

# The Role of Adolescent Acne Treatment in Formation of Scars Among Patients With Persistent Adult Acne: Evidence From an Observational Study

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## PRACTICE POINTS

- Postacne scarring is the most severe complication of acne.
- Isotretinoin or topical retinoid treatment in adolescence decreases the risk for scars during adult acne, justifying the role of maintenance therapy with topical retinoids.

Persistent adult acne is one of the most difficult types of acne to treat. It is a long-lasting disease with uncontrolled exacerbations that often result in scarring. The aim of this study was to analyze the influence of acne therapy used in adolescence on patients who later developed persistent adult acne. The use of oral antibiotics, isotretinoin, and topical retinoids in adolescence and their role in diminishing scar formation during adult acne was analyzed. This population-based study included 111 patients, 91 of whom had persistent adult acne. Results indicated that the use of isotretinoin or topical retinoids for adolescent acne decreased the risk for scar occurrence in adulthood.

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In the last 20 years, the incidence of acne lesions in adults has markedly increased.<sup>1</sup> Acne affects adults (individuals older than 25 years) and is no longer a condition limited to adolescents and young adults (individuals younger than 25 years). According to Dreno et al,<sup>2</sup> the accepted age threshold for the onset of adult acne is 25 years.<sup>1-3</sup>

In 2013, the term *adult acne* was defined.<sup>2</sup> Among patients with adult acne, there are 2 subtypes: (1) persistent adult acne, which is a continuation or recurrence of adolescent acne, affecting approximately 80% of patients, and (2) late-onset acne, affecting approximately 20% of patients.<sup>4</sup>

Clinical symptoms of adult acne and available treatment modalities have been explored in the literature. Daily clinical experience shows that additional difficulties involved in the management of adult acne patients are related mainly to a high therapeutic failure rate in acne patients older than 25 years.<sup>5</sup> Persistent adult acne seems to be noteworthy because it causes long-term symptoms, and patients experience uncontrollable recurrences.

It is believed that adult acne often is resistant to treatment.<sup>2</sup> Adult skin is more sensitive to topical agents, leading to more irritation by medications intended for external use and cosmetics.<sup>6</sup> Scars in these patients are a frequent and undesirable consequence.<sup>3</sup>

Effective treatment of acne encompasses oral antibiotics, topical and systemic retinoids, and oral contraceptive pills (OCPs). For years, oral subantimicrobial doses of cyclines have been recommended for acne treatment. Topical and oral retinoids have been successfully used for more than 30 years as important therapeutic options.<sup>7</sup> More recent evidence-based guidelines for acne issued by the American Academy of Dermatology<sup>8</sup> and the European Dermatology Forum<sup>9</sup> also show that retinoids play an important role in acne therapy. Their anti-inflammatory

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activity acts against comedones and their precursors (microcomedones). Successful antiacne therapy not only achieves a smooth face without comedones but also minimizes scar formation, postinflammatory discoloration, and long-lasting postinflammatory erythema.<sup>10</sup> Oral contraceptives have a mainly antiseborrheic effect.<sup>11</sup>

Our study sought to analyze the potential influence of therapy during adolescent acne on patients who later developed adult acne. Particular attention was given to the use of oral antibiotics, isotretinoin, and topical retinoids for adolescent acne and their potential role in diminishing scar formation in adult acne.

## Materials and Methods

**Patient Demographics and Selection**—A population-based study of Polish patients with adult acne was conducted. Patients were included in the study group on a consecutive basis from among those who visited our outpatient dermatology center from May 2015 to January 2016. A total of 111 patients (101 women [90.99%] and 10 men [9.01%]) were examined. The study group comprised patients aged 25 years and older who were treated for adult acne (20 patients [18.02%] were aged 25–29 years, 61 [54.95%] were aged 30–39 years, and 30 [27.02%] were 40 years or older).

The following inclusion criteria were used: observation period of at least 6 months in our dermatologic center for patients diagnosed with adult acne, at least 2 dermatologic visits for adult acne prior to the study, written informed consent for study participation and data processing (the aim of the study was explained to each participant by a dermatologist), and age 25 years or older. Exclusion criteria included those who were younger than 25 years, those who had only 1 dermatologic visit at our dermatology center, and those who

were unwilling to participate or did not provide written informed consent. Our study was conducted according to Good Clinical Practice.

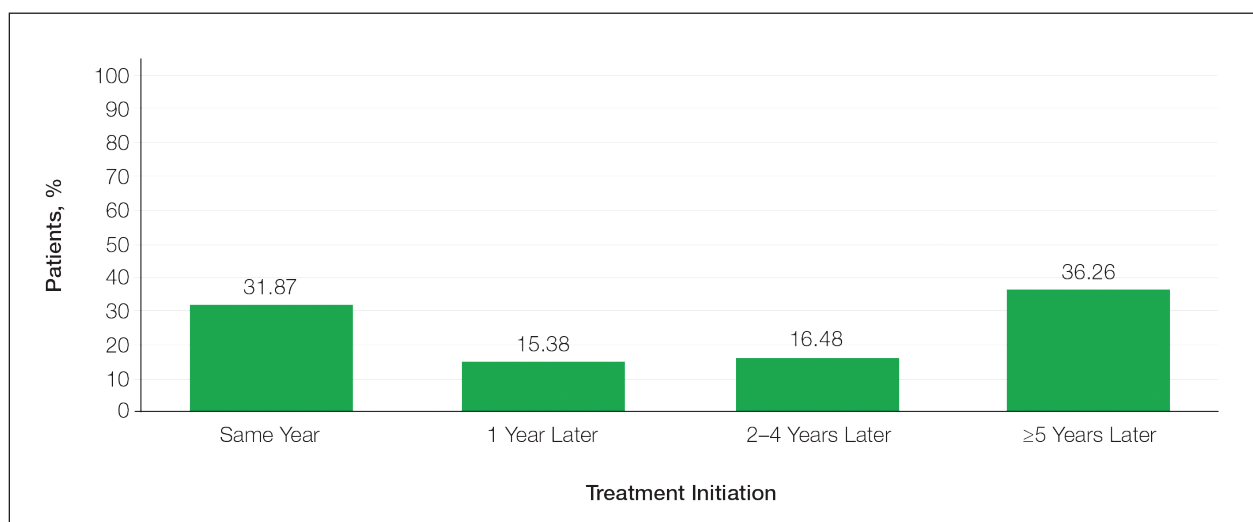
**Data Collection**—To obtain data with the highest degree of reliability, 3 sources of information were used: (1) a detailed medical interview conducted by one experienced dermatologist (E.C.) at our dermatology center at the first visit in all study participants, (2) a clinical examination that yielded results necessary for the assessment of scars using a method outlined by Jacob et al,<sup>12</sup> and (3) information included in available medical records. These data were then statistically analyzed.

**Statistical Analysis**—The results were presented as frequency plots, and a Fisher exact test was conducted to obtain a statistical comparison of the distributions of analyzed data. Unless otherwise indicated, 5% was adopted as the significance level. The statistical analysis was performed using Stata 14 software (StataCorp LLC, College Station, Texas).

## Results

**Incidence of Different Forms of Adult Acne**—To analyze the onset of acne, patients were categorized into 1 of 2 groups: those with persistent adult acne (81.98%) and those with late-onset adult acne (ie, developed after 25 years of age) (18.02%).

**Age at Initiation of Dermatologic Treatment**—Of the patients with persistent adult acne, 31.87% first visited a dermatologist the same year that the first acne lesions appeared, 36.26% postponed the first visit by at least 5 years (Figure 1), and 23.08% started treatment at least 10 years after acne first appeared. Among patients with persistent adult acne, 76.92% began dermatologic treatment before 25 years of age, and 23.08% began treatment after 25 years of age. Of the latter, 28.57% did not start therapy until they were older than 35 years.



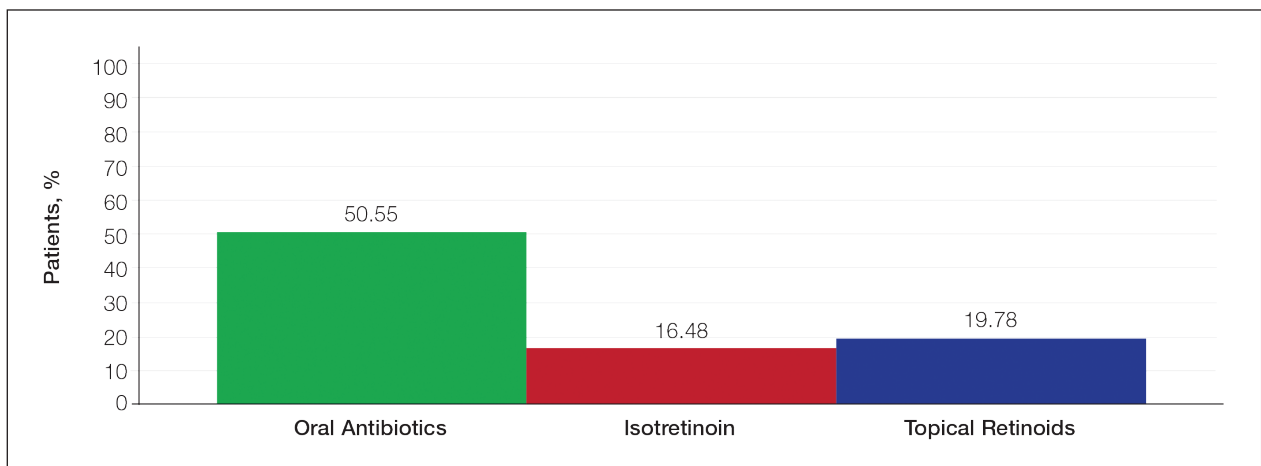
**FIGURE 1.** Initiation of dermatologic treatment for patients with persistent adult acne (n=91).

**Severity of Adolescent Acne**—In the persistent adult acne group, the severity of adolescent acne was assessed during the medical interview as well as detailed histories in medical records. The activity of acne was evaluated at 2-year intervals with the use of a 10-point scale: 1 to 3 points indicated mild acne (7.69% of patients), 4 to 6 points indicated moderate acne (24.18%), and 7 to 10 points indicated severe acne (68.13%).

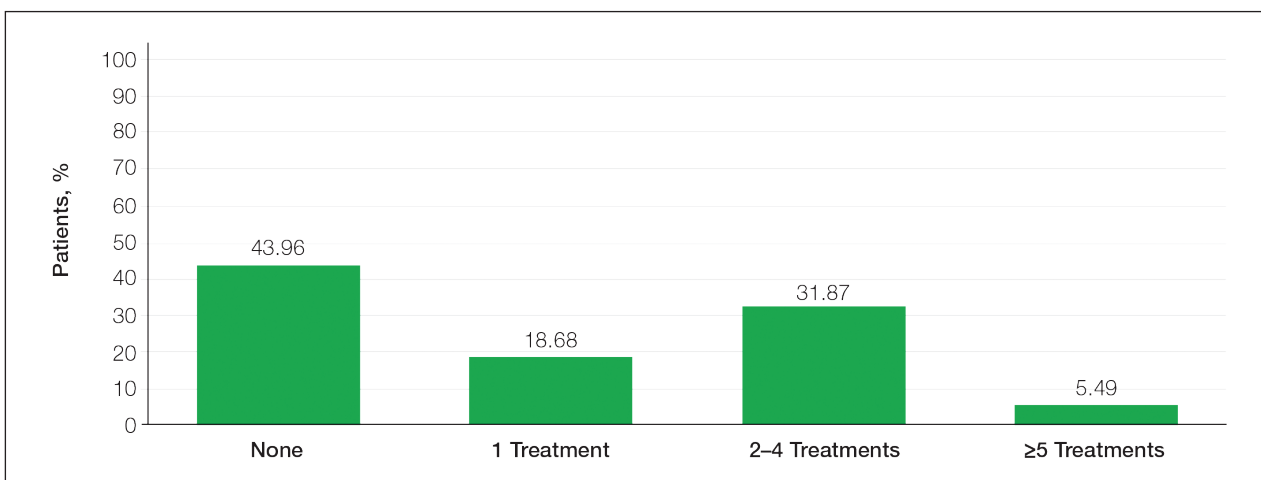
**Treatment of Persistent Acne in Adolescence**—Treatment was comprised of oral therapy with antibiotics, isotretinoin, and/or application of topical retinoids (sometimes supported with OCPs). Monotherapy was the standard of treatment more than 25 years ago when patients with persistent adult acne were treated as adolescents or young adults. As many as 43.96% of patients with persistent adult acne did not receive any of these therapies before 25 years of age; rather, they used antiacne cosmetics

or beauty procedures. Furthermore, 50.55% of patients were treated with oral antibiotics (Figure 2). Topical retinoids were used in 19.78% of patients and isotretinoin was used in 16.48%. Incidentally, OCPs were given to 26.5%. In the course of adolescent acne, 31.87% of patients received 2 to 4 courses of treatment with either antibiotics or retinoids (oral or topical), and 5.49% were treated with 5 or more courses of treatment (Figure 3). The analysis of each treatment revealed that only 1 patient received 4 courses of isotretinoin. Five courses of oral antibiotics were given in 1 patient, and 3 courses of topical retinoids were given in the same patient.

**Topical Retinoids**—In an analysis of the number of treatments with topical retinoids completed by patients with persistent adult acne, it was established that 80.22% of patients never used topical retinoids for acne



**FIGURE 2.** Patients with persistent adult acne treated with oral antibiotics, isotretinoin, and topical retinoids before 25 years of age (n=91).



**FIGURE 3.** Total number of oral antibiotics, isotretinoin, and topical retinoid treatments before 25 years of age in patients with persistent adult acne (n=91).

during adolescence. Additionally, 12.08% of these patients completed 1 course of treatment, and 7.69% completed 2 to 4 treatments. However, after 25 years of age, only 25.27% of the patients with persistent adult acne were not treated with topical retinoids, and 35.16% completed more than 2 courses of treatment.

**Duration of Treatment**—Because adult acne is a chronic disease, the mean number of years that patients received treatment over the disease course was analyzed. In the case of persistent adult acne, the mean duration of treatment, including therapy received during adolescence, was more than 13 years. At the time of the study, more than 30% of patients had been undergoing treatment of adult acne for more than 20 years.

**Scars**—The proportion of patients with persistent adult acne who experienced scarring was evaluated. In the persistent adult acne group, scars were identified in 53.85% of patients. Scars appeared only during adolescence in 26.37% of patients with persistent adult acne, scars appeared only after 25 years of age in 21.97% of patients, and scars appeared in adolescence as well as adulthood in 30.77% of patients.

In an analysis of patients with persistent adult acne who experienced scarring after 25 years of age, the proportion of patients with untreated adolescent acne and those who were treated with antibiotics only was not significantly different (60% vs 64%;  $P=.478$ ) (Table). The inclusion of topical retinoids into treatment decreased the proportion of scars (isotretinoin: 20%,  $P=.009$ ; topical retinoids: 38.89%,  $P=.114$ ).

## Comment

**Persistent Adult Acne**—Patients with symptoms of persistent adult acne represented 81.98% of the study population, which was similar to a 1999 study by Goulden et al,<sup>1</sup> a 2001 study by Shaw and White,<sup>13</sup> and a 2009 report by Schmidt et al.<sup>14</sup> Of these patients with persistent adult acne, 23.08% initiated therapy after 25 years of age, and 23.08% started treatment at least 10 years after acne lesions first appeared. However, it is noteworthy that 68.13% of all patients with persistent adult acne assessed their disease as severe.

**Treatment Modalities for Adult Acne**—Over the last 5 years, some researchers have attempted to make recommendations for the treatment of adult acne based on standards adopted for the treatment of adolescent acne.<sup>2,9,15</sup> First-line treatment of patients with adult comedonal acne is topical retinoids.<sup>9</sup> The recommended treatment of mild to moderate adult inflammatory acne involves topical drugs, including retinoids, azelaic acid, or benzoyl peroxide, or oral medications, including antibiotics, OCPs, or antiandrogens. In severe inflammatory acne, the recommended treatment involves oral isotretinoin or combined therapies; the latter seems to be the most effective.<sup>16</sup> Furthermore, this therapy has been adjusted to the patient's current clinical condition; general individual sensitivity of the skin to irritation and the risk for irritant activity of topical medications; and life situation, such as planned pregnancies and intended use of OCPs due to the risk for teratogenic effects of drugs.<sup>17</sup>

To assess available treatment modalities, oral therapy with antibiotics or isotretinoin as well as topical retinoids were selected for our analysis. It is difficult to determine an exclusive impact of OCPs as acne treatment; according to our study, many female patients use hormone therapy for other medical conditions or contraception, and only a small proportion of these patients are prescribed hormone treatment for acne. We found that 43.96% of patients with persistent adult acne underwent no treatment with antibiotics, isotretinoin, or topical retinoids in adolescence. Patients who did not receive any of these treatments came only for single visits to a dermatologist, did not comply to a recommended therapy, or used only cosmetics or beauty procedures. We found that 80.22% of patients with persistent adult acne never used topical retinoids during adolescence and did not receive maintenance therapy, which may be attributed to the fact that there were no strict recommendations regarding retinoid treatment when these patients were adolescents or young adults. Published data indicate that retinoid use for acne treatment is not common.<sup>18</sup> Conversely, among patients older than 25 years with late-onset adult acne, there was only 1 patient (ie, <1%) who had never received any oral antibiotic or isotretinoin treatment or therapy with topical

### Treatment of Adolescent Acne and Scarring in Patients With Persistent Adult Acne (n=91)

Treatment in Adolescence/ Young Adulthood	Acne Scarring, n (%)		Fisher Exact Test (One Sided)
	No Scars After 25 Years of Age	Scars After 25 Years of Age	
Untreated	16 (40)	24 (60)	
Treated with antibiotics only	9 (36)	16 (64)	$P=.478$
Treated with isotretinoin	12 (80)	3 (20)	$P=.009$
Treated with topical retinoids	11 (61.11)	7 (38.89)	$P=.114$

retinoids. The reason for the lack of medical treatment is unknown. Only 25.27% of patients were not treated with topical retinoids, and 35.16% completed at least 2 courses of treatment. The use of topical retinoids for the treatment of persistent and late-onset adult acne may be the result of the spread of knowledge among dermatologists acquired over the last 25 years.

**Acne Scarring**—The worst complication of acne is scarring. Scars develop for the duration of the disease, during both adolescent and adult acne. In the group with persistent adult acne, scarring was found in 53.85% of patients. Scar formation has been previously reported as a common complication of acne.<sup>19</sup> The effects of skin lesions that remain after acne are not only limited to impaired cosmetic appearance; they also negatively affect mental health and impair quality of life.<sup>20</sup> The aim of our study was to analyze types of treatment for adolescent acne in patients who later had persistent adult acne. Postacne scars observed later are objective evidence of the severity of disease. We found that using oral antibiotics did not diminish the number of scars among persistent adult acne patients in adulthood. In contrast, isotretinoin or topical retinoid treatment during adolescence decreased the risk for scars occurring during adulthood. In our opinion, these findings emphasize the role of this type of treatment among adolescents or young adults. The decrease of scar formation in adult acne due to retinoid treatment in adolescence indirectly justifies the role of maintenance therapy with topical retinoids.<sup>21,22</sup>

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