BL_565

The pattern of skin properties as distinctive facial area

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Introduction:

Chronically and environmentally stimulated skin turns its appearance. The skin mechanical properties are able to be evaluated through measurement devices such as Primos, Antera 3D CS, Corneometer® CM825, Sebumeter® SM815 and Spectrophotometer CM-700d.
Primos is a three-dimensional skin-surface measurement device that uses fringe projection to assess skin topography and can visualize skin texture and wrinkle on the skin surface. Antera takes a photograph for skin topography and color-related skin chromophores and is more sensitive for wrinkle measurement.
Corneometer is based on capacitance measurement and usually referred in literature as the most sensitive instrument for measuring the water content. It is possible to measure the water content uniformly 30~40 micrometer under corneum layers where effects of cosmetics or medications are small. The unit is A.U. and the value is proportional to skin moisture amount.
Sebumeter is a device that measures the amount of sebum obtained after contacting the skin with a special translucent lipid absorbing tape(sebumeter cassette) and measuring the amount of sebum per unit area (㎍/㎠) using the photometric reflection is proportional.
Ageing in the skin occurs with changes in its structure and skin color because of internal stimuli such as genetic variances or environmental exposure including UV.
Skin types are classified by majorly the proportion of oiliness and hydration which are depending on interaction of skin properties.
In the present study, skin properties are evaluated as distinctive facial area and with age which are analyzed to water content, sebum content, wrinkle formation, and brightness on the face surface in thousands of females in Korea.

Materials & Methods:

Test area condition
Subjects rested in 20~25℃ and 40~60% humidity area for 30 minutes after washing out the test area. It was to accommodate in atmosphere before the equipment evaluation and as subjects rest the water intake was limited.
Wrinkle measurement 1
Wrinkle formation at corner of eyes and glabella was evaluated in the same area by 3D skin photograph equipment, Primos CR (GFMesstechnik GmbH, Germany). The saved images were assessed to evaluate with wrinkle parameter which is Ra (Average roughness).
Wrinkle measurement 2
The wrinkle was measured using the 3D skin imaging device Antera 3D CS. At the corner of eyes and glabella were photographed and the stored image analyze average roughness (Ra).
Water amount measurement
Skin moisture at the cheek and the glabella was evaluated using Corneometer CM825 (Courage Khazaka electronic GmbH, Germany). The corneometer probe was contacted to skin, measuring through the sensor, 3 times and averaged value was used as skin moisture data. Corneometer measures the capacitance where the probe contacts to measure water content and present excellent result value in dry skin with small water content.
Skin oil content measurement
Sebum content at the cheek and the glabella was evaluated using Sebumeter SM815(Courage+Khazaka eletronic GmbH, Germany). Measurement was made once, measured for 20 seconds and used as data for evaluating the skin oil content.
Skin brightness measurement
Skin brightness was evaluated by Spectrophotometer CM700-d (Konica Minolta, Japan). The cheek area was measured 3 times and the average was used as evaluation data. Among the result values, L* indicates facial brightness. The skin pigmentation and non-pigmentation area is measured to evaluate the skin tone (skin brightness) value.

Results & Discussion:

In the result of Primos-CR, average roughness (Ra) was increased with on the corner of eye and the glabella. In the 40s, the range of Ra was wide compared with other ages. Wrinkle formation was represented individually various with age (Fig 1).

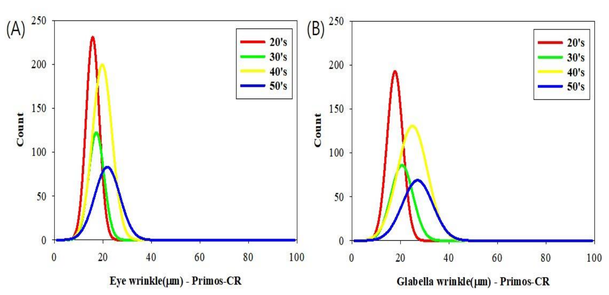

Figure 1. Average roughness analyzed by using primos-CR as ages

In the result of Antera 3D, average roughness (Ra) was increased with on the corner of eye and the glabella. On the eye wrinkle, the range of Ra was wide compared with glabella. Wrinkle formation was represented individually various on the around eye (Fig 2).

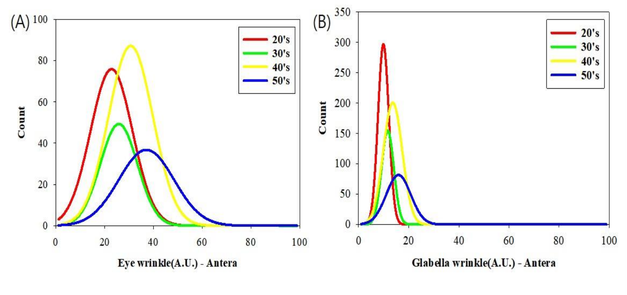

Figure 2. Average roughness analyzed by using Antera 3D as ages

The Ra was highly correlated between the two devices for wrinkle detection in both eye and glabella (Fig 3).

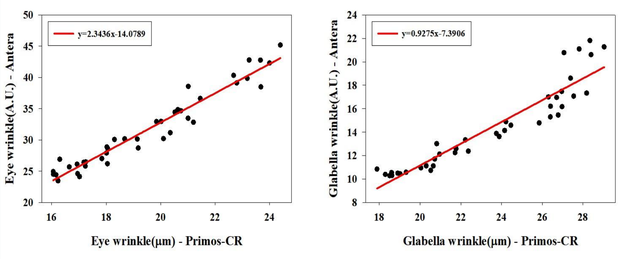

Figure 3. The correlation of analyzed data from primos-CR and antera 3D

In the result of corneometer, the capacitance was not difference with age on the cheek and glabella. The water amount was slightly lower in the 20s on the cheek and in the 30s on the glabella. The range of skin hydration was variable on the glabella compared with the cheek (fig 4).

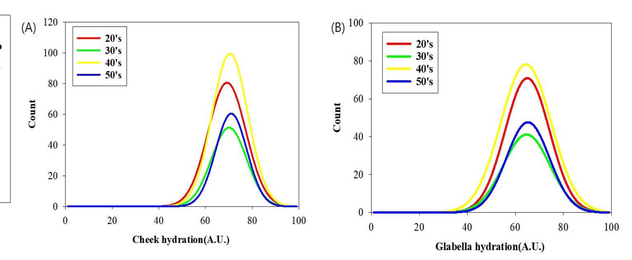

Figure 4. Capacitance analyzed by using corneometer as ages

In the result of sebumeter, the oil content was not shown to trend with age on the cheek and glabella. The oil content was slightly lower in the 40s and 50s. In all ages, the oiliness was represented higher in the glabella than in the cheek (Fig 5).

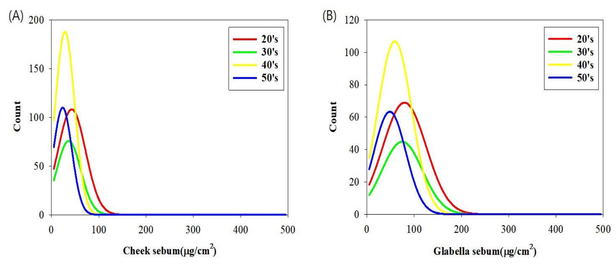

Figure 5. Sebum analyzed by using sebumeter as ages

In the result of spectrophotometer, the L* was represented lower on the region with pigmentation compared with without pigmentation. It means that the region with pigmentation was darker than it without pigmentation. The facial brightness was slightly higher in the 20s (Fig 6).

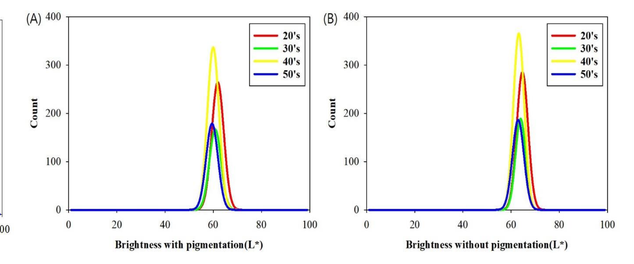

Figure 6. L* analyzed by using spectrophotometer as ages

Conclusions:

In this study, the wrinkle formation was showed age dependently, supporting the previous studies with respect to skin ageing. The data of average roughness analyzed by primos-CR and antera 3D were highly correlated on the eye and glabella as age. The water amount and oil content were not dependent on ages. Water amount was higher on the cheek and oil content was higher on the glabella, supporting individual skin type about distribution of T- and U- zone. Facial brightness in the unpigmented cheek was more increased compared with pigmented area, although those data were not correlated with ages. Taken together, the pattern of skin properties can organize as age and skin area. Further study will be extended to classify more detail skin properties based on big data.

References:

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