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.

1. 緒 言
疲劳によって肌の調子や化粧のりが悪くなるといった肌の変化を自覚している女性は多く、疲労やストレスによる眠不足の影響などがいわれている。また、仕事中の自覚症状の訴えとして疲労とともに痛みが増す向きがあるとされている。
近年では、多種多様な生活サイクルのなかで睡眠時間の短縮、夜更かし等の生活習慣の変化が急速に進んでいることから、睡眠不足が生活に影響を及ぼす生活習慣の改善が急がれている。

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