A Skin Pollution Model for Assessing Cleansing Efficacy of a Sonic Skin Care Brush

Peterson G, PhD, Rapaka S MS, Koski N, Tadlock L, MD
Pacific Bioscience Laboratories; Redmond, WA, USA

INTRODUCTION

Atmospheric pollutants of major public health concerns include particulate matter (soot or carbon black, dust (iron oxides), carbon monoxide, ozone, nitrogen dioxide and sulfur dioxide). The link of atmospheric pollution to skin aging is of increasing concern worldwide with new evidence of a cause-effect relationship emerging. In light of these findings, we have developed a pollution model to mimic particulate matter trapped in sebum creating a robust (difficult to remove) surrogate for dirty, polluted skin to more effectively evaluate differences between devices, cleansers, and their combination on cleansing the skin.

OBJECTIVE

To evaluate the cleansing efficacy/protective effect of a sonic brush vs. manual cleansing against particulate pollution (trapped in grease/oil typical of human sebum). Particulate matter is measured as those particulates that are 2.5 microns or less (PM$_{2.5}$) and those 10 microns or less (PM$_{10}$).

MATERIALS AND METHODS

A pollution model (Sebollution; Sebum Pollution Model; SPM) was used in this study to evaluate the cleansing efficacy of the sonic skin care brush to remove particulate pollutants trapped in sebum on the skin. SPM consists of atmospheric particulate matter/pollution (PM$_{2.5}$ and PM$_{10}$) combined with grease/oils typical of human sebum.

Twenty subjects between the ages of 18 to 65 were enrolled in a single-center, cleansing study to compare the sonic cleansing brush (normal speed) compared to manual cleansing. Equal amount of SPM were applied to the center of each cheek (left and right). Method of cleansing (sonic vs. manual) was randomized to the side of the face (left or right) for each subject. Each side was cleansed for five seconds using the sonic skin care brush with sensitive brush head or manually, using equal amounts of water and a gel cleanser.

Results of image analysis (Image J, NIH, Bethesda, MD, USA) were taken at baseline, before application of the SPM and following cleansing. Image analysis (Image J, NIH, Bethesda, MD, USA) was used to quantify color intensity (amount of particulate pollutants on the skin) using a scale of 0 to 255 (0=all black pixels; 255=all white pixels). Differences between the baseline and post-cleansing values (pixels) are reported as the amount of SPM remaining for each cleansing method.

RESULTS

Using a robust cleansing protocol to assess removal of pollutants (SPM; atmospheric particulate matter trapped in grease/oil), the sonic brush removed significantly more SPM than manual cleansing (p<0.001). The amount of SPM remaining after cleansing was an average of 2.41 pixels for sonic versus 86.22 pixels for manual cleansing.

CONCLUSION

The sebollution model can provide robust procedures to measure/assess cleansing efficacy and synergy between cleansing devices and cleansing formulations.

REFERENCES


Figure 1. Amount of sebollution (artificial sebum+pollution) remaining on the skin after cleansing with a sonic brush vs. manual cleansing. Photos at baseline, before cleansing, and after cleansing.

COMMERCIAL SUPPORT

Commercial support provided by Pacific Bioscience Laboratories.