

Mandom Discovers Scalp Oil Decreases Styling Ability

- Development of a Cosmetic Hair Product for Young Men that Prevents Effects from Scalp Oil -

Mandom Corporation (Headquarters: Osaka; CEO: Motonobu Nishimura; hereinafter, "Mandom") discovered that oil secreted from the scalp (scalp oil) migrates to the hair, decreasing the styling ability of styling products (setting ability, arranging ability, holding ability). Oleic acid, in particular, easily migrates to the hair, and its effect on setting ability were found to be large. These research results and the powder styling technology developed by Mandom (reference ①) were applied to successfully develop a styling agent, Gatsby Hair Jam, which is not affected by scalp oils and will go on sale in Fall 2013 (sale date, 8/26).

These research results were announced at the 72nd SCCJ Research Symposium that was held on 7/9/2013 and are also intended to be announced at the 31st Annual Meeting of the Japanese Society of Aesthetic Dermatology, to be held in Kobe from 8/10 to 8/11/2013.

1. Scalp oils negatively affect hairstyle

Previously, the inability to create a desired hairstyle and the inability to maintain a hair style were believed to be primarily caused by water from humidity and sweat. However, Mandom believed that factors other than water affect hairstyle, and conducted a study showing that hairstyle is affected by scalp oils.

(1) Scalp oil migrates from the scalp surface to the hair

Hair from 6 subjects was sampled immediately after washing and 7 hours later, and the amount of scalp oil on the hair was analyzed. A higher amount of oil was observed in the hair 7 hours after washing than immediately after washing, and scalp oils were shown to have migrated to the hair.

(2) Effect of migrated oils on styling ability

① Effect on styling ability (*1)

Hair was styled with styling agent (hair gel, hair wax) immediately after model scalp oils, prepared based on analytical values, were applied to hair bundles, and the styling ability of that hair was measured in comparison to hair to which the model scalp oils were not applied (unapplied). After measuring the setting ability for the hair gel (the load when force is applied to bundles and the bundles are bent) and the arrangement ability for hair wax (load applied to a comb passed through the hair bundles), both types of hair-styling ability were found to decrease as a result of applying the model oils (Figure 2).

Furthermore, a panel of 11 judges performed a functional evaluation of when hair gel or hair wax was actually applied to human hair immediately after washing (without application of oil) and when it was applied 24 hours after washing, and the presence of scalp oils decreased styling ability in both situations.

(*1) Styling ability is the ability to style hair by hardening it with a resin (setting ability) or the ability to freely arrange the tips of the hair using oils without hardening the hair (arrangement ability); examples of typical styling agents for each type include hair gel for setting ability and hair wax for arrangement ability.

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② Effect on holding ability

We also studied the effect of scalp oil on the holding ability (ability to maintain a hairstyle) of hair gel, which styles the hair by hardening it with a resin.

After applying the model scalp oils to hair bundles, hair gel was placed in the hair, and then the hair was rolled with a rod to create curls. The percentage of curls held after a set amount of time was evaluated. The percentage of held curls was lower when the model scalp oils were applied than when the scalp oils were not applied.

2. Oleic acid causes hair styles to unravel in young men

Oleic acid, abundant in the scalp oils of young men, was found to easily migrate to the hair and significantly affect setting ability. This oleic acid is believed to be one reason for hair styles in young men becoming unraveled.

(1) Oleic acid is abundant in the scalp oils of young men, and it migrates to the hair especially easily.

Previously, Mandom found that the scalp oils of young men had a higher percentage of free fatty acids, including oleic acid, than the scalp oils of middle-aged men (Figure 5). Therefore, we immersed the scalp/hair model roots into model scalp oils or oleic acid and studied the ability of these substances to migrate onto the hair, and we found that oleic acid migrates onto the hair especially easily (Figure 6).

(2) Oleic acid has a particularly strong negative effect on setting ability

When the hair was styled with hair gel after applying each scalp oil component onto hair bundles, oleic acid was discovered to have a particularly large effect in reducing setting ability (Figure 7).

Applying powder technology based on the results of these studies, Mandom developed a styling agent (Figure 8) that minimizes scalp-oil migration to the hair, owing to the oil-absorption effect of the powder and the fact that it prevents the formation of the gaps (capillaries) between the hairs that serve as pathways for migrating scalp oils.

This cosmetic hair product that minimizes the effects of scalp oils will be placed on the market as “Gatsby Hair Jam” (sale date 8/26).

<Reference diagrams>

Figure 1. Change in the quantity of scalp oil components on the hair over time after washing

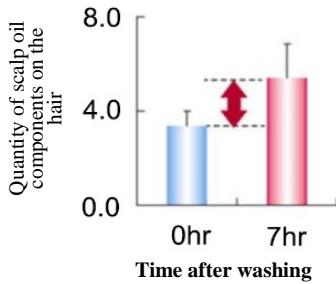
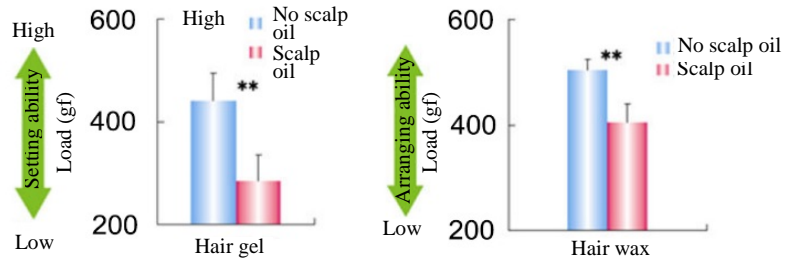
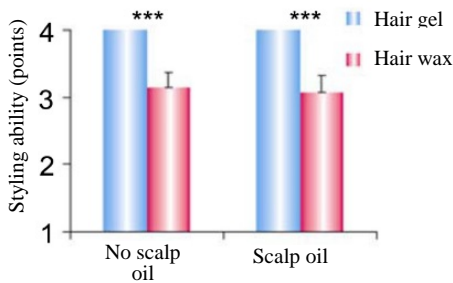


Figure 2. Change in styling ability due to the presence of scalp oils (hair bundle evaluation)



** P<0.01, ttest

Figure 3. Change in styling ability due to the presence of scalp oils (human head evaluation)



*** p<0.001, Mann-Whitney U test

Figure 4. Change in the holding ability of hair gel due to scalp oils

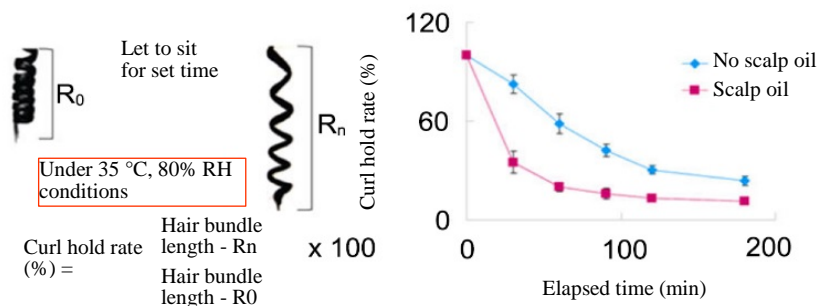


Figure 5. Percentage of scalp oil components according to age group

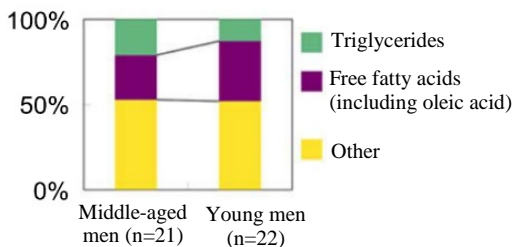
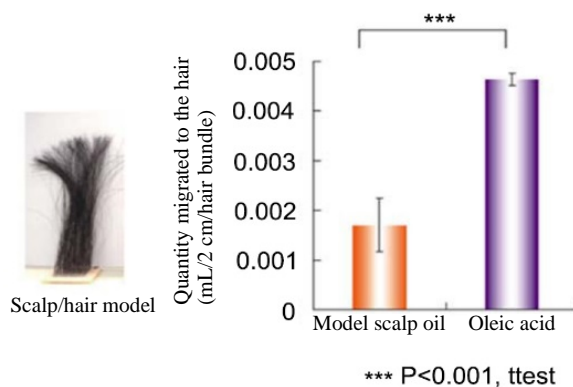
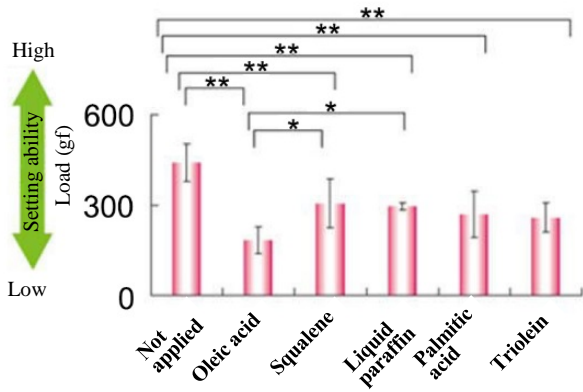


Figure 6. Amount of model scalp oils and oleic acid that migrated to the hair 24 hours later



*** P<0.001, ttest

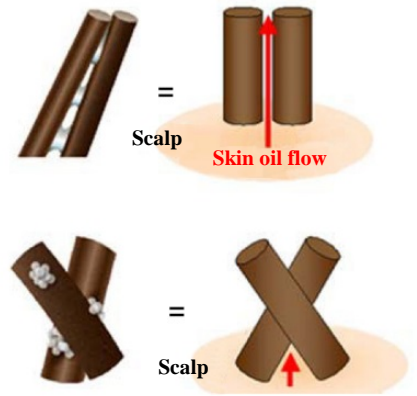
Figure 7. Setting ability according to scalp oil components



* 0.01 <P <0.05, ** P<0.01, ttest

Figure 8. Difference in the flow of scalp oils by styling function

- **Linear adhesion mechanism**
(hair gel, hair wax)
A pathway for skin oil is formed in between the hairs
- **Point adhesion mechanism**
(powder styling)
A pathway for skin oil is no formed between the hairs



<References>

①News Release Related to Powder Styling
(Released November 12, 2010)

“Mandom Develops Third New Styling Mechanism After Setting Polymer and Oil-Derived Styling Mechanisms”