



# Which Skin Type Is Prevalent in Korean Post-Adolescent Acne Patients?: A Pilot Study Using the Baumann Skin Type Indicator

Young Bok Lee, Sae Mi Park, Jung Min Bae, Dong Soo Yu, Hyun Jee Kim, Jin-Wou Kim

*Department of Dermatology, Uijeongbu St. Mary's Hospital, College of Medicine, The Catholic University of Korea, Uijeongbu, Korea*

Dear Editor:

Acne is a common condition. Although acne is primarily associated with adolescents, it also affects many adults. Adult females are particularly susceptible to acne and to its negative impact on quality of life. Patients with post-adolescent acne represent an increasingly significant population of acne patients requiring special therapy. However, many post-adolescent acne patients are not well informed of suitable cosmeceuticals for acne. These patients may unnecessarily spend significant time and money consuming cosmetics.

For several decades, dry, oily, combination, or sensitive skin types were considered the four fundamental types of skin. On the basis of the four traditional skin types, acne patients were considered as oily and sensitive skin types. However, the choice of cosmeceuticals and ongoing pharmacological therapy for acne patients should be considered only after evaluating the skin type of individual patients and the ongoing pharmacological therapy. Otherwise, inadequate cosmetics and/or incorrect procedures may worsen acne.

Williams and Layton reported that sebum secretion might be higher among adult women with persistent acne compared to those without acne<sup>1</sup>. However, Choi et al.<sup>2</sup> and Youn et al.<sup>3</sup> reported that the sebum excretion was not associated with the development of acne in Korean adults. Until now, the prevalent skin type of Korean post-adolescent acne patients was not well known. We aimed to evaluate the skin type of post-adolescent female acne patients

compared to normal control using the Baumann Skin Type Indicator<sup>4</sup>.

Fifty Korean women were voluntarily enrolled in this study. Eligibility criteria included a minimum age of 19 years. We enrolled patient who was more than 19 years old and visited to a dermatologist for treatment of acne. At the first visit of dermatological evaluation, the patients with post-adolescent acne were submitted questionnaire to determine the Baumann skin type. Post-adolescent acne patients were diagnosed with persistent acne (continuum of acne from adolescence into adulthood) or late-onset acne (acne after puberty)<sup>5</sup>. The study was conducted retrospectively after approval from the Institutional Review Board of The Catholic University of Korea, Uijeongbu St. Mary's Hospital (IRB no. UC14QISE0001). From January to June in 2014, questionnaires were obtained from twenty patients with post-adolescent acne and thirty normal controls.

Questionnaires were based on the Baumann Skin Type Indicator and were composed of 64 questions designed to determine baseline skin type<sup>4</sup>. The Baumann Skin Type Indicator defines 16 facial skin type variations using four dichotomous parameters: dry (D) or oily (O); sensitive (S) or resistant (R); pigmented (P) or non-pigmented (N); and wrinkled (W) or un-wrinkled (tight, T)<sup>4</sup> (Supplementary Table 1).

All analyses were performed using SAS (Statistical Analysis System, ver. 9.3; SAS Institute Inc., Cary, NC, USA). Odds ratios (ORs) were computed from outcome event pro-

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**Corresponding author:** Dong Soo Yu, Department of Dermatology, The Catholic University of Korea, Uijeongbu St. Mary's Hospital, 271 Cheonbo-ro, Uijeongbu 11765, Korea. Tel: 82-31-820-3509, Fax: 82-31-846-4799, E-mail: frank@hananet.net

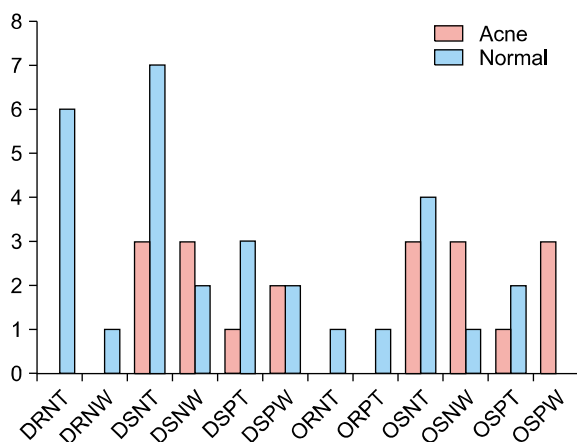
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portions for each group. *p*-values of 0.05 or less were considered statistically significant.

The mean age of the post-adolescent acne patients (*n*=20) was 33.75±2.83 years and the mean age of the normal controls (*n*=30) was 37.3±2.27 years. The most prevalent skin type of normal controls was DSNT (*n*=7, 23.3%), followed in order by DRNT (*n*=6, 20.0%) and OSNT (*n*=4, 13.3%). However, DSNT, DSNW, OSNT, OSNW, and OSPW (*n*=3, in each skin type, 15.0%) were equally prevalent in the post-adolescent acne group. Greater skin type diversity was shown in the normal controls (11 skin types among 16 Baumann skin types) than post-adolescent acne patients (8 skin types among 16 Baumann skin types) (Fig. 1).

The OR of oily skin type was 2.33 in the post-adolescent acne group compared with the normal control group. However, there was no statistical significance in this difference. All post-adolescent acne patients had sensitive skin type (100.0%), while 70.0% of normal controls had sensitive skin type. The OR of sensitive skin type was 18.12 (*p*=0.05). There was no statistically significant difference for pigmented skin between the acne group and the normal control. Acne patients were more associated



**Fig. 1.** Prevalence of skin type in post-adolescent acne patients and normal controls. D: dry, R: resistant, N: non-pigmented, T: tight, W: wrinkled, S: sensitive, P: pigmented, O: oily.

**Table 1.** Odds ratios of oily, sensitive, pigmented, and wrinkled skin types in post-adolescent acne patients compared with normal controls

Skin type	Acne (n=20)	Normal (n=30)	Odds ratio	<i>p</i> -value
Oily type	10 (50.0)	9 (30.0)	2.33	0.157
Sensitive type	20 (100.0)	21 (70.0)	18.12	0.05
Pigmented type	7 (35.0)	8 (26.7)	1.48	0.53
Wrinkled type	11 (55.0)	6 (20.0)	4.89	0.01

Values are presented as number (%) or number only.

with the wrinkled skin type (OR of 4.89, *p*=0.01) (Table 1). Post-adolescent acne is associated with negative impacts on the psychological, social, and emotional health of patients. Post-adolescent acne patients have significantly reduced quality of life scores compared to adolescent acne patients<sup>5</sup>. A previous study reported increased unemployment rates in adult acne patients compared to those without acne<sup>6</sup>. A large number of post-adolescent acne patients are not aware of their skin type.

The present study showed that Korean female post-adolescent acne patients were significantly associated with sensitive skin type and wrinkled skin type rather than oily skin type. Baumann described that about 40 percentages of people have sensitive skin type, composed of acne subtype, rosacea subtype, stinging subtype, and allergic subtype. The association with sensitive skin type and acne is predictable. The sensitive skin type of acne patients can be explained by barrier dysfunction in acne skin<sup>7</sup>. Acne patients have lower levels of the essential fatty acid, such as linoleic acid, compared with healthy skin and that results in impaired barrier function<sup>8</sup>. Choi et al.<sup>9</sup> reported that disruption of calcium gradient in acne comedos. Calcium gradients play an important role in the restoration of skin barrier function after injury<sup>10</sup>. The incomplete lipid skin barrier is also considered to result in reactive follicular wall hyperkeratosis, abnormal desquamation, and follicular plugging<sup>11</sup>.

In this study, the association between the oily skin type and post-adolescent acne was not statistically significant. The results support a previous Korean study, which demonstrated that sebum excretion is not associated with acne development<sup>2</sup>. In contrast, several previous studies demonstrated the association between sebum excretion and acne<sup>12,13</sup>. Perkins et al.<sup>13</sup> demonstrated a positive correlation between sebum secretion and acne severity. Goulden et al.<sup>12</sup> reported 60%~70% greater lipid content in black acne patients compared to white control subjects. To explain these discrepancies, first, there might be differences in the presentation and complications of acne across race and ethnicities<sup>13</sup>. Second, the Korean diet is rather different from that of westernized countries. Effect of diet on

acne pathogenesis was revealed that hyper-insulinemic diets trigger an endocrine response promoting unregulated tissue growth and enhanced androgen synthesis<sup>14</sup>. A study found that Asian women from Los Angeles had higher prevalence of acne than those from Japan, and the Japanese diet has lower total fat and sugar compared to that of America<sup>15</sup>.

This study has limitations. First, a large number of patients and controls were not included. Second, the severity of acne and patient treatments were not considered. Third, the objective examination to confirm skin sensitivity was not performed. However, we are the first to demonstrate that sensitive skin type and wrinkled skin type are more associated with Korean female post-adolescent acne rather than oily skin type. We are also the first to demonstrate Korean skin type using Baumann Skin Type Indicator. Baumann Skin Type Indicator was helpful for determining skin type in Koreans. We suggest that dermatologists should evaluate the skin type of each acne patient and make appropriate skin care recommendations, including medical skin care, cosmeceuticals, and cosmetics.

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## SUPPLEMENTARY MATERIALS

Supplementary data can be found via <http://anndermatol.org/src/sm/ad-29-817-s001.pdf>.

## CONFLICTS OF INTEREST

The authors have nothing to disclose.

## REFERENCES

- Williams C, Layton AM. Persistent acne in women: implications for the patient and for therapy. *Am J Clin Dermatol* 2006;7:281-290.
- Choi CW, Lee DH, Kim HS, Kim BY, Park KC, Youn SW. The clinical features of late onset acne compared with early onset acne in women. *J Eur Acad Dermatol Venereol* 2011;25:454-461.
- Youn SW, Park ES, Lee DH, Huh CH, Park KC. Does facial sebum excretion really affect the development of acne? *Br J Dermatol* 2005;153:919-924.
- Baumann L. *The skin type solution*. New York: Bantam Books, 2007.
- Holzmann R, Shakery K. Postadolescent acne in females. *Skin Pharmacol Physiol* 2014;27 Suppl 1:3-8.
- Cunliffe WJ. Acne and unemployment. *Br J Dermatol* 1986;115:386.
- Levin J. The relationship of proper skin cleansing to pathophysiology, clinical benefits, and the concomitant use of prescription topical therapies in patients with acne vulgaris. *Dermatol Clin* 2016;34:133-145.
- Downing DT, Stewart ME, Wertz PW, Strauss JS. Essential fatty acids and acne. *J Am Acad Dermatol* 1986;14:221-225.
- Choi EH, Ahn SK, Lee SH. The changes of stratum corneum interstices and calcium distribution of follicular epithelium of experimentally induced comedones (EIC) by oleic acid. *Exp Dermatol* 1997;6:29-35.
- Lee SH, Elias PM, Feingold KR, Mauro T. A role for ions in barrier recovery after acute perturbation. *J Invest Dermatol* 1994;102:976-979.
- Hou SY, Mitra AK, White SH, Menon GK, Ghadially R, Elias PM. Membrane structures in normal and essential fatty acid-deficient stratum corneum: characterization by ruthenium tetroxide staining and x-ray diffraction. *J Invest Dermatol* 1991;96:215-223.
- Goulden V, Stables GI, Cunliffe WJ. Prevalence of facial acne in adults. *J Am Acad Dermatol* 1999;41:577-580.
- Perkins AC, Cheng CE, Hillebrand GG, Miyamoto K, Kimball AB. Comparison of the epidemiology of acne vulgaris among Caucasian, Asian, Continental Indian and African American women. *J Eur Acad Dermatol Venereol* 2011;25:1054-1060.
- Cordain L, Lindeberg S, Hurtado M, Hill K, Eaton SB, Brand-Miller J. Acne vulgaris: a disease of Western civilization. *Arch Dermatol* 2002;138:1584-1590.
- Zhou BF, Stamler J, Dennis B, Moag-Stahlberg A, Okuda N, Robertson C, et al. Nutrient intakes of middle-aged men and women in China, Japan, United Kingdom, and United States in the late 1990s: the INTERMAP study. *J Hum Hypertens* 2003;17:623-630.

**Supplementary Table 1.** Baumann Skin Type Indicator

	Oily		Dry		
	Pigmented	Non-pigmented	Pigmented	Non-pigmented	
Wrinkled	OSPW	OSNW	DSPW	DSNW	Sensitive
Tight	OSPT	OSNT	DSPT	DSNT	Sensitive
Wrinkled	ORPW	ORNW	DRPW	DRNW	Resistant
Tight	ORPT	ORNT	DRPT	DRNT	Resistant

D: dry, N: non-pigmented, O: oily, P: pigmented, R: resistant, S: sensitive, T: tight, W: wrinkled.