Acne Vulgaris

Epidemiology: 85% of teens will have acne! Starts in teen years but often persists into adulthood. Effective treatment can mitigate short-term psychiatric effects as well as long-term cosmetic effects, which include post-inflammatory skin changes and scarring.
Pathophysiology: 1) Increased sebum production due to hormones. 2) Abnormal keratinocytes which lead to follicular plugging. 3) Presence of *P. acnes* which in turn causes inflammation. **How does P. acnes evoke acne**? When it gets trapped in the follicle, it releases immunogenic and proinflammatory debris, which makes acne worse. The bacteria itself can also stick to toll-like receptors on pro-inflammatory cells, which makes those pro-inflammatory cells stick around longer.

Management of Acne:

Facial Hygeine	• Wash with gentle cleanser 1-2 times daily. Washing more frequently may result in increased sebum production or dry, cracked skin. • Emphasize that this is not a cleanliness problem. • Cleansers containing salicylic acids may be useful, as salicylic acid has an exfoliating effect which is helpful in preventing comedone formation
Topical Acids	• Salicylic acid is often found in over the counter cleansers and creams. It works as a comedolytic agent. Less effective than retinoids. • Azelaic acid is also a comedolytic, but also inhibits growth of P. acne. Good alternative to topical retinoids as it is better tolterated. Side effects include hypopigmentation, so keep that in mind when prescribing to dark-skinned patients. Available as a 20% topical cream that is appliced 1-2x daily.
Benzoyl Peroxide (BPO)	• Works in 3 ways: as an anti-inflammatory, as a bactericidal agent against *P. acnes,* and has comedolytic properties. Even better, it is a direct toxin against P. acnes, so no resistance has been reported. So, is a great starting point for patients with either inflammatory or comedonal acne. • If acne is moderate, BPO can be used in combination with topical retinoid (if mostly comedonal) or topical antibiotic (if mostly inflammatory). • Single daily application of 5% benzoyl peroxide, or, twice daily at 2.5%. Prefer the gel. • Side effects include burning and peeling, but often subside with consistent use. May take up to 6 weeks to see full effect. • Warn families that this product may bleach tshirts, towels, pillow cases, etc.
Topical retinoid	• Topical retinoids work by regulating how the epithelial lining of the pore is formed, making it less likely to become plugged. • May be a good fit for those with oily skin, but a poor choice for those with dry skin or history of atopic dermatitis. • Third generation topical retinoids such as adapalene and tazarotene are more receptor selective, better tolerated, and they are more stable when mixed with BPO in combination medications. Examples: Adapalene (brand name Differin) available as 0.1% OTC or 0.3% presciption. Apply daily at bedtime. Combo: Adapalene/BPO available in 0.1%/2.5% gel - also only use once daily at night. • Best if used at night because interaction with light may make medication less effective. BID use discouraged due to side effects. • Side effects include dryness, redness and irritation. Typically these peak around 2 weeks of use. To minimize side effect profile, use with a moisturizer. Begin using every other day, then increase use to daily. • Warn pateints that they may initially result in paradoxical worsening of acne, as deep comedones are brought to the surface. Final results are seen after several weeks of consistent use.
Topical antibiotic	• Most commonly, topical clindamycin or erythromycin. Examples: Clindamycin 1% gel BID, Erythromycin 2% gel BID. Less commonly, topical dapsone. Example: 5% dapsone applied twice daily. • Can be used in combination with BPO - these combinations are great because the patient only has one cream to keep track of, but can be expensive and/or difficult to cover with insurance. Examples: Erythromycin/BPO gel 3% or 5%., or Clindamycin/BPO gel 1% or 5%.

Hormone therapy	• Oral contraceptives can be effective and serve multiple purposes - birth control and acne management. Combined estrogen and progesterone OCPs prevent androgen synthesis, thus preventing acne. Good choice if patient has menstrual flares of acne.
	  • Contraindicated in smokers, patients with history of DVT.
	  • It is important to note that not all OCPs work for acne. Progesterone-only OCPs may worsen acne, while combined estrogen-progesterone OCPs improve acne.
	• Less commonly, spironolactone, flutamide, or cyproterone acetate may be used to decrease androgen levels (particularly in patiets with PCOS).

Systemic antibiotic	• Systemic antibiotics are both anti-inflammatory and anti-microbial against P. acnes. • Doxycycline 50mg-100mg daily or 40mg extended release daily. Studies have shown both are effective. Remember, can't use doxycycline in children < 9yo due to dental staining. • Minocycline 50mg-100mg daily for 12 weeks. Side effects include nausea, vomiting, drug reactions such as DRESS. So, typically use doxycycline as first line agent.
Isotretinoin	• Used in severe acne. Brand name: Accutane. Prescribed by dermatologists. This is the only medication that effects all three components that lead to acne: decreased sebum production, improves follicle keratinization (which decreases comedones) and creates an environment that is inhospitable for P. acnes. • Use is accompanied by frequent blood draws to assess cholesterol and liver function. Must be acompanied by effective contraceptionand frequent pregnancy testing in female patients because it is teratogenic.

Sources:
Acne Vulgaris in the Pediatric Patient. Ashton, Rosalind; Weinstein, Miriam. Pediatrics in Review. Nov 2019.
Acne and Its Management. Basak, Alison; Zaenglein, Andrea. Pediatrics in Review. Nov 2013.

Choosing the right regimen for your patient:

1. Is the acne mostly comedonal, mostly inflammatory, or both?
    a. **Comedonal** acne responds well to topical **retinoids** with benzoyl peroxide.
    b. **Inflammatory** acne responds well to benzoyl peroxide alone or in combination with a topical **antibiotic**.
        i. **I like to think: inflAmed = Antibiotic.**
2. Is the acne mild, moderate or severe?
    a. Mild – topical BPO
    b. Moderate – would start with topical BPO + retinoid or topical antibiotic. Switch to oral antibiotic if needed.
    c. Severe – may need oral antibiotic + topicals, refer to Derm for possible isotretinoin
3. Is there a history of sensitive skin or atopic dermatitis?
    a. If yes, patient may not tolerate topical retinoids

Examples:

1. A 14 yo boy comes in for a primary care visit. He has mild inflammatory acne across his forehead and around his nose. He hasn't tried any over the counter products but does use a mild face wash every evening. He is a wrestler and wears a headband to keep sweat out of his eyes during practice. He has heard that cutting dairy out of his diet may help control his acne.
    a. What behavior modifications may be useful to help control his acne?
        i. No strong evidence that supports diet modification is useful in acne management
        ii. Limit friction to the area
        iii. Wash face 1-2x daily with a mild cleanser
    b. What medication regimen do you recommend?
        i. Topical benzoyl peroxide, 5% gel once daily in the evening
    c. What anticipatory guidance do you give him about benzoyl peroxide use?
        i. Wear a plain white t-shirt. It may bleach clothing. It takes up to 6 weeks to see full effect, so stick with it.
2. He comes back in 2 months and states that his acne has improved with behavior modification and topical BPO, but it still isn't completely under control. Is there anything else that we can add?
    a. Add a topical retinoid. Use in a combination gel.
3. The following year, you see his younger sibling in clinic for the same problem. Except, the younger brother has acne that is much more severe and includes inflammatory and comedones. He also has a history of atopic dermatitis. He states that he has tried the combination BPO/retinoid gel but feels that his skin only became more red and dry. What do you suggest?
    a. Switch to topical clindamycin + BPO
    b. If that doesn't work, can escalate to an oral antibiotic such as doxycycline + topical BPO
4. A 13 yo female comes to your office in tears. She tells you that she is being made fun of at school because of her severe acne. On exam, she has severe inflammatory acne across her cheeks, chin and hairline.
    a. Start on triple therapy – oral antibiotic + topical retinoid/BPO combo.
    b. Refer to dermatology – with insurance issues and wait times, may take weeks for her to see a dermatologist.
5. You see a 18 yo female in clinic with a chief complaint of acne. She uses topical clindamycin and BPO but feels her acne has worsened since starting birth control. She is otherwise healthy. Other medications include a multivitamin and a progesterone-only oral contraceptive. She is about to start college in the fall. What do you suggest?
    a. Oral contraceptive change – from progesterone only to combined estrogen-progesterone.

Last but not least: **ABCD:** *A great mnemonic for management options!*

Azelaic Acid
Benzoyl Peroxide
Clindamycin
Differin (adapalene)

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