

## When Friends or Patients Ask About . . .

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# Acne

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ACNE is mankind's most common skin disease. Almost everyone has had some type of pimple or blemish on his face, back, or chest sometime in his life. Whether these blemishes are called zits, goobers, blackheads, or hickeys, they are most common during adolescence. Their occurrence and prevalence follow a bell-shaped curve, since both the severity of the acne and the number of lesions decrease after the teen-age years. Yet, it is wrong for any physician to advise his friend or patient, "Do nothing and you will outgrow it." Not only is this not always true, but such neglect can often lead to permanent scarring and even more severe emotional trauma.

### THE PATHOGENESIS OF ACNE

Acne is a disease of the pilosebaceous unit, which includes the hair follicle and its sebaceous gland. Thus, acne is uniquely human, since sebaceous follicles do not occur in lower animals. Sebaceous follicles are most numerous on the face, but are also found in abundance on the back, chest, and upper arms.

Normally, with appropriate hormonal stimulation by testosterone in puberty and through adulthood, the sebaceous glands secrete an oily material called sebum, which rises to the top of the hair follicle and then flows out onto the surface of the skin, causing the normal lubrication of the skin. The basic problem in patients suffering with acne is that the canals through which this oily sebum flows become plugged up. For both hormo-

nal and hereditary reasons, the horny epithelial cells lining the infundibular area of the hair follicles stick together, preventing the normal smooth passage of sebum to the skin surface. This blockage results in a buildup of sebum under the skin surface, which may appear as a whitehead. When the follicular "pore" is enlarged and sebum has mixed with lining epithelial cells, some of which are pigmented, the result is a blackhead. Thus, formation of the comedo results. The comedo is a horny plug, a whitehead when young and a blackhead when old. Interestingly, the sebaceous glands regress as the comedo develops.

Blackheads and whiteheads are noninflammatory. This means that although they are a cosmetic nuisance, they will generally not cause substantial scarring. However, some patients get inflammatory lesions: pustules, red papules, and ruptured cysts. These lesions result when accumulated sebum and bacterial degradation products rupture through the hair follicle lining into the deeper parts of the skin, the dermis. The bacteria, chiefly *Corynebacterium acnes* (*Propionibacterium acnes*), live in such hair follicles. They break down the more complex fats of the sebum into triglycerides and free fatty acids (FFAs). They digest the triglycerides, but the remaining FFAs are irritating. The rupture or breakdown of the comedo then dumps not only these FFAs, but also horn, fat, hair, and bacterial products into the dermis, creating a "toxic" foreign-body response. An inflammatory response ensues, with pus cells and vascular dilation. This accounts for the red papules, the whitish pustules, and the ruptured cysts. These lesions are tender, sore, and, worst of all, often heal slowly with considerable scarring.

Some lucky persons get only one or

two pimples a month, especially just before menstrual periods in women, and these spontaneously resolve. Others, less fortunate, get such ugly red bulges on their faces and backs that they are ashamed to go out socially or even engage in routine school activities. These persons suffer from acne conglobata, the most severe form of the disease.

### TREATMENT

With our increased knowledge of the true pathogenesis of acne, rational forms of treatment can be established. Diet plays no role in acne treatment in most patients. Controlled studies have shown that ingestion of even large amounts of chocolate have not clinically exacerbated acne. High intake of kelp and seaweed may ultimately be the only true dietary restriction in acne due to the high iodine content. Sun exposure tends to even the color of the skin with a smooth suntan and would initially seem to dry up acne lesions and make them less obvious. Yet, it may also stimulate the epidermal cell turnover rate and, as such, lead to the formation of new comedones several weeks to months after the initial sun exposure. Aminobenzoic acid sunscreens in a nonocclusive film or gel provide effective protection.

Patients should be instructed not to pick, scratch, or otherwise manipulate their acne-bearing skin. Such trauma can cause rupture of a noninflammatory lesion and transform it into a potentially scarring papule or pustule. We often see this in areas of football padding, headgear, and motorcycle helmets. Certain cosmetics and hair pomades are comedogenic. Fifty percent of popular creams will produce comedones in the rabbit ear, which is an experimental model for the induction and treatment of acne. Young women may find themselves in a vicious cycle. They notice a few pimples on their face and attempt to cover them up with makeup. The makeup causes a flare-up of the acne. These frustrated women then attempt more and more cover-up of increasing greasiness, camouflage, and comedogenicity. Often, clearing of the face will occur with only the advice to cease using all cosmetics, although such clearing may take as long as six months to be complete.

If you wish to suggest a topic or write an answer for this feature, write to William H. Crosby, MD, Scripps Clinic and Research Foundation, La Jolla, CA 92037.

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## Systemic Antibiotics

Oral antibiotics that effectively decrease the bacterial count of *C. acnes* are a mainstay in the treatment of inflammatory acne vulgaris and acne conglobata. Only the tetracyclines and erythromycin have been found to increase selectively in concentration around the hair follicles, thus reducing *C. acnes* count and subsequent inflammation. Clindamycin has been used less frequently since severe gastrointestinal disturbances have been reported. Long-term use of both tetracycline and erythromycin has proved safe in doses of 1 g or less per day.

## Topical Agents

Standard ingredients for the topical treatment of acne have recently fallen out of favor to newer agents. Sulphur, once the old reliable agent, has been incriminated as being comedogenic. Use of new agents is based on current concepts of pathogenesis.

Topical application of tetracycline and erythromycin has been effective experimentally. Topical sensitization has not been a problem. Topical tetracycline can cause a yellowish-brown stain on the skin. Topical erythromycin in a water-soluble base has been effective in clinical trials. Although still under evaluation, topical antibiotics are inferior to orally administered antibiotics and should not be used in severe cases of inflammatory acne.

Topical tretinoin interferes with comedo formation by preventing the horny cells lining the hair follicle from sticking to each other, thus preventing the formation of the firm plug, the comedo. As seen under the electron microscope, tretinoin inhibits the synthesis of tonofilaments. The fragile horny cells fall apart rather than adhering to each other. Although it is not a peeling agent, as were many of the earlier topical products, it can cause irritation, especially during the early weeks of therapy. Tretinoin is particularly effective in combination with oral antibiotics and topical benzoyl peroxide. It enhances the activity of antimicrobial agents.

Topical benzoyl peroxide preparations have bacteriostatic effects, causing considerable suppression of *C.*

*acnes* and subsequently reducing the FFA production by 50% within two weeks of treatment. They have also proved to be comedolytic in the rabbit ear model.

Although exfoliants have come and gone in popularity, salicylic acid is still favored because of its comedolytic and keratolytic properties. Many dermatologists use topical diluted trichloroacetic acid as a "face peel."

Abrasives are hard particles that may be incorporated into soap-like products for the treatment of acne. All are sold over the counter without a prescription. Although not specifically comedolytic, they do cause some peeling and may eliminate that excessively oily feeling, which bothers so many persons with acne.

## Physical Measures

Successfully performed acne surgery involves the extraction of the contents of the comedo along with some of its epithelial lining. It has been shown histologically that even 40 days after such extraction, the follicle has reformed but the epithelium is no longer producing cohesive horny cells. This type of expression is to be compared favorably and contrasted with the patient's own manipulations, which, while possibly forcing some of the follicular contents toward the surface, push irritating bits of FFA, sebum, and horn out of the follicle and into the surrounding dermis, resulting in long-lasting foreign-body reaction and subsequent scarring.

The surgical process of dermabrasion is used to ameliorate some of the severe scarring that can result from inflammatory acne. Dermabrasion first involves freezing the scarred skin and then planing it down with an electrically powered wire or diamond brush. Desperate and scarred persons often seek out dermabrasion as the last resort. Such patients should be told of the many possible disadvantages of the technique as well as its possible beneficial applications. As with all cosmetic procedures, neurotic persons who seek the treatment as a means of help for deeper psychological problems should not be treated.

Black patients should be cautioned about their higher risk of hypertrophic scarring and keloid formation. Patients should be made aware

that the technique will not give them the peaches-and-cream complexion for which they have long yearned. It will not completely remove ice-pick or crateriform scars. Postinflammatory hyperpigmentation is more likely to develop in brown-eyed persons, especially if they receive a considerable amount of sun exposure. Other complications, eg, bacterial infection and milia production, are rare. Beware of before-and-after pictures. The edema of the face occurring a few weeks after the treatment gives the false illusion that more scars were removed than actually were. It takes six months or more before an objective and accurate assessment of the effects of the dermabrasion can be made.

The size and surrounding inflammation of ruptured pilar cysts usually dramatically decrease within 24 hours after intralesional injection of diluted corticosteroids. Other cysts may be incised and drained, especially if they are severely painful or are in dangerous areas around the eyes or neck.

## PARTING WORDS

Most acne patients require not only consolation but active help. A treatment regimen involving a combination of therapeutic modalities offers tremendous physical, cosmetic, and emotional help to the millions of persons who suffer from acne.

## Nonproprietary Names and Trademarks of Drugs

Benzoyl peroxide—*Benoxyl Lotion, Benzagel, Desquam-X, Oxy-5, Panoxyl, Persadox.*  
Clindamycin—*Cleocin.*

## Additional Readings

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