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"IT'S NOT JUST AN EYE BUT RATHER THE REGION OF THE GAZE"

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1.Introduction:

Aging is a complex process affecting all human beings, it is influenced by intrinsic and extrinsic factors. Characteristics of skin aging are common, including wrinkles, sun spots, uneven skin color and features related to sagging skin. [1]

The skin around the eyes is the thinnest and most fragile one. We blink our eyes thousands of times a day, which leads to the early appearance of signs of aging in this area of the face. [2]. Eye area is key to determine a person's age and emotions, as shown by eye-tracking studies [3]. All these reasons explain the according interest to this area and the increasing number of aesthetic procedures conducted every year. [4]

To study the characteristics of aging skin objectively, it is well documented that the use of photographic scales offers much more reliable means of assessing the sign of photoaging than purely descriptive ordinal scales. [5] In our work, we developed validated and published ordinal photographic's scales. As the signs of aging are common to all women (such as wrinkles, tissue sagging and uneven skin) we chose to use the same validated clinical scales established from a collection of digital images of Caucasian healthy women, that were validated on photographs of Japanese women demonstrating that photographic reference scales established in an ethnic population can be used to asses skin aging in individuals of different ethnic backgrounds, [6, 7, 8].

Using the same scales for all studied populations enabled us to compare them and to assess how these signs change with age, skin phototype and geographical location. In this work, we compared aging features of the eye area between Asian, Caucasian, Hispanic, Indian and African large populations.

2. Materials and Methods

Data of 7593 women from different studies, aged between 20 and 70 years, were studied to describe aging of the eye area from phototype I to VI (cf. Figure 1). Studies were conducted in accordance with the principles of the Declaration of Helsinki, and written informed consent was obtained from all participants.

The relationship between the chronological age and the clinical features were studied using polynomial regression method.

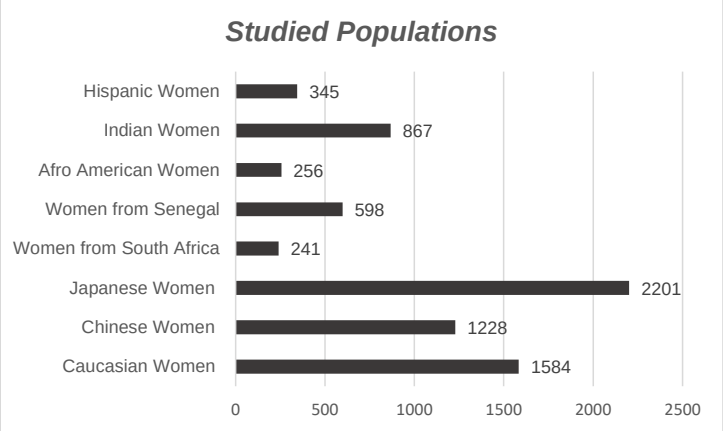

Figure 1. Population distribution

Clinical evaluations were conducted by trained dermatologists on facial pictures (open and closed eyes faces and both profiles) using the clinical ordinal validated photographic scales to compare aging features between the different studied populations: crow's feet, wrinkles under the eyes, drooping eyelid, bag under the eyes, dark circle intensity and frown lines.

3. Results

In studied populations, Caucasian women presented the highest severity of eye area aging. For example, a 35-year-old Caucasian woman presents in average a comparable grade of crow's feet wrinkles to a 50-year-old Afro-American woman (cf. Figure 2). Among the Asian studied populations, Japanese women presented the lowest grade of wrinkles severity compared to the other Asian women, especially for wrinkles under the eyes. Despite the fact that melanin protects against photoaging, women from south Africa living in Pretoria and women from west Africa living in Dakar, presented more severe grade of wrinkles compared to Afro-American women living in New York, which mainly can be explained by sun exposure and the UV index in these cities (cf. Figures 4 & 5)

Hispanic and Indian women with lighter phototype are comparable to Caucasian women.

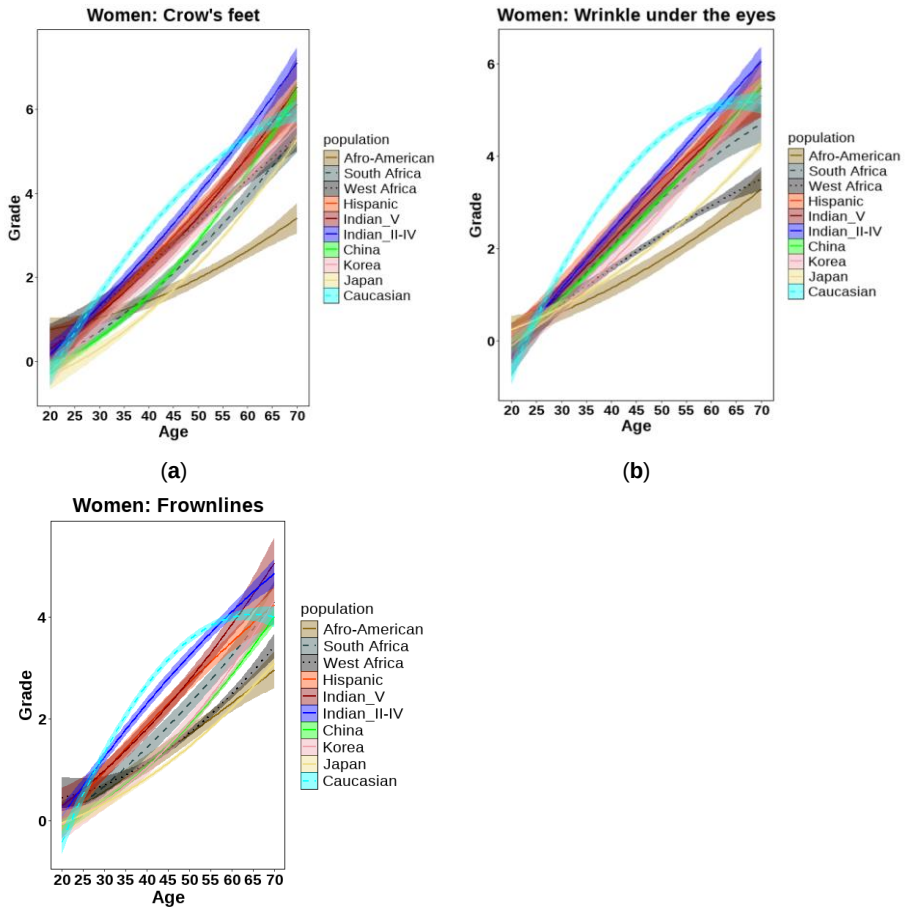

Figure 2. Comparison of the severity of wrinkles between the different studied populations (a) crow's feet wrinkles; (b) wrinkles under eyes; (c) frown lines

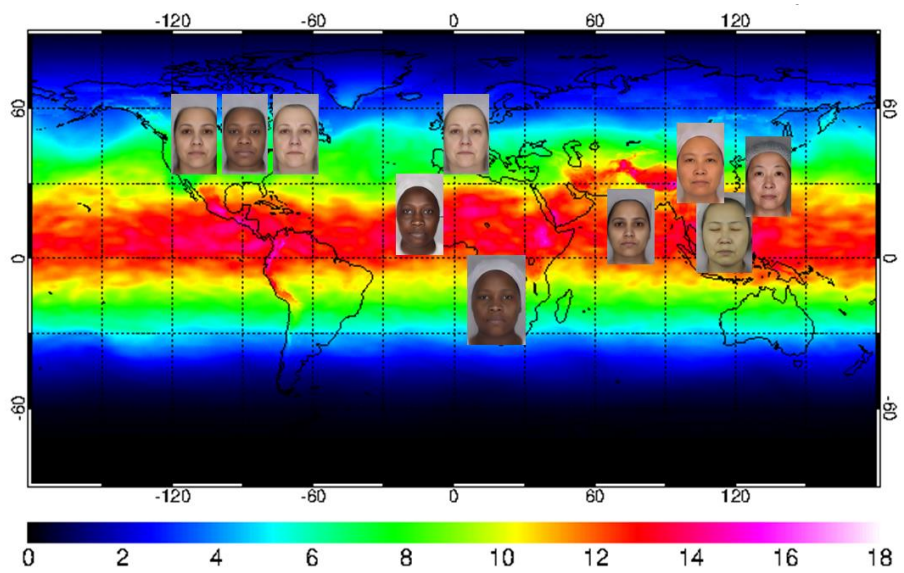

Figure 3. UV index in the cities of each studied population [9] (average faces illustrating the different studied populations))

Figure4. example of inter-ethnic crow's feet wrinkles gravity

Figure 5. example of inter-ethnic frown lines wrinkles gravity of women aged 44 years old, C: Caucasian, H: Hispanic and AA: Afro-American respectively.

Drooping eyelid related to tissue sagging: Caucasian women at the age of 50 presented a moderate to severe grade whereas Afro-American women presented mild to moderate grade at the same age. Asian women presented a comparable grade of drooping eyelid. (cf. Figure. 6).

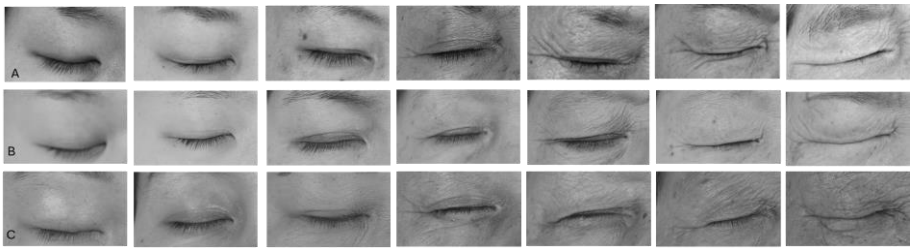

Figure 6. Drooping eyelid:

A: Japanese, B: Korean and C: Chinese women

Concerning bags under the eyes, Korean women presented the lowest grade of severity compared to other studied population.

According to our results, we found that variation of features related to tissue sagging between the different studied populations is less important than wrinkles. (cf. Figure 7)

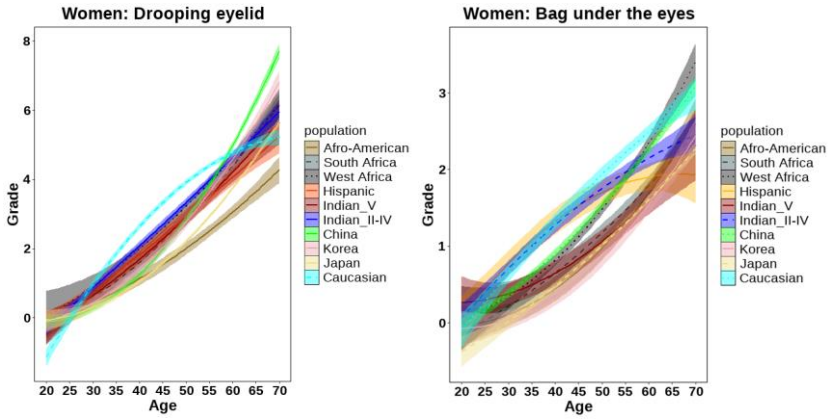

Figure 7. Comparison of the severity of tissue sagging between the different studied populations (Drooping eyelid and Bag under the eyes)

When it comes to the severity of dark circles, women with a darker phototype and Indian women have the most severe dark circles (cf. Figures 8 & 9). It is interesting to note that the presence of dark circles in West Africa was statistically lower among people who declared to use daily sunglasses (data not shown).

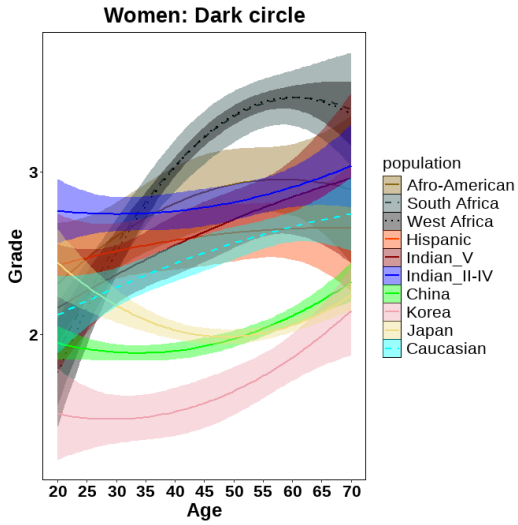

Figure 8. Comparison of the severity of dark circles between the different studied populations,

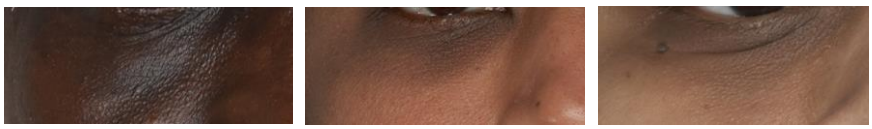

Figure 9. Example of dark circle in darker phototype

4. Discussion

To the best of our knowledge, few studies have been carried out on darker skin types, particularly in West Africa. Moreover, studies comparing so diverse populations using the same clinical aging scales are rare.

The results highlight the protective effect of melanin on the eye ageing especially for wrinkles. The Afro-American women presented the lowest grade of wrinkles severity whereas the Caucasian women presented the highest grade of wrinkles severity. The results also underline the importance of sun protection for this area even in dark phototype. The Japanese women

presented grade of wrinkle around the eyes closed to the level of dark phototype. Sagging tissue was less linked to ethnic origin and probably more a reflection of chronological aging.

Dark circles are a major concern for the darkest phototypes (V and VI), and the use of sunglasses is a protective factor, confirming the importance of sun protection for this sign too.

5. Conclusion

All women are affected by the same skin aging features. Grading photographs from different populations using the same reference scales revealed several differences in the frequency and severity of aging features. The speed of aging or the level of severity is probably mainly driven by skin color and sun exposure. We highlighted specifics concerns for each population.

A good understanding of the characteristics of eye region aging between different populations could help to identify risk factors to propose the most appropriate skin care strategy of eye aging.

References :

[1],Neelma A Vashi, et al. Aging Differences in Ethnic Skin. J Clin Aesthe Dermatol. 2016 ; 9:31-8.

[2], Della volpe et al, Skin diversity: histological study of 140 skin residues, adapted to plastic surgery. Ann Chir Plast Esthet. 2012; 5:423-49

[3], A. Porcheron, J. Pripfl, W. Jenner, M. Pivec, M. Binder, E. Tschachler , F. Morizot. Perception and gaze behaviour : How do we look at faces? 32nd European Conference on Visual Perception, Regensburg, 24-28 August 2009.

[4], Global survey of ISAPS (International Society of Aesthetic Plastic Surgery) 2023

[5],Griffiths CE, Wang TS, Hamilton TA, et al. A photonumeric scale for the assessment of cutaneous photodamage. Arch Dermatol.1992;128:347-351.

[6],Randa Jdid, Julie Latreille, et al. Validation of digital photographic reference scales for evaluating facial aging signs. Skin Res Technol. 2018 ; 24:196-202

[7],Valet F, et al. Quality assessment of ordinal scale reproducibility: log-linear models provided useful information on scale structure. J Clin Epidemiol. 2008;61:983-990.

[8],Erwin TSCHACHLER and Frederique MORIZOT. Ethnic Differences in Skin Aging; Skin Aging, Chapter: pp 23-31

[9] https://crondallweather.co.uk/uv-index-definitions-and-current-readings/#google_vignette

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