A NOVEL BIONSTRUMENTAL CLINICAL STUDY TO INVESTIGATE LIP AGING

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BTBP — BrighTex Bio-Photonics — *pioneering innovation*

AVON — *the company for women*

Abstract

Lips are an important feature on a woman's face since they are a focal point of attractiveness; however, the lip aging process is not well understood and it has seldom been quantitatively investigated. Lip morphology (influenced by genetic background and environment) differs considerably amongst individuals and has made meaningful study design difficult. We have overcome some of these difficulties and present here the results of a novel clinical study using advanced image analysis to provide a comprehensive quantitative picture of lip aging. We developed a system to perform quantitative assessments of various lip parameters. The lips of thirty-three (33) pairs of mothers (average age-49) and their young adult biological daughters (average age-21yrs) with an average age difference of 28 years were evaluated. All evaluations were performed in an environment controlled laboratory (70F 40%RH). Whilst visual observation showed that each pair of mother and daughter shared a similar general shape of lips, comparisons of image analysis results demonstrated that the severity of lip wrinkling of the daughter was on average 22% less than that of her mother. Whilst mothers have significantly longer deep wrinkles than their daughters, the latter group exhibited more fine lines. Moreover, daughters' lip surface areas were on average 35% greater than mothers'. Their lips were also significantly rosier and the vermillion borders were better defined with regards to both color variation and smoothness. Since mothers and daughters share similar genetic backgrounds and living environments, this study provides an insight into lip aging. The results also provide a valuable scientific foundation for anti-aging lip product development. Using the evaluation tool, we have successful demonstrated the anti-aging effects of a novel lip product.

Background

Lips have important physiological as well as sociological functions. One can express emotion during verbal and psychological communication using movements of lips.

Key Biological Features about Lips:
- Lips are highly sensitive areas for both tactile and thermal stimuli.
- Barrier and water-holding functions of the lip are much lower than those of the facial skin.
- The skin blood flow on the lip is significantly greater than that on the cheek.
- Surface temperature is also significantly higher on the lip than on the cheek.

However limited research has been done to investigate the effect of aging on lip wrinkling, color (rosiness) and surface area.
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Objective

To evaluate and quantify:
Age-related variations in the lip features between mothers and their daughters.
Anti-aging (wrinkle reduction) benefits of Anti-aging Lipstick using the BTBP Clarity™ R&D dermal analysis system.

Methodology

33 pairs of mothers and daughters were recruited for this one-visit study. During the study visit, subjects acclimated in the environment controlled laboratory and refrained from licking their lips and minimal talking for ten (10) minutes. One front-view image of the face was taken using BTBP Clarity R&D.

Lip Wrinkle Measurements – Lip wrinkle measurements includes four severity categories.
The software reports the number and average length of each category's wrinkles and it also provides the total count, average wrinkle length and average wrinkle severity of all detected wrinkles.
The four categories are defined as below:
Category 1: Severity measurement <=35
Category 2: Severity measurement >35 and < 70
Category 3: Severity measurement >= 70 and < 115
Category 4: Severity measurement >= 115
**Anything less than 10 pixels long is not classified as being a wrinkle.

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Lip Analysis
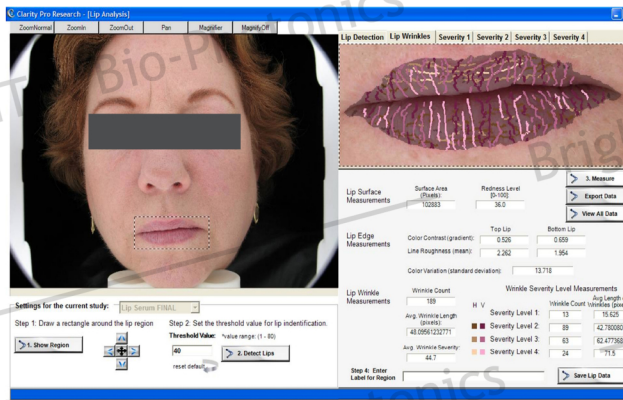
Results

Parameters	Mother	Daughter	Daughter vs. Mother (% Difference)
Wrinkle Average Severity	33.83	27.43	-19*
Cat 4 Total Wrinkle Length	236.68	178.41	-25
Cat 3 Total Wrinkle Length	1417.6	6031.07	-27**
Cat 2 Total Wrinkle Length	2551.4	13384.5	33*
Cat 1 Total Wrinkle Length	622.42	1733.28	178*
Grand Total Length of Wrinkles	4632.2	8077.29	31

Table 1: Mean values of the length of different categories of wrinkles and wrinkle severity is stated for the 2 groups and the difference between them.

* Significant at p<0.05; ** Significant at P< 0.1

Parameters N = 33 pairs	Mother	Daughter	Daughter vs. Mother (%Difference)
Surface Area	62533.80	85063.60	36.03*
Lip Redness	37.07	39.5	6.56**
Edge Color Variation	15.82	15.09	-4.61
Top Lip Edge Color Contrast	0.58	0.51	-12.07*
Bottom Lip Edge Color Contrast	0.68	0.72	5.88
Top Lip Edge Roughness	2.26	2.3	1.77
Bottom Lip Edge Roughness	1.69	1.51	-10.65 (P=0.12)

Table 2 : Mean values of the lip features of mothers and their daughters and the mean difference between the two groups

Anti-aging Lipstick

Study Design:
Preconditioning Phase: All study subjects were asked to discontinue use of all lip treatment products (lip moisturizers, lip balms, lipsticks, etc.) one week prior to the baseline grading session.
Methodology:
The study involved three (3) visits (baseline, week 2 and 4) to the Testing Center over a 4-week period. Fifty female subjects aged 30-65 were instructed to use Anti-aging Lipstick at least 4x/day as their only lip treatment for a total of 4 weeks. Prior to their study visits, subjects were instructed not to wear any products on their lips. On each study date, subjects acclimated in the environment controlled laboratory for ten (10) minutes, after which one front image of the face was taken using Clarity-Pro. Each subject was instructed to keep talking to a minimum during the entire study visit. Wrinkle analysis was conducted using BTBP

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Results

Bioinstrumental Analysis (N=50)	% Magnitude of Change from Baseline [(%) of Subjects with Improvement from Baseline]	
Parameters	WEEK 2	WEEK 4
Average Wrinkle Severity	-4 [70]	-10 [82]
Category 1 Wrinkle (Finest Line) Length	35 [72]	66 [68]
Category 2 Wrinkle Length	NS	17 [64]
Category 3 Wrinkle Length	NS	NS
Category 4 Wrinkle (Deepest Line) Length	NS	-53 [76]

Table 3: Indicates the magnitude of improvement and percentage of subjects that exhibited improvement from baseline for the parameters at weeks two and four.

MOTHER
BASELINE

DAUGHTER
BASELINE

WEEK 2

WEEK 4

Figure 1: Lip images of mother at base-line, week 2 and week 4 time points and lip image of her daughter at base-line.

Conclusion

Mother-Daughter Study
- The wrinkle severity of lips of the daughters is on an average 22% less than their mothers.
- There is a significant difference in Category 1, 2, 4 wrinkle lengths between mothers and daughters.
- Daughter's lip surface areas were on an average 35% greater than mothers.
- Daughters' lips were significantly rosier and vermillion borders were better defined with regards to both color variation and smoothness.
- Mothers have significantly longer deep wrinkles than their daughters who have more fine lines.

Anti-aging Lipstick
There is a significant improvement (i.e. decrease from baseline) in average wrinkle severity and deep (category 4) wrinkle length, after four (4) weeks use of Anti-aging Lipstick.