

Mandom's comparative analysis of the present state of the skin of men to the state approximately 10 years earlier. The "impression of youthfulness" of men in their 40s is determined by "brightness of the skin"

~ "Impression of youthfulness" improves with skincare ~

Mandom Corporation (headquarters: Osaka City, President & CEO: Motonobu Nishimura; hereinafter referred to as "Mandom") is engaging in research on impression of skin to provide skincare products that improve one's impression of the skin's appearance.

At this juncture, we compared and analyzed the present skin state of men to their skin state ~10 years earlier to examine changes in skin condition and impression of skin appearance due to aging. We found that ① for skin condition, "brightness of skin" had decreased and "redness of skin" had increased, and ② for impression of appearance, "youthfulness" had declined.

Furthermore, by using an averaged image of the faces of men in their 40s to examine the relationship between skin tone of the face and "impression of youthfulness", we found that ③ "Impression of youthfulness" is affected by "brightness of skin".

In addition, we performed a four-week continuous-use study where model emulsion solution was used by men between 35 and 49 years of age. We found that ④ Skin condition based on moisture level and barrier function tended to improve; "brightness of skin" also increased and "impression of youthfulness" improved.

Owing to the above results, we now understand that skin condition, particularly "brightness of skin", contributes to a third-person's "impression of youthfulness" when a man in his 40s is viewed. In addition, we now recognize that skincare activities bring about an "impression of youthfulness."

The results of this research were presented at the 22nd JFACE Annual Conference (Forum Kaogaku 2017) held from September 9 to 10, 2017.

1. Skin condition and impression change over ~10 years of aging

(1) Darker skin tone and increased redness of skin occur in men due to ~10 years of aging

In 2005 and 2016, we used a facial image capturing-device (*1) to take facial images of 15 male subjects (ages 29 to 53 years at the time of first image capture). An image processing software (Photoshop) was then used to obtain the color values of skin in the facial images (L*a*b value: brightness, redness, yellowness, respectively) (*2). From the analysis of changes due to aging, we observed no changes to the yellowness (b* value unchanged) of the skin; however, a darker skin (decreased L* value) was evident, and redness had increased (increased a* value) (Figure 2). These results reveal specific color changes in the facial skin of men.

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(2) ~10 years of aging significantly declined the “youthfulness” of men

According to the VAS method (*3), a total of 92 third-person men and women (in their 20s and 40s) were asked to give their impression of the facial images taken in 2005 and 2016 for men. From the results obtained, impression of “youthfulness” significantly declined (Figure 3).

2. “Brightness of skin” affects “impression of youthfulness”

We examined the relationship between changes in skin color and impression due to ~10 years of aging. Taking the average face (*4) of 11 40-year-old men, we used an image processing software to create a total of 27 color-adjusted images with alterations in skin color (Figure 4). A total of 55 third-person (men and women; age, 20s and 40s) gave their impression of “youthfulness” based on these images, according to the VAS method.

Using the multivariate analysis quantification method I, we examined the influence of skin color on “impression of youthfulness.” This revealed a large influence of the L* value (brightness) and small influences of the a* value (redness) and b* value (yellowness) (Table). A multiple comparison test was then performed to examine the influence of the L* value (brightness) on “impression of youthfulness”. As the “impression of youthfulness” rose in images with increased L* value (brightness) and fell in images with decreased L* value, “impression of youthfulness” was observed to be affected by “brightness of skin” (Figure 5).

3. Improvement of skin condition and “impression of youthfulness” by continued use of model emulsion solution

We performed a four-week continuous-use study of a model emulsion solution (*5) with 20 male subjects (between 35 and 49 years old). Facial images before and after continuous use of the emulsion solution were captured, and measurements of skin condition (stratum corneum water content, barrier function (transdermal moisture vaporization level), skin elasticity and texture) (*6) and skin color performed. By comparing the differences between before and after continuous use of emulsion solution, we revealed that stratum corneum water content, barrier function, skin elasticity and texture were significantly improved after continuous use (Figure 6). Furthermore, for skin color, an increase in the L* value (brightness) ($p = 0.07$; Figure 7) was observed. Based on the evaluation performed by 62 viewers (men and women in their 20s and 40s) of the facial images taken during the experiment (using the VAS method), a rise in “youthfulness” (Figure 8) was documented.

This study revealed that the skin color of men changes with aging; “impression of youthfulness” of a 40-year-old man is affected by “brightness of skin” from the viewers point-of-view; and “impression of youthfulness” improves with skincare activities.

Mandom will apply this knowledge to future research on skin impression to develop skincare products for middle-aged men.

*1 Facial image capturing-device: A device that can capture images at the same lighting conditions and position “RSA-100 (Inforward Corp.).

2 Skin color values: Extraction of L a* b* values by Photoshop. 256 tones (0 to 255).

*3 Visual Analogue Scale method:

A scale drawn on a straight line with left end marked “I think so” and the right end marked “I do not think so.” The assessor indicates their impression at a point along the straight line.

*4 Average face: An averaged face created on a computer using the facial parts position registration software “FaceFit” or average face creation tool, “Heikin”.

- *5 Model emulsion solution: An emulsion prepared by considering the condition of the skin of men.
- *6 Stratum corneum water content: SKICON-200EX, Barrier function (TEWL): Tewameter, Elasticity: Cutometer, Texture: Reflective Replica Analysis System.

<Reference Material>

Figure 1. Facial images of a man taken in 2005 and 2016.



Figure 2. Changes in skin color due to ~10 years of aging.

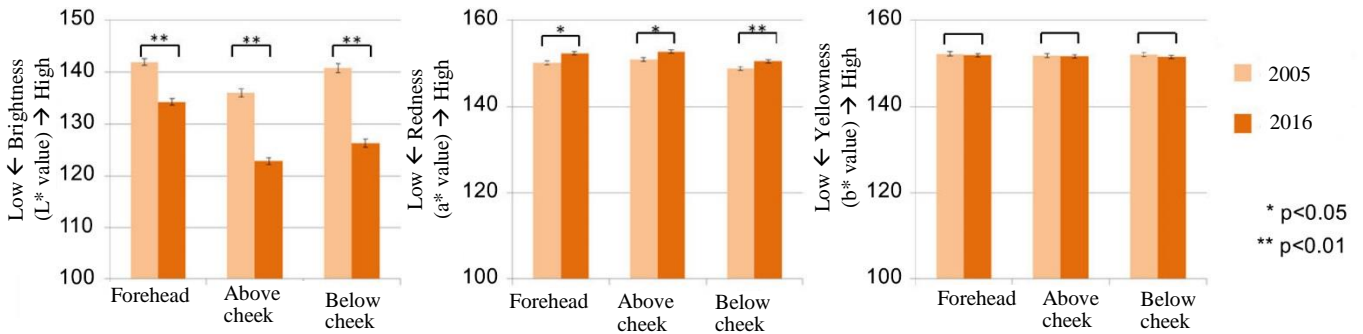


Figure 3: Changes in impression average due to ~10 years of aging

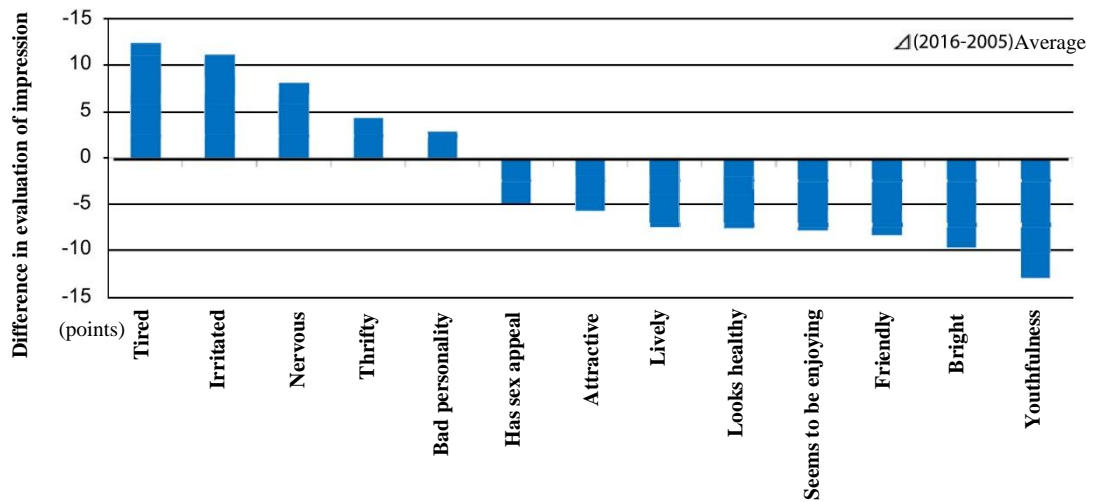


Figure 4. The 27 patterns of color-adjusted images.

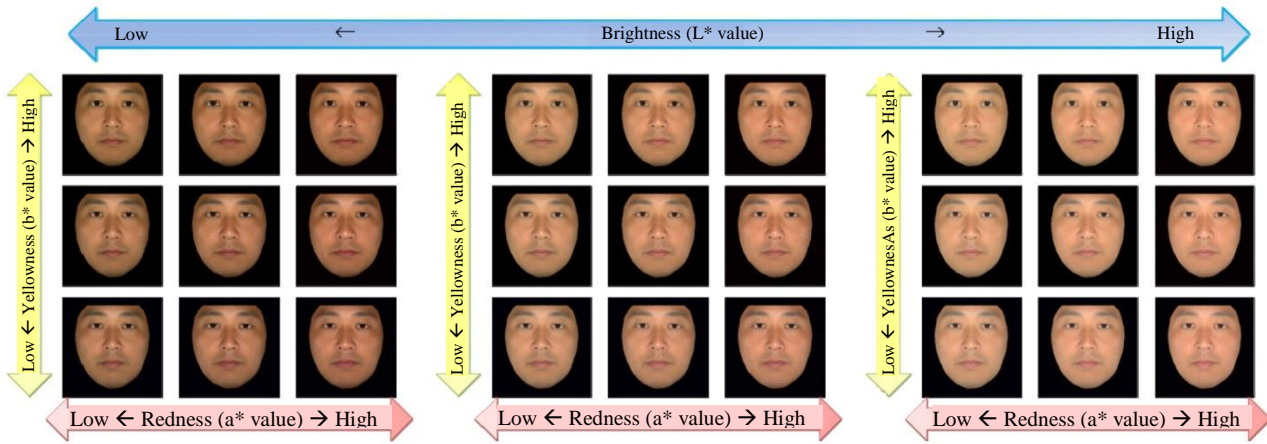


Table. Partial correlation coefficient.

Color item	L*	a*	b*
Partial correlation coefficient	0.98	0.35	0.12

* Closer value is to 1, > influence

Figure 5. Multiple comparison test for L* value

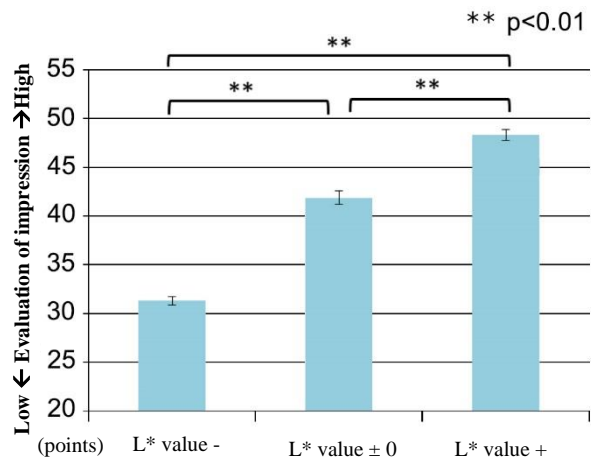


Figure 6. Comparison of skin conditions before and after continuous use of model emulsion solution.

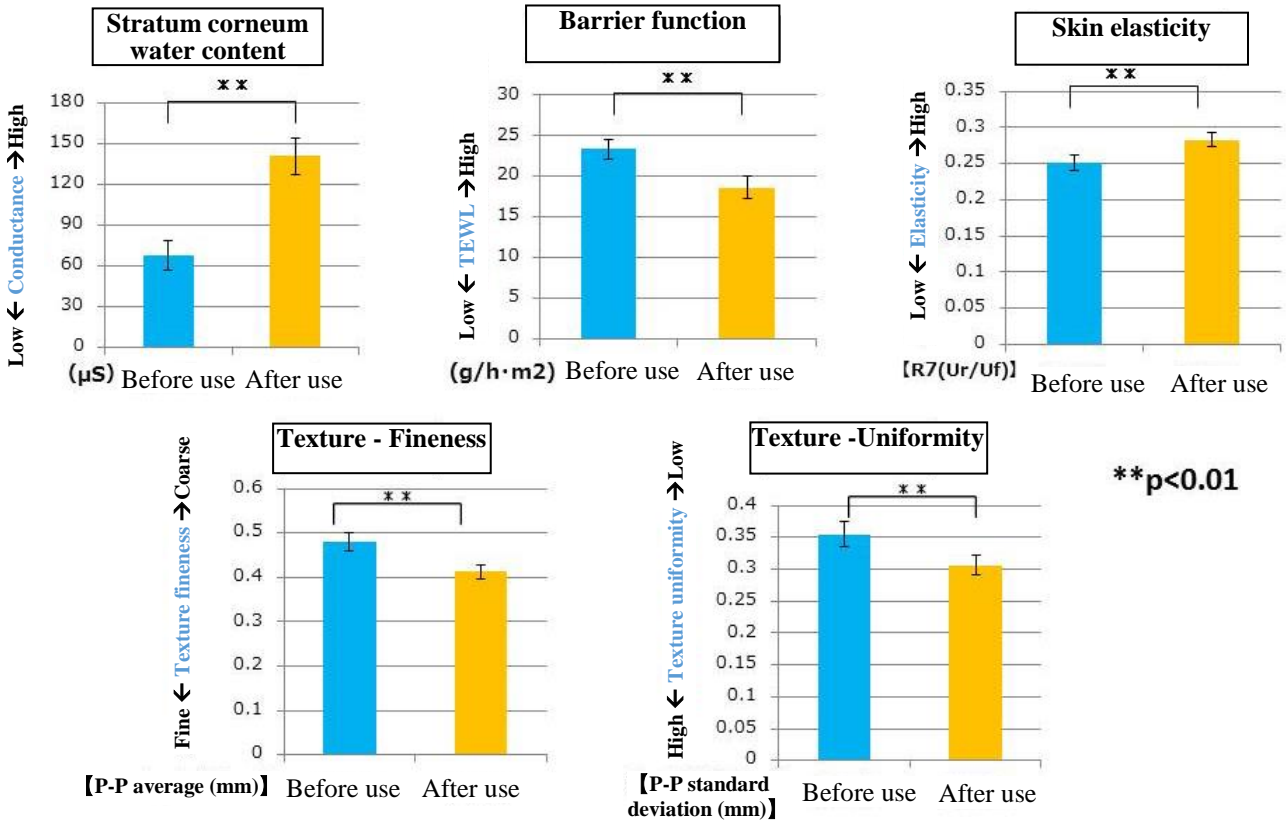


Figure 7. Comparison of the brightness of skin before and after continuous use of model emulsion solution

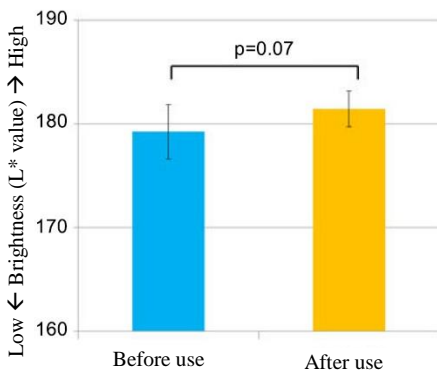
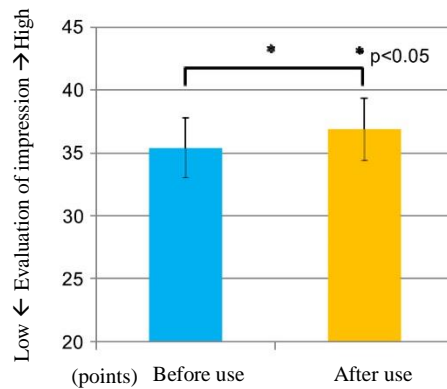


Figure 8. Comparison of the impression of “youthfulness” before and after continuous use of model emulsion solution



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