Acne: Types and Treatment for the Myriad Presentations of the Common Skin Complaint

Cynthia Griffith MPAS, PA-C
Dermatology Physician Assistant
University of Texas Southwestern Medical Center Dallas Texas
Editor in Chief Journal of Dermatology PAs

I have no relevant relationships with ineligible companies to disclose within the last 24 months (Note: Ineligible companies are defined as those whose primary business is producing, marketing, selling or reselling, or distributing healthcare products used by or on patients.)

Learning Objectives

Compare and contrast different types of acne and acne mimickers

Identify culprits that can exacerbate acne including medications, physical manipulation, infection

Discuss treatment including caveats for skin of color, acne in pregnancy, and current literature recommendations about diet and acne

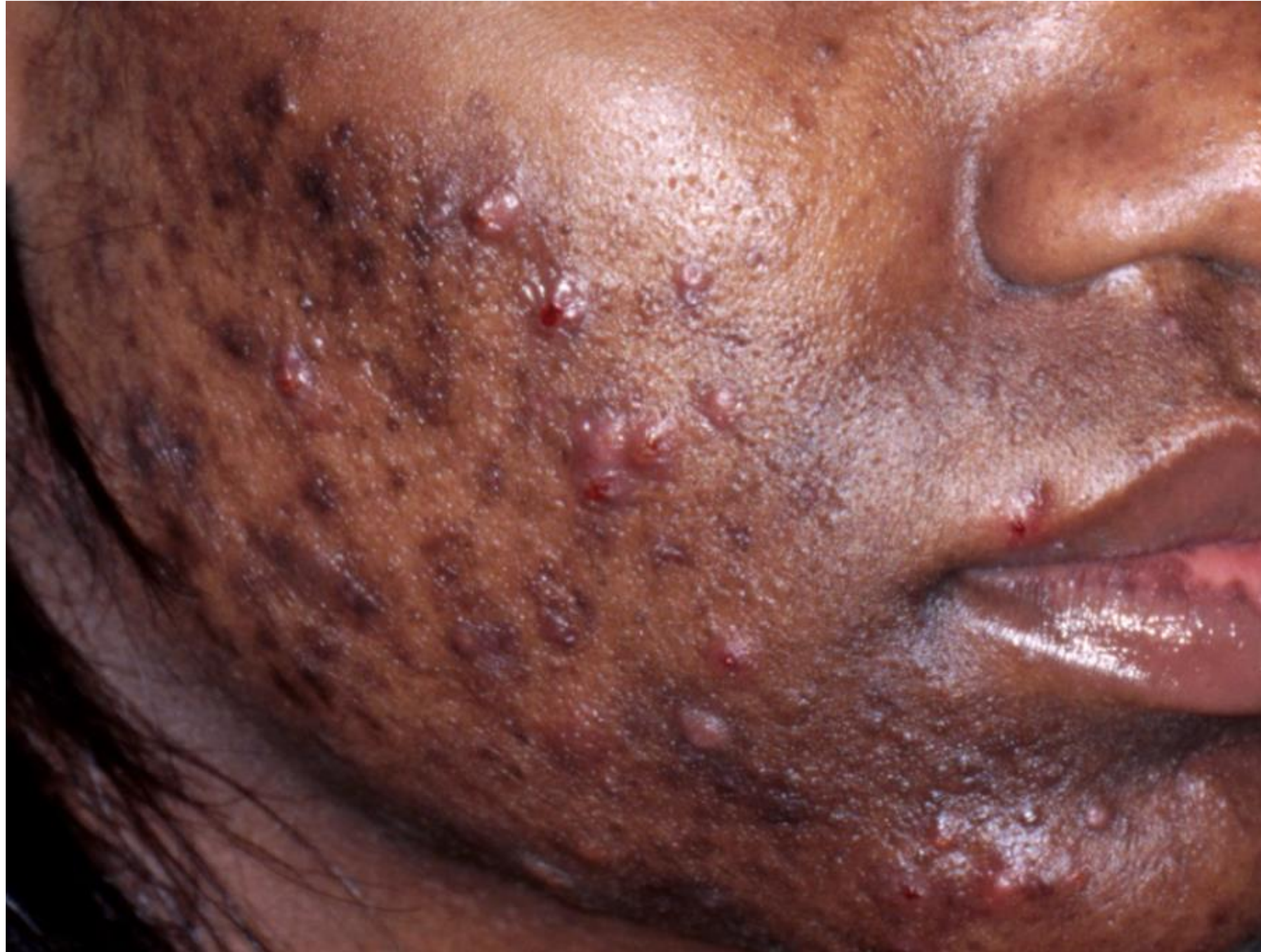
Prevalence and impact of Acne

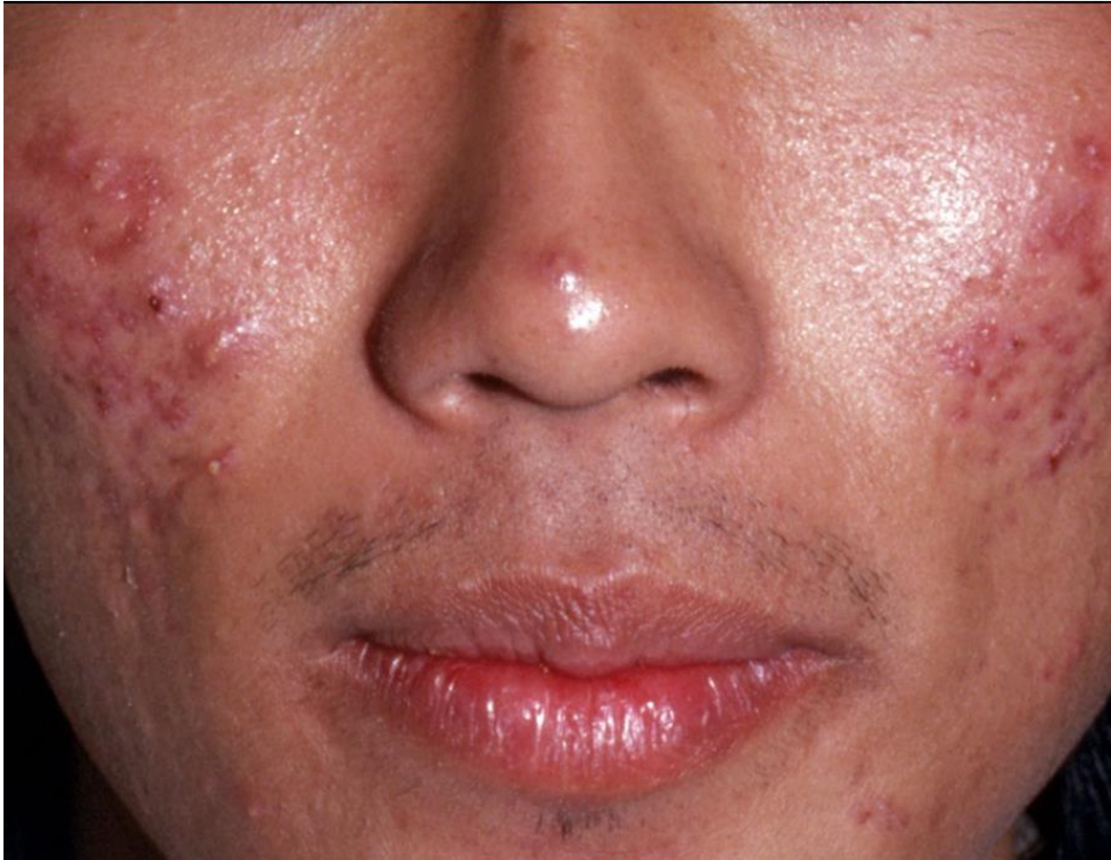
- Approximately 50 million people in the United States have acne
- Affects approximately 85% of teenagers
- no mortality associated with acne, but there is often significant physical and psychological morbidity, such as permanent scarring, poor self-image, depression, and anxiety
- direct cost of the disease is estimated to exceed $3 billion per year

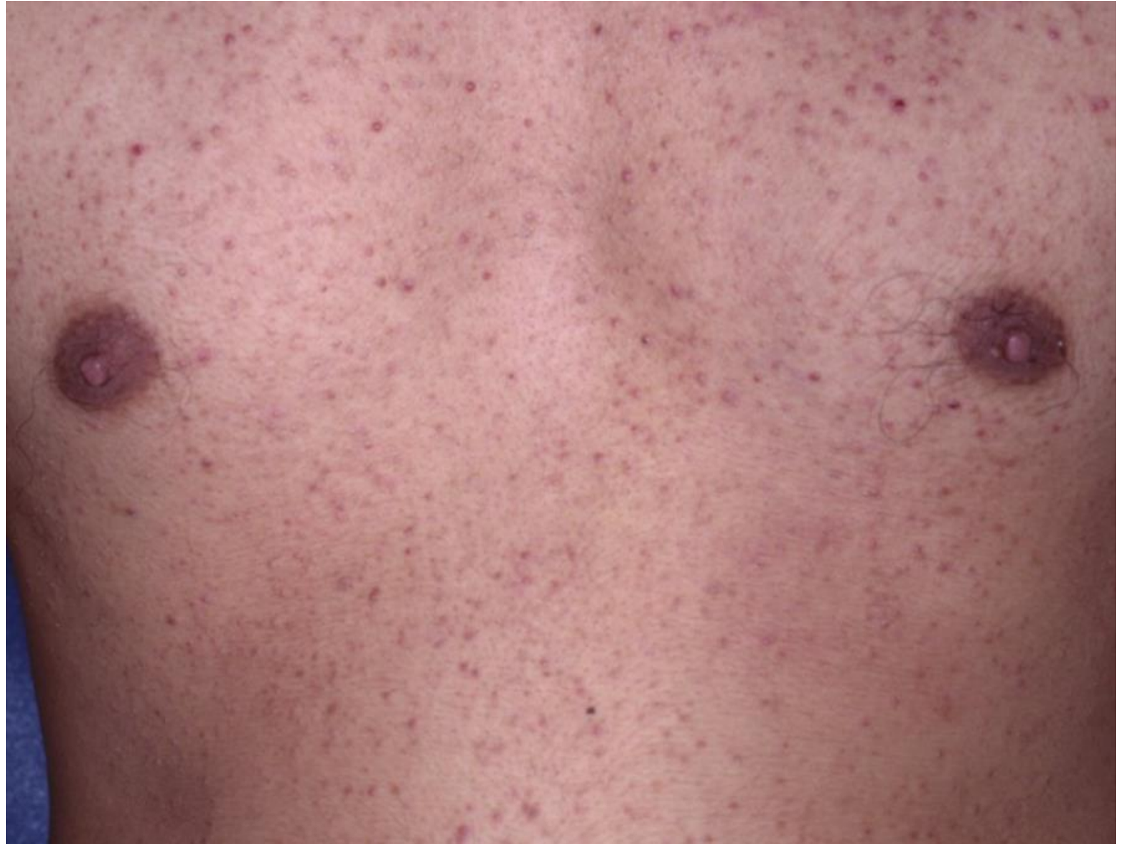
White G.M. Recent findings in the epidemiologic evidence, classification, and subtypes of acne vulgaris. *J Am Acad Dermatol.* 1998; **39**: S34-S37
Bhate K. Williams H.C. Epidemiology of acne vulgaris. B*r J Dermatol.* 2013; **168**: 474-485

Acne clinical appearance

- acne has a variable presentation with a constellation of lesion types including open and closed comedones, papules, pustules, nodules, and cysts
- face is involved in most cases, and the trunk is affected in up to 61% of patients
- lesions can progress to scars, post inflammatory hyperpigmentation

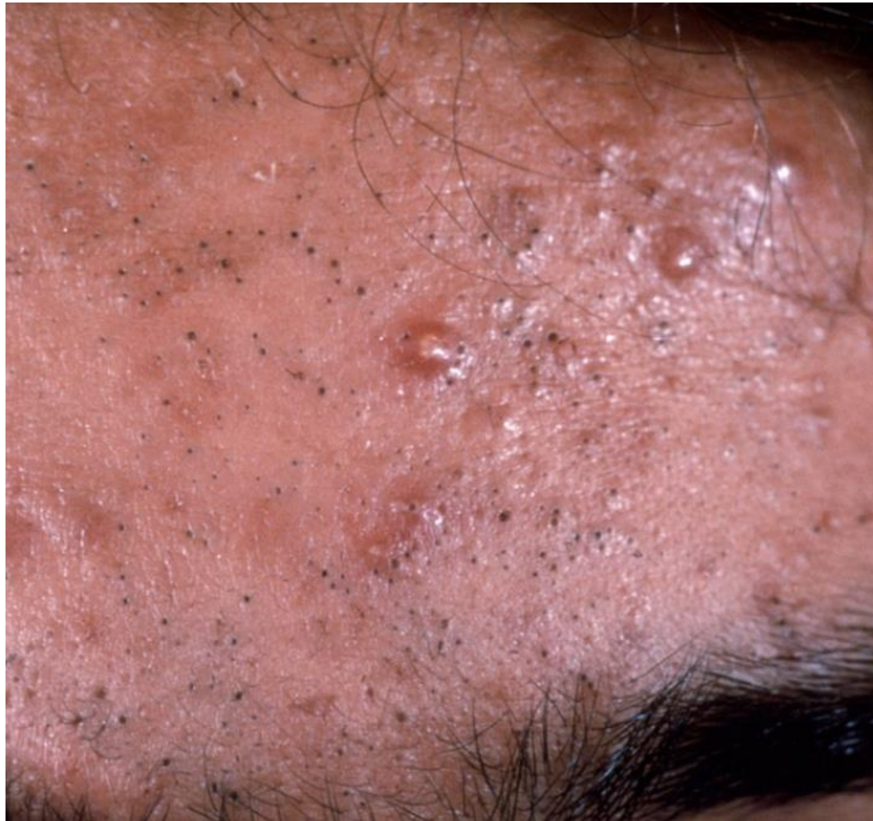


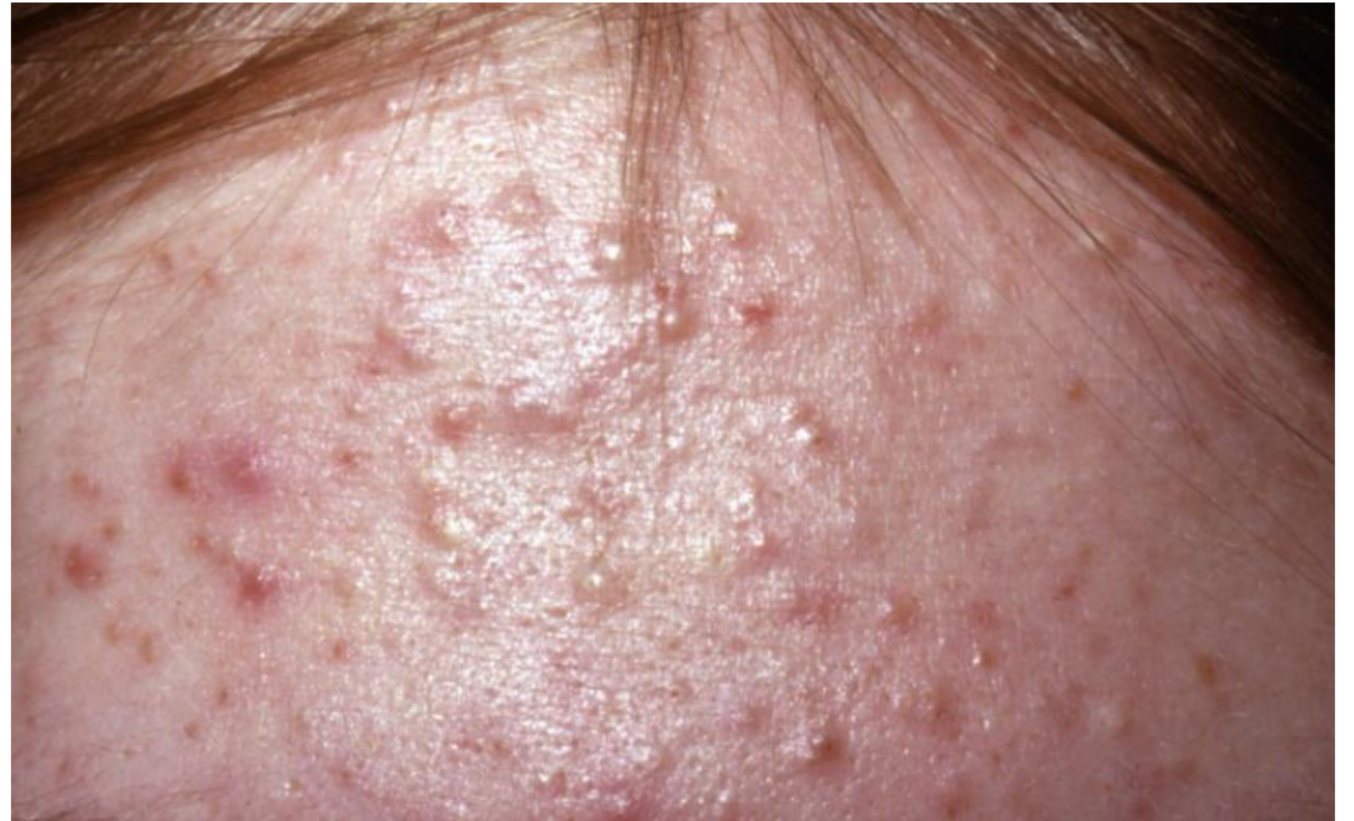




Causes of acne

- multifactorial inflammatory disease affecting the pilosebaceous follicles of the skin
- follicular hyperkeratinization, microbial colonization with *Propionibacterium acnes*, sebum production, and complex inflammatory mechanisms involving both innate and acquired immunity.
- neuroendocrine regulatory mechanisms, diet, and genetic and nongenetic factors all may contribute to acne



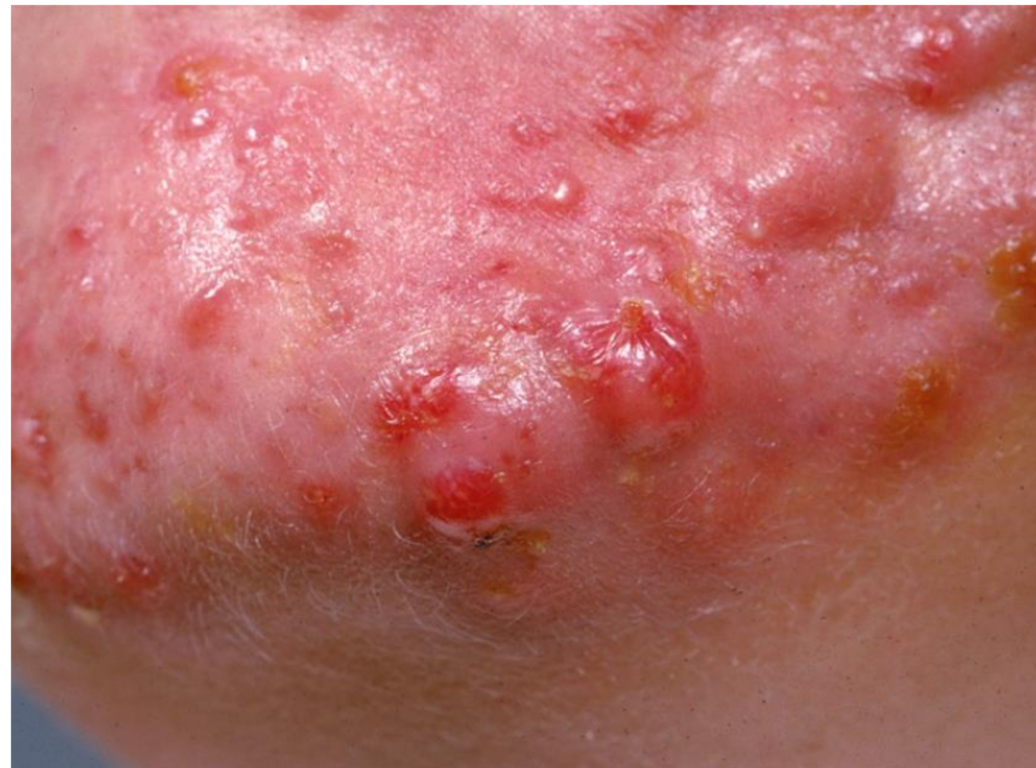


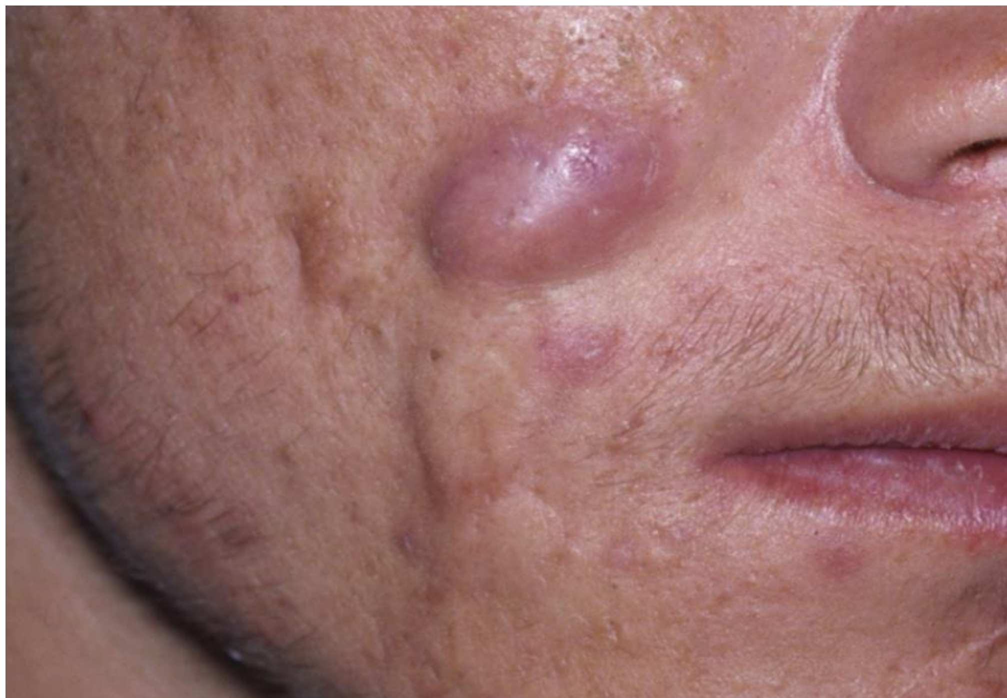
Types of Acne

- Comedonal
  - Open
  - Closed

Types of Acne

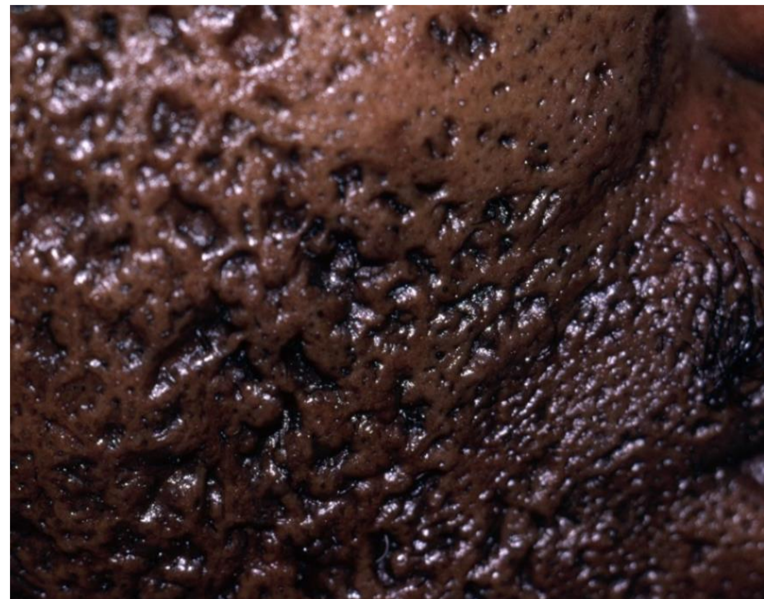
- Nodulocystic

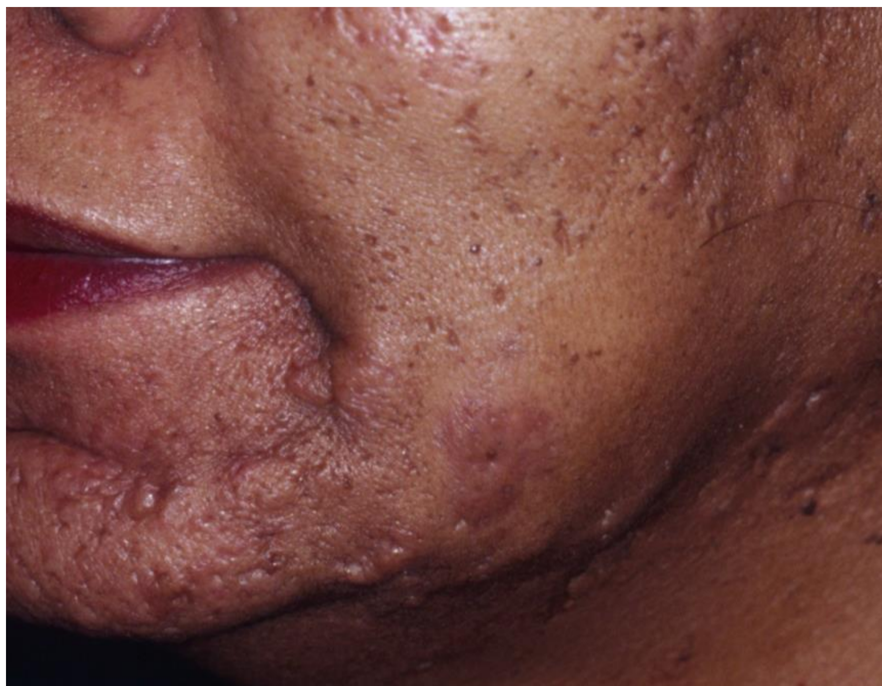




Types of Acne

- Scarring





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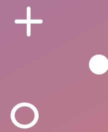
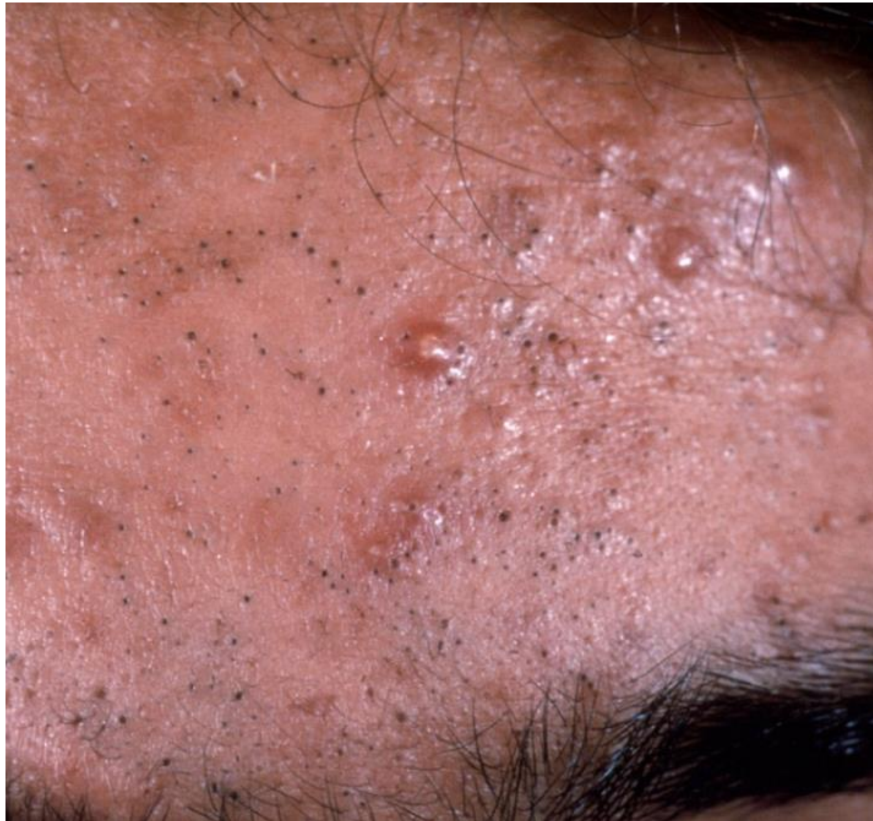
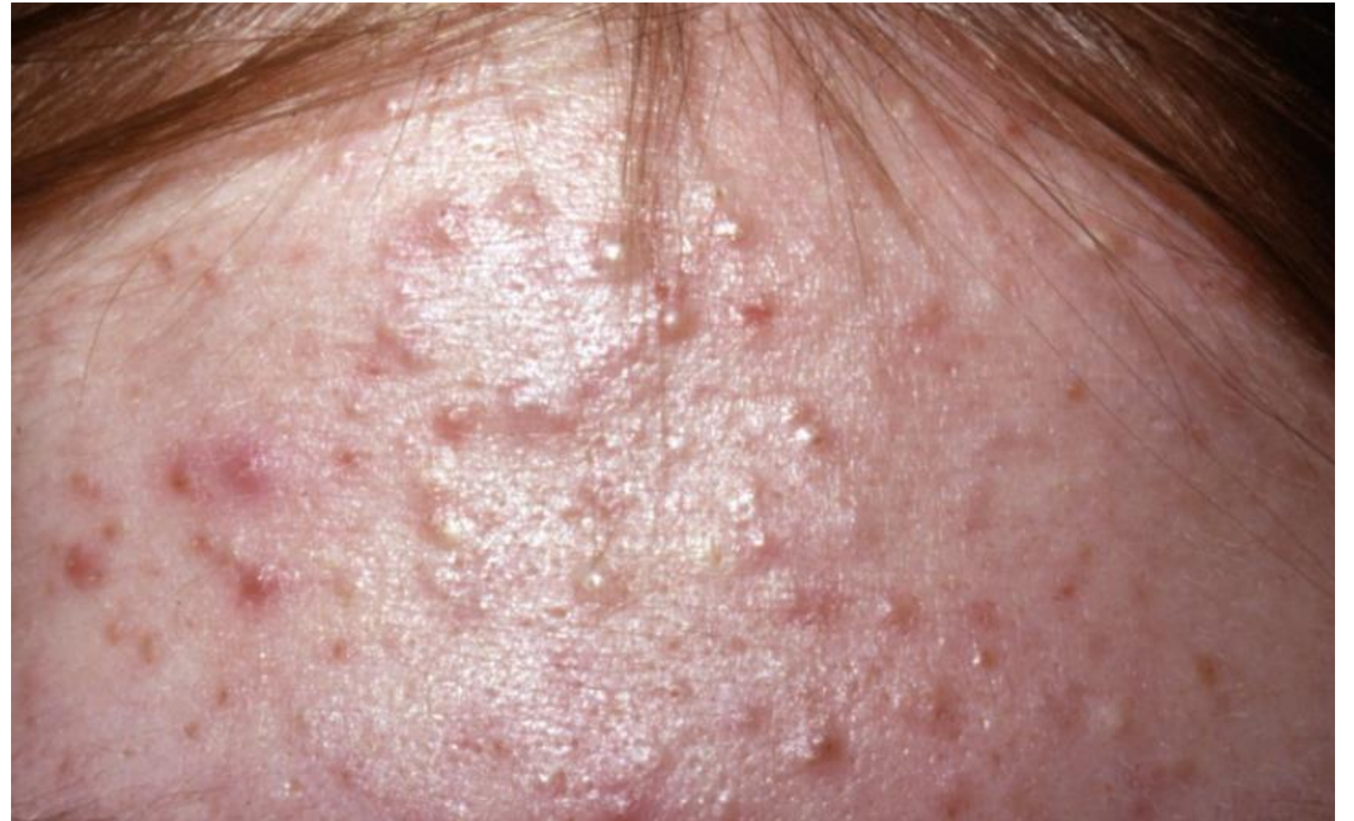
DDx for comedones

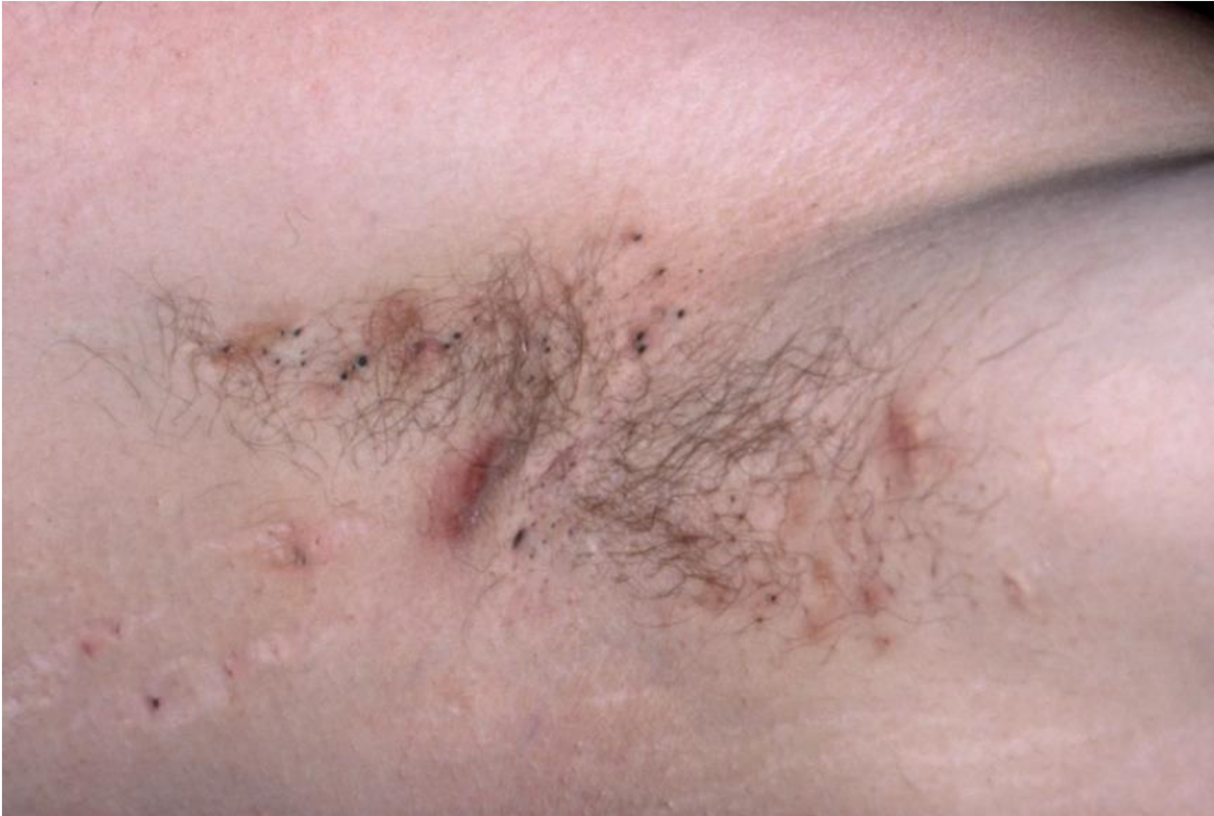


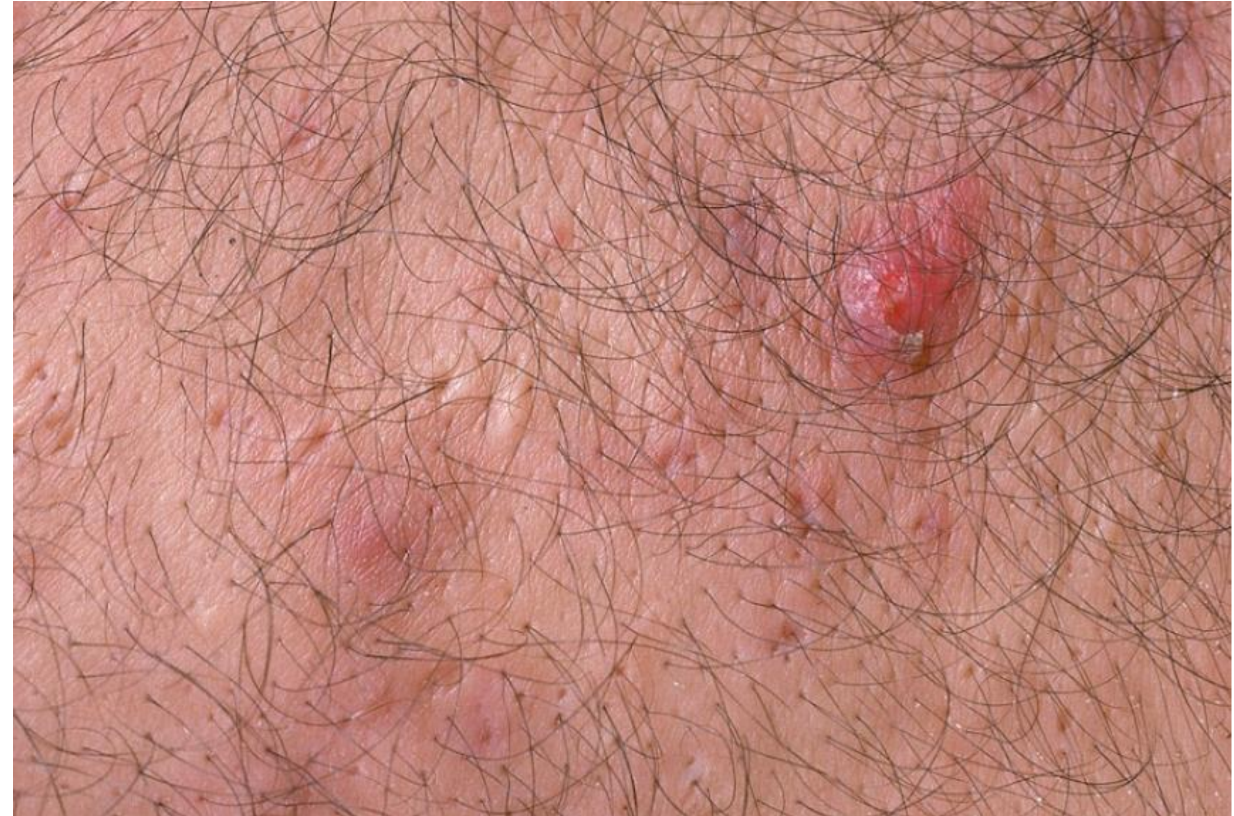




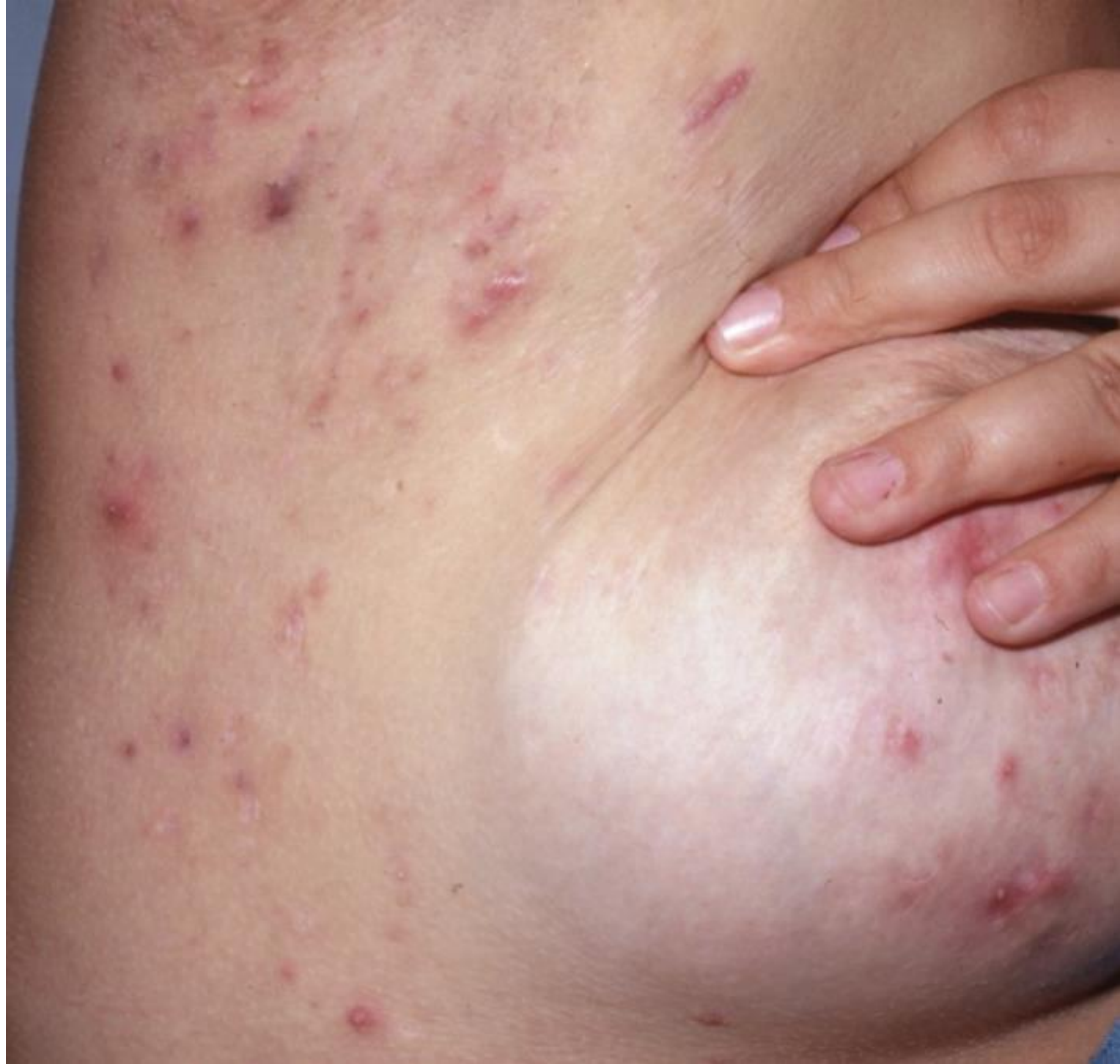
Comedones

Hidradenitis suppurativa





Hidradenitis suppurativa

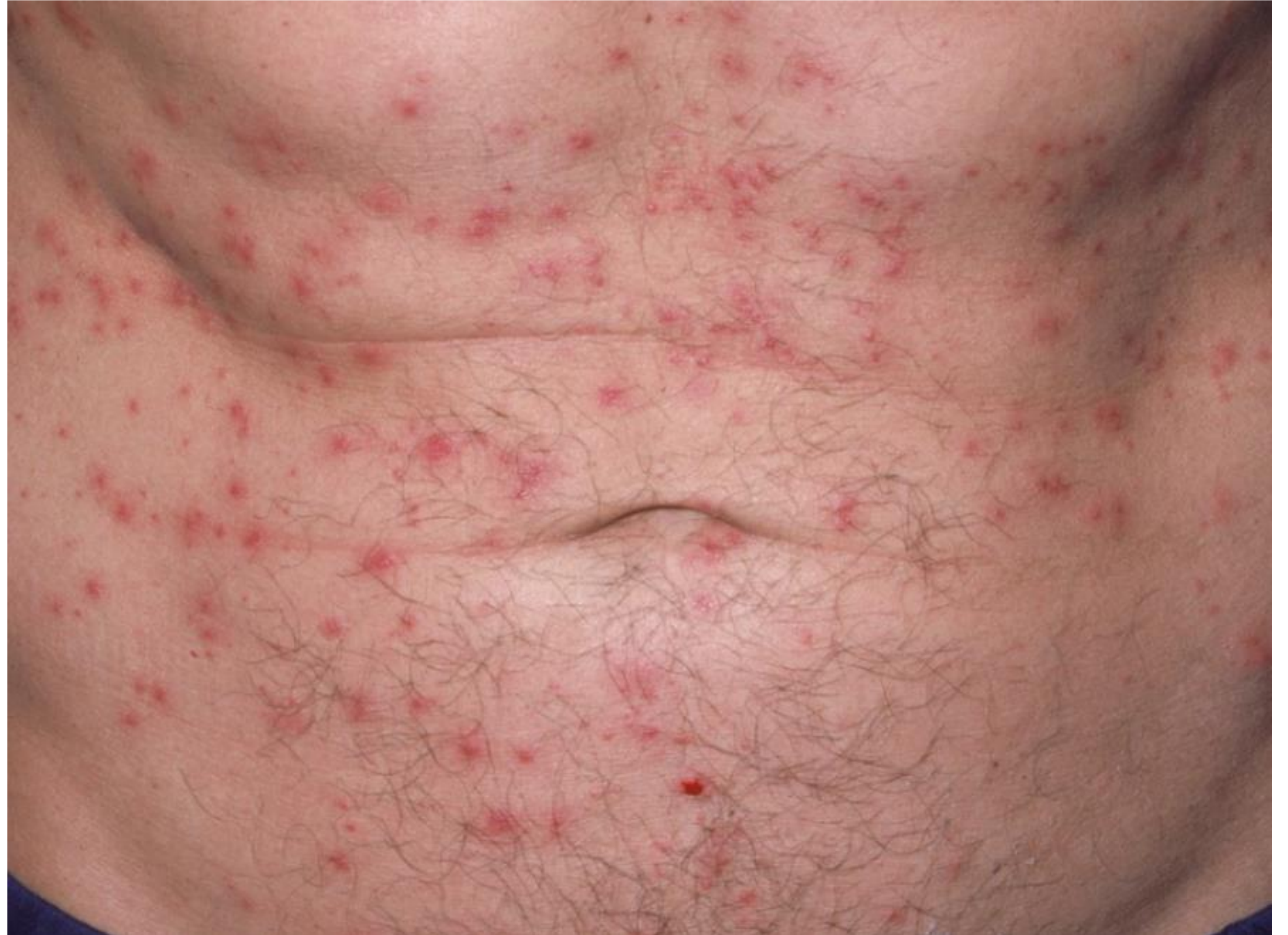


Other conditions that mimic acne

- Gram-negative folliculitis
- Pityrosporum folliculitis
- *Staphylococcus aureus* cutaneous infections
- Rosacea

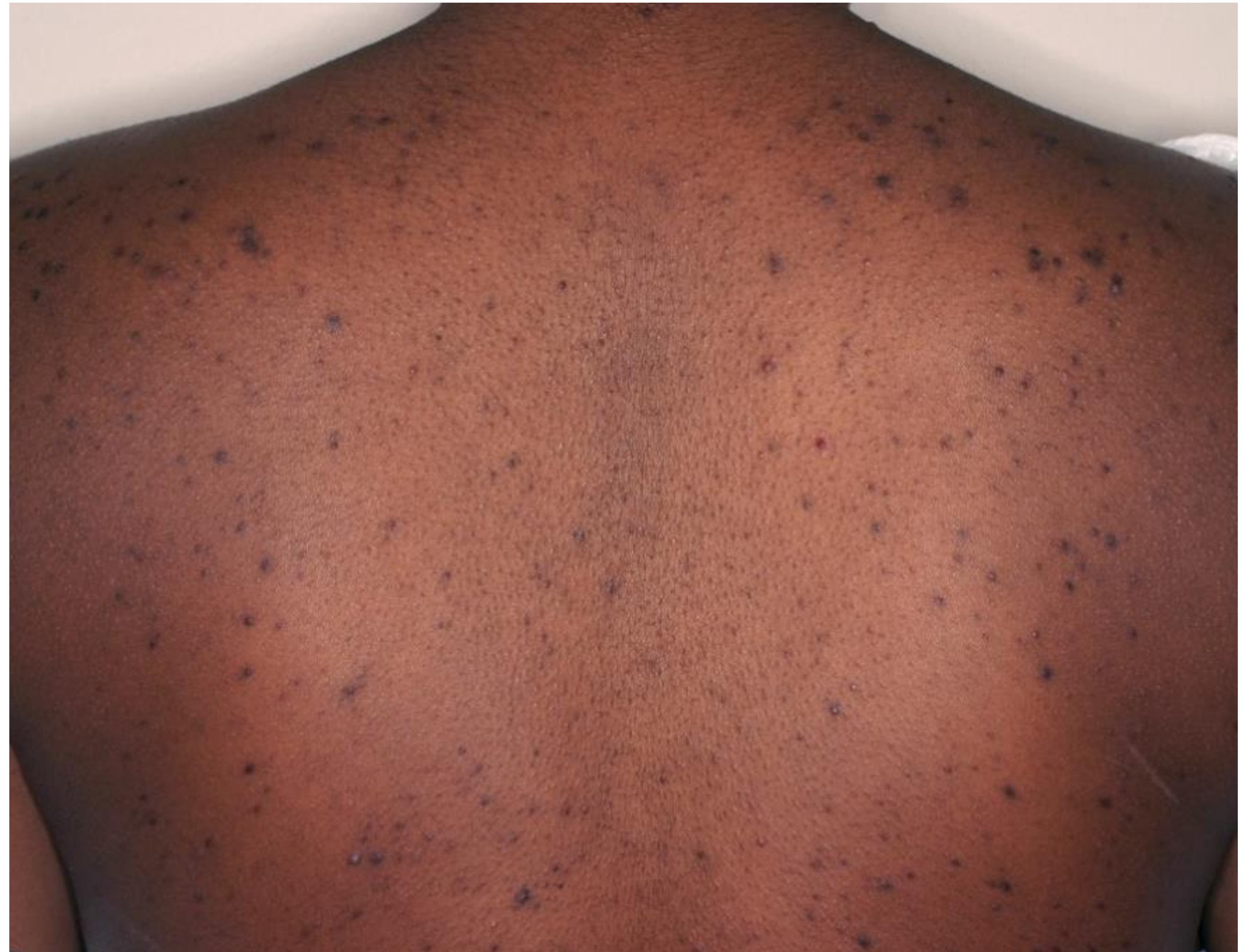
Gram-negative folliculitis

- presents as uniform and eruptive pustules, with rare nodules, in the perioral and perinasal regions, typically in the setting of prolonged tetracycline use.
- It is caused by various bacteria, such as Klebsiella and Serratia, and is unresponsive to many conventional acne treatments. Gram-negative folliculitis is typically diagnosed via culture of the lesions,
- treated with isotretinoin or an antibiotic



Pityrosporum folliculitis

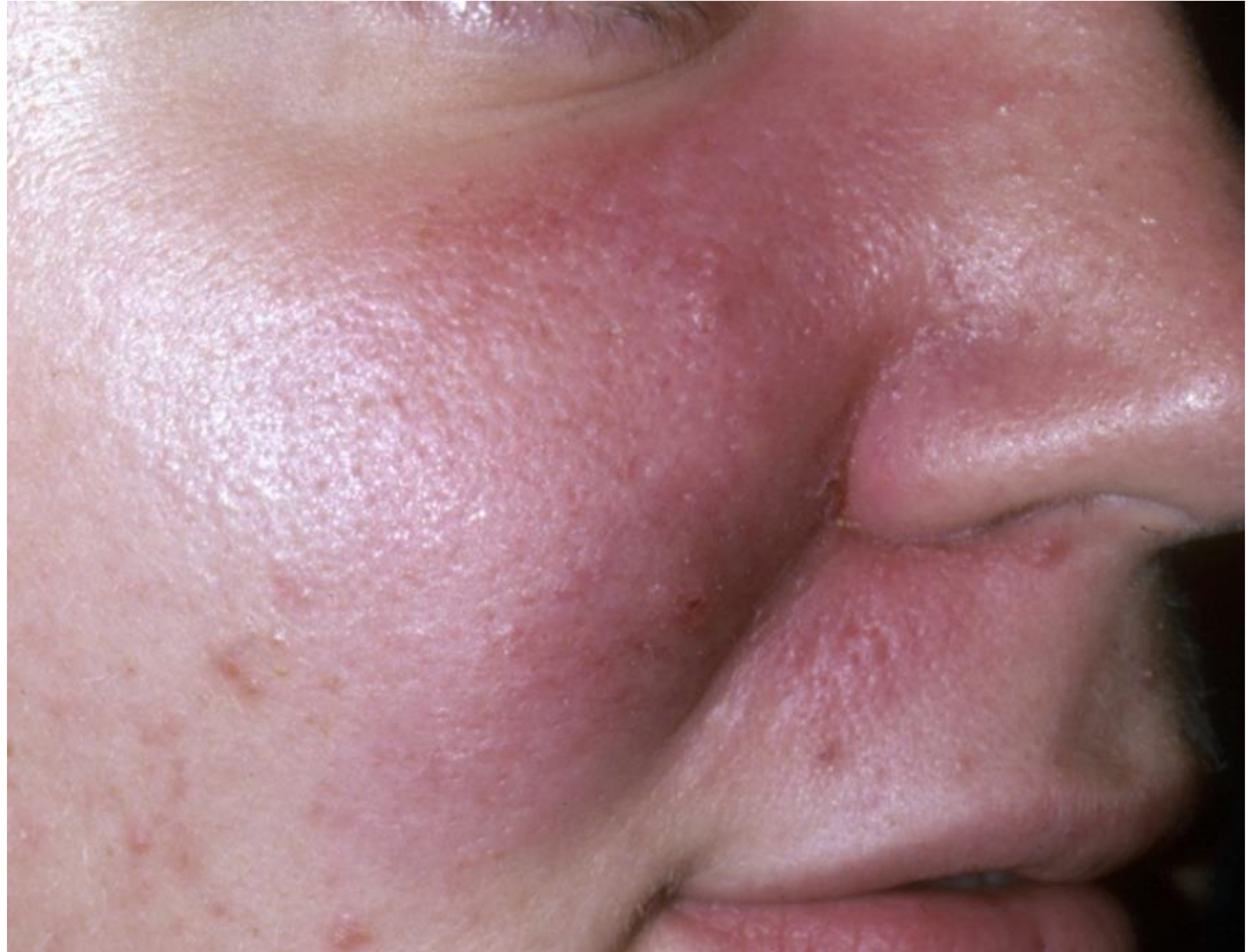
- Caused by Malassezia (normal flora) grows with antibiotic use or immunosuppression
- In cases of acne unresponsive to typical treatments
- Clinical presentation: truncal involvement or monomorphic appearance
- Itraconazole 200 mg daily for 1-2 weeks, or
- Fluconazole 100-200 mg daily for 1-3 weeks
- Recurrence is common



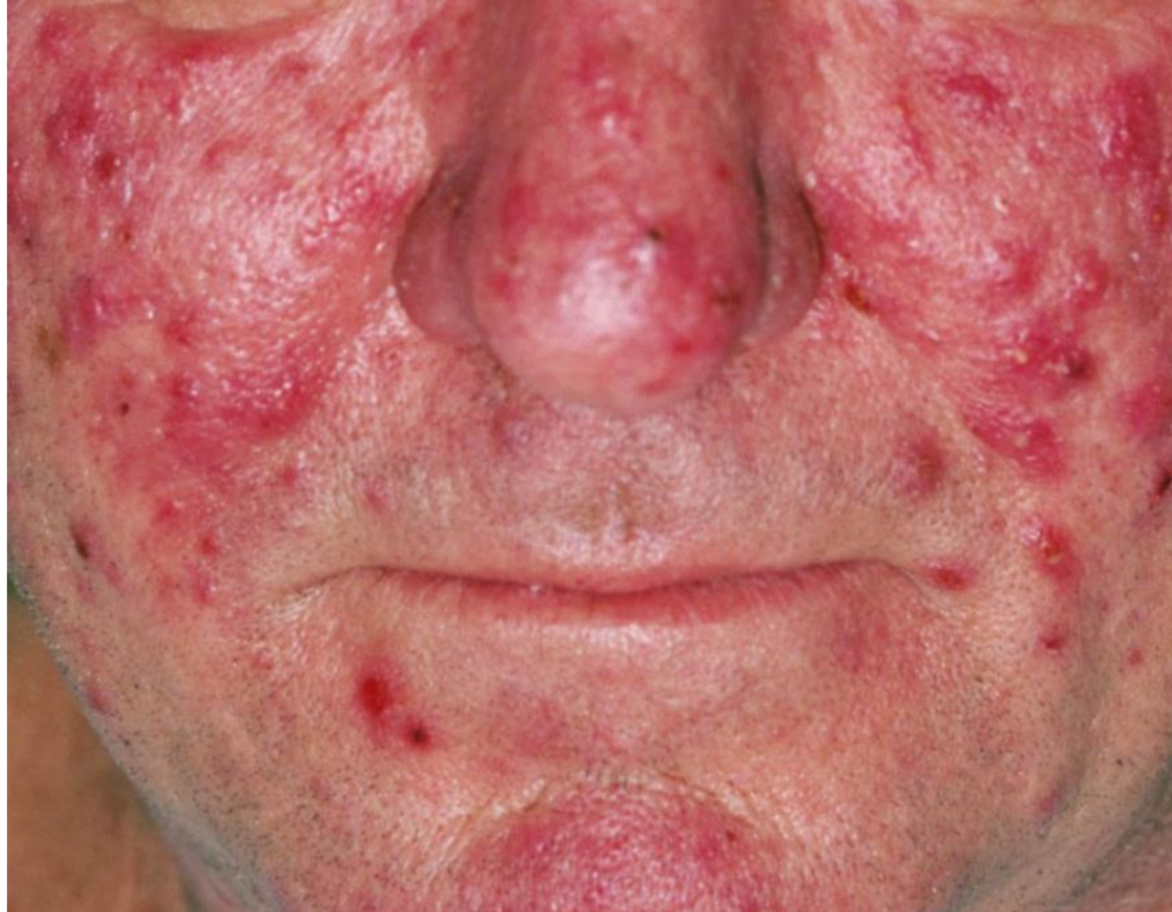
Rubenstein RM, Malerich SA. Malassezia (pityrosporum) folliculitis. *J Clin Aesthet Dermatol*. 2014;7(3):37-41.

Staphylococcus aureus cutaneous infections

acute eruptions; a swab culture may be helpful in these cases



Rosacea

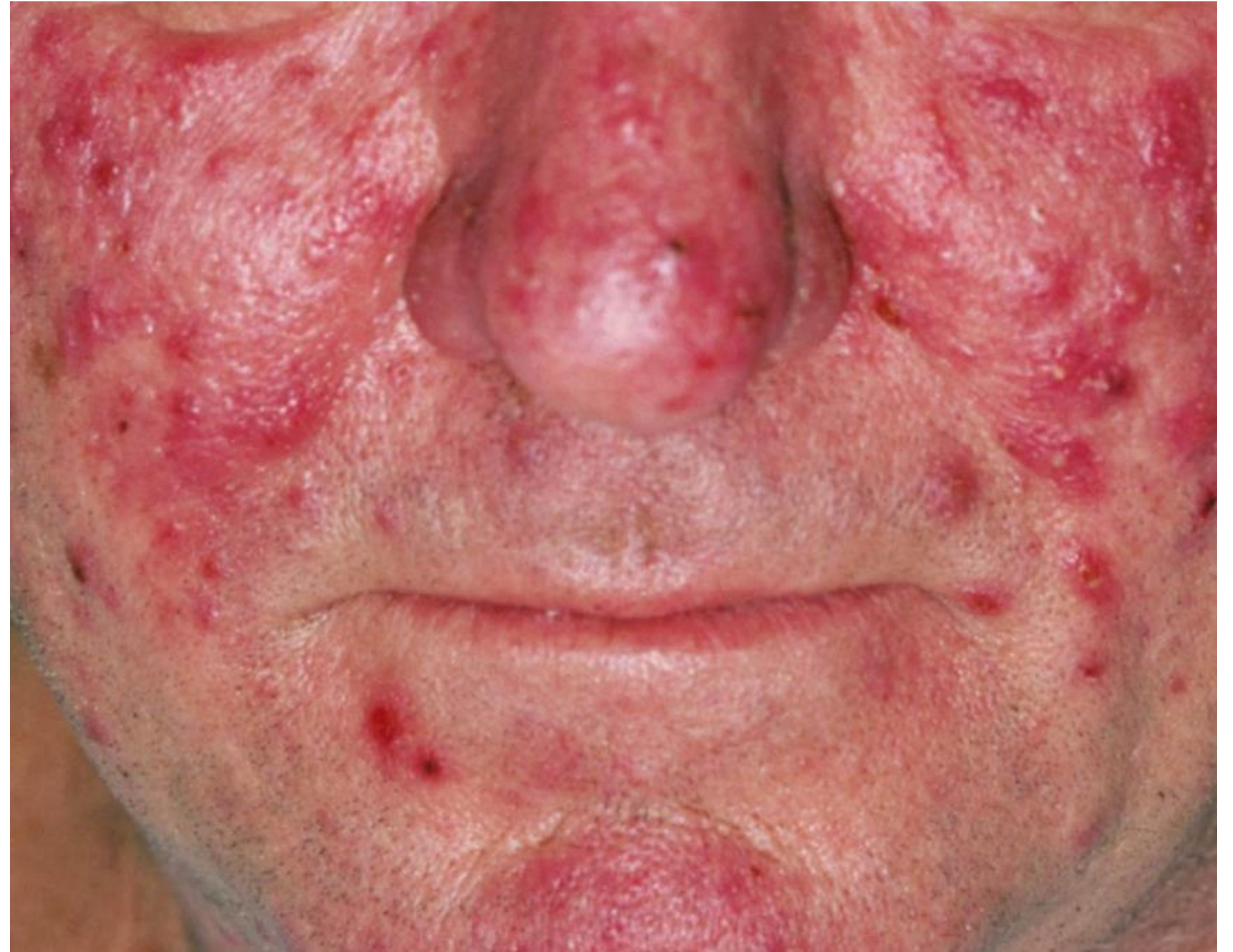


Rosacea

-Will not have comedones but can have pustules

-be aware of inhaled or oral steroids flaring this

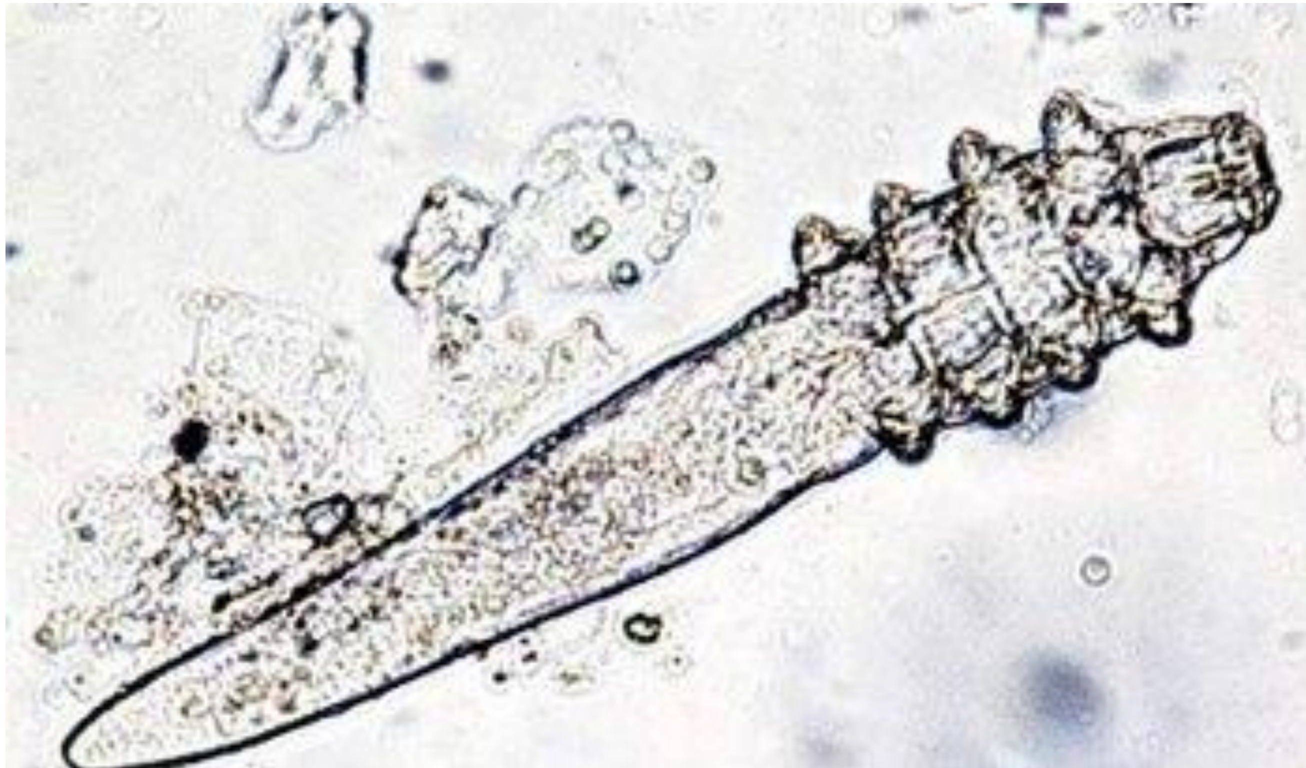
-if pustule you may want to scrap pustule to rule out demodex rosacea especially if the patient is itchy



KOH – Potassium Hydroxide

- Use 15 blade, Glass slide, solution of 10-20% KOH (potassium hydroxide), chlorazol black, cover slips
- Scrape the leading edge of the scaling, burrow, or the subungual debris around a nail
- Keep the blade perpendicular to the skin and scrape the blade onto the skin catching the scale with the glass slide
- Add 2-3 drops of KOH and chlorazol black and cover slip, wait
- Use low power and then higher power (10 objective) on the microscope to look for:

Demodex



- Treatment with topical ivermectin, metronidazole, sodium sulfacetamide, permethrin
- ivermectin 200 µg/kg (usual range, 12-18 mg) or oral metronidazole

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Medications that can worsen acne

- Oral, inhaled or topical steroid
- Hormones (gender reassignment, body building, OCP)
- Lithium
- Anticonvulsants
- medications that contain bromides or iodides

Hormone disorders that cause acne

- Congenital adrenal hyperplasia (eg, 21-hydroxylase deficiency)
  - 1:10,000 to 1:15,000 people in the United States and Europe
- Polycystic ovarian syndrome (PCOS)
  - 6% to 12% (as many as 5 million) of US women of reproductive age

https://rarediseases.org/rare-diseases/congenital-adrenal-hyperplasia/

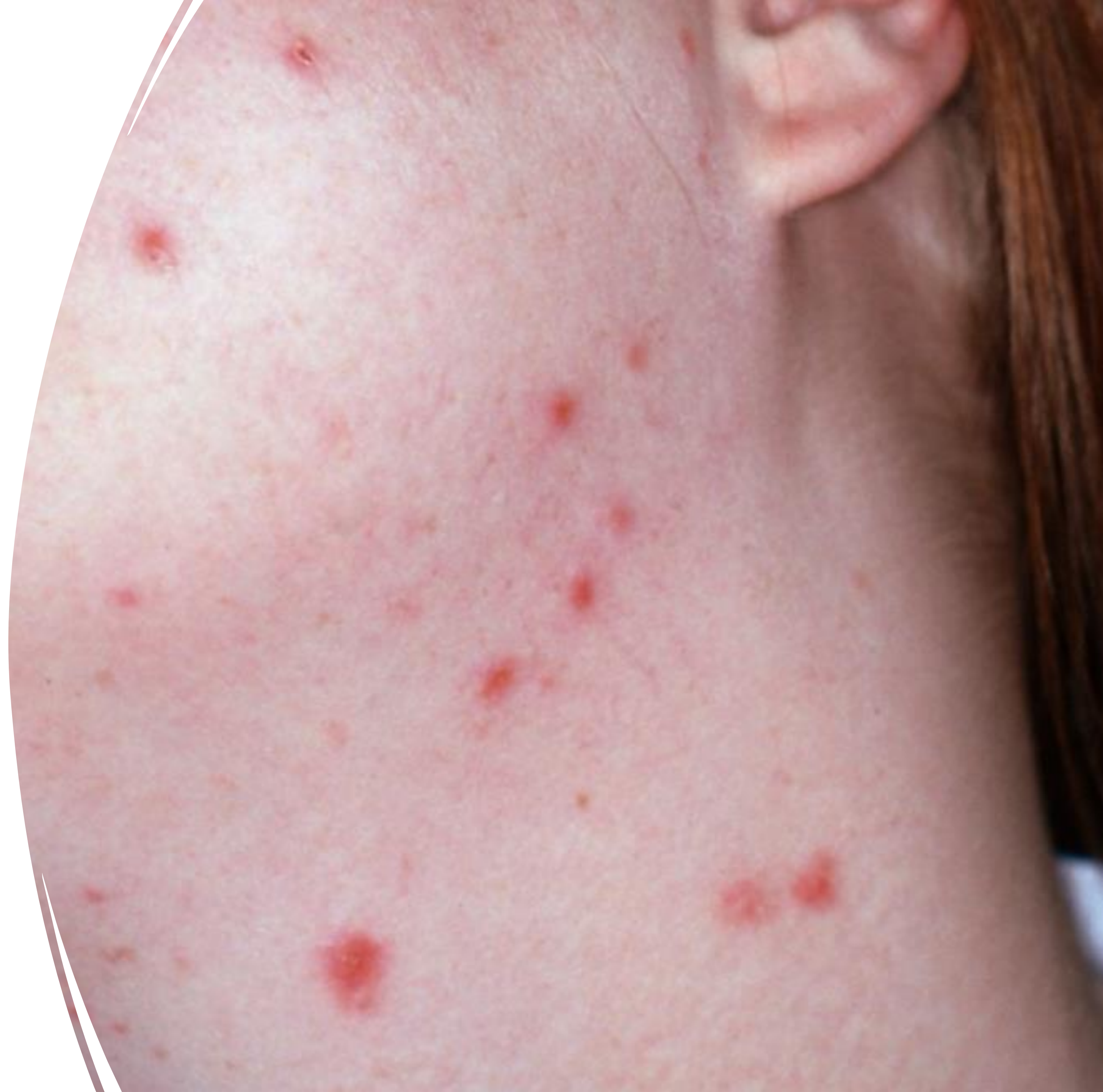
https://www.cdc.gov/diabetes/basics/pcos.html

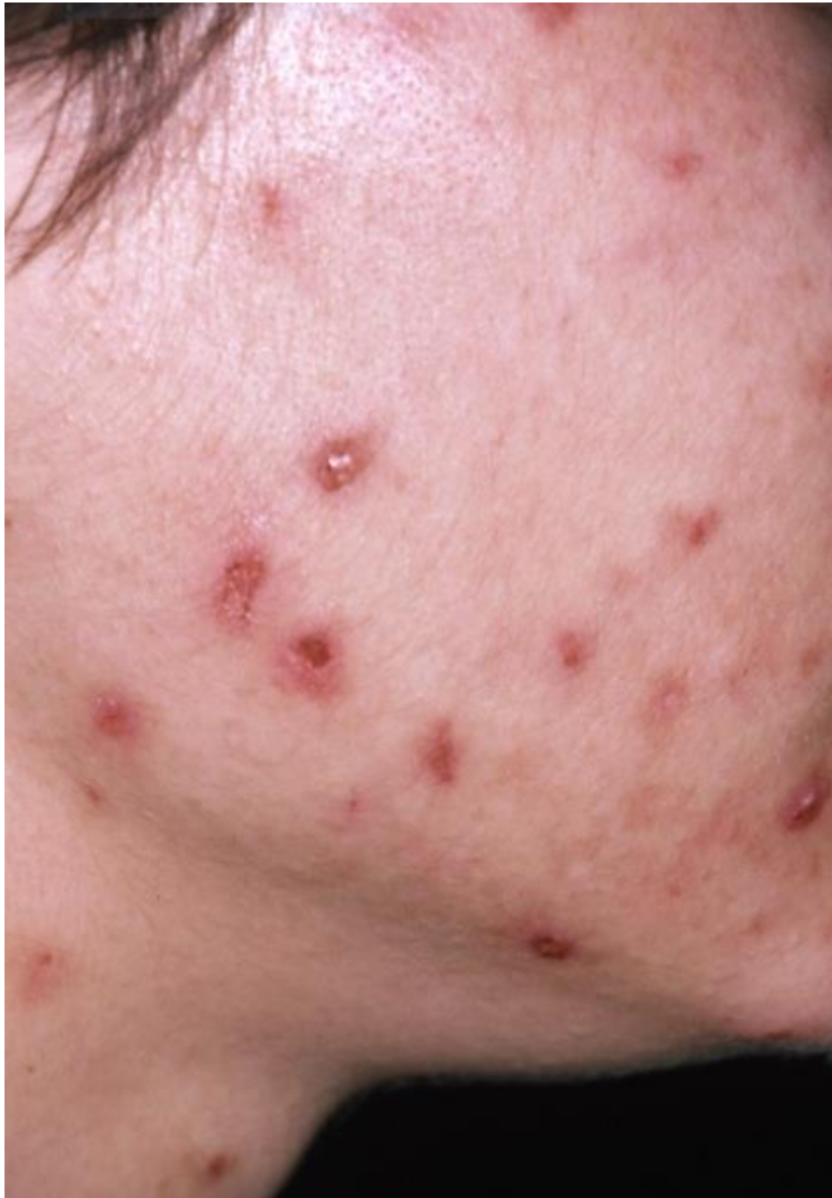
When to consider endocrine evaluation

- most acne patients will have normal hormone levels
- indicated for patients with clinical features or a history of hyperandrogenism
- In prepubertal children: acne + early-onset body odor, axillary or pubic hair, accelerated growth, advanced bone age, and genital maturation.
  - Growth charts and a hand film for bone age are good screening tools before specific hormonal testing.
- In postpubertal females: Acne+ infrequent menses, hirsutism, androgenetic alopecia, infertility, polycystic ovaries, clitoromegaly, and truncal obesity

Exacerbators of acne

- including medications, physical manipulation, infection





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Treatment of acne

	Mild	Moderate	Severe
1st Line Treatment	Benzoyl Peroxide (BP) or Topical Retinoid -or- Topical Combination Therapy** BP + Antibiotic or Retinoid + BP or Retinoid + BP + Antibiotic	Topical Combination Therapy** BP + Antibiotic or Retinoid + BP or Retinoid + BP + Antibiotic -or- Oral Antibiotic + Topical Retinoid + BP -or- Oral Antibiotic + Topical Retinoid + BP + Topical Antibiotic	Oral Antibiotic + Topical Combination Therapy** BP + Antibiotic or Retinoid + BP or Retinoid + BP + Antibiotic -or- Oral Isotretinoin
Alternative Treatment	Add Topical Retinoid or BP (if not on already) -or- Consider Alternate Retinoid -or- Consider Topical Dapsone	Consider Alternate Combination Therapy -or- Consider Change in Oral Antibiotic -or- Add Combined Oral Contraceptive or Oral Spironolactone (Females) -or- Consider Oral Isotretinoin	Consider Change in Oral Antibiotic -or- Add Combined Oral Contraceptive or Oral Spironolactone (Females) -or- Consider Oral Isotretinoin

Tips on Topical Treatments for Acne

Newly FDA approved acne topical

Winlevi, clascoterone cream 1%

Novel mechanism of action (last drug with this distinction was 1982, isotretion): non-antibiotic option that targets the androgen receptor on skin

inhibits the effects of hormones on oil production and inflammation

Use for hormonal acne

Can be used in men and women ages 12 and older

Acne Scarring

- Resurfacing procedures: Chemical peels
- Dermabrasion
- Laser resurfacing
  - Ablative
  - Nonablative
- Fractional (ablative vs nonablative)
- Fillers directly under scars
- Microneedling

Special consideration for pregnancy

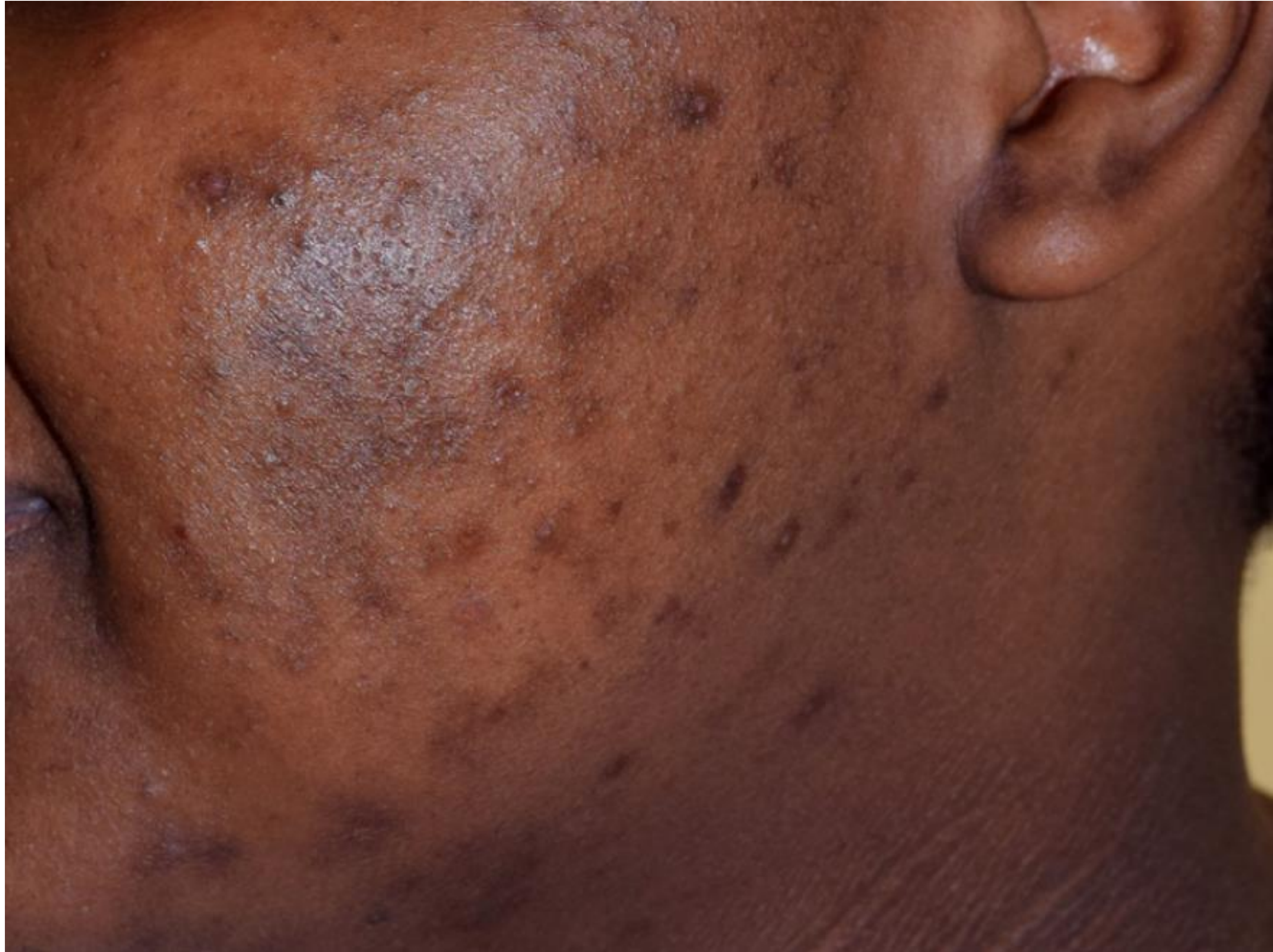
Pregnancy safe options:

Azelaic acid OTC or prescription

Topical erythromycin

Special considerations skin of color

- Generally, darker skin reacts to injury or insult with localized melanin deposition, resulting in uneven skin tones, but even pale skin can have long-lasting dark or red spots after resolution of an acne lesion
- PIH is a common occurrence in patients with acne, particularly in those with darker skin and those who excoriate their lesions.
- PIH often has a prolonged duration and can be more bothersome than active acne lesions for the patient.



Special considerations: Skin of color

- study of Middle Eastern acne patients, more than half (56.4%) were primarily concerned with uneven skin tone
- Asian population (324 persons from 7 countries), Abad-Casintahan et al found PIH in 60% of acne
- PIH ranges in color from light brown to grey or black; dark purple lesions may be an early form of PIH.

M. Chandra, J. Levitt, C.A. Pensabene **Hydroquinone therapy for post-inflammatory hyperpigmentation secondary to acne: not just prescribable by dermatologists** Acta Derm Venereol, 92 (2012), pp. 232-235

Treatment of post inflammatory hyperpigmentation (PIH)

sun protection

treatment of underlying acne

Table III. Actions of agents used to treat postinflammatory hyperpigmentation

Agent	Mechanism
Retinoids	Increase keratinocyte turnover and remove pigmentation, inhibit tyrosinase, and reduce pigment transfer
Hydroquinone	Inhibition of melanogenesis via reduction in active tyrosinase
Kojic acid	Inactivates tyrosinase by chelating copper atoms
Azelaic acid	Selectively influences hyperactive and abnormal melanocytes, prevents tyrosine-tyrosinase binding
Flavonoids (aloesin from aloe vera plants, stilbene derivatives such as resveratrol, licorice extracts)	Inhibit tyrosinase activity at distal portions of the melanogenic pathway
Antioxidants/Redox agents (beta carotene and vitamin C and E)	Prevent oxidative damage to skin, scavenge reactive oxygen species, inhibit second messengers that stimulate melanogenesis, interact with copper at active site of tyrosinase
Niacinamide	Interrupts melanosome transfer from melanocyte to keratinocyte
Alpha hydroxy acids, salicylic acid, linoleic acid	Accelerate skin turnover, dispersing melanin; linoleic acid also reduces tyrosinase activity
Arbutin	Structural homolog for tyrosinase (competitive inhibitor), inhibits melanosome maturation

H.A. Gollnick, A. Abanmi, M. Al-Enezi, *et al.* **Management of acne in the Middle East** J Eur Acad Dermatol Venereol, 31 (Suppl 7) (2017), pp. 4-35

Additional treatments for PIH

Chemical peels like salicylic acid peels

Lasers – Intense pulse light

Improving insulin resistance through diet and lifestyle can have a positive impact on both acne and the propensity for PIH.

Complementary/Alternative therapies

- topical tea tree oil comparable to Benzoyl Peroxide but better tolerated
- Other herbal agents, such as topical and oral ayurvedic compounds, oral barberry extract, and gluconolactone solution have been reported to have value
- weak evidence of the possible benefit of biofeedback-assisted relaxation and cognitive imagery.

Bassett I.B. Pannowitz D.L. Barnetson R.S. A comparative study of tea-tree oil versus benzoyl peroxide in the treatment of acne. M*ed J Aust.* 1990; **153**: 455-458

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Current literature recommendations
about diet and acne

Current literature recommendations about diet and acne

Given the current data, no specific dietary changes are recommended in the management of acne
Emerging data suggest that high glycemic index diets may be associated with acne
Limited evidence suggests that some dairy, particularly skim milk, may influence acne

Take Home Points

- Think about mimickers: Rosacea, Folliculitis
- Talk to your patients about physical manipulation that can worsen acne causing infection and PIH
- Think about sun protection in skin of color

References:

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Guidelines of care for the management of acne vulgaris, American Academy of Dermatology Work group 2016
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Diane M. Thiboutot, Brigitte Dréno, Abdullah Abanmi, Andrew F. Alexis, Elena Araviiskaia, Maria Isabel Barona Cabal, Vincenzo Bettoli, Flordeliz Casintahan, Steven Chow, Adilson da Costa, Tam El Ouazzani, Chee-Leok Goh, Harald P.M. Gollnick, Minerva Gomez, Nobukazu Hayashi, Maria Isabel Herane, Juan Honeyman, Sewon Kang, Lajos Kemeny, Raj Kubba, Julien Lambert, Alison M. Layton, James J. Leyden, Jose Luis López-Estebaranz, Nopadon Noppakun, Falk Ochsendorf, Cristina Oprica, Beatriz Orozco, Montserrat Perez, Jaime Piquero-Martin, Jo-Ann See, Dae Hun Suh, Jerry Tan, Vicente Torres Lozada, Patricia Troielli, Leihong Flora Xiang

Questions?

Cynthia.Griffith@utsouthwestern.edu