

Adolescent Acne: A Stepwise Approach to Management

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Abstract and Introduction

Abstract

Acne is a common problem that affects about 90% of teenagers. It occurs during a time of low self-esteem and high concern about appearance. There are many acne products on the market, and making an appropriate selection can be daunting. But a simple step-wise approach to the selection of medications can remove much of the confusion. This article will discuss the etiology and pathology of acne, over-the-counter (OTC) and prescription medications used in the management of the disease, and some quick tips and teaching points for the patient.

Introduction

It is estimated that about 45 million Americans have acne vulgaris. It is a disease of both adults and adolescents (Figure 1). In this article, the focus will be on the adolescent, but many of the comments about treatment apply to all age groups. Approximately 90% of all teens are affected by acne to some extent.^[1] In girls, acne can precede menarche by more than 1 year.



Figure 1. Reproduced from WebMD Scientific American® Medicine, an online, continually updated adult primary care reference text, available by subscription. To learn more click [here](#).

The impact of acne may appear minimal to an observer but may be significant to the young person involved. There may be psychological effects as well. Adolescence is a time of low self-esteem, high peer pressure, rebellion against authority, and struggles to establish independence. The young person who has concerns about appearance will frequently choose to miss school, work, or social events, thus increasing feelings of depression and isolation.^[2] Kellett and Gawkrödger^[3] found that acne patients reported levels of social, psychological, and emotional problems as great as those reported by patients with chronic disabling asthma, epilepsy, diabetes, back pain, or arthritis. This study also reported that the impact on quality of life did not correlate with acne severity.^[3]

Consumers of all ages spend approximately \$100 million per year on OTC remedies for acne.^[1] A study conducted in 2000 indicated that 75% of patients waited about 1 year before seeking professional help for acne. Nonprescription products tried most frequently were medicated cleansers, pads, and lotions. Acne was believed to be curable by 49% of those surveyed, and they anticipated that the duration of treatment would be less than 6 months.^[4]

Teens obtain much false information about healthcare and proper treatment from friends and popular magazines. They do not understand that acne is a chronic problem and that therapy might be required intermittently for months, even years. Teens are especially impatient and should be informed about realistic expectations for improvement. They must be encouraged to continue therapy even if they feel that nothing is happening. Providing correct information will empower teens to make better choices and begin assuming responsibility for their own health care (Table 1).

Pathophysiology

Acne is a chronic disease involving the pilosebaceous follicles. Sebaceous glands are found most abundantly on the face and scalp, though they are present on every part of the skin except the palms of the hands and soles of the feet. Though the sebaceous gland is a mini organ, it is anatomically and functionally related to the hair follicle. Cutaneous disorders attributed to the sebaceous gland are really disorders of the entire pilosebaceous unit. The areas most commonly involved in acne are the face, upper chest, and back. Other less common areas include the upper arms, buttocks, and upper thighs.

Acne arises from the interaction of 4 factors^[5]:

1. Excess sebum production caused by androgenic stimulation of sebaceous glands;
2. Outlet obstruction of the sebaceous follicle arising from excess production of keratinocytes (the basic cell of the epidermis);
3. Increased proliferation of the bacteria *Propionibacterium acnes* that normally live in the sebaceous follicle; and
4. Inflammation caused by sebum escaping into the surrounding skin.

Obstruction of the sebaceous follicle is the primary pathologic event in acne, giving rise to the micro-comedo, the precursor of all acne lesions. Once the follicle is plugged, its lower portion becomes engorged and distended with sebaceous discharge and keratinocytes. While the pore opening remains closed, the lesion is called a closed comedo, or "whitehead." The closed comedo is 1-3 mm in diameter, white or flesh-colored, and very slightly raised. Oxidization occurs when the follicle enlarges enough to stretch the pore and the trapped matter is exposed to air. This causes the characteristic dark appearance of open comedones or "blackheads." Open comedones are flat or slightly raised, brown-to-black papules about 3-5 mm in diameter.

Early acne, involving a majority of open and closed comedones, is a noninflammatory process. As dilation of the follicle continues, the follicular epithelium is disrupted and irritants such as sebum, hair, and keratinocytes are released into the surrounding dermis. This leakage causes an inflammatory reaction and initiates the formation of the inflammatory lesion papules, pustules, and nodules. Although *P acnes* is a live bacterium, living in the follicle, it dies when the follicular structure is disrupted. Toxins are released into the dermis, which increases inflammation. Therefore, uncomplicated, inflammatory acne is a sterile process and not a skin infection.^[6]

As inflammation continues to worsen, larger papules and pustules are created. Acne papules are pink or red and 2-5 mm in diameter. Pustules contain grossly purulent material. Acne nodules are solid, raised inflammatory lesions that exceed 6-10 mm in diameter and are situated deeper in the dermis. The acne cyst is a large nodule that has suppurated and become fluctuant. Scars form as a result of damage to the surrounding dermis.^[6] Scars may appear as small deep punched out pits ("ice pick"), atrophic macules, hypertrophic papules, or broad, sloping depressions.

In a person who is prone to acne, factors that may trigger or worsen the severity of the disease include:^[5]

- Pomade or gel used on the hair, which can cause acne on the forehead.
- Prolonged use of topical or oral steroids, which can cause localized or generalized acne.
- Certain oral medications such as lithium and phenytoin may worsen acne. *Depo Provera* injections for

contraception may also worsen acne.

- Friction from a tight strap on a sports helmet causes acne in the area being rubbed.
- Excessive manipulation by the patient, causing the primary lesions to disappear and leaving excoriated, raw-looking marks. This is called acne excoriée and can cause scar formation.

Clinical Presentation

Acne is a continuous process and causes the eruption of new lesions over time, so at one time there may be comedones, papules, and pustules. Acne is usually described by the primary lesions present and the severity of those lesions (mild, moderate, or severe). Comedonal acne is the presence of a predominance of open and closed comedones. Mild comedonal acne would have only a few open and closed comedones. Severe comedonal acne would have many comedones, but only a few papules and pustules. Inflammatory acne is the presence of erythematous papules and pustules. Cystic acne is characterized by multiple cysts, nodules, and pitted scarring. Some scarring can occur without cyst formation. The treatment of acne is aimed at preventing scars from forming.^[7]

Complications

Acne can have several complications. These can occur with or without treatment, or as a side effect of treatment:^[7]

- **Gram-negative folliculitis.** A pustular eruption may occur when a patient has been on extended oral antibiotic therapy. There is an overgrowth of lactose-fermenting Gram-negative bacteria, leading to superficial pustules. Treatment involves discontinuing the current antibiotic and initiating treatment with an antibiotic specific to Gram-negative bacteria.^[8]
- **Localized cellulitis.** Acne cysts become extremely inflamed and cause infection of the surrounding tissue. Treatment is a broad spectrum antibiotic, orally or intravenously.
- **Acne keloidalis.** Individuals who have the genetic predisposition to have a keloid reaction to inflammation will develop keloids in the beard area, along the jaw line, and on the posterior scalp. Preventing acne will do much to prevent keloid formation. Injections of a low-dose steroid can be used to decrease keloids that have appeared.
- **Acne conglobata.** A severe form of nodular acne that causes epithelium-lined sinus tracts. It is the most severe form of acne, with large deep nodules, cysts, abscesses, and severe scarring. Isotretinoin (*Accutane*) is usually required to treat this severe form of acne.
- **Hyperpigmentation.** In darker-pigmented skin, inflammation will cause increased production of melanin. As acute acne lesions fade, they leave dark spots that are as cosmetically distressing as the acne itself. Several of the comedolytic preparations, when used over many months, will help improve irregular pigmentation. However, treatment should start at the lowest strength, to prevent further irritation by the topical preparation. Additionally, products containing hydroquinone (the only effective skin bleaching agent) are available both OTC at 2% strength and by prescription at 4% strength. They are applied once daily on the discolored skin. Skin discoloration will not improve if sun exposure continues, so an effective sunscreen that protects against both UVA and UVB should be used twice daily, in the morning and early afternoon.^[9]

Management

Treatment of acne is aimed at preventing the formation of comedones, papules, and pustules and reducing inflammation. Both topical and oral medications are important. Because treatment is preventive, not curative, improvement may be slow. Patient education should cover both general principals of hygiene and warnings about avoiding manipulation of individual lesions. "Picking" or "popping" pimples only increases inflammation and potential for scarring. These instructions may have to be repeated at each visit, until the patient understands the necessity of all treatment modalities.

Hygiene

The first step in successful acne management is good hygiene. In the author's experience, adolescents (especially males) between the ages of 12 and 14 years lack basic information about skin care. Acne is not a problem of dirt on the skin, as many people believe. Twice-daily washing is sufficient. More frequent exposure to water and medications can cause overdrying and rebound secretion of sebum. If prescription topical medications are given, a mild, nonmedicated soap should be chosen. Strong deodorant soaps, which are

effective on the body, can be too irritating to facial skin. Abrasive sponges or cloths (such as the popular "buff puff") should be avoided because they cause microscopic abrasions and create portals for the entry of bacteria. Astringents contain alcohol, which increases skin dryness and sometimes worsens irritation.

Certain moisturizers designed for use on acne-prone skin will help maintain the balance of moisture. Teens can be taught to look for products with labeling that includes the words "noncomedogenic" or "for acne-prone skin." These products will not contain ingredients that worsen acne. Most of these products now contain a sunscreen and will counter the increased sun sensitivity caused by acne medications.

Any topical therapy will initially worsen acne, since irritation is a common early side effect. The teen should be taught that this initial response will last about 2 weeks. Since it takes about 28 days to regenerate skin, the preventive effect of medications will not appear immediately. Improvement should become noticeable after 4 weeks of therapy, if medications are used as directed.^[6]

Topical Medications

Popular magazines boast many advertisements for antiacne products, and making an appropriate choice seems overwhelming to an uneducated consumer. Skin reactions to soaps and topical medications may vary. The same medication will have a different effect on different skin types. Much of early acne treatment is trial and error, finding the right product that works best for an individual patient. When OTC products don't work or cause irritation, the expense can add up quickly, so information about products can save consumers time, trouble, and skin irritation.

Topical comedolytics help dry excess sebum and make the excreted sebum less sticky. This prevents occlusion of the pores and consequent formation of comedones. Topical comedolytics also cause sloughing of the stratum corneum and help remove existing sebum plugs along with loose keratinocytes. They also help normalize keratin turnover in the follicle.^[7]

Initial selection of a medication will depend on the severity of the adolescent's acne and on the skin type. Most teens have already tried some OTC products before they seek professional help. OTC topical comedolytics include benzoyl peroxide and salicylic acid. Prescription comedolytics include tretinoin, azelaic acid, and adapalene. Individual should generally start therapy at the lowest strength of medication. If an OTC has not yet been tried and acne is mild, benzoyl peroxide or salicylic acid can be recommended. Both benzoyl peroxide and salicylic acid come in a variety of products and in several different delivery systems, such as creams, washes, gels, and cleansing pads (Table 2). The choice depends on how much time the individual has to devote to skin care, how each person reacts to the product, and the cost of individual products. Benzoyl peroxide is more effective, combining antibacterial action with mild comedolytic properties. However, benzoyl peroxide may be more irritating, with a higher incidence of allergic reactions.^[6]

If the teen has already tried several OTC products, he or she should start with a prescription for a tretinoin cream 0.025%. Adapalene and azelaic acid are both marketed as less irritating than tretinoin and may provide improvement in persons who have an irritation reaction to tretinoin. Mild acne will often respond to the combination of a topical comedolytic and topical antibiotic. Topical antibiotics include erythromycin, clindamycin, and sodium sulfacetamide. They all come in various vehicles as discussed later. For convenience, *Benzamycin* (benzoyl peroxide and 3% erythromycin) and *Benzaclin* are available by prescription, combining both comedolytic and antibiotic in 1 medication. These might prove helpful to a young teen who has trouble remembering to apply topical medications.

A change in either topical or oral medication is suggested only if there is severe erythema and scaling, indicating that the medication is too strong for that skin type, or the medication is consistently used for 6 to 8 weeks and there is no improvement, indicating that the medication is not strong enough.^[11]

Choice of Medication Vehicle

When choosing topical products, it is important to understand the effect on the skin of the vehicle in which the medication is delivered. Gels and solutions, such as astringents or the solution version of topical antibiotics, have a higher alcohol content and increase the drying effect. Creams and lotions are in an emollient base and are more moisturizing. Washes are better for acne on the torso, because they are easier to apply to large areas of the body. Cleansing pads are more portable and may be more convenient to carry in a gym bag, school bag,

or suitcase.^[6] Generally, individuals should start with a cream and judge the reaction -- change to a gel if cream is not effective and change to a lotion if cream is too irritating.

Alpha Hydroxy Acids (AHAs)

A recent development in skin care is the AHAs, such as glycolic or lactic acid. These products have been used for many years by dermatologists at concentrations of 20% to 30% for facial peel procedures. More recently, AHAs have been added to OTC washes and moisturizers at concentrations of 4% to 6%. AHAs have been found to soften the stratum corneum, remove dead cells, and change free radicals on the skin.^[12,13] These products combine well with both topical comedolytics and topical antibiotics. They can be used as the daily facial cleanser or morning moisturizer before application of prescription medication. AHAs in the 20% to 30% strength help to improve discoloration and scarring. Mild benefit can also be seen at the 4% to 6% strength.^[13] As with all other topical products, irritation is a problem, especially during the first few weeks of treatment. Many well-known brands of skin care products, such as Oil-Of-Olay, Ponds, Clinique, and Neutrogena, now have product lines containing AHAs, and consumer preference should guide product choice.

A Comment About Topical Vitamins

Increasingly, vitamins are being used for several purposes in acne care. Vitamins A, C, and E all have antioxidant capabilities and are being included in a variety of topical skin care products. Free radicals damage DNA and are believed to be the cause of many diseases, from cancer to colds. Antioxidants applied topically have been shown to be effective in stabilizing free radicals on the skin.^[14] Theoretically, topical application of vitamin C should help correct wrinkles and sagging due to loss of elasticity of aging or sun-damaged skin. Manufacturers bombard the consumer with information about one formulation or another, and it is difficult to judge their true value. No studies have yet provided absolute proof as to the clinical value of topically applied vitamins.^[15]

Retinol, a derivative of the antioxidant vitamin A, has recently started appearing in OTC skin care products. Retinoids as a class of medications (with retinol being one example) regulate growth and differentiation in cells, diminish malignant cell growth, and strengthen immune function. Both topical and oral versions are available. (The oral retinoid isotretinoin is discussed later in this article.) Topical retinoids, at a mild strength, are found in moisturizers, washes, and lotions and work much like OTC AHA products.^[14] The prescription comedolytic tretinoin is also a retinoid, but at a higher concentration. Retinol, the vitamin itself, has grandfather status with the US Food and Drug Administration (FDA) and is exempt from regulation. The dose contained in many products is very small and has not been shown to be of benefit in skin care. In stable formulations and in appropriate concentrations, it can produce some benefit on the skin. Few products currently available meet this standard.^[15]

The same situation applies to the addition of Vitamin E to skin care products. There is a theoretical basis for believing the product will work, but no controlled studies have documented clinical value. Vitamin C and E stored in the skin are degraded by UV light. Daily application of these substances in a good moisturizer cream will not cause harm and may help prevent photodamage.^[15]

Prescription Treatments

Topical comedolytics. As mentioned previously, topical comedolytics dry excess sebum and cause exfoliation, thus reducing comedo formation, and are the basis for acne therapy (Table 3). Therapy should begin with a topical comedolytic and with patient education about routine skin care. The choice of medication depends on individual skin type and severity of condition.

Generally, tretinoin cream is the first choice, due to its availability as a generic and reduced cost. *Avita* is another tretinoin available in 0.025% cream and gel. *Retin A Micro* (tretinoin formulated in a less irritating vehicle^[17]), adapalene (*Differen*), tazarotene (*Tazorac*), and azelaic acid (*Azelex*) are not yet off patent and are generally more expensive. The teen should be advised that only a small quantity of medication is necessary (a dab about the size of a pea is placed in the palm, then spread over the face).

A note on the cost of topical medications: some insurance companies consider treatment of acne a cosmetic issue and do not cover cost of the medications. For persons covered by these plans, acne treatment can be

expensive, possibly limiting medication options.

Topical antibiotics. Topical antibiotics combined with prescription comedolytics form the foundation of acne therapy. Topical antibiotics such as erythromycin, clindamycin, and sodium sulfacetamide are equally effective (Table 4). Metronidazole is not thought of as an acne medication, but is also effective. Again, there is a wide choice of vehicle, with cream, solution, gel, lotion, and wipes available. The choice of vehicle is based on skin type and patient preference. For example, a solution or gel containing alcohol, which will increase the drying effect, might be more appropriate for a person with very oily skin. On the other hand, a person with sensitive skin may benefit more from a lotion or cream, which will not contribute to dryness. (Sensitive skin is a problem if the teen has a history of atopic dermatitis as a child.) Active teens may prefer wipes as more convenient and portable. Using a lotion with an emollient base will help balance the drying effect of topical comedolytics.

Topical antibiotics should not be used alone due to increased bacterial resistance. Instead, combination with benzoyl peroxide or another comedolytic is recommended. *Benzamycin* is a prescription-only alcohol-containing gel with benzoyl peroxide 5% and erythromycin 3%. *BenzaClin* is a prescription-only alcohol-free water-based gel containing 5% benzoyl peroxide and 1% clindamycin. Both are effective, but expensive. *Benzamycin* gel requires refrigeration, making quick access difficult. *BenzaClin* no longer requires refrigeration. The same result can be obtained by using an OTC benzoyl peroxide and topical erythromycin or clindamycin, which are available by prescription.^[11]

Oral antibiotics. Oral antibiotics act by killing *P. acnes* and reducing the concentration of fatty acid in the sebaceous follicles. Tetracycline has been the preferred antibiotic for the treatment of acne since 1951. Tetracycline is lipophilic with anti-inflammatory action, making it a safe, inexpensive choice. Its most common drawback is that it cannot be taken with foods containing calcium or iron because they bind with the medication and inhibit absorption. Tetracycline is also photosensitizing and can cause either a severe sunburn or a pruritic rash on exposed skin. Tetracycline should not be prescribed to individuals younger than age 12 years as it may stain developing permanent teeth.

Doxycycline and minocycline, which are both in the tetracycline family, make excellent alternatives to tetracycline. Doxycycline is more photosensitizing than tetracycline and can cause erosive esophagitis if not taken with a full glass of water. It has fewer food restrictions than does tetracycline and is more convenient because of once-daily dosing. Minocycline is excellent for short treatment of approximately 1 year or less. With prolonged use, minocycline has the potential to cause bluish staining of the teeth and skin. Erythromycin is also an excellent alternative to the tetracycline family of drugs, especially in the summer when photosensitivity is of greatest concern. Amoxicillin and cephalexin are alternatives when other oral antibiotics have been ineffective. Trimethoprim-sulfamethoxazole is avoided by many clinicians due to the high potential for erythema multiforme and Stevens-Johnson reactions (Table 5).

Bacterial resistance to oral antibiotics is a growing problem. Resistance should be suspected when a patient whose acne was previously stable begins to worsen. Resistance disappears a few months after the antibiotic has been withdrawn. Suggestions for avoiding antibiotic resistance include: (1) prescribing an oral medication only when topical therapy has failed; (2) discontinuing oral medication during maintenance when the condition has improved; and (3) avoiding the concurrent use of different oral and topical antibiotics.^[12]

Isotretinoin. Isotretinoin (*Accutane*) is a derivative of vitamin A, a fat-soluble vitamin. Isotretinoin is recommended for use with patients who have severe scarring, cystic acne. Isotretinoin is anti-inflammatory and decreases the size of the sebaceous glands, thus decreasing the amount of sebum produced. When appropriately used, it is very effective in achieving long-term remission of acne, and it appears to decrease scarring.

Isotretinoin may be prescribed for the following reasons:^[17]

- Less than 50% improvement in acne after 6 months of treatment with combination topical and oral therapy;
- Appearance of scars;
- Acne that is associated with significant psychological distress; or

- Acne that quickly relapses during or shortly after conventional therapy.

Isotretinoin is sometimes inappropriately used as a first-line treatment. It has many adverse reactions, including potential hepatotoxicity, increased levels of triglycerides (which, in turn, can trigger pancreatitis), and hypercalcemia with loss of bone mass. It is also teratogenic, so females are required to use 2 forms of birth control during treatment. Oral contraceptives are preferred unless there is some contraindication to their use.

The FDA required the maker of *Accutane*, Roche, to implement a program called SMART (System to Manage *Accutane* Related Teratogenicity). Each prescriber is required to sign an agreement to follow prescribing guidelines, which include monthly laboratory monitoring of liver function, cholesterol, and triglyceride levels and pregnancy testing in women. Stickers are provided by the company to affix to the written prescription, which informs the pharmacist that the prescriber is following these guidelines. If no yellow sticker is on the prescription, the pharmacist is not supposed to fill it.

In addition, *Accutane* prescriptions will no longer be accepted over the telephone. Patients must sign 2 consent forms discussing teratogenicity and depression/suicidal ideation, as well as the need for monthly blood monitoring. These forms can be obtained from the manufacturer by calling 1-800-93-ROCHE or from their Web site at www.rocheusa.com. Medical practitioners should not prescribe isotretinoin unless they are participants in the SMART program.

Recent press reports have linked isotretinoin to depression and suicide. No clinical trials have shown a causative relationship between the medication and depression.^[18] However, parents will be required to sign a consent form asserting their understanding of this possibility and should be cautioned to carefully monitor the emotional status of teens being treated with isotretinoin.

Hormonal therapy. Oral contraceptives with low androgenic activity have been shown to be useful in managing female acne since 1951. Newer compounds have fewer side effects and are better tolerated. After 3 months of therapy with oral contraceptives, sebum production can be decreased by as much as 40%.^[4] *Ortho TriCyclen* has been approved by the FDA for the treatment of acne. Norgestimate and desogestrel are members of a new generation of progestins that have proven to be less androgenic, and may be more effective for acne than oral contraceptives with older types of progestins. However, no comparison studies have been done. Therefore, other brands of oral contraceptives may also have the same effect on acne despite lacking FDA approval.^[8]

Spironolactone is a potassium-sparing diuretic with proven androgenic receptor blocking properties. Numerous trials have reported the benefit of spironolactone in decreasing sebum production and decreasing excess hair growth in women with elevated DHEAS (dehydroepiandrosterone sulfate secreted by the adrenal glands). Doses range from 50 to 200 mg daily. Improvement of acne has been reported to be between 35% and 100%.^[8] The combination of spironolactone with oral contraceptives improves the clinical response of both medications significantly. Though spironolactone is generally well tolerated, side effects can be experienced at higher doses and may include menstrual irregularities, breast tenderness, fatigue, and headache. Long-term safety has been proven.^[8]

Recommendations

Acne affects about 90% of teens. It can have a significant physical as well as emotional impact. Personal hygiene plays an important role in the management of adolescent acne. In addition, many OTC and prescription medication choices are available.

- The clinician should start by prescribing a topical comedolytic and topical antibiotic. OTC comedolytics, especially benzoyl peroxide, should be tried before advancing to tretinoin cream.
- The clinician should change medication only after 2 months of therapy, or if there is skin irritation from the topical product.
- Oral medications should be added when the acne is more inflamed or if there is inadequate response to topical medications.
- Isotretinoin should be reserved for severe, cystic, scarring acne that has not cleared with several oral antibiotics used over adequate time periods.
- The teen should be educated in good personal hygiene and cautioned about overuse of OTC products

in combination with prescriptions.

Orderly selection of medications, combined with ongoing patient education can help the young person manage his or her condition, thus decreasing the negative impact of the disease.

Tables

Table 1. Patient Education: Basic Skin Care For Acne

<p>Acne is a chronic condition, usually triggered by the onset of puberty and increasing hormone levels. It cannot be cured, but there are many things you can do to keep acne from becoming a major problem. Remember that all teens have acne to some extent, so you are not alone. Take control of your condition with good basic skin care using carefully selected products. Do not listen to every advertisement you hear, as some things might not be appropriate for you. Follow the instructions given by your healthcare provider. Try to be patient. Acne improvement takes time and attention.</p>
<p>Acne Myths Myth 1: Vigorous cleansing with abrasive cleansers or sponges will remove blackheads and prevent acne. False. This causes microscopic tears in the skin and increases sites where <i>Propionibacterium acnes</i> (acne-causing bacteria) can enter the skin. Myth 2: Eliminating certain foods from your diet will control acne. False. Foods do not worsen acne; however, a balanced diet helps the immune system work to maintain resistance to the bacteria that contribute to acne. Myth 3: Squeezing pimples will clear them more quickly. False. Squeezing or touching pimples disrupts the follicular wall and causes redness and swelling of the surrounding skin, thus increasing the severity of acne and potential for scarring.</p>
<p>Dos and Don'ts of Skin Care Do wash with mild, unscented soap. Twice daily cleansing is plenty. More frequent washing will only irritate the skin. Don't use abrasive sponges or cloths. They cause irritation and allow bacteria to grow. Do protect your skin from the sun. Use a sunscreen with SPF 15 daily, and wear a broad-brimmed hat for shade. Don't use astringents and after-shaves that contain alcohol. Do be faithful to daily skin care. The medication won't work if it stays in the bottle!</p>

Table 2. Over-the-Counter Acne Products^[10]

Medication	Brand Names	Strengths	Vehicles	Comments
Benzoyl peroxide	<i>Persagel, Desquam-E Oxy Wash, Fostex</i>	2.5%, 5%, 10%	Gel, wash, cream, lotion	Initially irritating. Contact allergy in 2% of users. Start with 5% strength.
Lactic acid	<i>Clean & Clear, Fostex, Aveeno, Neutrogena</i>		Liquid soap, bar soap, lotions	
Retinol	<i>Neutrogena Multivitamin Acne Treatment, Neutrogena Skin Clearing Moisturizer</i>	Variable, not controlled by US Food and Drug Administration		Effectiveness not documented.
Salicylic acid	<i>Oxy Wash, PropaPh, Neutrogena Acne Wash</i>	1%, 2%, 5%	Lotion, cream, wash, gel	May irritate initially. Some are available with tint for cover-up.

Table 3. Topical Prescription Comedolytics^[16]

Medication	Brand Name	Strengths	Vehicles and Dispensing Size	Comments
Adapalene	<i>Differin</i>	0.1%	Cream -- 15 g, 45 g Gel -- 15 g, 45 g Solution -- 30 cc Wipes -- 60/box	Photosensitizing. Less irritating than tretinoin.
Azelaic acid	<i>Azelex</i>	20%	Cream -- 30 g, 50 g	Not photosensitizing. Synergistic when used with tretinoin.
Tretinoin	<i>Retin-A</i> <i>Avita</i>	0.025%, 0.05%, 0.1%	Cream -- 20 g, 45 g Gel -- 15 g, 45 g Lotion -- 28 cc	Photosensitizing. Initiate treatment at the lowest strength. Gels are stronger than cream, due to increased absorption.
Tazarotene	<i>Tazorac</i>	0.05%, 0.1%	Cream -- 15 g, 30 g, 60 g Gel -- 30 g, 100 g	No advantage over other products.
Combination Products				
Benzoyl peroxide and erythromycin	<i>Benzamycin</i>	BP 5%, erythromycin 3%	Gel	Must be refrigerated. Often irritating.
Benzoyl peroxide and clindamycin	<i>BenzaClin</i>	BP 5%, clindamycin 1%	Alcohol-free, water based gel	Sometimes irritating. Contraindicated in those having a history of regional enteritis, ulcerative colitis, or antibiotic-associated colitis.

Table 4. Topical Antibiotics^[16]

Medication	Brand Names	Vehicles and Dispensing Size	Comments
Erythromycin	<i>EryDerm</i> , <i>ATS</i> , <i>Emgel</i> , <i>Erycette</i>	Solution -- 60 cc Gel -- 27 g, 50 g Wipes -- 60/box	66% alcohol 77% alcohol 66% alcohol
Clindamycin	<i>Cleocin</i>	Solution -- 30 cc, 60 cc Gel -- 30 g, 60 g Lotion -- 60 cc Wipes -- 60/box	50% alcohol 50% alcohol 5% alcohol 50% alcohol
Gentamycin 1%	<i>Garamycin</i>	Cream -- 15 g Ointment -- 15 g	Rarely used. Petrolatum base of ointment may help in acne excoriée
Metronidazole	<i>MetroGel 0.75%</i> , <i>MetroCream 0.75%</i> <i>Noritate 1%</i> <i>MetroLotion 0.75%</i>	Gel -- 28 g Cream -- 45 g Cream -- 30 g Lotion -- 60 cc	No alcohol but still irritating. No alcohol. No alcohol.
Sodium sulfacetamide 10%, sulfur 5%	<i>Sulfacet R</i> , <i>Novacet</i> , <i>Klaron</i>	Lotion -- 25g	Not for use by patients with kidney disease.

Table 5. Oral Antibiotics^[16]

Medication	Strengths	Starting Dose	Maintenance Dose	Comments
Tetracycline	250 mg 500 mg	500 mg twice a day	250-500 mg daily	Calcium decreases absorption. Photosensitizing.
Doxycycline	50 mg 100 mg	100 mg twice a day	50-100 mg daily	Calcium decreases absorption. Photosensitizing. Erosive esophagitis.
Minocycline	50 mg 100 mg	100 mg twice a day	50-100 mg daily	More expensive. More side effects including a potential to cause blue discoloration of teeth and skin.
Erythromycin	250 mg 500 mg	500 mg twice a day	500 mg daily	Sustained release less irritating to gastrointestinal tract.
Amoxicillin	250 mg 500 mg	500 mg twice a day	500 mg daily	Useful if erythromycin not tolerated.
Cephalexin	500 mg	500 mg twice a day	500 mg daily	Rarely used.

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