News Release

February 15, 2019

Mandom Corporation

Panasonic Corporation

Mandom collaborates with Panasonic to develop ergonomic, easy-to-use packaging for roll-on antiperspirant deodorants

Mandom Corporation (HQ: Osaka City; President and Corporate Officer: Motonobu Nishimura; hereinafter "Mandom") and Panasonic Corporation (HQ: Kadoma City, Osaka Prefecture; President and CEO: Kazuhiro Tsuga; hereinafter "Panasonic") developed a container for roll-on antiperspirant deodorants (hereinafter referred to as "roll-on") sold by Mandom.

Mandom has developed a roll-on container that reduces the stress on users' hands and makes it easy for users not only to apply roll-on to the underarm but also to take it with them wherever they go. The product development combined Mandom's knowledge of users' behavior, situations in which roll-on is used, and users' feeling when using it, with Panasonic's expertise in ergonomics and affective engineering. This is the first attempt by both Mandom and Panasonic at developing cosmetic containers based on ergonomics.

1. Roll-on users' behavior, usage situations and awareness

Consumers are paying greater attention to grooming and odor control with every year, and are using deodorant products in a wider variety of situations. A survey, conducted by Mandom, of 1,384 males aged 10 to 50 revealed that around 70% of males carry deodorant products when they go out (Figure 1). Given this situation, portable roll-on deodorant products that control odor effectively are becoming more and more popular. Consumers also use deodorant products with their clothes on, and apply them not only to their underarm, but also to the forearms and chest. Mandom has already been exploring easy-to-use roll-on container shapes and improving their products. However, we need to provide more user-friendly container shapes in accordance with the increasing number of users and usage situations.

2. Design and verification based on ergonomics and affective engineering

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Mandom has been collaborating with Panasonic to develop a design which can convey a global brand vision and product concept. This is an essential part of communicating our message to consumers. In addition to being user-friendly starting with using usability verification to brainstorm ideas (Figure 2), we have applied the rich usability technology experience of Panasonic Product Analysis Center, which has wealth of knowledge in ergonomics and affective engineering. We measured the muscle potential*1 of arms and hands during roll-on use from an ergonomic perspective, and analyzed the relationship between muscular activity and ease-of-use. The results showed a negative correlation between the muscle load on the thumb and the (subjectively evaluated) ease of application to the underarm. The greater the load on the thumb felt by consumers, the more difficult they felt it was to apply products (Figure 3).

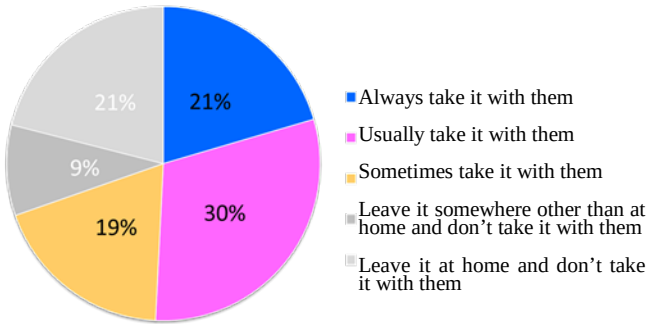
The Mandom roll-on container was newly developed based on our study and reduces the load on the thumb, making it easier to use than traditional products (see Figure 4).

We will continue to develop and design more easy-to-use and attractive products, thorough improvements in ergonomic and affective engineering technology.

*1 Muscle potential: The action potential generated by the muscle fiber stress that accompanies muscle contraction.

Reference materials

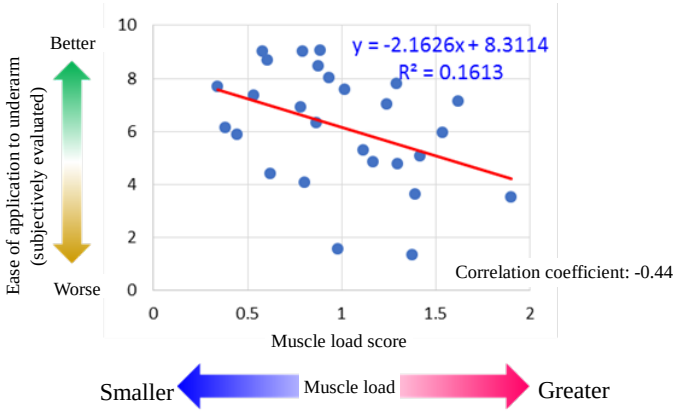
Figure 1. Whether people take deodorant with them when they leave the house

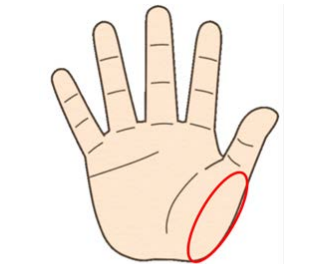


Survey details: Conducted online Sep 2018 with 1,384 males aged 10 to 50 years

Figure 2. Mandom and Panasonic collaboratively brainstorming ideas on container shape

Figure 3. Muscle potential measurement experiment – Relationship between load on muscles associated with thumb movement (abductor pollicis brevis) and "ease of application to underarms"

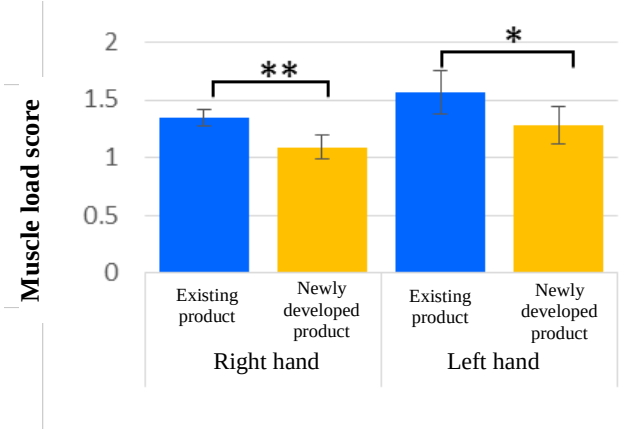




Area where muscle potential was measured
(abductor pollicis brevis)

- **Conducted: December 2018**
- **Participants: Males 20-49 years old (n=9)**
- **Sample size: 3**
- **Evaluation: Mandom**
- **Muscle load score: Measured muscle potential value compared with Mandom reference product**

Figure 4. Comparison of muscle load between existing Mandom products and the newly developed product (thumb area)



(p<0.01, *p<0.05)**

- **Conducted: December 2018**
- **Participants: Males 20-49 years old (n=9)**
- **Evaluation: Mandom**
- **Muscle load score: Measured muscle potential value compared with Mandom reference product**

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