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Letter to the Editor

Comparison of Bacterial Pollution Level According to Sponge Storage Method

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Dear Editor-in-Chief

Worldwide, the most important factor of various qualifications of skin care experts is hygiene conception to maintain cleanliness. Among the many cleansing tools are cleansing cream or oil, massage cream, face pack, and sponge. Sponge is the most frequently used in washing and has the advantage of effectively removing dust, residue, and oil, without skin stimulation during skin care management. In particular, from a health perspective, it reduces skin temperature (1).

Sponge is classified into natural and synthetic resins. A natural sponge is harvested from oceanic organisms. Germ multiplication in natural sponges is low because they absorb and dries water rapidly. However, they are expensive and vulnerable to sunlight and soap. By contrast, synthetic sponges are relatively cheaper and less sensitive to sunlight. Hence, most Korean skin-care shops use synthetic sponges. However, the use of synthetic sponges has various adverse effects due to wrong reuse of sponges (2). Of these adverse effects are various types of microbism that causes skin infection. The representative pathogens that cause skin infections are *Staphylococcus aureus*, gram-positive bacteria, gram-negative bacteria, and eumycetes. These pathogens and eumycetes cause various skin problems such as folliculitis, boil, cellulites, and impetigo (3).

The number of times disinfection, drying, and rinsing are performed before reuse of sponges greatly differ between Korean skin-care shops. Regarding sponge drying, 62.6% of Korean skin-care shops dries sponges at closing (2). Of these shops, 60.0% use incompletely dried sponges (2).

To leave sponges at room temperature without completely drying them causes the germs from dead skin cells and cosmetics from the preceding customer to multiply in the sponges. Germ multiplication is largely affected by temperature and humidity and is activated as the temperature and humidity increase (4). Moreover, dead skin cells, sebum, and cosmetic oil in a used sponge induce germ multiplication. Meanwhile, a sponge that has a low water-absorbing ability suppresses germ multiplication but is fragile and has a rapidly decreasing density, which results in shortening of sponge life. With respect to health and hygiene, comparing two conditions, namely keeping in room or cold temperature, may be useful to resolve the aforementioned issues. Thus, this study

aimed to determine the proper method of sponge storage, to inspire the conception of hygiene among beauticians, and to provide a hygiene plan by comparing germ pollution levels between room and cold temperatures.

The instruments used in this study were 150 sponges from Daejeon Metropolitan City, Republic of Korea. The sponges were assigned into room-temperature storage (n = 75) and cold storage (n = 75), and the germ distribution status in bacillus cultures was compared. This study used the chi-square test, and statistical significance was set at $P < 0.05$ by using SPSS Window version 18.0 (Chicago, IL, USA). In sponges with multiplicated germ clusters, *Corynebacterium*, *Bacillus*, *Acinetobacter*, and *Micrococcus* species were colonized in this order (2). By using the decuple method, the number of germs was counted from the spread plates with the diluted samples. The cultures were classified into 4 groups, namely the "no colony," "less than 10^3 colonies," "more than 10^3–10^5 colonies," and "more than 10^5 colonies" groups. Our results indicate no statistically significant differences in the number of *Corynebacterium*, *Bacillus*, *Acinetobacter*, and *Micrococcus* species the two storage methods ($P > 0.05$) (Table 1).

Table 1: Comparison of bacterial pollution level according to sponge storage method

Species	Temperature	Colony count/sponge number					X^2	*P*
		Total	No colony	<10^3 CFU/mL	10^3–10^5 CFU/mL	>10^5 CFU/mL		
Corynebacterium	Room	75	19	12	16	28	2.462	0.482
	Cold	75	27	13	13	22		
Bacillus	Room	75	39	14	15	7	6.289	0.098
	Cold	75	52	12	9	2		
Acinetobacter	Room	75	60	4	5	6	2.351	0.503
	Cold	75	64	5	4	2		
Micrococcus	Room	75	62	5	6	2	0.804	0.848
	Cold	75	65	5	4	1		

The *P* values were obtained by using the chi-square test.
Room temperature, 23–25°C; cold temperature, 2–3°C

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