

STUDIES ON THE SKIN TROUBLE AND THE FACIAL COLOR CHANGE DUE TO HORMONAL CYCLE IN FEMALE

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Key Words

Facial color, hormonal cycle

ABSTRACT

Many eastern females concern themselves about the condition and the color of their skin. The purpose of the present study is to classify the skin trouble and the change of the facial color due to hormonal cycle in female. We examined the actual circumstances by questionnaires, and made patch tests of methyl nicotinate, representing rubefacient, to estimate the epidermal penetration rate, and measured the facial color change during the menstrual cycle period to invest the correlation factors between skin trouble due to cosmetics and facial color change. Fifty-two percent of subjects had skin trouble relating to cosmetics. One second of subjects with skin trouble due to cosmetic complained the change of symptom by menstrual cycle. The changes of symptom were related on premenstrual period. The skin trouble developed mainly on the first trimester of the pregnancy. In patch test of methyl nicotinate, most cases showed decreased threshold of the reaction on menstruation, and other cases showed increased reactivity of the skin of menstruation.

In facial color measurements, it proves in the appearance of red spot, darkness, increasing the value and turning the hue to yellowish. Also it demonstrates that premenstruation hue turn red and value level decrease. During the period, facial color turns pale and hue progress to yellow. This fact coincides with the questionnaire.

We have quantified through questionnaire, which demonstrates it has good correlation with done to the subjects among the internal environment factors hormonal cycle influences the facial color change and the skin trouble due to cosmetics. Through this paper the development of a more fragmented make-up and skin care products is required to increase the interest to females, to make true the creation of beauty.

INTRODUCTION

Skin is aging by many factors, thereby facial color & conditions change. The facial condition changes in accordance with sex, individual variation, age, region, season, and facial site. Also it changes in accordance with health condition, internal and/or external stress.(1)

Especially, the majority of females perceive skin trouble and the changes of the facial color due to hormonal cycle. It is reported menstruation dermatitis occur or the existing skin trouble is developed.(2)

Also many reports of investigations demonstrates that the physiological function of the skin changes due to hormonal cycle.

Edward et al. found that cutaneous vascular changes in the skin of women was related to the activity of the ovaries. Namely, after the increase of progesterone begins, there is evidence if greatly increased cutaneous blood flow which reaches a maximum in the day or two proceeding the onset of menstruation.(3)

Seeberg studied cutaneous absorption at various stages of the menstrual cycle by injecting intradermally various agents(normal saline, tuberculin, trichophytin, streptococcal suspension, diphtheria toxin, inactivated diphtheria toxin). These absorption studies yielded uniform results. Prior to the onset of menstruation and on the first menstrual day, absorption of an indicator injected intradermally proceeded more rapidly than it did at other stages of the menstrual cycle. On the other hand allergic as well as toxic were found to be weaker prior to menstruation and on the first menstrual day than they were during the remaining portion of the menstrual cycle.(4) Judging from these reports, we can estimate menstruation cycle, that is to say, two hormones relating to menstruation cycle, estrogen and progesterone control the skin condition.

In this point, it is anti-inflammation of estrogen that we are interested in.(5) Nicol et al. reported estrogen is the natural stimulant of body defense by injecting in mice.(6) Therefore, we can infer that the relative ratio of estrogen/progesterone affect the skin trouble.

In order to derive good correlation among the inter environment factors hormonal cycle influences the facial color change and the skin trouble due to cosmetics, we have quantified through questionnaire, facial color measurement, and patch test of methyl nicotinate. Through this paper we are risen the effect of make-up controlled the facial color changes by grasping the changes of the skin condition. Further more through this paper we hope to offer useful information to develop more fractionated make-up and skin care products satisfied the desire in females.

EXPERIMENTAL

1. Questionnaire

1) Subjects

- (1) 418 Korean Women resident in Seoul, Pusan, Taejeon
- (2) Age distribution : from 18 to 67
- (3) Average age : 30.2

2) The contents of questionnaire

Q1) Do you think the facial color and condition change are related to menstruation cycle?

- (1) Yes (2) No

Q2) If you think it does, when do you think them happen?

- (1) before menstruation (2) during menstruation (3) after menstruation

Q3) What are your symptoms?

- (1) dryness (2) itching (3) fever (4) redness
(5) paleness (6) papulae (7) pigmentation others ()

2. Measurements of facial color

1) Subjects

- (1) 30 Korean women in 20's
- (2) The measurement period was done for 2 months.

2) Method

(1) Measurement sites

- Facial Sites : the forehead, below eye, the temples of head, cheeks

(2) Instrument

- Minolta CR 200 Chromameter
- Parameter (Munsell Denotation System : Hue, Value, Chroma)

(3) Measurement Condition

- At 30 Minutes after cleansing, when the face skin turned calm.
3 times per area at normal temperature.
- Room temperature : 23 ± 2
Relative humidity : 60 ± 5% RH

3. Patch test for the skin trouble

1) Subject

- 10 Korean women who think that their facial color and condition change are related

to menstruation cycle.

- before menstruation (1~5 days before the menstruation) and during menstruation

2) Method

- reagent : 0.0156M, 0.00156M, 0.000156M Methyl nicotinate solution in olive oil(7)
- measurement condition : patch test was attached on the forearm for 20 minutes. At 10 minutes after it was removed.
- decision method
 - x : no redness happens
 - Δ : a little redness
 - : redness happens
 - ⊙ : redness and swelling happen

RESULTS

1. Questionnaire

To know the influences hormonal cycle affects to the facial color and skin condition change, we have make the investigation during the menstruation cycle, which we thought this the time when females get stressed psychologically. This is because of the fact that the hormonal secretion affects skin condition.

Table 1 shows the factors of facial color change in Korean Women based on the questionnaire. Table 2 shows 217 subjects among 418 of the total, which is a 51.9%, have answered they feel the facial color change before or after the menstruation period. Women in their early 30's has shown the highest rate(63.9%). The data done to the subjects who have answered they feel the facial color change before/after the menstruation period is display in Table 3.

Table 1. The factors of facial color change in Korean Women based on the questionnaire.

FACTORS	AGING	INTERNAL STRESS	EXTERNAL STRESS	ETC.	TOTAL
CASES	191	95	130	2	418
%	45.7	22.8	31.1	0.4	100.0

Table 2. Percentage of cases experienced facial color change due to menstruation.

AGE	19~24	25~29	30~34	35~39	40~44	45~	TOTAL
TROUBLE	65/	71/	39/	29/	6/	7/	217/
/TOTAL	113	127	61	71	21	25	418
TROUBLE	57.5	55.9	63.9	40.9	28.6	28.0	51.9
/(%)							

Table 3. Period when facial color change was experienced in the menstrual cycle.

SUBJECTS	BEFORE MENSTRUATION	DURING MENSTRUATION	AFTER MENSTRUATION	TOTAL
CASES	144	63	10	217
%	66.4	29.0	4.6	100.0

During the 1~5 days before the menstruation period the answer data display the highest rate of a 66.4% of the facial color change. During the menstruation period display a 29.0% and 1~5 days after menstruation period is a 4.6%. Table 4 shows their symptoms. Among the symptoms it is shown papulae are the highest rate(46.9%) and the next is dryness(27.9%).

Table 4. Symptoms developed or progressed in menstrual cycle.

SYMPTOMS	CASES	PERCENTAGE OF CASES(%)
PAPULE	102	46.9
DRYNESS	61	27.9
REDNESS	19	8.7
BURNING	11	5.1
PIGMENTATION	9	4.4
ITCHING	5	2.5
OTHERS	10	4.5
TOTAL	217	100.0

2. Facial color

To quantify the facial color change, we have done the investigation during 2 months to 30 females in their 20's. The 2 months were divided in three parts ; before, during, after the menstruation period. The result display in Table 5. 15 subjects of 30 did not feel any facial color change. We have enforced to these 15, who answered they do not feel any facial color change. There was no alternation. The other 50% felt facial color change before and during the menstruation period. The result for these 15 is shown in Table 5, which proof the appearance of red spot, darkness increasing the value and turning the hue to yellowish. Table 5 also demonstrates that before menstruation, hue turn red and value level go down. During the period, facial color turn pale and hue progress to yellow. This fact coincide with the questionnaire.

Table 5. The facial color change during menstrual cycle
(15 persons of feel the facial color change.)

PERIOD	COLOR		
	H (Ave.)	V (Ave.)	C (Ave.)
BEFORE MENSTRUATION	2.33	6.12	3.13
DURING MENSTRUATION	2.94	6.18	3.63
AFTER MENSTRUATION(1)	2.78	6.14	3.59
AFTER MENSTRUATION(2)	2.80	6.15	3.53

BEFORE MENSTRUATION : 1~5 days before menstruation

DURING MENSTRUATION : during menstruation

AFTER MENSTRUATION (1) : 1~5 days after menstruation

AFTER MENSTRUATION (2) : 7 days after menstruation

3. Patch test

In the patch test of methyl nicotinate, 5 subjects among 10 are very sensitive on 1~5 days before menstruation period. Also 4 subjects among 10 are a little sensitive. This result is shown in Table 6.

The result of this patch test coincide with the questionnaire that the majority of subjects feel skin condition change before menstruation.

Table 6. The result of methyl nicotinate patch test

	Before Menstruation				During Menstruation		
	0.000156M	0.00156M	0.0156M		0.000156M	0.00156M	0.0156M
1	○	○	●	»	X	○	○
2	X	●	●	»	X	△	○
3	X	X	○	>	X	X	△
4	X	△	○	>	X	X	△
5	X	X	△	=	X	X	△
6	X	○	●	»	X	X	○
7	X	△	●	»	X	X	△
8	X	○	○	>	X	△	○
9	X	○	●	>	X	○	○
10	X	○	●	»	X	X	○

DISCUSSION

At normal period for a female the ripening follicle begin to produce estrogen. These are responsible for development of the sexual characteristics and reproduction organs. In one of the ovaries, follicle begins to develop and estrogen increase.

The follicle cells are stimulated to produce estrogen by the combined influence of FSH(follicle stimulating hormone) and LH(lutenizing hormone) which are secreted by the pituitary gland.

Under the influence of LH, the developing egg is separated from follicle and becomes transformed into the corpus luteum. The corpus luteum is secreting progesterone. For about ten days after ovulation, the high blood levels of progesterone continue the preparation of the uterus for possible pregnancy, inhibit contraction of the uterus, and progesterone begins to decline about the 26th day of the cycle. The corpus luteum degenerates, the lining of the uterus begins to break down, and by the 28th day, the menstrual flow begins.(8)(9)

In this paper, internal environment, especially stress given by hormonal secretion which alter its affected the facial color and skin condition change. Also the changes of symptoms were concentrated on the 1~5 days before the menstruation period.

In the experiment of skin absorption by menstruation cycle, the reactions increase during the 1~5 days before the menstruation period.

We infer that these results are closely related with female sex hormone (estrogen and progesterone). It is inferred that skin conditions change depending on the ratio of estrogen/progesterone. Figure 1 shows that skin troubles develop when the ratio of estrogen/progesterone become to the minimum. Thence also we can infer that skin troubles develop on the first stage of the pregnancy when progesterone are secreted much.

Through this paper, we have quantified hormonal cycle influences the facial color and skin condition change. Also we hope to give a usefulness information for the development of cosmetics product.

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Figure 1. Events occurring in the ovary, changes on the lining of the uterus, and changes in hormone levels in the blood during the menstrual cycle.

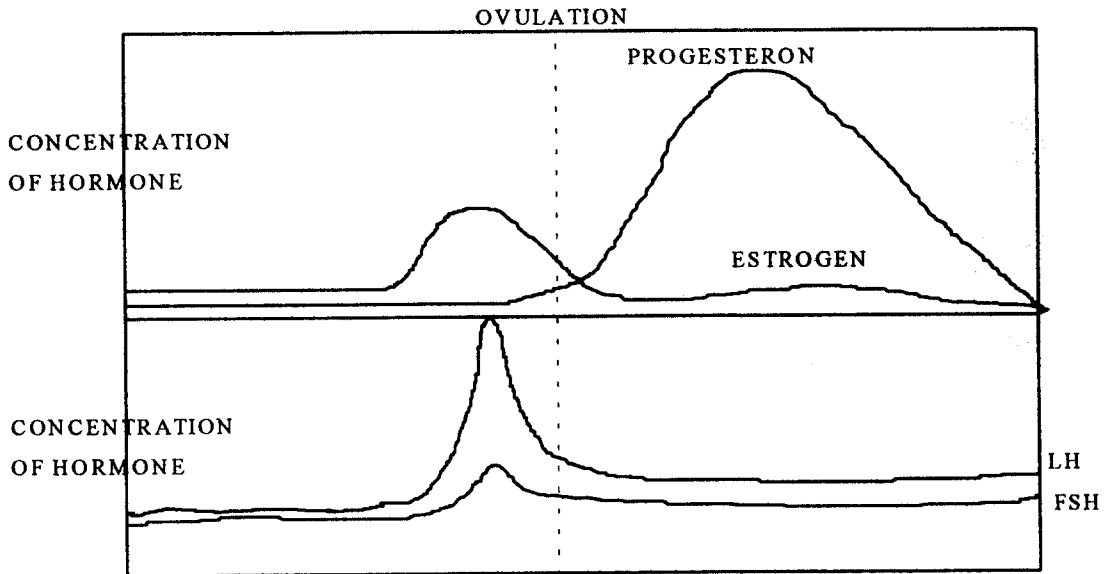
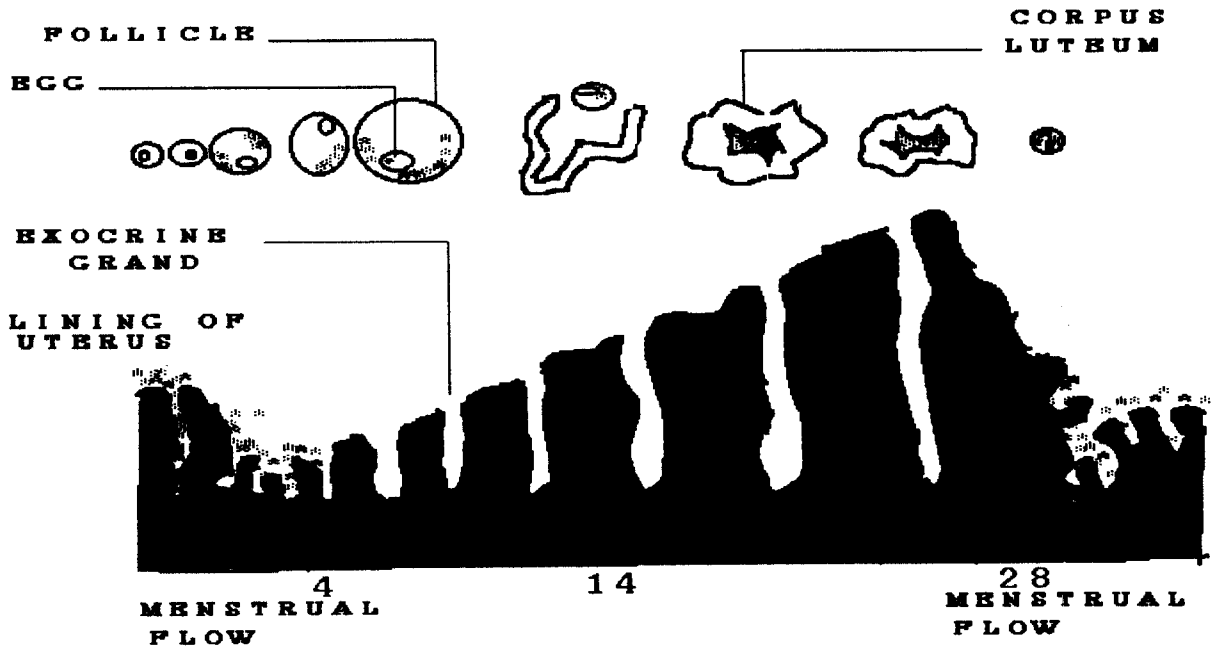


Figure 2. The Factors of facial color change in Korean women based on the questionnaire.

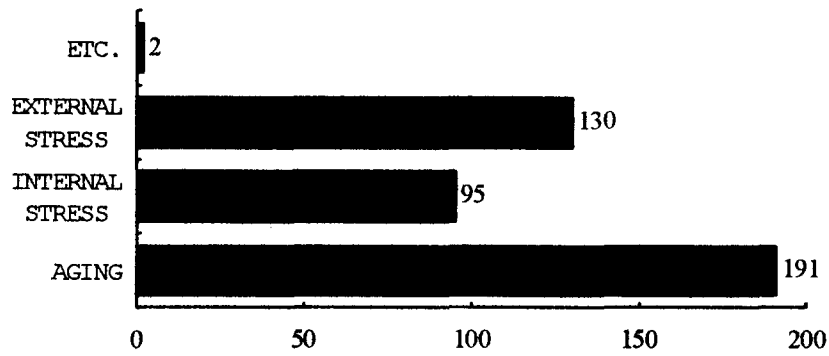


Figure 3. Period when facial color change was experienced in the menstrual cycle.

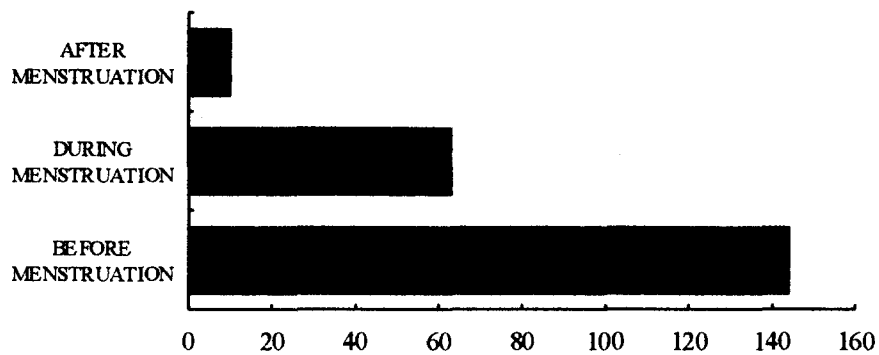


Figure 4. Symptoms developed or progressed in menstrual cycle.

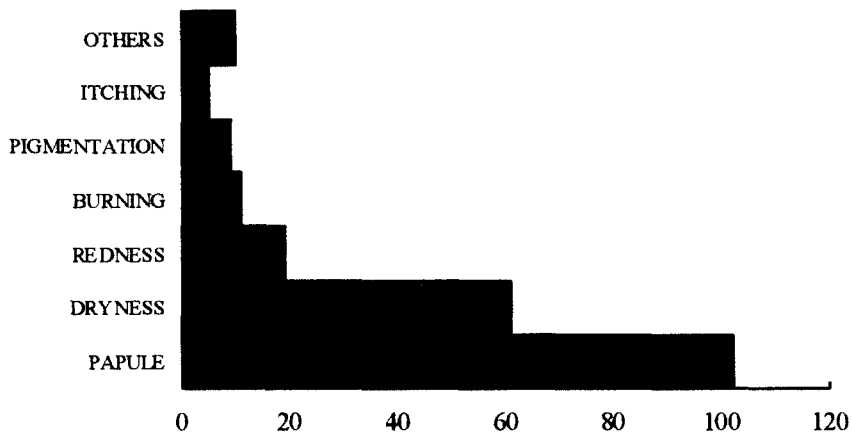


Figure 5. The facial color(Hue) change during menstrual cycle (15 Persons of feel the facial color change)

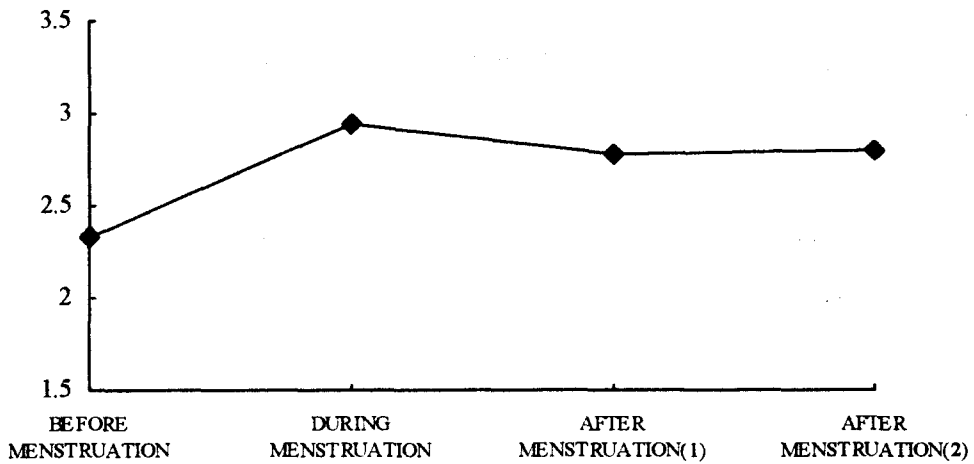


Figure 6. The facial color (Value) change during cycle (15 Persons of feel the facial color change).

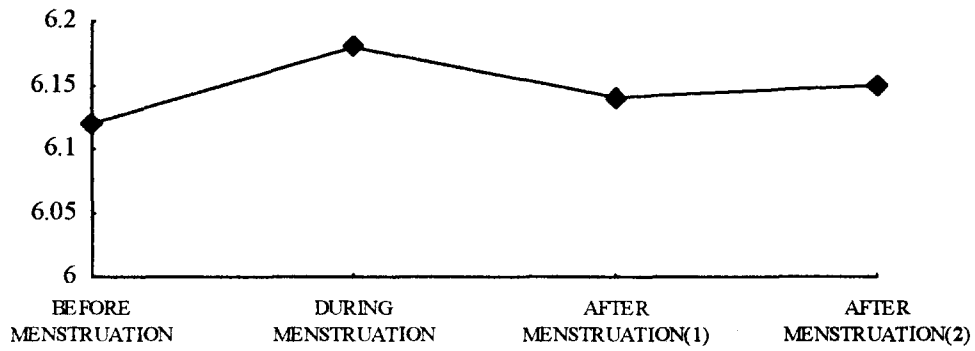


Figure 7. The facial color (Chroma) change during menstrual cycle (15 Persons of feel the facial color change).

