

〈原 著〉

## 疲労が皮膚生理機能および顔面部形状の日内変化に及ぼす影響

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### Effects of Fatigue on Daily Change in Physiological Function and Shapes on the Facial Skin

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#### Abstract

This study measured the changes in shape of the face and physiological function on the facial skin through the day under conditions of sleeplessness, so as to determine the effect of fatigue on physiological function on the face. The subjects were 12 healthy adult women and the experiments were conducted over 3 consecutive days. While fatigue was to be induced by 2 consecutive nights without sleep. A total of 8 measurements were made 3 times a day during the 3 days, in the morning (9:00–11:00 hours), in the afternoon (15:00–17:00 hours) and the evening (21:00–23:00 hours).

The results showed daily changes in shape of the face on the first day, but these changes in shapes tended not to be found on the 2nd and 3rd days after a sleepless condition was imposed. Particularly, it was clear that shape of the face remain swollen in the 2nd and 3rd days. Concerning a skin color,  $b^*$  value increased and  $a^*$  value decreased. The skin blood flow, oxygen saturation and skin temperature showed tendency to decrease. And a significant correlation was determined a relationship between change of skin color ( $a^*$ ) and change of skin temperature. Also, a significant correlation was determined a relationship between change of skin color ( $a^*$ ) and change of oxygen saturation. Because of the high rate of reports from the subjects of the symptoms of fatigue, it was assumed that physiological stress from fatigue due to lack of sleep was affecting facial shape and skin color.

**Key words:** fatigue, insufficient sleep, daily change, swelling, skin color.