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Study on clinical efficacy and speed difference between high and low concentration retinol

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Introduction:

The use of retinol cream was first attempted by Stuettgen and Kligman in the 1960s, and numerous clinical research have been studied, it is currently used in cosmetics as a representative anti-aging cream.[1] Retinol is known to have various clinical effects such as reduction of melanin in the epidermis, differentiation of keratinocytes, collagen synthesis, and angiogenesis.[2][3][4] Although many studies have been conducted that retinol has various effects such as wrinkle improvement, moisture increase, and pore reduction at various concentrations, there are no study yet on whether the type or size of clinical effects differ depending on the concentration of retinol. [5],[6]
Therefore, in this study, retinol was divided into 4 groups(1500, 2500, 3300, 6600IU) from 1500IU to 6600IU, which is known to be effective for wrinkles, and whether the type of effect at each concentration is different or there is the difference in effect at low and high concentrations.

Materials & Methods:

This study was conducted with a total of 66 women 40-59 years old residing in Korea after IRB(Institutional Review Board) approval was obtained from the GMRC(Global Medical Research Center) divided into two groups of 30 or more. Each group was instructed to use two products, and products with retinol concentrations of 1500, 2500, 3300, and 6600 IU were used for a total of 12 weeks. Wrinkle, pore size (ANTERA 3D CS, Miravex, Ireland), elasticity(Cutometer dual MPA580, C+K, Germany), skin color(VISIA-CR, Canfield Science, USA) and desquamation index(D-squame, Visioscan VC98, C+K, Germany) were measured at 0, 2, 4, 8 and 12weeks, respectively. As for the analysis method, RM ANOVA was used to compare changes before and after(2,4, 8 and 12weeks), and a multivariate analysis method in which the value measured at week 0 was treated as a covariate was used for comparison between groups. The mean value for each time point was the estimated value.

Results & Discussion:

Results

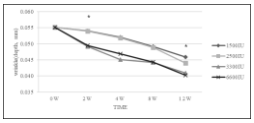
As a result of using retinol for 12 weeks, it was shown that there were significant improvements in wrinkle, elasticity, skin color, pore size and desquamation index regardless of the retinol concentration.(Table 1)

Contents	concentration(IU)	0week	2week	4week	8week	12week
eye wrinkle(depth, mm)	1500	0.078	0.077	0.074	0.068	0.063
	2500	0.078	0.077	0.076	0.071	0.065
	3300	0.078	0.074	0.070	0.067	0.062
	6600	0.078	0.071	0.068	0.064	0.061
forehead wrinkle(depth, mm)	1500	0.055	0.054	0.052	0.049	0.046
	2500	0.055	0.054	0.052	0.049	0.044
	3300	0.055	0.049	0.045	0.044	0.041
	6600	0.055	0.049	0.047	0.044	0.040
skin brightness(L, AU)	1500	71.50	72.47	73.36	74.22	74.61
	2500	71.50	72.32	73.14	73.91	74.62
	3300	71.50	71.68	71.91	72.40	72.82
	6600	71.50	71.69	71.87	72.50	72.89
pore size(area, mm2)	1500	50.68	45.89	40.91	33.64	29.68
	2500	50.68	44.00	40.19	35.46	28.73
	3300	50.68	44.63	39.86	32.30	20.78
	6600	50.68	45.08	41.30	32.19	22.62
desquamation index(DI, %)	1500	12.69	12.15	11.46	11.24	12.01
	2500	12.69	12.05	11.45	11.40	11.76
	3300	12.69	11.14	10.12	9.80	9.57
	6600	12.69	11.30	10.44	10.11	9.71
elastisity(R2, AU)	1500	0.63	0.64	0.65	0.66	0.68
	2500	0.63	0.64	0.65	0.67	0.68
	3300	0.63	0.63	0.64	0.65	0.67
	6600	0.63	0.64	0.64	0.66	0.66

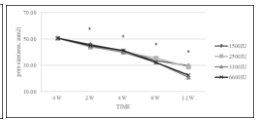
<table 1> Results of various skin parameters according to retinol concentration

Using retinol for 12 weeks, eye wrinkles were significantly reduced at all concentrations, 18.8, 16.9, 20.5, and 21.8% were decreased at 1500, 2500, 3300, and 6600IU, respectively. Furthermore forehead wrinkles were significantly reduced at all concentrations, 16.7, 20.1, 25.7, and 27.1% were decreased at 1500, 2500, 3300, and 6600IU, respectively. Skin elasticity were increased significantly 7.5, 8.5, 6.2 and 5.9 at 1500, 2500, 3300, and 6600IU, respectively, and skin brightness(L) increased significantly at all concentrations also, they were shown that increases of 4.4, 4.4, 1.8, and 1.9% at 1500, 2500, 3300, and 6600IU, respectively. In addition, both pore size and desqamation index were decreased at 1500, 2500, 3300, and 6600IU, pore size was decreased by 41.4, 43.3, 59.0, 55.4%, and desqamation index was decreased by 5.4, 7.3, 24.6, and 23.5%, respectively.

The clinical results of retinol showed specific skin change results according to the low concentration up to 2500(1500, 2500IU) and the high concentration(3300, 6600IU) higher than that.
Retinol results showed a specific effect on wrinkle improvement as is known, it was more effectively improved in the high concentration group and the pore size improvement effect was maintained higher in the low concentration group(Figure 1). In particular, in the case of pore size, it showed a clear efficacy advantage at high concentrations after 12 weeks of using retinol(Figure 2).

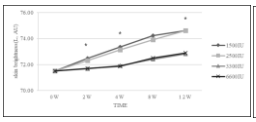


<Figure 1> Forehead wrinkle change depending on retinol concentration for 12weeks.
* p<0.05, significant difference between the group.

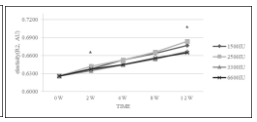


<Figure 2> Pore size change depending on retinol concentration for 12weeks.

However, in all the results, the high concentration of retinol was not more effective, and the low concentration showed a quick and high effect on skin brightness and elasticity. In the case of skin brightness, there was a significant difference between the groups from 2 weeks, and this difference was maintained until 12 weeks(Figure 3). Skin elasticity was also significantly more effective in the low concentration group than in the high concentration group at 12 weeks(Figure 4).



<Figure 3> Skin brightness(L) change depending on retinol concentration for 12weeks.
* p<0.05, significant difference between the group.



<Figure 4> Skin elasticity(R2) change depending on retinol concentration for 12weeks.

Retinol has been attracting attention as an anti-aging material for a long time and is still mainly used as a raw material for cosmetics. However, there are few studies on the classification of efficacy according to the concentration of retinol, and only studies that the efficacy increases as the concentration increases. Therefore, in this study, it was found that there is a difference in the type of efficacy that appears depending on the concentration of retinol, and it can be classified based on 2500IU. Looking at figures 1, 2, 3 and 4, at 12 weeks, at low concentrations (1500IU, 2500IU) and high concentrations (3300IU, 6600IU), there were significant differences in forehead wrinkle, pore size, skin brightness and skin elastisity. This means that not only the difference in the effect size, but also the difference in the type can be shown. Therefore, in order to use retinol on the skin, it means that the efficacy to be improved should be clearly defined and the appropriate concentration of retinol should be used.

Conclusions:

In the case of high concentration retinol (3300, 6600 IU), structural changes of the skin such as wrinkles and skin texture showed an effect, and in the case of low concentration retinol (1500, 2500 IU), skin elasticity and color change was noticeable. We found that, depending on the concentration of retinol, the kind of efficacy and the timing of skin change were different. Therefore, it is necessary to set the concentration of retinol according to the desired efficacy.

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