doi:10.36849/JDD.6872

 ORIGINAL ARTICLE

The Many Faces of Pediatric Acne: How to Tailor Nonprescription Acne Treatment and Skincare Using Cleansers and Moisturizers

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ABSTRACT

Background: Acne vulgaris (acne) is a common, complex, multifactorial disorder. Various expressions of acne in childhood can be categorized by age, severity, and pubertal status.

Objective: To improve pediatric acne patients' outcomes, various expressions of pediatric acne to educate and tailor nonprescription acne treatment and skincare using cleansers and moisturizers were defined and discussed.

Methods: An expert panel of pediatric dermatologists and dermatologists reviewed and discussed nonprescription acne treatment and skincare literature. The results from the literature searches were used together with the panel's expert opinion and experience to adopt various expressions of pediatric acne and prevention, treatment, and maintenance of the condition using nonprescription acne treatment and skincare.

Results: The panel agreed on sixteen acne patient profiles addressing various age categories of pediatric acne: neonatal acne: birth to ≤ 8 weeks; infantile acne: 8 weeks to ≤1 year; mid-childhood acne: 1 year to <7 years; preadolescent acne: ≥7 to 12 years; adolescent acne: ≥12 to 19 years or after menarche for girls. Nonprescription acne treatment and skincare products containing lipids such as ceramides play an important role in monotherapy, adjunctive, and maintenance treatment; however, their role in pediatric acne is not well defined and requires more studies.

Conclusion: Pediatric acne deserves more attention from healthcare providers treating children regarding differential diagnosis, treatment, and maintenance using nonprescription acne treatment and skincare.

J Drugs Dermatol. 2022;21(6):602-612. doi:10.36849/JDD.6872

INTRODUCTION

Acne vulgaris (acne) is a complex, multifactorial disease with significant social, psychological, and physical consequences.[1-6] Acne is most prevalent in teens and is considered a chronic condition with a prolonged course of acute outbreaks, relapses, recurrences, and a significant psychological impact.[2-4] Acne is associated with lower self-esteem, anxiety, and depression.[3,4] There are various expressions of pediatric acne, based on age (neonatal, infantile, mid-childhood, preadolescent, and adolescent), severity (mild, moderate, severe), type (eg, comedonal, papules, pustules, nodular), and other characteristics (eg, oily skin, pomedal acne).[5-8]

A pattern of innate inflammation is considered to trigger acne by direct and indirect multifactorial, complex, and interrelated mechanisms.[5-8] The mechanisms include generating chemotactic and pro-inflammatory factors, stimulating inflammatory mediators.[9,10] The initial inflammatory response may progress into inflammatory patterns, which lead to acne lesion formation up to and including scar formation in some patients.[9]

The presence of pediatric acne may be a manifestation of underlying pathology.[5,6] Workup when necessary is based on age and physical findings, including morphology and distribution of acne lesions and physical condition in relation to age.[5,6]

The pathogenesis of pediatric acne is thought to be similar to acne at all ages, although the approach to treatment may differ due to the state of skin maturity and concerns about the safety and efficacy of various therapies in young age groups.[5-8]

Treatment recommendations[5,6] for mild pediatric acne may start with topical benzoyl peroxide (BPO) or a low strength topical retinoid. Other options are topical fixed combination therapy such as BPO plus antibiotic, BPO plus retinoid, or a combination of BPO, antibiotic, and retinoid.[5,6] Pediatric treatment recommendations[5,6] for moderate acne may start with topical treatment similar to mild conditions.[5,6] A further option may be an oral antibiotic combined with topical retinoid plus BPO.[5,6] A major consideration to changing the type or the formulation of the topical treatment is an inadequate response to therapy.[5,6] For females, hormonal therapy may be an option.[5,6,13,14]

A fixed combination topical treatment may be combined with an oral antibiotic for severe pediatric acne.[5,6] If the response to treatment is inadequate, consideration to changing the oral antibiotic or oral isotretinoin may be given; consider hormonal therapy for females.[5,6]

The advisors noted that of the acne prescription treatments in children younger than 12 years of age are considered off-label.[15]

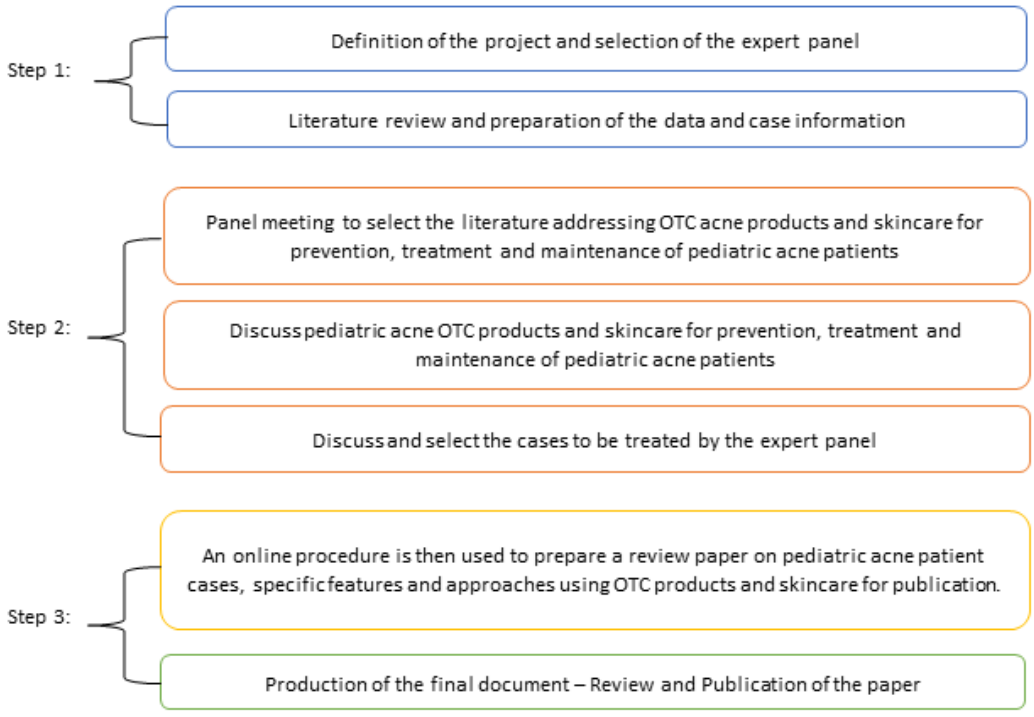
Nonprescription acne products and skincare using cleansers and moisturizers should play a necessary part in acne treatment.[5,6,10,14] However, within the available acne treatment consensuses, there is a knowledge gap on nonprescription cleansers and moisturizers in pediatric acne.[6] To improve pediatric acne patients' outcomes giving it more attention from health care providers treating children, the advisors defined various expressions of pediatric acne to educate and tailor nonprescription acne treatment and skincare using cleansers and moisturizers.

METHODOLOGY

Role of the Panel

A panel of 7 experts in dermatology in pediatrics who treat pediatric acne patients convened a meeting on August 28, 2021. They reviewed and discussed the literature on nonprescription acne treatment and skincare using cleansers and moisturizers for this population (Figure 1). During the meetings' workshop,

FIGURE 1. Procedure used for the project. Step 1 was done before the meeting in preparation of the activities during the meeting. Step 2 was performed during the meeting and for step 3 an online process was used.



each group used pediatric acne expressions to define 4–6 pediatric acne patient profiles. Advisors answered the following questions for each patient profile: 1) Why did you select this patient profile? 2) What would you use (treatment and adjunctive skincare)? 3) What prevention and/or education would you offer? 4) Is there a place in these patient profiles for monotherapy, adjunctive, or maintenance treatment with ceramides (CERs) containing nonprescription acne products and skincare? If so, which and why?

Literature Review

A literature search was conducted using keywords related to pediatric acne. Prior to the meeting, literature was culled on current best practices in pediatric acne, addressing nonprescription acne products and skincare as monotherapy, adjunctive, and maintenance treatment. Searches were performed on PubMed and Google Scholar on August 5th and 6th, 2021, by a dermatologist and a physician/scientist. Selected articles included guidelines, consensus papers, and reviews describing current best practices in pediatric acne treatment using acne products and skincare, clinical research studies published in the English language from 2010 to 2021. Search terms used:

Acne vulgaris, acne pathogenesis, pediatric acne, pediatric acne treatment, combination acne therapy, retinoids, benzoyl peroxide, bacterial resistance, isotretinoin, hormonal treatment, pediatric acne guidelines, algorithm, consensus recommendations.

OTC or nonprescription acne products and skincare use, pediatric acne prevention, treatment, maintenance, monotherapy, adjunctive treatment, efficacy, safety, tolerability, skin irritation of OTC acne products, and skincare use, quality of life aspects, handling and comfort, adherence to treatment.

The results of the searches were evaluated independently by two reviewers. Based on reviewer consensus, each treatment within the publications was assigned an alphanumeric level of evidence (1 to 4 and A to C), using pre-established criteria by the American Academy of Dermatology.[16] Initially, 57 articles were identified, and after excluding 14 duplications and poor quality papers, 43 articles remained, of which only 14 were of sufficient quality to grade. The selected publications comprised 5 guidelines, algorithms, and consensus papers, 22 clinical studies (15 randomized controlled trials), 14 reviews, and 2 other papers.

Notably, there were no publications specifically on nonprescription pediatric acne treatment and skincare.

Pediatric Acne

Diagnosis and screening

There are various age categories of pediatric acne: neonatal acne: birth to ≤ 8 weeks; infantile acne: 8 weeks to ≤1 year; mid-childhood acne: 1 year to <7 years; preadolescent acne: ≥7 to 12 years; adolescent acne: ≥12 to 19 years or after menarche for girls.[5,6]

Other systems consider three different groups of acne patients: preadolescent (≥7 to 12 years), adolescent (≥12-25 years), and post-adolescent patients (≥25 years; Figure 2).[7,8]

Adequate evaluation of children with acne requires a directed medical history and physical examination.[5,6] The medical history should include the age of acne onset, duration of disease, growth parameters, and age of onset for any early signs of virilization. The physical examination should include height, weight, types, location of acne, and signs of puberty (body odor, axillary and pubic hair, breast buds, enlarged phallus, testis, or clitoris). Laboratory evaluation is indicated for patients with other signs of virilization. Hand and wrist x-ray for bone age is a simple, practical initial examination.[5,6] A workup and a referral to a pediatric endocrinologist are warranted for mid-childhood acne (ages 1 to < 7 years), which is very uncommon, and patients need to be examined, especially if displaying secondary sexual characteristics.[5,6] Finally, physicians should collect patient history on their diet and consider any potential contributing factors related to their acne (e.g., milk consumption).[9]

Details on diagnosis and the presentation of pediatric acne are in Box 1.

Box 1: Diagnosis

General: Screening and evaluation of pediatric acne typically requires a directed history and physical examination.

History should include age of acne onset, duration of disease, growth parameters, and age of onset for early signs of virilization, such as body odor, axillary or pubic hair. Physicians should collect patient history on diet and consider any potential contributing factors related to their acne (e.g., milk consumption).[9]

Physical examination should include height, weight, types and location of acne, and signs of puberty, (body odor, axillary and pubic hair, breast buds, enlarged phallus, testis or clitoris).
Laboratory evaluation is indicated for patients with other signs of virilization. Hand film for bone age as initial screen is useful.

Follow-up: Guidance and long-term follow-up is indicated in all cases.

Specific Significant neonatal and infantile acne, check for signs of sexual precocity, virilization, or growth abnormalities. A work-up and a referral to a pediatric endocrinologist are warranted.[5]

Mid-childhood acne (ages 1 to < 7 years) is very uncommon.[5,6] Patient *needs* to be examined, especially if displaying secondary sexual characteristics. Investigate history of topical steroid use or other acne inducing medications. Refer *to endocrinologist* for work-up.

Preadolescent acne is common and a work-up beyond history and physical examination is generally unnecessary unless there are signs of androgen excess, PCOS, or other systemic abnormalities.[5,6]

Adolescent acne screening, evaluation and physical examination according to presentation.

FIGURE 2. Presentations of pediatric acne.

Acne type	Age of onset	Presentation
Neonatal acne 	Birth to ≤8 weeks	Small erythematous papules, rarely comedonal and/or inflammatory lesions.
Infantile acne 	8 weeks to ≤1 year	Comedones, papules, pustules, and rare nodules on the cheeks, chin, much less on the chest and back.
Mid-childhood acne 	1 year to <7 years	Comedones, papules, pustules and nodules.
Preadolescent acne 	≥7 to 12 years	Comedones in the T-zone, covering the central forehead or on the central part of the face, the brow, nose, and lips.
Preadolescent acne 	≥7 to 12 years	Comedones in the T-zone, covering the central forehead or on the central part of the face, the brow, nose, and lips.

Patient and parent education

All patients and parents are to receive education on their child's condition, prevention, treatment, and acne maintenance. In addition, hand out a treatment and skincare plan during the visit and provide information about trusted websites for additional information (2). Children with acne and their parents may hold common misconceptions about acne that need tackling before treatment begins, such as poor hygiene. Moreover, vigorous washing may irritate the skin, enhancing inflammation exacerbating acne.[5,6] Education of patients and parents on realistic treatment outcomes may support treatment adherence. They may expect a slight improvement in the first month, but about 20% improvement per month after that. After successfully controlling the disease, maintenance treatment with topical agents is essential.[5,6]

Pediatric acne treatment

Treatment of uncomplicated preadolescent acne is similar to acne in older age groups.[5,6] Treatment recommendations for mild pediatric acne may start with topical BPO or a low strength topical retinoid.[5,6] Moderate acne treatment comprises topical fixed combination therapy such as BPO plus antibiotic or a retinoid plus BPO.[5,6] A further option may be an oral antibiotic combined with topical retinoid plus BPO, which may also be suitable for severe cases.[5,6] The advisors noted that most of the acne prescription treatments in children younger than 12 years of age are considered off-label.[5,6,14] Prescription acne treatment options were summarized (Table 1).

Available nonprescription products for monotherapy of mild pediatric acne or as an adjunct to prescription treatment are

TABLE 1.

Prescription Pediatric Acne Treatment				
Type	**Topical**	**Age indication**	**Oral***	**Age indication**
Retinoid	Tretinoin	Some ≥10 years Most ≥12 years	Isotretinoin	≥12 years
Antibiotic	Erythromycin Clindamycin	Pediatric use: No specific age ≥12 years	Erythromycin Tetracycline Doxycycline Minocycline Trimethoprim-sulfamethoxazole Amoxicillin Chephalexin Azithromycin Sarecycline^	No specific age ≥8 years ≥8 years ≥12 years ≥2 months No specific age No specific age ≥6 months ≥9 years
Anti-inflammatory	Dapsone	≥12 years	--	--
Fixed combination BPO + Antibiotic	BPO + Erythromycin BPO + Clindamycin	≥12 years ≥12 years	--	--
Fixed combination BPO + Retionoid	BPO + Tretinoin	≥12 years	--	--
Fixed combination Retinoid + Antibiotic	Tretinoin + Clindamycin	≥12 years	--	--

*Pediatric use
Drugs@FDA: FDA Approved Drug Products http://www.accessdata.fda.gov/scripts/cder/drugsatfda/index.cfm
^Sarecycline, FDA approved in October 2018 for non-nodular moderate-to-severe acne, is a new tetracycline class, narrow antibacterial spectrum oral antibiotic.
Modified with permission from Schachner et al.[6]

TABLE 2.

Non-Prescription Pediatric Acne Topical Treatments		
Type	**Formulation**	**Activity/effect**
Benzoyl peroxide	2.5%, 5%, 10%	Antibacterial, mild sebostatic, mild keratolytic
Salicylic acid	0.5%, 2%	keratolytic
Sulfur	3%-8%	It helps absorb excess sebum
Sodium sulfacetamide	10%	Antibacterial
Resorcinol	2%	Antibacterial, mild keratolytic
Niacinamide	2%, 4%, 5%, 10%	Anti-inflammatory, antimicrobial, reduced sebum, helps skin tone evening
Glycolic acid	7%, 12%, 10%, 15%, 20%	Exfoliation

considered safe and frequently recommended (Table 2).[5,6]

The FDA has issued a monograph for topical acne over-the-counter (OTC) drug products that dictate the required active ingredients, levels, and labeling and allowed claims for these products that manage acne. However, the monograph does not distinguish between types, the severity of acne, nor age (children versus adults) regarding actives or claims.

Skincare with gentle cleansers and moisturizers

Skincare products using cleansers and moisturizers should be suitable for acne-prone and oily skin. These cleansers and moisturizers are non-comedogenic and complement acne treatments offering benefits such as gentle cleansing, hydration, and promoting a healthy barrier. Daily use of fragrance-free, non-irritating, and non-comedogenic cleansers, moisturizers, and sunscreen may reduce skin dryness, erythema, and photosensitivity resulting from topical or oral drugs.[5,6,14] Using the appropriate skincare helps to minimize irritation and inflammation.[5,6] The skincare regimen should be an essential part of the acne prevention, treatment, and maintenance care regimen (Box 3).[5,6,14]

FIGURE 3. Pomedal-acne in richly pigmented skin.

Box 2: Patient and parents education and information

Discuss the condition in understandable terms to the patient and parents while clearing up misconceptions about acne, behavior, and hygiene.

Discuss how prescription, nonprescription, skincare, and sunscreen work and why combinations may be needed.

Discuss in detail the use and application of the treatment and skin care.

Discuss realistic expectations about treatment outcomes and expect a slight improvement in the first month, followed by a 20% improvement per month.

Discuss that after successful control of the disease, maintenance treatment with topical agents is essential.

Discuss that if the acne re-occurs, active treatment is needed.

PROVIDE A DETAILED HANDOUT ON THE DISCUSSED INFORMATION

Tips to help prevent breakouts

- Wash the face no more than twice a day with warm water and a mild cleanser. Gently massage the face with circular motions. *Don't scrub.* After cleansing, apply treatment and a moisturizer as recommended.
- Don't pop pimples because it increases inflammation and infection, enhancing swelling, redness, and may lead to scarring.
- Avoid touching the face or leaning your face on objects that collect sebum and skin residue like a cell phone. As touching can spread the infection, wash the hands before applying treatment, skincare or makeup.
- If wearing glasses or sunglasses, clean them frequently to keep oil from clogging pores around the eyes and nose.
- If acne is present on the body, do not wear tight clothes. Allow the skin to breathe and prevent irritation. Avoid wearing scarves, headbands, and caps as they can collect dirt and oil.
- Remove makeup before going to sleep. Choose non-comedogenic brands. Do not use old makeup.
- Keep hair clean and out of the face to prevent acne flares.
- Use sun protection (sun avoidance and sunscreen with an SPF ≥15) as sun exposure may trigger acne flares. Moreover some treatments may cause photosensitivity.

Tips to avoid treatment failure

- Stress the potential downside of the treatment. Stress a minimum of 6 weeks before improvement of the condition. Do not have patients return to the clinic for at least 6-12 weeks.

Trusted websites for education on acne and additional information

- https://pedsderm.net/for-patients-families/patient-handouts/
- https://www.msdmanuals.com/home/skin-disorders/acne-and-related-disorders/acne
- https://kidshealth.org/en/teens/skin-tips.html
- https://www.aad.org/public/diseases/acne/causes/acne-causes
- https://www.skincarephysicians.com/acnenet/

Box 3: Skincare using gentle cleansers and moisturizers

General information:

Daily application of fragrance-free, non-irritating, and non-comedogenic cleansers, moisturizers, and sunscreen may reduce adverse events such as dryness, erythema, photosensitivity, and PIH resulting from prescription oral and topical drugs.[34-41]

Skincare, such as non-comedogenic cleansers and moisturizers, have been successfully used to reduce skin irritation.[34-41]

The skincare is applied once or twice a day, morning or evening on the full face, and for preparation of the skin for other acne treatment products.[6]

Monotherapy:

Mostly for mild acne for its anti-inflammatory action, prevention of acne flares, oil control, and minimization of scars. CERs-containing skincare may offer acne patients benefits to help restore skin barrier function.[35-41]

Adjunctive skincare:

Common ingredients in acne products (eg, BPO and retinoids) are effective but may cause skin irritation and impair the skin barrier function.[34-38]

CERs-containing cleansers, creams or serums with BPO or adapalene and BPO or niacinamide are frequently used on the face for moderate-to-severe acne in combination with prescription and nonprescription acne products.

Maintenance:

CERs-containing cleansers or SA containing lotion, creams or serums with BPO or an OTC strength topical retinoid and sunscreen can be used for maintenance. The products are applied to help to help prevent acne flares, are anti-inflammatory, anti-follicular occlusion, control oily skin, and minimize scars.[34-41]

Pediatric Case Profiles and Their Approaches

Neonatal and infantile acne

Neonatal acne occurring at 0–8 weeks of life is estimated to affect 20% of newborns more frequently boys than girls.[5] The condition usually presents small erythematous papules and pustules on the face, rarely with comedones.[5,6,14] In the differential diagnosis, eruptions due to other causes need to be excluded, such as bacterial folliculitis, secondary syphilis, herpes simplex virus, and varicella-zoster virus.[5,20,21] Other conditions to be ruled out comprise transient neonatal pustular melanosis, erythema toxicum neonatorum, eosinophilic pustular folliculitis, sebaceous gland hyperplasia, and congenital adrenal hyperplasia.[21,22] Neonatal cephalic pustulosis due to colonization of Malassezia yeasts present monomorphic red papules or pustules on the face and neck without comedones.[20,21] Maternal medications may also cause neonatal or infantile eruptions and should be checked; for instance, lithium, phenytoin, and corticosteroids. [21,22]

While usually benign and self limited, rarely when neonatal acne presents with signs of sexual precocity, virilization, or growth abnormalities, significant neonatal acne may be due to an underlying endocrinologic disease, tumor, or other gonadal/ovarian pathology.[5] These patients require a workup and a referral to a pediatric endocrinologist.[5] Neonatal acne typically resolves over a few months without scarring.[5] For more complicated cases, off-label topical therapies may be considered.[5,14,21,22] Three neonatal and infantile acne patient case profiles and approaches are presented in Table 3.

Case 1 concerns neonatal acne in a 6-weeks-old female patient, addressing parental concerns and providing education on the condition. The condition is transient and well treatable. In the case of *Malassezia sympodialis*, treat the patient with topical ketoconazole and, if needed, hydrocortisone cream 1 to 2.5%. Further, consider benzoyl peroxide (BPO) or salicylic acid (SA) containing topical products and CERs-containing moisturizers.

TABLE 3.

Natal Acne: Birth to ≤ 8 Weeks, Infantile Acne: 8 Weeks to ≤1 Year			
N°	**Category**	**Profile**	**Details**
Case 1	Neonatal acne: birth to ≤ 8 weeks	Female; 6-weeks; Neonatal/Infantile acne unclear ethiology	Why: Parental concern, educate them that this condition is transient and treatable What: CER containing BPO or SA In case of Malassezia Sympodialis: Ketoconazole +/- hydrocortisone Prevention/Education: Prevention is not relevant in these cases, although there is a risk of scarring (ice pick) Skincare: CER-containing cleansing and moisturizing products
Case 2		Male neonate; 6 weeks; Breastfeed; Comedonal, mild	Why: Common condition, parental concern, will be managed by a pediatrician What: Gentle skincare Prevention/Education: Introduce the concept that the ceramides-containing baby skincare line is safe Skincare: CER-containing cleansing and moisturizing products
Case 3	Infantile acne: 8 weeks to ≤1 year	6-month-old male; Comedonal/Small papular-pustular; Occasional occurrence	Why: Challenging case Treatment: Topical BPO 2.5%, topical antibiotic (maybe) "low and slow" Prevention/Education: Speak with parents for reassurance Skincare: CER-containing acne foaming wash, baby ointment

Ceramides (CER)-containing skincare, CeraVe. Benzoyl peroxide (BPO), Salicylic acid (SA)

Case 2 is a breastfeeding six-week-old male patient with mild comedonal acne, a common condition managed by a pediatrician, who addressed parenteral concerns, and the safety and use of CERs-containing baby products.

Case 3 is a 6-month-old male patient with infantile acne presenting occasional comedonal and minor papular-pustular acne. This challenging case was treated with 2.5% BPO, and a topical antibiotic was added if needed—skincare comprised of CERs-containing acne foaming wash and baby ointment.

Preadolescent Acne

Preadolescent acne occurring in children at 7 to 12 years of age, or up to menarche for females[12,13,15,18,22] has become more common; however, only a few epidemiological studies have been conducted in this population.[17,19]

Patients with preadolescent acne may experience psychological stress due to unfavorable perceived appearance changes, an increased social impairment, and even mental health problems.[3,4,23,24] The patients' concerns may differ from parental concerns.[5,6]

This type of acne often presents as comedones, covering the central forehead or the central part of the face, e.g., the brow, nose, lips, and even ears.[5,6] Early diagnosis and prompt initiation of treatment may prevent emotional stress and possible sequelae. Moreover, effective treatment and maintenance may prevent severe facial scarring from preadolescent acne.[5,6,18] Four preadolescent acne patient case profiles and approaches are discussed in Table 4.

TABLE 4.

Preadolescent Acne: ≥7 to 12 Years			
N°	**Category**	**Profile**	**Details**
Case 4	Preadolescent acne: ≥7 to 12 years	8-year-old preadolescent female	Why: Uncomplicated regimen What: SA, BPO wash Prevention/Education: Education on the condition Skincare: CER-containing mild cleanser, moisturizer, sunscreen
Case 5		8-year-old female; Mild comedonal acne	Why: Common case, mildest of cases Treatment: No prescription treatment needed (can add on if required, later), CER-containing BPO 4% or SA (*monotherapy*/maintenance) Prevention/Education: information and handout Skincare: CER-containing foaming cleanser
Case 6		10-year-old female; Comedonal	Why: Common pre-pubertal condition; Parent-driven appointment, but the child is amenable to teaching; Pediatrician will manage the acne. What: No prescription treatment gentle facial wash +/- adapalene Prevention/Education: Handout, samples Skincare: CER-containing foaming cream cleanser, AM/PM Moisturizer
Case 7		12-year-old female; Mixed comedonal/inflammatory	Why: At risk for progression with time, due to age and hormones; Pediatricians will still handle this condition. What: Combination skincare regimen with nonprescription retinoid and prescription topical Prevention/Education: Information, handouts, samples Skincare: CER-containing foaming cream cleanser, AM/PM Moisturizer

Ceramides (CER)-containing skincare, CeraVe. Benzoyl peroxide (BPO), Salicylic acid (SA)

Case 4 and 5 concern 8-year-old female patients with mild comedonal acne, a common skin condition. A gentle cleanser with either BPO or a SA containing formulation as monotherapy and maintenance was recommended. Additionally, twice daily, a CER containing moisturizer was applied.

Case 6
concerns a 10-year-old female patient with comedonal acne, a common pre-pubertal condition. The parents initiated the appointment with a pediatrician, and their child agreed that education and treatment might improve her skin condition. A CERs and BPO 4% containing foaming cleanser was recommended as monotherapy and maintenance.

Case 7
presents a 12-year-old female patient with mixed comedonal/inflammatory acne at risk for progression due to age and hormones. In pre adolescent and early adolescent acne the incompletely understood spectrum of disorders known as polycystic ovarian syndrome (PCOS). While it is important to recognize this phenotype, current treatment recommendations are not based on laboratory abnormalities but focus on a healthy diet and regular exercise.

Factors involved in pediatric acne development are similar to those of adult acne and comprise changes in the hormonal milieu, sebaceous gland hyperactivity, alterations in the skin microbiome, follicular keratinization, and proliferation of *Cutibacterium acnes* (*C. acnes*), inflammation, and genetic factors.[5,6,10] Hormonal changes trigger increased sebum formation and proliferation of *C. acnes*, decreasing skin microbial diversity.[9,25] Although the contribution of *C. acnes* to acne development remains unclear, *C. acnes* plays a role in maintaining the equilibrium of the skin's microbiome by colonizing the lipid-rich sebaceous follicles.[25] Testosterone and dihydrotestosterone (DHT) are important for regulating sebum production.[12,13,17-19] The larger-sized sebaceous glands in acne-prone individuals are stimulated at the time of puberty.[10] Although the pathology of acne is not completely understood, a pattern of innate inflammation is considered the starting point.[9-11] Currently it is unclear if inflammation may be less at the forefront of preadolescent acne.[9] In preadolescent acne, changes in the hormonal milieu seem more important than inflammation, including elevated insulin and IGF-1, while increasing androgen levels influence sebaceous hypersecretion and follicular hyperkeratinization.[9,11-13]

Typically pediatricians will handle this condition. The patient received a combination skincare regimen with nonprescription retinoid and a prescription topical. A CERs- containing foaming cream cleanser and twice daily (AM/PM) CERs-containing moisturizer were recommended for skincare.

Adolescent Acne: ≥12 to 19 Years or After Menarche For Girls

Case 8 concerns a 13-year-old female patient with mild comedonal and inflammatory acne on the chest and back. Treatment comprised a CERs-containing 4% BPO wash, adapalene plus BPO, and topical Clindamycin if needed. In addition, a CER-containing foaming cream cleanser and twice daily (AM/PM) CERs-containing moisturizer were used (Table 5).

Case 9 is a 13-year-old adolescent male patient who presents with mild acne. Treatment comprised an uncomplicated regimen with a CERs-containing 4% BPO wash and a sun protection factor (SPF)-containing moisturizer.

Case 10 presents a 13-year-old skin of color (SOC) female patient with post-inflammatory hyperpigmentation (PIH) and acne-related facial scars. Acne prevalence and sequelae are considered more common in SOC populations.[26-28] Although the mechanism is not yet clear, PIH may be due to inflammation-inducing excessive melanin production or irregular pigment dispersion.[26-28] A study of 1942 SOC acne patients demonstrated that 43% had acne-related scarring. The study showed that most acne scars (99%) originated from inflammatory and post-inflammatory acne lesions.[29] Early and effective acne treatment with topical adapalene combined with BPO can prevent the risk of future scars.[14,30-32]

The clinician informed the patient and parents about acne-related scarring to help the patient and parents understand why they occurred. Avoiding an abrasive scrub, rubbing the skin, and topical alcohol may prevent irritation. Gentle skincare, decreasing washing, increasing moisturizer, and sunscreen use are beneficial for richly pigmented skin.[14,30-32] Pediatricians recognize the importance of PIH to acne patients and typically refer these cases to a dermatologist.[5,6] The treatment of this patient comprised a nonprescription skincare regimen with lightening properties included a prescription formulation containing azelaic acid/niacinamide/BPO.[33]

Case 11 concerns a 14-year-old male patient with nodular and cystic acne. This common acne case presents with dry skin resulting from acne treatment with oral isotretinoin.[34] Although evidence is scarce, researchers are increasingly interested in follicular epithelial barrier dysfunction in patients with acne.[10,34-36] A consensus paper stated that dryness and skin irritation resulting from acne treatment could be improved using ceramide-containing cleansers and moisturizers, enhancing treatment adherence.[36] The authors stated that the skin care regimen should be an essential part of the acne prevention, treatment, and maintenance care regimen.[36] Skincare is necessary for acne treatment and is part of various acne guidelines and consensus papers.[5,6,14,17,22,32,34,36]

Skincare comprised a CERs-containing healing ointment, moisturizer, plus SPF application in the morning after cleansing the face with a foaming wash.

TABLE 5.

Adolescent Acne: ≥12 to 19 Years or After Menarche For Girls			
N°	**Category**	**Profile**	**Details**
Case 8	Adolescent acne: ≥12 to 19 years or after menarche for girls	13-year-old female; Acne on chest and back; Mild comedonal/ inflammatory	Why: Common presentation What: CER-containing 4% BPO wash, Adapaline+BPO gel, Clyndamycine (maybe) Prevention/Education: Information, handouts Skincare: CER-containing foaming cream cleanser, AM/PM Moisturizer with SPF
Case 9		13-year-old adolescent male; Mild acne	Why: Uncomplicated regimen What: CER-containing BPO wash Prevention/Education: Information, handouts Skincare: CER-containing moisturizer with SPF
Case 10		13-year-old female; Skin of color; Scars; Post-inflammatory hyperpigmentation (PIH)	Why: Pediatricians will refer this case to a dermatologist. PIH is important to acne patients What: Prescription azelaic acid/niacinamide/BPO, Nonprescription skincare regimen with lightening properties, Prevention/Education: Information, handouts (e.g., avoid St. Yves apricot scrub, rubbing alcohol), help patients understand why they have scars; use gentle skincare; decrease washing, increase moisture; add sunscreen. "Gentle is best" in darker skin types. Skincare: CER-containing foaming cream cleanser, AM/PM Moisturizer lotion with SPF
Case 11		14-year-old male; Nodular/ cystic acne; Presents with dry skin from acne treatment (i.e., Accutane)	Why: Common case What: Oral isotretinoin Prevention/Education: Information, handouts Skincare: CER-containing foaming cream cleanser, Healing ointment + AM Moisturizer lotion with SPF
Case 12		15-year-old African American female; PIH	Why: Common case What: Azelaic acid (to address PIH), Adapalene + BPO gel Prevention/Education: Information, handouts, prevention of further PIH Skincare: CER-containing foaming cream cleanser, AM Moisturizer lotion with SPF
Case 13		15-year-old female; Moderate acne; Irregular menses	Why: Correct diagnosis and approach What: CER-containing BPO wash or wash without BPO, Adapalene + BPO gel Prevention/Education: Information, handouts. Tip: Adapalene + BPO gel can be placed on top of the moisturizer to avoid retinoid dermatitis, or consider a short contact application Skincare: CER-containing foaming cleanser, AM Moisturizer lotion with SPF
Case 14		16-year-old male; Acne on face, chest and back; Mild comedonal; Greasy/oily skin	Why: Typical patient What: Tazarotene gel Prevention/Education: Information, handouts Skincare: CER-containing foaming cleanser, AM Moisturizer lotion with SPF
Case 15		16-year-old female; Severe acne	Why: PCOS and metabolic syndrome workup required What: Start with topical adapalene or an adapalene + BPO wash. Consider adding: OCP, spironolactone, oral retinoids. Oral antibiotics in the month before starting oral retinoids. Skincare: CER-containing foaming cleanser, AM Moisturizer lotion with SPF
Case 16		17-year-old male; Accutane patient	Why: Severe acne referred to a pediatric dermatologist. What: Oral retinoid Prevention/Education: Information, handouts, addressing how to prevent further scarring. Skincare: CER-containing hydrating facial cleanser, healing ointment + AM moisturizer lotion with SPF, add lip care

Ceramides (CER)-containing skincare, CeraVe. Benzoyl peroxide (BPO), Salicylic acid (SA), Polycystic ovary syndrome (PCOS), Oral contraceptive pills (OCP)

Case 12 concerns a 15-year-old African American female patient with moderate acne papules, PIH, and pomade-related acne along the hairline and the forehead characterized by closely packed, closed comedones and small papules (Fig).[26-28,31] The patient is treated with topical azelaic acid and BPO gel to address PIH, a CERs-containing foaming wash, and a moisturizer.[35-41]

The use of hair grooming products to prevent hair dryness may trigger this type of acne.[28,31,39-41] Additionally, applying makeup or unsuitable skincare may induce or exacerbate acne. [28,31,39-41] Moreover, products to lighten the skin, specifically those with corticosteroids, may irritate the skin. [28,31, 39-41]

Case 13 presents a 15-year-old female patient with irregular menses and moderate acne. Adrenal androgen production and dehydroepiandrosterone (DHEA) and DHEA-S levels were checked, excluding PCOS. Treatment comprised adapalene plus BPO gel, a CERs-containing wash, and a moisturizer with sunscreen. The patient was advised that the adapalene and BPO gel can be placed on top of the moisturizer to avoid retinoid dermatitis or consider a short contact application.[6]

Case 14 is a 16-year-old male patient with greasy, oily skin presented mild comedonal acne on the face, chest, and back. This typical acne case was treated with topical tazarotene, a gentle cleanser, and CERs- containing moisturizer.

Case 15 is a 16-year-old female patient with severe acne. Referral to an endocrinologist for PCOS and metabolic syndrome workup was organized and confirmed the diagnosis of genetics-related PCOS. Treatment was comprised of oral contraceptive pills (OCP), topical adapalene, and a BPO wash. If the response to the treatment is inadequate, spironolactone or oral retinoids may be considered with prescribing oral antibiotics in the month before starting the oral retinoid. Further, a gentle cleanser and CERs-containing moisturizer with SPF were used.

Case 16 The 17-year-old male patient with severe acne was referred to a pediatric dermatologist. His condition required oral isotretinoin, which can result in dry skin.[34] Both the patient and parents were informed about acne, preventing further PIH, the treatment and adverse events, and measures to combat skin dryness. Physicians should consider the psychosocial aspects of acne (e.g., depression, mood effects of drugs such as oral contraceptives and isotretinoin). Skincare was comprised or a CERs-containing hydrating facial cleanser, a healing ointment, and a moisturizer plus SPF.

A consensus paper stated that dryness and skin irritation resulting from acne treatment could be improved using ceramide-containing cleansers and moisturizers, enhancing treatment adherence.[36] The type of acne and individual patient characteristics can help determine the appropriate nonprescription skincare when used with topical or systemic acne therapies.[5,6,36-41]

CONCLUSION

Pediatric acne can be categorized by age and pubertal status and deserves more attention from healthcare providers treating children regarding differential diagnosis, treatment, and maintenance. Therefore, the advisors used pediatric acne expressions to define pediatric acne patient profiles, treatment, and maintenance approaches using prescription and nonprescription acne products, and skincare.

Although treatment principles are the same as adolescent acne, not all prescription treatments are approved for use in children younger than nine years. Nonprescription acne treatment products and skincare play an important role as a monotherapy, adjunctive, and maintenance treatment in pediatric acne; however, their role in pediatric acne is not well defined and requires more studies.

Acne is associated with decreased ceramide levels, and acne treatments often impair skin barrier function. CERs-containing skincare, including cleansers and moisturizers, may offer additional benefits for pediatric acne patients.

DISCLOSURES

The authors disclosed receipt of an unrestricted educational grant from CeraVe US for support with the research of this work. The authors also received consultancy fees for their work on this project.

ACKNOWLEDGMENT

All authors participated in all the steps of the project, selection of the literature, and review of the manuscript.

All authors read and approved the final version of the manuscript.

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