inhibitor 보험기준

- 3년 이상 증상이 지속되는 성인(만 18세 이상)
- 국소치료제 4주 이상 /전신 면역억제제 (Cyclosporine 또는 Methotrexate)를 3개월 이상 치료하였음에도 반응 50%이상 감소)이 없거나 부작용 등으로 사용할 수 없는 경우
- dupilumab 약제 투여시작 전 EASI 23 이상

6세 이상 18세 미만 중등~중증 소아 청소년 아토피피부염 - 비보험

Topical corticosteroids (TCS)

- Topical corticosteroids
 - Still the **first-line anti-inflammatory treatment option in AD.**
 - The choice of the TCS depends on the patient's age, disease severity and location of AD lesions.
 - For routine treatment of flares, once-daily application of a potent TCS is sufficient, usually for 3–5 days.
 - **The most constructive way to use TCS and avoid steroid-related side-effects is not to spare them during acute flares, but through early TCS intervention combined with consequent baseline emollient skincare to stabilize the disease.**
 - Side effects
 - Atrophy, striae, purpura, telangiectasia, hypertrichosis, acne-like rashes

!!퍼센트!!
!!제형!!

표 27-1 국소스테로이드의 강도

| 강도(Potency) | 화학명(Generic name) | 제형(Formulation) |
|-----------------------|--|--|
| Class 1 (매우 강한 제제) | Betamethasone dipropionate 0.05% Clobetasol propionate 0.05% Halobetasol propionate 0.05% Diflorasone diacetate 0.05% | Ointment Cream, lotion, ointment, solution Cream, ointment Ointment |
| Class 2 (강한 제제) | Betamethasone dipropionate 0.05% Mometasone furoate 0.1% Halcinonide 0.1% Fluocinonide 0.05% Diflorasone diacetate 0.05% Desoximetasone 0.25% Desoximetasone 0.05% | Ointment, cream Ointment Cream, ointment Cream, gel, solution Ointment Cream, ointment Gel |
| Class 3 (강한 제제) | Amcinonide 0.1% Betamethasone dipropionate 0.05% Betamethasone valerate 0.1% Fluticasone propionate 0.005% Diflorasone diacetate 0.05% | Cream Cream Ointment, solution Ointment Cream |
| Class 4 (중등도 제제) | Mometasone furoate 0.1% Methylprednisolone aceponate 0.1% Triamcinolone acetonide 0.1% Betamethasone valerate 0.12% Fluocinolone acetonide 0.025% Hydrocortisone valerate 0.2% Prednicarbate 0.25% | Cream, lotion Cream, lotion, ointment Ointment Foam Ointment Ointment Ointment |
| Class 5 (중등도 제제) | Fluticasone propionate 0.05% Betamethasone dipropionate 0.05% Triamcinolone acetonide 0.1% Hydrocortisone butyrate 0.1% Hydrocortisone valerate 0.2% Fluocinolone acetonide 0.025% Betamethasone valerate 0.05% Prednicarbate 0.25% | Cream Lotion Cream Cream, lotion Cream Cream Cream, lotion Cream, lotion, solution |
| Class 6 (약한 제제) | Alclometasone dipropionate 0.05% Desonide 0.05% Triamcinolone acetonide 0.025% | Cream, lotion Cream, lotion Cream |
| Class 7 (약한 제제) | 기타 hydrocortisone, dexamethasone, flumethasone, prednisolone, methylprednisolone 제제 | |

표 27-1 국소스테로이드의 강도

| 강도(Potency) | 화학명(Generic name) | 제형(Formulation) | |
|-----------------------|--|--|--|
| Class 1 (매우 강한 제제) | Betamethasone dipropionate 0.05% Clobetasol propionate 0.05% Halobetasol propionate 0.05% Diflorasone diacetate 0.05% | Ointment Cream, lotion, ointment, solution Cream, ointment Ointment | 도모호론, 베타베이트 디푸코 |
| Class 2 (강한 제제) | Betamethasone dipropionate 0.05% Mometasone furoate 0.1% Halcinonide 0.1% Fluocinonide 0.05% Diflorasone diacetate 0.05% Desoximetasone 0.25% Desoximetasone 0.05% | Ointment, cream Ointment Cream, ointment Cream, gel, solution Ointment Cream, ointment Gel | 실크론지 에로콤 연고 에스파손 로션, 에스파손겔, 데속시원겔, 데타손 로션, 연고 |
| Class 3 (강한 제제) | Amcinonide 0.1% Betamethasone dipropionate 0.05% Betamethasone valerate 0.1% Fluticasone propionate 0.005% Diflorasone diacetate 0.05% | Cream Cream Ointment, solution Ointment Cream | 라벤다 크림, 네오덤 크림 |
| Class 4 (중등도 제제) | Mometasone furoate 0.1% Methylprednisolone aceponate 0.1% Triamcinolone acetonide 0.1% Betamethasone valerate 0.12% Fluocinolone acetonide 0.025% Hydrocortisone valerate 0.2% Prednicarbate 0.25% | Cream, lotion Cream, lotion, ointment Ointment Foam Ointment Ointment Ointment | 에로콤, 모메타손, 더모타손 크림 아드반탄, 토피솔 |
| Class 5 (중등도 제제) | Fluticasone propionate 0.05% Betamethasone dipropionate 0.05% Triamcinolone acetonide 0.1% Hydrocortisone butyrate 0.1% Hydrocortisone valerate 0.2% Fluocinolone acetonide 0.025% Betamethasone valerate 0.05% Prednicarbate 0.25% | Cream Lotion Cream Cream, lotion Cream Cream Cream, lotion Cream, lotion, solution | 리도맥스 크림 0.3% 더마톱, 락티케어 제마지스 크림 |
| Class 6 (약한 제제) | Alclometasone dipropionate 0.05% Desonide 0.05% Triamcinolone acetonide 0.025% | Cream, lotion Cream, lotion Cream | 리도맥스 로션 0.3% 데스오웬 |
| Class 7 (약한 제제) | 기타 hydrocortisone, dexamethasone, flumethasone, prednisolone, methylprednisolone 제제 | | 리도맥스 크림 0.15% |

Proactive treatment - TCS

- Hanifin et al.
 - Fluticasone propionate 0.05%
 - 20 weeks
 - Flare 7.7배 감소
- Berth-Jones et al.
 - Fluticasone propionate 0.05% cream
 - 16 weeks
 - Recurrence-free period 2배
 - Recurrence 횟수 5.8배
- Peserico et al.
 - Methylprednisolone aceponate 0.1%
 - 16 weeks
 - No flare during the entire study period (66%)
- **No sign of skin atrophy during proactive treatment of TCS**

Br J Dermatol 2002;147:528- 537

BMJ 2003;326:1367.

Br J Dermatol 2008;158:801-807

Ann Dermatol. 2012 Aug;24(3):253-60

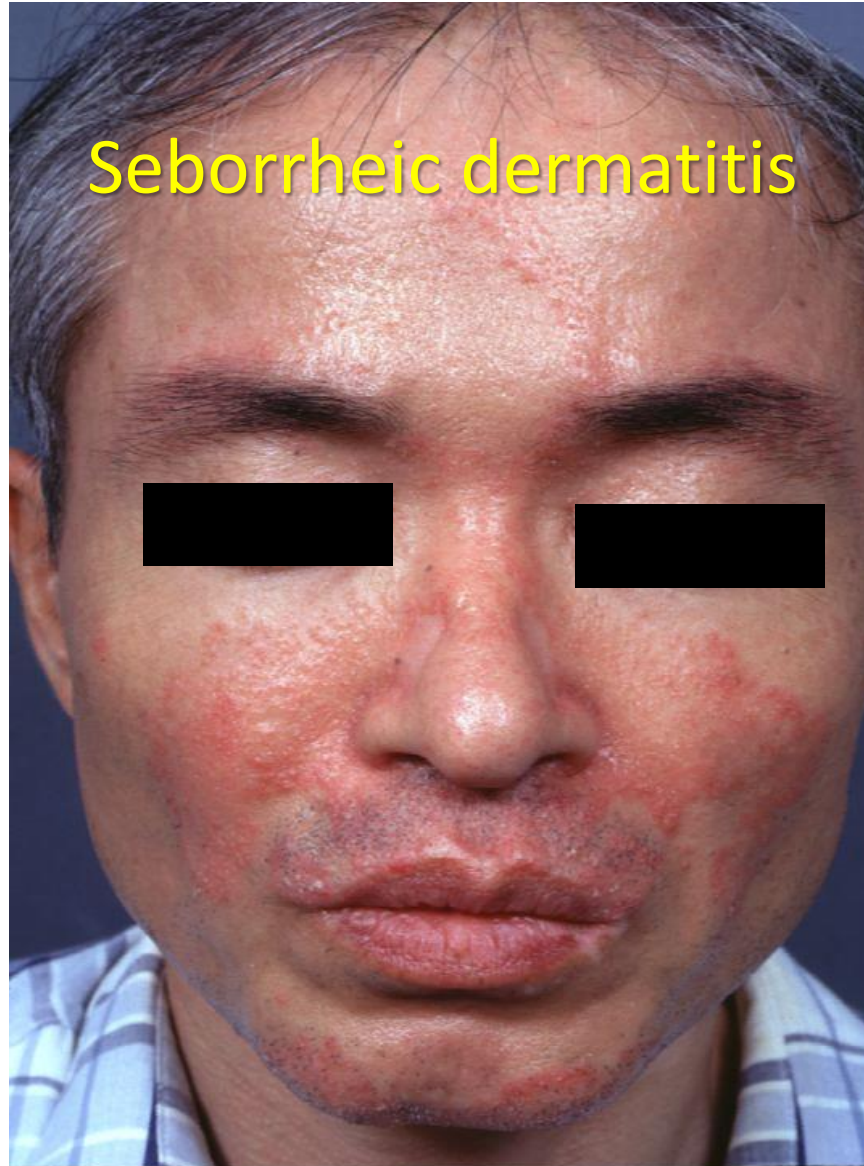
Topical calcineurin inhibitor

- Topical calcineurin inhibitor
 - Tacrolimus 0.03%, 0.1%, pimecrolimus 1.0%
 - Inhibiting synthesis of proinflammatory cytokines
 - Alternative therapy to corticosteroids, similar to a corticosteroid with moderate activity
 - Do not cause skin atrophy and protect barrier function
 - 화끈거림, 자극감 설명 필요
 - 냉찜질, 약 냉장보관 도움
 - 1~2주 내 호전
 - 특히 tacrolimus 는 oint 제형으로 사용감이 불편함을 미리 설명

Proactive treatment – TCI

- Wollenberg et al.
 - Tacrolimus ointment 0.1% twice weekly
 - 257 adults
 - Over 12 months
 - Induction phase twice daily for up to 6 weeks
 - Significantly fewer flares with tacrolimus 0.1% (56.9% vs. 29.6%), significantly reduced duration of flares (12.4% vs. 31.5%)
 - Median flare-free time was longer with proactive treatment with tacrolimus (142 days vs. 15 days)
- Thaçi et al.
 - European children study
 - Tacrolimus 0.03% twice weekly
 - Over 12 months
 - Proactive therapy reduced the number of flares, prolonged the flare-free time
- Paller et al.
 - Thrice weekly proactive use of tacrolimus 0.03%
 - 40 weeks
 - Median flare-free time 169 days vs. 43 days

Seborrheic dermatitis



Seborrheic dermatitis

- Infantile and adult forms exist
- Characterized by erythema and greasy scaling
- Scalp, ears, face, chest, and intertriginous areas
- Etiology unknown but may be related to increased sebum secretion, abnormal sebum composition, certain drugs, or *Malassezia* yeasts
- Parkinson's disease, HIV, neuroleptic drugs



[Image: Seborrheic Dermatitis \(Infant\) - MSD Manual Professional Edition \(msdmanuals.com\)](https://www.msdmanuals.com/professional/dermatology/infant-and-child-dermatology/seborrheic-dermatitis)

Xerotic eczema



Winter

Old aged: 장벽기능저하

Irritants (frequent bathing)

Atopy

Treatment of Eczema

- Identifying and removing the cause
- Elimination of triggering factors
 - heat, food, drug, psychogenic factors, etc
- Classic dermatological therapies
 - Moisturizing therapy
 - Topical corticosteroids, topical calcineurin inhibitor (Tacrolimus, pimecrolimus)
 - Antihistamines
 - Systemic corticosteroid, cyclosporine, methotrexate
 - Dupilumab, JAK inhibitors for atopic dermatitis

스테로이드제에 반응하지 않을 때

- 스테로이드에 대한 접촉피부염? – 점점 더 가려워지는지?
- 진균 감염? – 염증은 좋아지는데 점점 더 넓어지는지?
- 옴? – 밤에 특히 가렵지 않은지? 접히는 부위 위주로 popular lesion들이 있지는 않은지? Burrow 가 관찰되지 않는지? 함께 생활하는 가족들은 비슷한 증상이 없는지?

만성 습진에서 스테로이드제 장기간 치료가 부담될 때

- Topical calcineurin inhibitor – 피부암 발생과 연관성 떨어짐.
- Proactive treatment – 증상이 조절된 후에는 일주일에 2~3번으로 유지
- 나이와 피부 부위에 맞는 스테로이드제 고르기
- 습진의 초기에 적극적으로 사용하는 것이 오히려 스테로이드 총사용량을 줄일 수 있음.

**THANK
YOU!**

