Antiwrinkle Creams: A Comparative Study of Efficacy Between a New Antiaging Proprietary Formulation and a Market Leader

Amy B. Lewis, MD

This comparative, double-blinded study included 62 subjects and assessed the efficacy and tolerance of 2 antiwrinkle facial creams: Alyria Intense Wrinkle Correction/Wrinkle Repair and StriVectin-SD®, a popular product currently on the market. Volunteers applied the products twice daily during a period of 3 months. While both treatments were well tolerated and well perceived by the majority of subjects, clear differences were observed in the results. The improvements achieved with Alyria Intense Wrinkle Correction/Wrinkle Repair appeared more significant than those achieved with StriVectin-SD, primarily in the number of wrinkles, the appearance of deeper wrinkles, and the surface area and total length of wrinkles.

Aging is inevitable. However, when it comes to the visible signs of aging on the skin, what used to be unavoidable may not be so anymore. There are 2 different categories of skin aging: intrinsic and extrinsic.[1] Intrinsic aging comes from within, the result of natural changes caused by hormones, genetic factors, chronic muscle tension, and gravity. In the extracellular matrix of newborn skin, there is an abundant collagen meshwork with intact elastic fibers that yields tensile strength, elasticity, and resilience.[1] The high concentration of glycosaminoglycans, especially hyaluronic acid, provides the skin with ample hydration.[2] Intrinsic aging begins when people are in their twenties, even though the signs may not be visible for decades. Reduced collagen production causes dermal atrophy (eg, fine wrinkles, thinner skin), and decreased concentration of glycosaminoglycans leads to loss of hydration (dry skin) and slower turnover of dead skin cells (coarse texture).[2,3] Reduced elastic fibers diminish elasticity (less springback after skin pulls), while a loss of subcutaneous fat may cause facial depressions.[4,5] There is a greater visibility of bony landmarks, blood vessels, wrinkles, and furrows.

Extrinsic aging comes from external factors, such as wind, pollution, smoke, chemical exposure, and sun exposure, which is by far the most important external factor. Photodamage caused by the sun is responsible for at least 90% of the signs of extrinsic aging.[1]

Dr. Lewis is Assistant Clinical Professor of Dermatology, Yale School of Medicine, New Haven, Connecticut, and Director of Cosmetic Dermatology, SUNY Downstate Medical Center, Brooklyn, New York. She also has a private practice in New York, New York.

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Lentigines (sun spots), fine lines and wrinkles, solar keratoses, coarseness, and senile purpura (red blotches) are all evidence of photoaging. Several topical agents have been able to partially reverse photoaging; the retinoids are the most widely studied, followed by α-hydroxy acids,[6,7] antioxidants (topical vitamin C, vitamin E, green tea, copper, alpha-lipoic acid),[8,9] growth factors, and peptides.[10]

To improve discoloration, capillaries, and textural anomalies, microdermabrasion,[11] peels,[12] various lasers, and photorejuvenation have been widely used and are effective.[13] For deeper furrows or wrinkles, the use of short- and long-acting fillers, or botulinum toxin type A when appropriate, has changed the aging visage dramatically. Since all patients cannot afford (or may not need) the more aggressive approaches outlined above, some prefer to start with topical creams to deal with their aging concerns. One of the most common complaints is of the appearance of wrinkles, which can be caused by both intrinsic and extrinsic aging factors.

A newer class of topical antiaging agents is known as the collagen-producing peptides. One of these peptides, pal-KTTKS or palmitoyl pentapeptide-3 (PP-3; recently renamed *palmitoyl pentapeptide-4*), is a synthesized version of a protein fragment found in the most common type of collagen. It is a lipophilic modified peptide made of naturally derived amino acids. When PP-3 is added to cultured human fibroblasts, it stimulates them to produce collagen, elastin, and hyaluronic acid, which are key components of the extracellular matrix.

Two French studies have revealed that palmitoyl pentapeptide produced dramatic changes in the appearance of aging facial skin.[14] The first study examined the effects of palmitoyl pentapeptide 3 ppm versus retinol 700 ppm on photoaged skin. There was a measured decrease in overall roughness and deep facial wrinkles with both treatments after 4 months. Although skin thickness increased by an average of 9% after 4 months for both treatments, the 2-month data suggested that palmitoyl pentapeptide thickened the skin about 1.5 times faster than retinol, but did not cause the inflammatory reactions frequently associated with retinol use. Overall, the results suggest that palmitoyl pentapeptide is as effective as retinol at regenerating the skin without the irritation that often occurs secondary to retinoid application.

The second trial examined the effects of palmitoyl pentapeptide 5 ppm on the structure of elastin and collagen IV in 49 women with photoaged skin. In this 4-month, double-blinded study, the women who used 5 ppm of palmitoyl pentapeptide had substantial improvements in skin roughness, wrinkle volume, and wrinkle depth. Skin biopsies conducted on 6 patients indicated that palmitoyl pentapeptide triggered growth in and enhanced the structure of elastin and collagen IV. The researchers noted that the peptide was not associated with any adverse effects and was "a safe and potent alternative to retinoids in wrinkle repair."[14]

We present in this article a double-blinded study comparing the efficacy of 2 facial creams in the reduction of wrinkles. The products tested were Alyria Intense Wrinkle Correction/Wrinkle Repair, which contains PP-3, and StriVectin-SD®.

METHODS

A double-blinded, single-center, parallel-group design was used in this comparative study of 2 skin care products. A total of 62 healthy female subjects, aged 40 to 55 years (mean age, 48.9 years), photo type II to IV, with moderate to severe wrinkles in the crow's feet area (skin aging score III to V as per in-house grading system where I indicates no wrinkling in the crow's feet area and VI indicates very severe wrinkling in the crow's feet area) were recruited and randomly assigned to 2 groups, group A and group B. Women affected by or with a history of skin irritation, allergies, dermatitis, or significant dermal anomaly in the test area were excluded. Thirty-one subjects from group A and 29 subjects from group B completed the study. Two participants abandoned the study for personal reasons not related to the product or study. The volunteers were instructed to stop the use of all facial skin treatments (hydrating, antiwrinkle, etc) a few days prior to beginning the study. The procedures were explained, and a written consent form was presented to and signed by each participant.

The antiwrinkle efficacy and the consumer acceptance of the 2 facial skin creams were compared before, during, and after treatments. The 2 products evaluated were designated as product A, Alyria Intense Wrinkle Correction/Wrinkle Repair, and product B, StriVectin-SD. They were distributed to the participants according to their respective group identity, A or B. Instructions related to product application were given to the participants. The facial creams were to be applied sparingly, for a period of 3 months, morning and night, and massaged vigorously in a circular motion until absorbed.

Changes to wrinkle parameters were assessed by profilometry of the eye contour area on days 0, 28, 56, and 84. Silicon replicas of the crow's feet were analyzed by a computerized digital-image–processing system coupled with the Quantirides® software to obtain the skin's topography. This standard technique is based on the measurement of the shadows cast when an incident light is inclined at an angle of 35° on the replica. Digital photographs were also taken under standard conditions. On day 0, a partial-face frontal photograph and two 45° angle profile photographs were taken. The study

Scores for Sensory Attributes for Group A* and Group B† on Day 84

Day 84 Parameters	Very Appreciated, %		Appreciated, %		Total Appreciated, %		Indifferent, %		Not Appreciated, %	
	A	B	A	B	A	B	A	B	A	B
Ease of application	68	24	29	69	97	93	0	7	3	0
Feeling after application	55	24	39	45	94	69	3	24	3	7
Texture	65	28	26	62	91	90	6	7	3	3
Fragrance	36	24	29	31	65	55	32	17	3	28
Average‡	56	25	31	52	87	77	10	14	3	10

*Treated with Alyria Intense Wrinkle Correction/Wrinkle Repair.

†Treated with StriVectin-SD®.

‡Averages for group B add up to 101% because of successive rounding up of numbers.

was then conducted in a controlled room (temperature: 20±2°C, relative humidity: 45±5%). Silicon replicas of eye contour zones were taken after 15 minutes of stabilization in the controlled room. The same steps were repeated on days 28, 56, and 84. At the end of each treatment period, each volunteer completed a self-evaluation questionnaire designed to assess the perceived efficacy of product claims, sensory attributes, and adverse effects, if any.

The following parameters were analyzed: the total surface area of wrinkles, the number and mean depth of the depressions due to cutaneous relief, and the depth of deep and medium-deep wrinkles. The wrinkles were differentiated by depth class (class 1, 0-55 μm; class 2, 55-110 μm; and class 3, 110-800 μm) before and after treatments in order to better evaluate the efficacy of a given product. Statistical analysis was carried out on all pertinent parameters. Results obtained on days 28, 56, and 84 were compared with those obtained on day 0 for each group and between groups, using the Student *t* test. Results were expressed as a mean plus or minus SD of the mean measurements of the 60 volunteers. The information obtained from the self-evaluation questionnaires was tabulated and analyzed.

RESULTS

Sensory

The test products were well tolerated by the majority of volunteers. Some minor discomfort was reported, namely redness and a prickling and burning sensation, particularly around the eyes and lips. These were temporary in nature, lasting only the first few days of use. A high number (21%–23%) of volunteers in group B reported developing pimples during the study compared with none of the volunteers in group A. No major tolerance issues relating to treatments were reported in either group. Both treatments generated favorable comments from the volunteers. The test product assigned to group A was favored at a higher level than that assigned to group B (Table).

Profilometry

The following parameters were measured: the total area covered by wrinkles, the number and mean depth of the depressions due to cutaneous relief, and the depth of deep and medium-deep wrinkles.

Number of wrinkles

Product A was shown to significantly decrease the number of wrinkles by 12% after 56 days ($P<.05$) and by 25% after 84 days ($P<.01$). Product B showed a significant ($P<.05$) reduction of 14% after 84 days (Figure 1A).

Area occupied by wrinkles

The area occupied by wrinkles was significantly ($P<.01$) reduced by 17% after 28 days and 39% after 84 days for subjects treated with product A. Subjects treated with product B also observed a significant ($P<.05$) reduction in the area occupied by wrinkles (14% after 28 days and 15% after 84 days; Figure 1B).

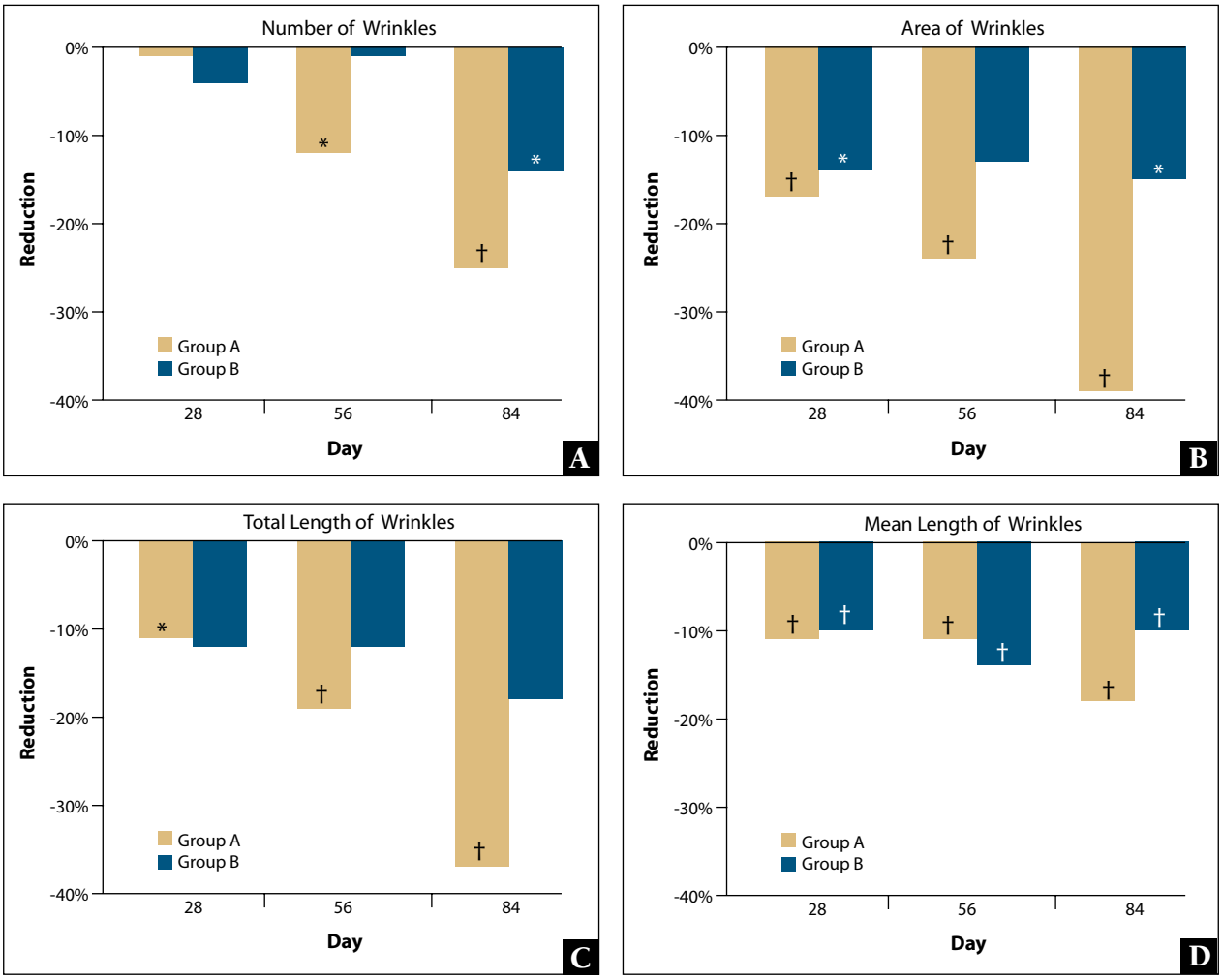

Figure 1. Comparative profilometry results for number of wrinkles (A), area of wrinkles (B), total length of wrinkles (C), and mean length of wrinkles (D) for group A (treated with Alyria Intense Wrinkle Correction/Wrinkle Repair) and group B (treated with StriVectin-SD®). Asterisk indicates significance at $P<.05$ compared with baseline. Dagger indicates significance at $P<.01$ compared with baseline.

Total length of wrinkles

The total length of wrinkles on patients using product A was significantly reduced by 11% after 28 days ($P<.05$) and 37% after 84 days ($P<.01$). Patients using product B observed a significant ($P<.05$) reduction of 18% after 84 days (Figure 1C).

Mean length of wrinkles

The mean length of wrinkles was significantly reduced ($P<.05$) by 18% after 84 days for product A and 10% for product B (Figure 1D).

Significant reductions in wrinkle number, surface area, total length, and mean length were measured for patients using product A. The reductions were progressive over time, with improvements of 39% reduction in total surface area and 37% reduction in total wrinkle length by day 84. Significant improvements for wrinkle parameters were also observed, but to a lesser degree, in group B. Improvements were not progressive.

Results on wrinkle classes

After 84 days, subjects using product A observed significant ($P<.01$) reductions in the number of wrinkles by 25%, 27%, and 23% for class 1, class 2, and class 3 wrinkles, respectively. Subjects using product B also observed significant ($P<.05$) reductions in the number of class 1 (23%) and class 2 (14%) wrinkles. No significant reduction was observed in class 3 wrinkles for group B (Figure 2). Figure 3 shows patients from group A at day 0 and after 84 days of treatment.

COMMENT

Both test products may be considered safe and well tolerated, although a high number (21%–23%) of volunteers in group B reported developing pimples during

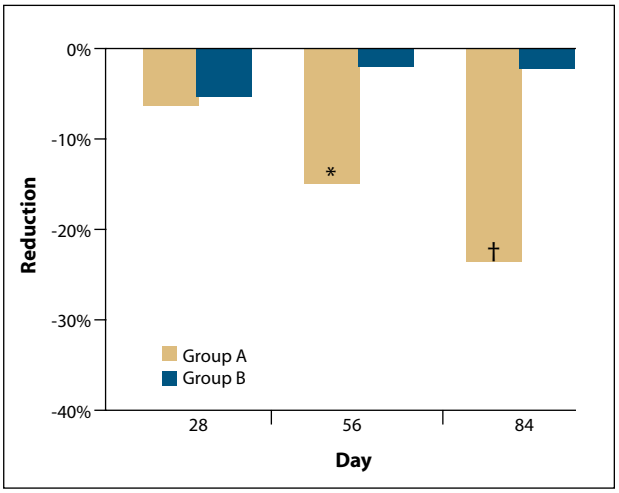

Figure 2. Comparative results for the number of class 3 wrinkles for group A (treated with Alyria Intense Wrinkle Correction/Wrinkle Repair) and group B (treated with StriVectin-SD®). Asterisk indicates significance at $P<.05$ compared with baseline. Dagger indicates significance at $P<.01$ compared with baseline.

the study. In comparing the sensory attributes scores, it is clear that both treatments generated favorable comments from the volunteers, but the test product assigned to group A was favored at a higher level than the one assigned to group B. On average, product A was "very much appreciated" by 56% of the subjects of group A, while product B was "very much appreciated" by 25% of the subjects of group B.

Statistically significant superiority of group A over group B for both the type and level of efficacy was demonstrated. Significant reductions in all wrinkle parameters, including number, surface area, total length, and mean length, were measured for patients using product A. Although statistical improvements for these parameters were also observed in the group using product B, they were not as consistent. Product A resulted in striking improvements in wrinkle parameters, namely a 25% reduction in the number of wrinkles. The average reduction in the total surface area of wrinkles was 39%, 2.5 times greater than the average reduction associated with product B. Product A effected significant improvement in fine, medium, and deep wrinkles (depth class levels 1, 2, and 3). Product B also effected a diminishing of the finer lines but had no effect whatsoever on the deeper class 3 wrinkles. The mean length of the wrinkles in group A diminished by 18%. Before and after pictures demonstrate the potential efficacy of product A (Figure 3).

The apparent superiority of product A over product B may be attributed to the former's high-performing formula

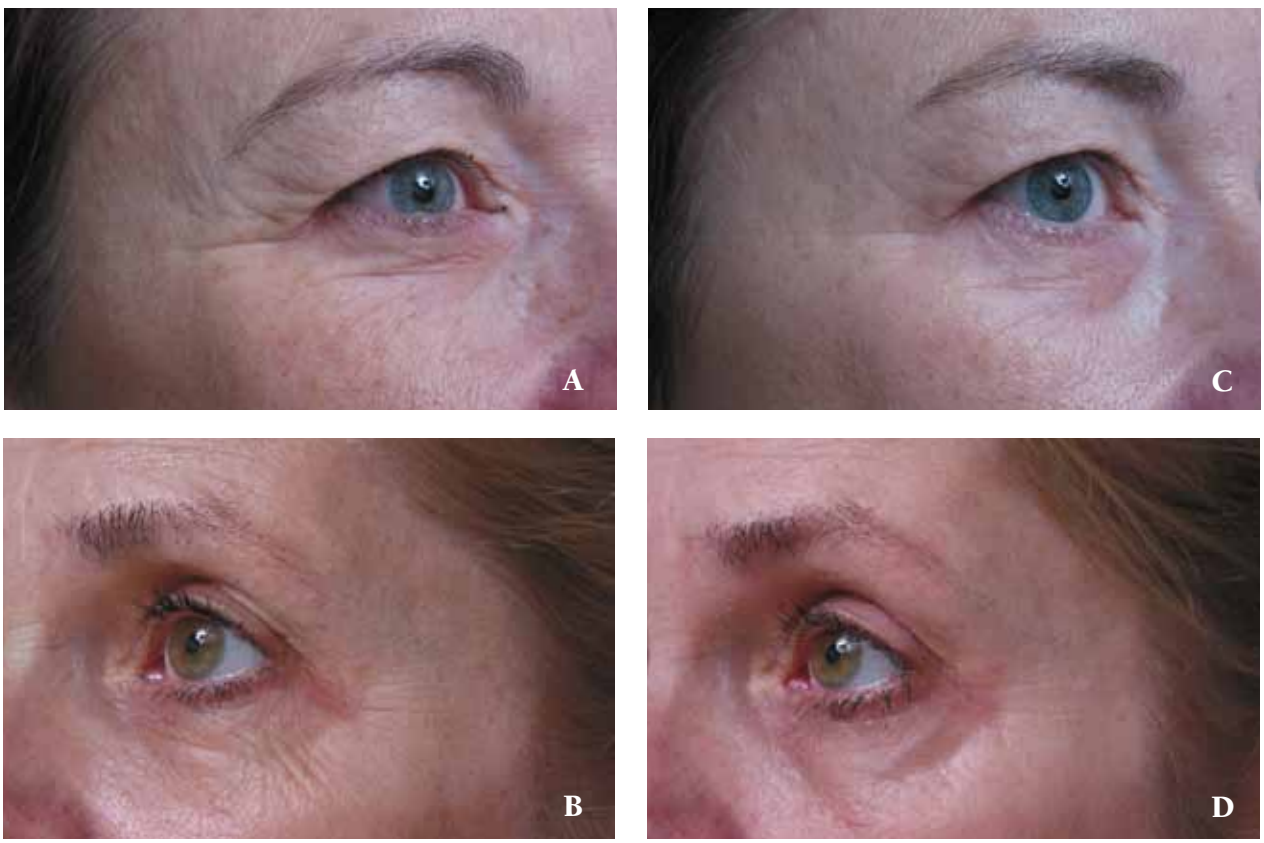

Figure 3. Subjects treated with Alyria Intense Wrinkle Correction/Wrinkle Repair at day 0 (A, B) and at day 84 (C, D).

resulting from both the judicious selection of ingredients, including a pentapeptide, and their relative concentrations. Individual results of group A subjects went as high as a 66% reduction in the number of wrinkles, an 80% reduction in the total surface area of the wrinkles, and a 54% reduction in the mean length of the wrinkles. Product A was shown to yield reliably progressive results with regard to many of the measured parameters during the test period, while product B did not show that progression. Therefore, even though the consumer might detect an initial benefit from using product B, the improvement could quickly plateau and the consumer might become frustrated and abandon the treatment. However, given the consistent results achieved by subjects using product A, the consumer might be satisfied enough to continue using it. It would be of value to further assess the level of wrinkle reduction achievable with continuous use (ie, beyond the 3-month test period).

CONCLUSION

The observations covered in this report indicate that the product used by group A is a more effective antiwrinkle treatment than the product used by group B. This study proves that visible improvements in the appearance of wrinkles of multiple depths and lengths are achievable with the use of palmitoyl peptides in rejuvenating facial creams without necessarily resorting to more invasive cosmetic procedures.

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