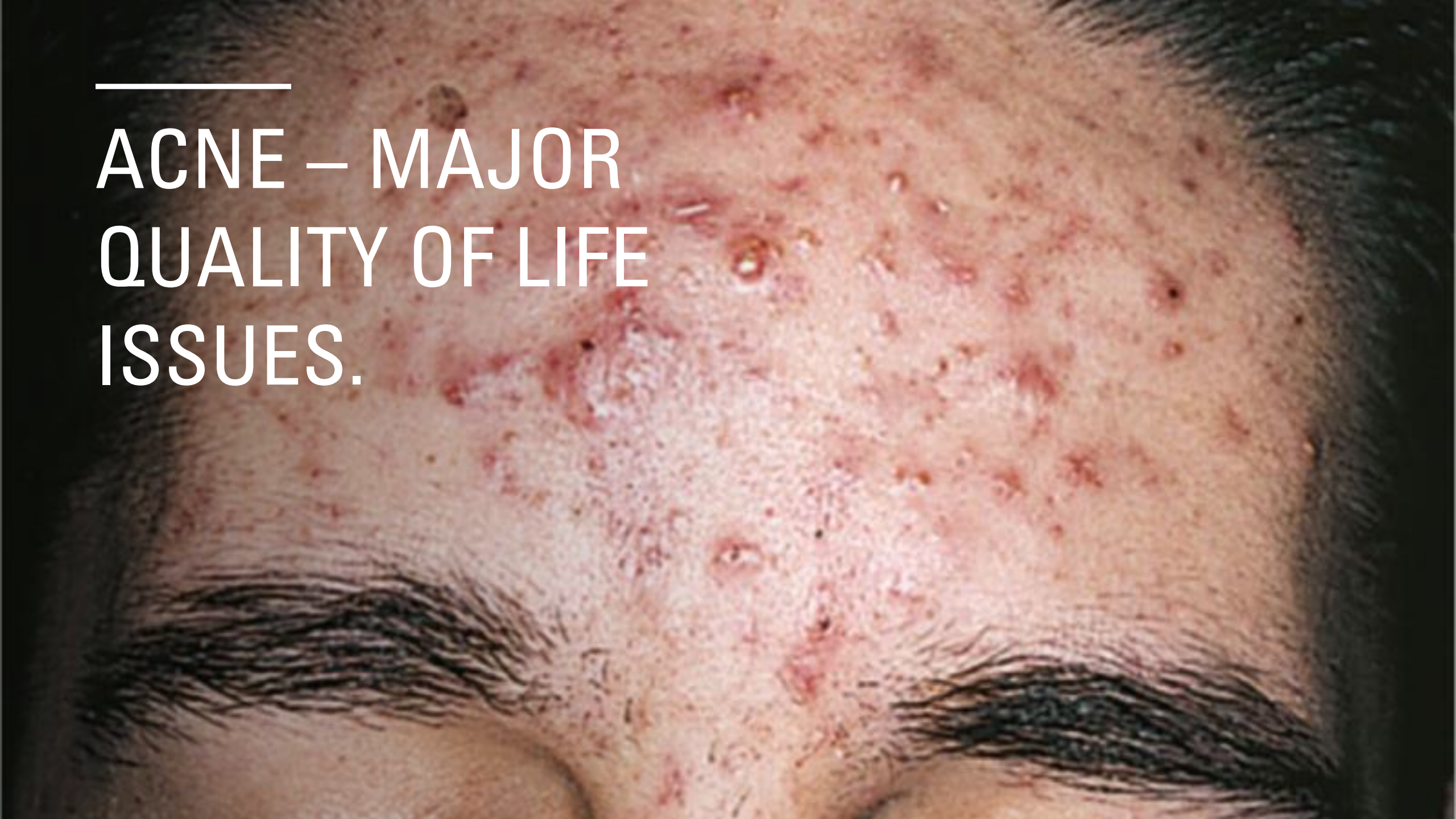

SKIN DEEP: ESSENTIAL DERMATOLOGY FOR PRIMARY CARE PROVIDERS

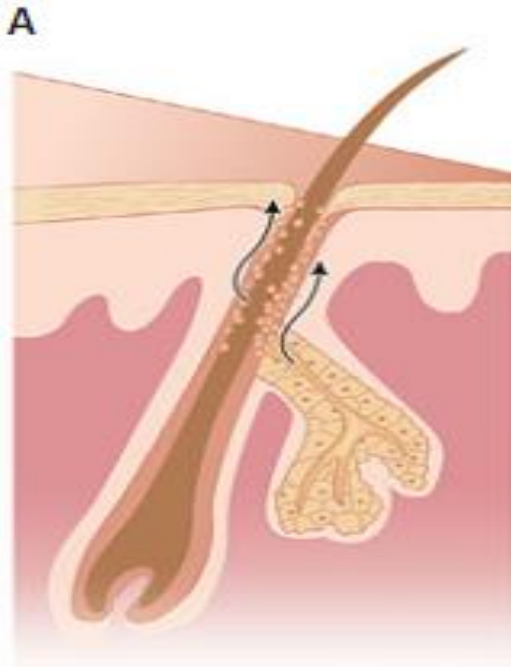
Shellie D. Hill DNP, APRN, FNP-BC



ACNE – MAJOR
QUALITY OF LIFE
ISSUES.



PATHOPHYSIOLOGY



Microcomedone

- hyperkeratotic infundibulum
- cohesive corneocytes
- sebum secretion



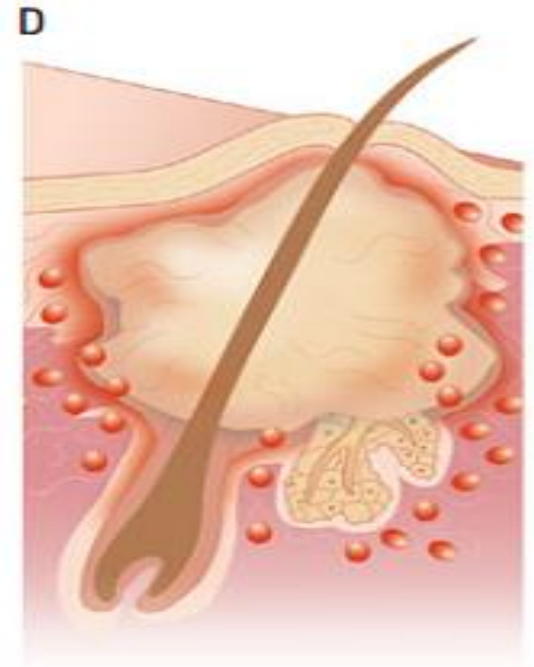
Comedone

- accumulation of shed corneocytes and sebum
- dilation of follicular ostium



Inflammatory papule/ pustule

- further expansion of follicular unit
- proliferation of *Propionibacterium acnes*
- perifollicular inflammation



Nodule

- rupture of follicular wall
 - marked perifollicular inflammation
 - scarring
-

COMBINATION THERAPY = SYNERGY

	Decreases sebum production	Normalizes keratinization or keratinolytic	Decreases P. acnes	Decreases inflammation
TOPICAL THERAPY				
Antibiotics			X	X
Retinoids		X		X
Benzoyl perox		X	X	X
Azelaic acid		X	X	
Clascoterone	X			
ORAL THERAPY				
Antibiotics			X	X
Isotretinoin	X	X	X	X
Estrogens/antiandroid	X			
spironolactone	X			



MILD ACNE TREATMENT – BEST PRACTICES

Strong recommendations

1. Topical retinoids
 2. Benzoyl peroxide (BP)
 3. Topical antibiotics
 - Fixed-dose combinations
 1. Topical antibiotic + BP (superior in combination)
 2. Topical retinoid + BP (best maintenance)
 3. Topical retinoid + topical antibiotic (fast)
-



MILD ACNE TREATMENT

Conditional recommendations

1. Salicylic acid 0.5% - 25% decrease in inflammatory lesions; 11% less closed comedones.
2. Azelaic acid 20% bid- 28% more than placebo achieved 50-100% decrease in total lesion count (TLC).
3. Clascoterone 1% (Winlevi) – novel - targets hormonal acne.

MODERATE TO SEVERE ACNE TREATMENT

Strong recommendations

1. Oral antibiotic = Doxycycline
2. Isotretinoin
3. Intralesional corticosteroids – in combination with above for cystic and nodular acne.

Mild



Moderate



Severe



MODERATE TO SEVERE ACNE TREATMENT

Conditional recommendations

Oral antibiotics (3-4 months)

1. Minocycline
2. Sarecycline (narrow spectrum, better side effect profile)

Hormonal agents

1. Combined oral contraceptives
 2. Spironolactone
-

ORAL ISOTRETINOIN

- Very effective

20 weeks dosing: 81% had a 90% reduction in lesion count; 88.9% achieved treatment success.

Remission 60% first course (16-14 wks). If needed before age 15, will likely need second course at some point.

- Teratogenic – Pregnancy Category X – iPledge program.
 - Lab- LFT (increase by 0.8-10%), lipids (increase by 6.8-27%; triglycerides by 7-39%), pregnancy test.
 - Loose to no association with inflammatory bowel disease, no increase in depression and rare effect on bone health.
 - Prevalence of depression decreases by 40% after isotretinoin treatment.
-

ACNE TREATMENT – INSUFFICIENT EVIDENCE

Physical modalities – chemical peels, microneedling, laser and light devices, and photodynamic therapy.

A light blue downward-pointing arrow indicating a flow from the first category to the second.

Complementary/alternative therapies – plant-derived agents, vitamins, witch hazel, zinc.

A light blue downward-pointing arrow indicating a flow from the second category to the third.

Diets – low-glycemic-load, low dairy, low whey, omega-3 fatty acids, and chocolate.

MAINTENANCE ACNE THERAPY

Appropriate skin care

Consider maintenance in patients with frequent relapse after treatment.

Topical retinoids are recommended for maintenance therapy specifically: Fixed combination of topical adapalene and BP.

If not tolerated: topical adapalene, azelaic acid, or BP.

ROSACEA



SFS

ROSACEA

- Chronic inflammatory disorder; multifactorial.
- Affects 14 million Americans.
- Age of onset 30-50 y/o.
- Typical patient –fair skin, N. European.
- Women to men 2-3:1.
- Erythema, pustules, ocular, telangiectasias, and flushing.



EVIDENCED BASED (EB) ROSACEA TREATMENTS

Best evidence for **persistent erythema**:

Topical Brimonidine (Mirvaso 0.5%)

Topical Oxymetazoline (Rhofade 1%)

Best evidence for **papules/pustules**:

Topical Ivermectin (Soolantra 1%)

Topical Azelaic acid (Finacea 15%)

Topical Metronidazole (Metrogel 1%)

Oral Doxycycline (submicrobial)

EVIDENCED BASED ROSACEA TREATMENTS

Best evidence for telangiectasias:

Intense pulsed light

Pulsed dye laser

Potassium titanyl phosphate

Best evidence for flushing:

Intense pulsed light

Best evidence for ocular rosacea:

Topical Azithromycin

Topical Tacrolimus (Protopic 0.1%)

Topical or oral Cyclosporin

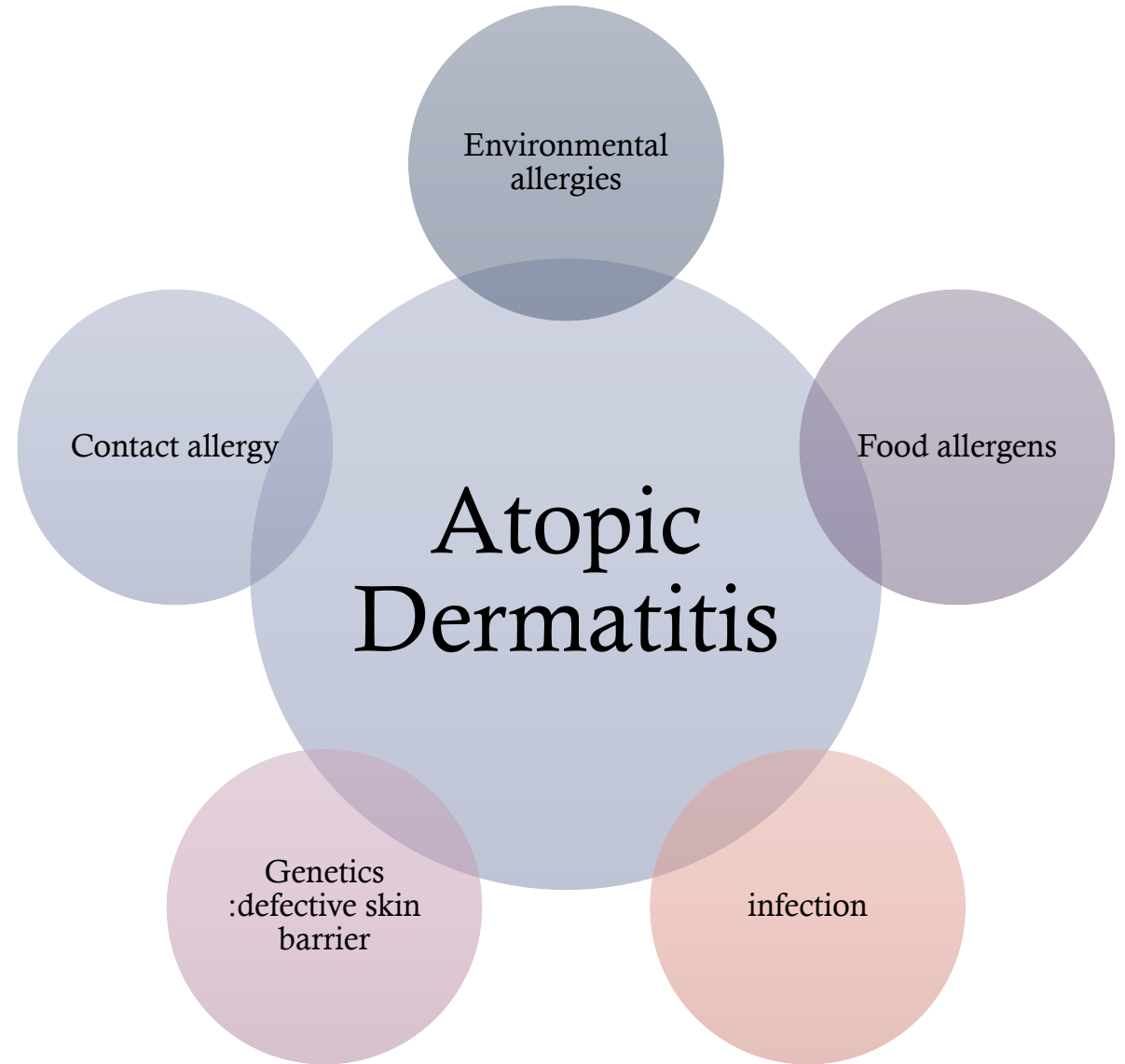
DERMATITIS

Atopic

irritant contact

allergic contact

ATOPIC DERMATITIS PATHOGENESIS



ATOPIC DERMATITIS



Eczema – 15% children and 7% adults in the U.S.

Presents differently with age

Infants – red skin, tiny vesicles on “puffy” surface. Intermittent scaling and exudates, crusts and cracks.

ATOPIC DERMATITIS

Childhood – Lesions are more papular with lichenification, erosions, and crusts.

Adults – more lichenification and excoriations.



ATOPIC DERMATITIS LIFESTYLE TREATMENTS

- **Hydration of skin** is cornerstone
 - Thick emollients after bath; non-soap cleansers
 - Wet dressings especially after applied cream
- **Avoid exacerbating factors** – emotional stress, dry air, wool, weather
- **Bleach baths**
- **Probiotics** and **emollient enhancement** have a protective role in AD



AD TREATMENT

- Topical glucocorticoids
 - Topical Calcineurin inhibitors (TCI's)
 - PDE-4 inhibitor Crisaborole ointment 2% (Eucrisa)
 - Topical aryl hydrocarbon receptor agonist Tapinarof cream 1% (Vtama)
 - Roflumilast cream .15% (Zoryve)
 - JAK inhibitor Ruxolitinib cream 1.5% (Obzelura)
 - Phototherapy
-

EB TOPICAL AD TREATMENT

Strong recommendations:

Topical glucocorticoids

Topical Calcineurin inhibitors (TCI's)

PDE-4 inhibitor Crisaborole ointment 2% (Eucrisa)

Roflumilast cream .15% (Zoryve)

Topical aryl hydrocarbon receptor agonist Tapinarof cream 1% (Vtama)

JAK inhibitor Ruxolitinib cream 1.5% (Obzelura)

EB SYSTEMIC AD TREATMENT

Strong recommendations:

Biologics:

Dupliumab (Dupixent – >6 mo)

Tralokinumab (Adbry > 12y/o)

Lebrikizumab (Ebglayss > 12y/o)

Namolizumab + TCS (Nemluvio > 12y/o)

JAK inhibitors:

Upadacitnib (Rinvoq > 12y/o)

Abrocitinib (Cibinqo > 12y/o)

Baricitinib (Olumiant > 12y/o)

EB AD TREATMENT

Conditionally recommended:

Wet dressings

Phototherapy

Methotrexate

Cyclosporin

Azathioprine (Imuran)

Mycophenolate mofetil (CellCept)

TOPICAL STEROIDS

Potency classification: **Super, high, moderate, low**

Potency and side effects of topical steroids (TS) are related to saturation of the glucocorticoid cell receptors (GCR) in different cell types.

Concentration of TS applied, extent and depth of absorption metabolism and diffusion out of skin all affect saturation of GCR.

Structure of the TS determines how tightly it binds to the GCR in the cell.

TOPICAL STEROIDS

Super-high

Clobetasol 0.05%

Halbetasol 0.05%

High

Flucinonide 0.05%

Desoximetasone
0.25% *

Medium

Triamcinolone 0.1%

Low

Desonide 0.05%

TOPICAL STEROIDS DOSING

- Thick, tough skin
 - Super-high potency up to 20 days per month (M-F)
- High risk areas (eyelids, groin, axilla, breasts) or peds
 - Low potency up to 15 days per month (M, W, F)
- Everywhere else
 - Medium potency up to 20 days per month (M-F)

TOPICAL CALCINEURIN INHIBITORS

- These are EXTREMELY safe except in vary RARE situations
- Body of evidence that these do not cause cancer is HUGE
- Large, study on children & TCI = no increased risk of leukemia, lymphoma or other malignancies; no evidence of systemic immunosuppression; no associated skin atrophy or impaired epidermal barrier function.

Tacrolimus 0.1% (Protopic) ointment = mid/high potency steroid (\$50/30g)

Pimecrolimus (Elidel) = low/mid potency steroid (\$90/30g)

- Both cause intense burning in beginning.

IRRITANT CONTACT DERMATITIS

- Chemical irritant – detergents, cement, fiberglass, poinsettias
- Usually sharply demarcated to exposure area. Starts with burning or stinging before objective findings or itch
- Treatment
 - avoid irritant & barriers
 - acutely treat with wet dressings
 - topical or oral glucocorticoids



ALLERGIC CONTACT

- Allergic contact dermatitis -antigen causes reaction
- Typically, well demarcated, superimposed vesicles and papules
- Distribution at exposure site



TREATMENT OF IRRITANT AND ALLERGIC DERMATITIS

Topical steroids; oral steroids; antihistamines

- Systemic steroids
- All types of dermatitis tend to rebound or re-flare if treatment is not long enough.
- Point of the taper is to prevent side effects of high dose steroid – significant adrenal suppression does NOT happen in less than a month.
- Typically start 40mg/day and taper over 3-4 weeks
- Example: 40mg q am x 3, 20mg q am x 3, then 10mg q am x 15 (prescription is 10mg tabs #33)

ANTIHISTAMINES

- Non-sedating antihistamines
- Efficacy increases with increasing dose; side effects usually do not
- Start at high dose and titrate back if working
 - Loratadine (Claritin) 30mg bid
 - Fexofenadine (Allegra) 360mg bid
 - Cetirizine (Zyrtec) 10mg bid

*Cetirizine works best, but 1:6 get sedated with it.

Clarinex and Xyzal not studied in high doses.

INFECTIOUS SKIN DISEASES



IMPETIGO

Gram-positive bacterial infection of the epidermis occurring near Staph aureus colonization

Usually, Staph aureus but can be streptococci or combination of both

- Nonbullous – most common, papules that progress to vesicles surrounded by erythema then pustules that break and form thick, honey-colored crust



IMPETIGO

- Bullous – seen in young children, vesicles enlarge to form flaccid bullae (2-5mm) with clear yellow fluid that rupture leaving thin, brown crust
- Ecthyma – ulcerative lesions extend through the epidermis and deep into dermis, “punched-out” ulcers covered with yellow crust



IMPETIGO TREATMENT

Topical antibiotics – use when limited number of lesions without bullae

- Mupirocin ointment (Bactroban) tid x 7-10 days
- Retapamulin ointment (Altabax) bid x 5 days (>9mo)

Oral antibiotics – use when bullous or many lesions

- Doxycycline, Cephalexin or amoxicillin-clavulanate x 7 days
- Macrolides do not cover *S. aureus* or strep well

MRSA

- I & D is paramount – only need antibiotic if resistant or if patient systemically symptomatic
- Know your local MRSA antibiogram
- Saint Louis
 - TMP-SMX DS bid – 98%
 - Amox/clav – 94%
 - Cefepime – 98% (IV)
 - Linezolid 600mg bid – 100%
 - Expensive



UNCOMPLICATED CELLULITIS



Treatment options:

- Cephalexin 500mg QID
- Dicloxacillin 500mg QID
- Clindamycin 600mg Q8h
- IV for severe, Vanco if MRSA

FUNGI

TINEA

- Pathogenesis
- Dermatophytes make keratinases that digest keratin and sustain existence of fungi in keratinized structures.
- Transmitted by fomites from one person to another (less common by direct skin contact), animals and rarely soil.



TINEA

- Clinical presentation varies by site of infection, immunologic response of the host and species of fungus
- Can be dry scaling, macerated, moccasin-type, inflammatory, bullous or ulcerative
- Tinea pedis (athlete's foot)
- Tinea manuum (hand)
- Tinea cruris (jock-itch)
- Tinea corporis (ringworm – trunk & extrem.)
- Tinea capitis (scalp)





TINEA OVER HERE
TINEA OVER THERE...

TINEA TOPICAL TREATMENT

- Topical antifungal preparations: dosing varies between agents; usually 4 weeks including at least one week after lesions have cleared. Apply 3 cm beyond advancing margin of lesion/s.
- Azoles (Clotrimazole - Lotrimin, econazole, miconazole, ketoconazole, luliconazole, oxiconazole, sertaconazole)
- Allylamines (terbinafine – Lamisil, naftifine – Naftin, Butenafine)
- Hydroxypyridone (Ciclopirox - Loprox)
- Large study showed no difference in efficacy, safety and tolerability

TINEA SYSTEMIC TREATMENT

- Extensive corporis infection, immunosuppression, failed topical treatment, tinea capitis, tinea barbae or tinea unguium (onychomycosis)
- Griseofulvin 10mg/kg/day for 4 weeks
- Itraconazole 200mg/day x 1 week or 100mg/day x 2 weeks
- Terbinafine 250mg/day x 2 weeks (now FDA approved for >4y/o)
- Fluconazole 50-100mg/day or 150mg/weekly x 2-4 weeks
- * do not use oral ketoconazole



CANDIDIASIS

Intertrigo – body folds (topical nystatin powder, clotrimazole, or miconazole twice daily)

Interdigital – web spaces

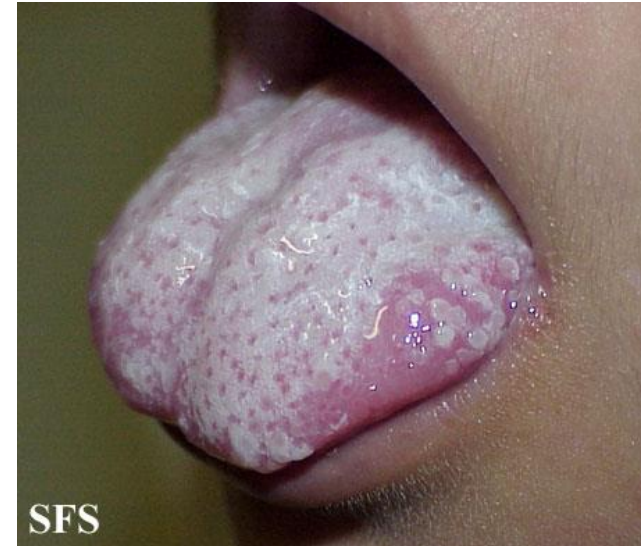
Diaper dermatitis (nystatin, amphotericin B, miconazole, or clotrimazole twice daily)

Oral – (Infants - nystatin oral suspension; Adults – nystatin or Clotrimazole troche)



CANDIDIASIS

- Genital (vaginitis or balanitis)
- Vaginal (topical miconazole nitrate, clotrimazole OR One-time oral therapy with fluconazole (150 mg).
- Balanitis (Topical therapy is sufficient in most patients. Evaluate sexual partners and treat if needed.)



TINEA VERSICOLOR

Predisposing factors: Hot, humid climates, oily skin

Typically, on trunk, back, abdomen and upper extremities; color varies;

Stretch test - diagnostic tip*

Fluconazole 300mg once weekly for 2 weeks



VIRAL SKIN ERUPTIONS

HSV 1 & HSV 2

- Labialis (oropharyngeal): HSV-1 (80-90%), HSV-2 (10-20%)
- Urogenital: HSV-1 (10-30%), HSV-2 (70-90%)

Presentation: prodrome -vesicles in groups on an erythematous base-pustules-ulcers

Diagnosis

- viral culture (PCR),
- Serology type specific antibodies





HSV 1 (LABIALIS)

- Episodic therapy
 - Topical
 - Oral
 - Acyclovir 400mg 5x day x 5 days
 - Valacyclovir 2g twice daily x 1 day
 - Famciclovir 1.5g x 1 dose
- Continuous suppression- severe outbreaks, eczema, pre-op suppression
 - Oral – Acyclovir 400mg bid; Valacyclovir 500-1g daily; Famciclovir 500mg bid
- Sitavig - mucoadhesive acyclovir 50mg – single tab/one dose

HSV 2 (UROGENITAL)

- Episodic therapy
 - Oral – Acyclovir 400mg TID x 5 days or 800mg TID x 2 days
 - Or 800mg BID x 5 days; Valacyclovir 500mg BID x 3 days or
 - 1 g daily x 5 days; Famciclovir 125-250-500mg BID x 5 days
- Continuous Suppression – severe or frequent outbreaks;
- 36 weeks gestation
 - Oral - Acyclovir 400mg TID; Valacyclovir 500mg BID



HERPES ZOSTER

- Painful erythematous papules-vesicles-pustules-crust
- Course in healthy people = 7-10 days
- Usually affects one dermatome but 2-3 neighboring dermatomes may be affected.
- Post herpetic neuralgia (PHN) difficult to treat



From Lemmi and Lemmi, 2000.

HERPES ZOSTER TREATMENT

Drug	Dose	Misc.
Acyclovir	800mg 5x daily x 7 days	IV for severe disease or immunocompromised, start in 72 hours
Valacyclovir	1gm TID x 7 days	Start in first 72 hours
Famciclovir	500mg TID x 7 days	Start in first 72 hours

HERPES ZOSTER TREATMENT AND PHN

- Antivirals – standard.
- Simultaneous antiviral + Gabapentin treatment may prevent PHN.
- Pain control
 - gabapentin, opioids
- Oral steroids - Mixed data on prevention of PHN.
- Referral needed
- Ophthalmicus ; Oticus – triad of facial paralysis, ear pain and vesicles in auditory canal.



ZOSTER VACCINE - SHINGRIX



- vaccine efficacy was 96.6% in adults age 50 to 59 years, 97.4% in adults age 60 to 69 years, and 91.3% in adults age 70 years and older. Vaccine efficacy remained high in adults age 70 years and older, at or above 84.7% in all four years after vaccination.
- The efficacy of two doses of Shingrix for the prevention of postherpetic neuralgia (PHN) was high: 91.2% in adults age 50 years and older, and 88.8% in adults age 70 years and older.

MOLLUSCUM CONTAGIOSUM PATHOGENESIS

- Molluscum Contagiosum Virus (MCV types 1-4) closely related to poxvirus
- Transmitted by skin-to-skin contact- autoinoculation is common
- Papules or small nodules, pearly white or skin colored, round, oval, umbilicated. Inflammatory “halo”
- Distribution – isolated single lesion, multiple, scattered discrete lesions or clustered. Can occur anywhere.



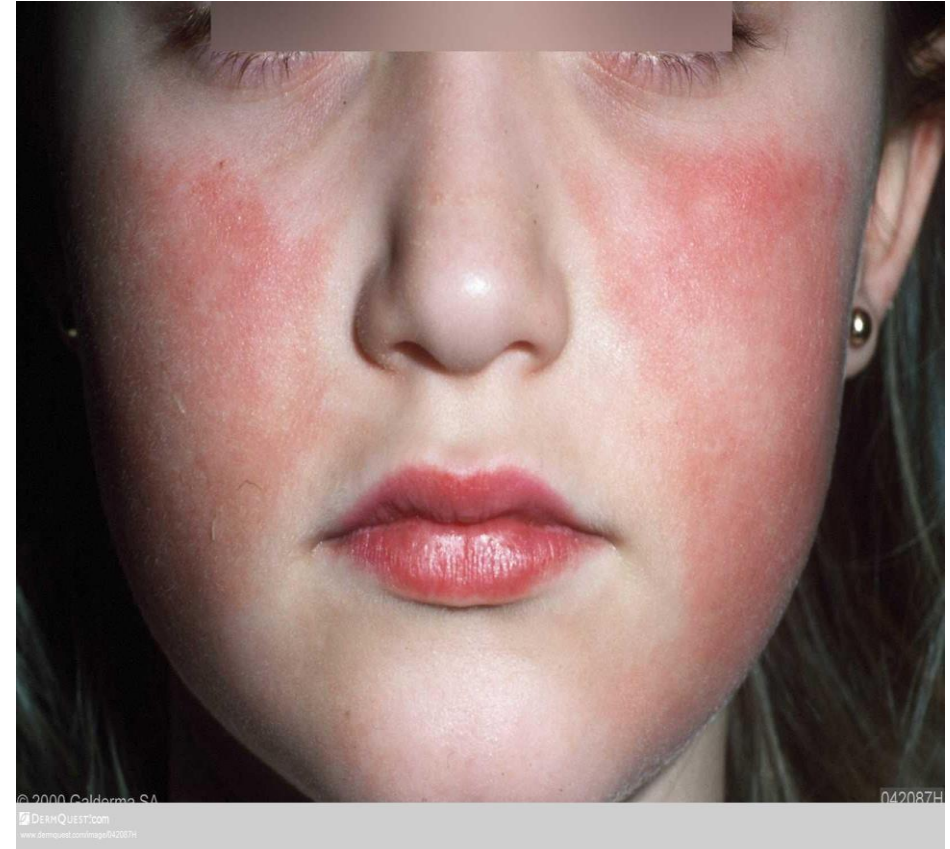
MOLLUSCUM CONTAGIOSUM TREATMENT

- asymptomatic or pruritic.
- Benign and self-limiting within 6 months (study showed 45.6% resolution @ 12 month untreated and 48.8% when treated).
- Topical treatments:
- Potassium hydroxide 5-20% 2x daily q other day for 1 week.
- Controversial use:
- Curettage or cryosurgery
- Topical imiquimod – scarring.
- Cantharidin, tretinoin, lactic acid, salicylic acid, silver nitrate, oral cimetidine



ERYTHEMA INFECTIONOSUM (FIFTH DISEASE)

- Parvovirus – DNA virus
- Most common in young – 60% young adults are seropositive.
- Transmitted by aerosol droplet.
- Symptoms
 - Prodrome of fever, malaise, headache, coryza - 2 days before rash.
 - Edematous erythematous plaques on the cheeks and erythematous lacy rash on trunk and extremities.



ERYTHEMA INFECTIONOSUM

Headache, sore throat, fever, myalgia, nausea, cough, conjunctivitis may coincide with rash

Infected adults likely to have arthralgia

Treatment - symptomatic

Self limiting – 3 weeks



HAND-FOOT-MOUTH DISEASE

- Coxsackievirus
- Typically occurs < 10 years of age; Self limiting 7-10 days
- Highly contagious – transmitted by oral-oral and fecal-oral
- 5-10 painful oral ulcers, cutaneous lesions (palms, soles, buttocks) can be asymptomatic or painful.



HAND-FOOT-MOUTH DISEASE

- Low grade fever, malaise, less commonly arthralgia, diarrhea
- Monitor for dehydration in babies – painful mouth
- Treatment
 - Symptomatic
- Self limiting 7-10 days



SEBORRHEIC KERATOSIS

Most common benign epithelial tumors

Hereditary, start after age 30

Evolve over months to years

Early lesions small, slightly elevated papule,
later – larger plaque

Late lesions – plaque with warty surface
“stuck on” appearance



ACTINIC KERATOSIS

- Precancerous
- percentage that progress to squamous cell carcinoma: estimates vary approx. 10%
- Single or multiple, discrete, dry, rough, adherent scaly lesions
- Occur on sun-exposed skin
- Diagnostic tip * Gently abrading lesions usually causes pain.



ACTINIC KERATOSIS TREATMENT

- Biopsy
- Refer for field treatment:
 - 5-Fluorouracil
 - Imiquimod
 - Ingenol mebutate
 - Topical diclofenac sodium 3% gel
 - Photo Dynamic Therapy



CUTANEOUS CARCINOMA

- Most common cancer in the U. S.
- One in five Americans will develop skin cancer during a lifetime.
- About 90% of nonmelanoma and 86% of melanomas can be attributed to exposure to ultraviolet (UV) radiation from the sun.
- Just one indoor tanning session increases users' chances of developing melanoma by 20 percent, and each additional session during the same year boosts the risk almost another two percent.
- Overall, the literature research revealed evidence that PCPs could reduce morbidity and mortality of skin cancer if they focus screening on patients at risk.

CUTANEOUS CARCINOMA

- Major Risks

- a personal or 1st degree relative with melanoma
- immunosuppressive therapy after transplant
- more than 100 nevi or more than 4 dysplastic nevi
- received 250 or more PUVA treatments
- radiation as a child for cancer,

- Risks

- naturally red or blonde hair color
- Freckles easily
- 50 to 100 nevi or dysplastic nevi
- burns easily, tans poorly
- history of many sunburns
- age >50

BASAL CELL CARCINOMA (BCC)

- Most common skin cancer in U.S.; Slow growing and usually do not metastasize.
- Waxy papules with central depression
- Pearly
- Rolled border
- Bleeding
- Crusting
- Erosion or ulceration
- “pearly pink papule” in sun exposed areas
- Tip: To better visualize a BCC – stretch the skin





BASAL CELL

SQUAMOUS CELL CARCINOMA (SCC)

- Second most common skin cancer and higher mortality than BCC; SCC has doubled over the last 40 years
- Aggressiveness varies wildly

Common features

- Raised, firm, skin-colored or pink
- Keratotic papule (carrot) or plaque





SQUAMOUS CELL

MELANOMA

- 5% of skin cancers.
- Three times as many deaths each year compared to nonmelanoma skin cancer.
- Most often in skin but can be from melanocytes in eyes, ears, GI tract, genital or oral mucous membranes.



ABCDE OF MELANOMA

- A - Asymmetrical Shape
- B - Border
- C - Color
- D - Diameter
- E – Evolution: The most important!



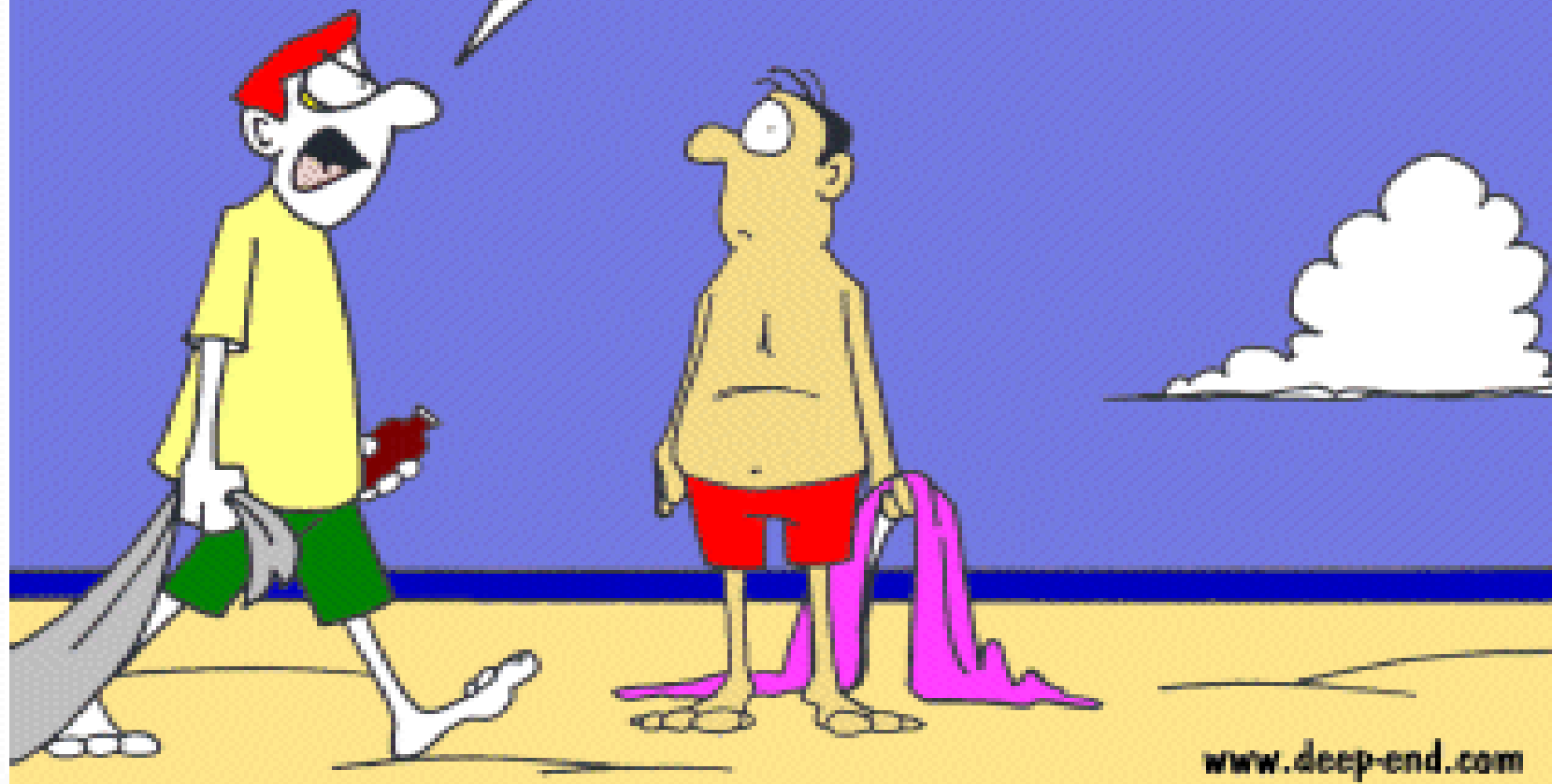
UGLY DUCKLING SIGN

- Ugly Duckling Sign as a Major Factor of Efficiency in Melanoma Detection.
- All melanomas were detected with both ugly duckling and ABCDE approach.
- ABCDE approach without UD leads to 7x more biopsies.
- When patient has multiple nevi, use ugly duckling.



" FAIR WARNING " !

Ain't nothing I hate worse than a
smart aleck" **SUN** of a **BEACH**"!



Thank you!

REFERENCES

- American Academy of Dermatology Association. (2025, 02/11/2025). *Skin conditions: Acne*. <https://www.aad.org/media/stats-numbers>
- Birkmann, A., Bonsmann, S., Kropf, D., Pfaff, T., Rangaraju, M., Sumner, M., Timmler, B., Zimmermann, H., Buschmann, H., & Ruebsamen-Schaeff, H. (2022). Discovery, chemistry, and preclinical development of pritelivir, a novel treatment option for acyclovir-resistant herpes simplex virus infections. *Journal of Medicinal Chemistry*, 65(20), 13614-13628.
- Cane, F., Posfay-Barbe, K. M., & Pittet, L. F. (2024). Hygiene measures and decolonization of staphylococcus aureus made simple for the pediatric practitioner. *The Pediatric Infectious Disease Journal*, 43(5), e178-e182. <https://doi.org/10.1097/inf.0000000000004294>
- Chao, Y. C., Ko, M. J., Tsai, W. C., Hsu, L. Y., & Wu, H. Y. (2023). Comparative efficacy of treatments for molluscum contagiosum: A systematic review and network meta-analysis. *JDDG: Journal der Deutschen Dermatologischen Gesellschaft*, 21(6), 587-597.
- Chen, L., Ni, Y., Wu, X., & Chen, G. (2022, 2022/10/03). Probiotics for the prevention of atopic dermatitis in infants from different geographic regions: A systematic review and meta-analysis. *Journal of Dermatological Treatment*, 33(7), 2931-2939. <https://doi.org/10.1080/09546634.2022.2091101>
- Davis, D. M. R., Frazer-Green, L., Alikhan, A., Bercovitch, L., Cohen, D. E., Darr, J. M., Drucker, A. M., Eichenfield, L. F., Paller, A. S., Schwarzenberger, K., Silverberg, J. I., Singh, A. M., Wu, P. A., & Sidbury, R. (2025, 2025/06/17/). Focused update: Guidelines of care for the management of atopic dermatitis in adults. *Journal of the American Academy of Dermatology*. <https://doi.org/https://doi.org/10.1016/j.jaad.2025.05.1386>

REFERENCES

- Dessinioti, C., & Katsambas, A. (2022, Dec). Antibiotics and antimicrobial resistance in acne: Epidemiological trends and clinical practice considerations. *Yale J Biol Med*, 95(4), 429-443.
 - Devasenapathy, N., Chu, A., Wong, M., Srivastava, A., Ceccacci, R., Lin, C., MacDonald, M., Wen, A., Steen, J., Levine, M., Pyne, L., Schneider, L., Chu, D. K., Asiniwasis, R. N., Boguniewicz, M., Ceccacci, R., Chen, L., Chu, A., Chu, D. K., De Benedetto, A., Devasenapathy, N., Frazier, W. T., Greenhawt, M., Huynh, J., Kim, E., LeBovidge, J., Levine, M., Lin, C., Lind, M. L., Lio, P. A., MacDonald, M., Martin, S. A., O'Brien, M., Ong, P. Y., Pyne, L., Schneider, L., Silverberg, J. I., Spergel, J. M., Srivastava, A., Steen, J., Wang, J., Wen, A., & Wong, M. (2023). Cancer risk with topical calcineurin inhibitors, pimecrolimus and tacrolimus, for atopic dermatitis: A systematic review and meta-analysis. *The Lancet Child & Adolescent Health*, 7(1), 13-25. [https://doi.org/10.1016/S2352-4642\(22\)00283-8](https://doi.org/10.1016/S2352-4642(22)00283-8)
 - Dvorin, E. L., & Ebell, M. H. (2020, Jan 15). Short-term systemic corticosteroids: Appropriate use in primary care. *Am Fam Physician*, 101(2), 89-94.
 - Eichenfield, D. Z., Sprague, J., & Eichenfield, L. F. (2021). Management of acne vulgaris: A review. *JAMA*, 326(20), 2055-2067. <https://doi.org/10.1001/jama.2021.17633>
 - Elias, P. M. (2022, 2022/05/01/). Optimizing emollient therapy for skin barrier repair in atopic dermatitis. *Annals of Allergy, Asthma & Immunology*, 128(5), 505-511. <https://doi.org/https://doi.org/10.1016/j.anai.2022.01.012>
 - Gupta, A. K., Polla Ravi, S., Wang, T., Faour, S., Bamimore, M. A., Heath, C. R., & Friedlander, S. F. (2024). An update on tinea capitis in children. *Pediatric Dermatology*, 41(6), 1030-1039.
-

REFERENCES

- Hammill, J. (2024). *Acne, depression, and anxiety symptoms in young adults* Université d'Ottawa | University of Ottawa].
 - Heng, A. H. S., & Chew, F. T. (2020, 2020/04/01). Systematic review of the epidemiology of acne vulgaris. *Scientific Reports*, 10(1), 5754. <https://doi.org/10.1038/s41598-020-62715-3>
 - Hon, K. L., Leung, A. K. C., Cheng, J., Luk, D. C. K., Leung, A. S. Y., & Koh, M. J. A. (2024). Allergic contact dermatitis in pediatric practice. *Curr Pediatr Rev*, 20(4), 478-488. <https://doi.org/10.2174/1573396320666230626122135>
 - Huang, Y. C., & Cheng, Y. C. (2017, Jun). Isotretinoin treatment for acne and risk of depression: A systematic review and meta-analysis. *J Am Acad Dermatol*, 76(6), 1068-1076.e1069. <https://doi.org/10.1016/j.jaad.2016.12.028>
 - Jain, P., Embry, A., Arakaki, B., Estevez, I., Marcum, Z. A., & Viscidi, E. (2024). Prevalence of genital herpes and antiviral treatment. *Sexually Transmitted Diseases*, 51(10), 686-693. <https://doi.org/10.1097/olq.0000000000001990>
 - Keam, S. J. (2022, 2022/07/01). Tapinarof cream 1%: First approval. *Drugs*, 82(11), 1221-1228. <https://doi.org/10.1007/s40265-022-01748-6>
-

REFERENCES

- Kohli, S., Tayal, R., & Goyal, T. (2022). Antihistamines in children: A dermatological perspective. *Indian Journal of Paediatric Dermatology*, 23(1), 8-23. https://doi.org/10.4103/ijpd.ijpd_124_21
 - Kridin, K., & Ludwig, R. J. (2023, 2023/02/01/). Isotretinoin and the risk of psychiatric disturbances: A global study shedding new light on a debatable story. *Journal of the American Academy of Dermatology*, 88(2), 388-394. <https://doi.org/https://doi.org/10.1016/j.jaad.2022.10.031>
 - Layton, A. M., & Dias da Rocha, M. A. (2023, 2023/12/31). Real-world case studies showing the effective use of azelaic acid in the treatment, and during the maintenance phase, of adult female acne patients. *Clinical, Cosmetic and Investigational Dermatology*, 16(null), 515-527. <https://doi.org/10.2147/CCID.S396023>
 - Leung, A. K., Lam, J. M., Leong, K. F., Barankin, B., & Hon, K. L. (2022). Paediatrics: How to manage pediculosis capitis. *Drugs in Context*, 11, 2021-2011-2023.
 - Leung, B., Lam, Leong, Hon,. (2021). Dermatology: How to manage acne vulgaris. *Drugs Context*.
 - Madhu, R. (2021). Topical antifungal drugs-an overview. *Indian Journal of Practical Pediatrics*, 23(1), 22.
-

REFERENCES

- Ragi, S., Moseley, I., Lin, E. M., Ouellette, S., & Rao, B. (2023). 42536 prevalence of acne in underrepresented groups: An all of us database analysis. *Journal of the American Academy of Dermatology*, 89(3), AB210. <https://doi.org/10.1016/j.jaad.2023.07.840>
 - Reynolds, R. V., Yeung, H., Cheng, C. E., Cook-Bolden, F., Desai, S. R., Druby, K. M., Freeman, E. E., Keri, J. E., Stein Gold, L. F., Tan, J. K. L., Tollefson, M. M., Weiss, J. S., Wu, P. A., Zaenglein, A. L., Han, J. M., & Barbieri, J. S. (2024). Guidelines of care for the management of acne vulgaris. *Journal of the American Academy of Dermatology*, 90(5), 1006.e1001-1006.e1030. <https://doi.org/10.1016/j.jaad.2023.12.017>
 - Samuels, D. V., Rosenthal, R., Lin, R., Chaudhari, S., & Natsuaki, M. N. (2020, Aug). Acne vulgaris and risk of depression and anxiety: A meta-analytic review. *J Am Acad Dermatol*, 83(2), 532-541. <https://doi.org/10.1016/j.jaad.2020.02.040>
 - Thiboutot, D., Anderson, R., Cook-Bolden, F., Draelos, Z., Gallo, R. L., Granstein, R. D., Kang, S., Macsai, M., Gold, L. S., & Tan, J. (2020, 2020/06/01/). Standard management options for rosacea: The 2019 update by the national rosacea society expert committee. *Journal of the American Academy of Dermatology*, 82(6), 1501-1510. [https://doi.org/https://doi.org/10.1016/j.jaad.2020.01.077](https://doi.org/10.1016/j.jaad.2020.01.077)
 - Zhu, P., Ji, W., Li, D., Li, Z., Chen, Y., Dai, B., Han, S., Chen, S., Jin, Y., & Duan, G. (2023). Current status of hand-foot-and-mouth disease. *Journal of biomedical science*, 30(1), 15.
-