ORIGINAL ARTICLE

Dermoscopic assessment of facial photoaging skin among north Morroccans

Evaluation du photovieillissement facial chez les Marocains du Nord par analyse dermoscopique

Nadia Handous, Ouiame El Jouari, Karima Sammoud, Adil Najdi, Salim Gallouj

Abdelmalek Essaâdi University, Faculty of Medicine and Pharmacy of Tangier, BP 2117, University Hospital Center Mohammed VI, BP 398, Dermatology Department, Tangier, Morocco.

Abstract

Introduction: Skin aging involves both chronological aging influenced by human genetics and extrinsic aging mainly caused by UV radiation and smoking. Dermoscopy is a non-invasive diagnostic tool that provides accurate aging assessment signs which may be invisible to the naked eye. This study aims to investigate and compare the dermoscopic features of facial photoaging in Moroccan females and males across various age groups. It also seeks to assess the impact of other factors associated with premature skin aging, notably smoking.

Methods: A descriptive and comparative study was conducted on 207 subjects with at least one hour of daily sun exposure. Participants were divided into three age groups: 35–49, 50–64, and 65+ years.

Results: In the group aged 35 to 49 years, a significant difference was observed between genders regarding yellowish discoloration, white lines, hypo-/hyperpigmented macules (P = 0.003) and deep wrinkles (P = 0.02). For subjects aged 50 to 64 years, males exhibited a significantly higher prevalence of yellowish discoloration and skin atrophy compared to females. However, females had a higher prevalence of superficial wrinkles (P = 0.02). In the group aged 65 years and older, significant differences were observed between females and males regarding white lines/skin atrophy, actinic keratosis, and senile comedones, all of which were more prevalent in males.

Conclusion: Dermoscopy is a straightforward method for better assessing facial aging and detecting early signs of photoaging leading to ensure prevention of skin aging and to monitor the effectiveness of therapeutic applications.

Keywords: Skin aging, Photoaging, Dermoscopy, Extrinsic factors

Résumé

Introduction : Le vieillissement cutané résulte du vieillissement chronologique, influencé par la génétique, et du vieillissement extrinsèque, causé principalement par l'exposition aux UV et le tabagisme. La dermoscopie, outil diagnostique non invasif, permet d'évaluer avec précision les signes de vieillissement cutané invisibles à l'œil nu.

Objectif: Cette étude analyse et compare les caractéristiques dermoscopiques du photovieillissement facial chez les hommes et les femmes marocains selon l'âge et l'impact du tabagisme.

Méthodes : Une étude descriptive et comparative a été menée sur 207 sujets exposés au soleil au moins une heure par jour. Trois groupes d'âge ont été définis : 35-49 ans, 50-64 ans et 65 ans et plus.

Résultats : Chez les participants âgés de 35 à 49 ans, une différence significative entre les sexes a été observée, les hommes présentant plus fréquemment une décoloration jaunâtre, des lignes blanches, des macules hypo-/hyperpigmentées (P = 0,003) et des rides profondes (P = 0,02). Dans le groupe des 50 à 64 ans, les hommes montraient une prévalence plus élevée de décoloration jaunâtre et d'atrophie cutanée, tandis que les femmes présentaient davantage de rides superficielles (P = 0,02). Chez les sujets de 65 ans et plus, les hommes étaient plus touchés par l'atrophie cutanée, la kératose actinique et les comédons séniles.

Conclusion : La dermoscopie est une méthode efficace pour évaluer le vieillissement cutané et détecter précocement le photovieillissement. Elle aide à la prévention et au suivi thérapeutique du vieillissement cutané.

Mots-clés : Vieillissement cutané, Photovieillissement, Dermoscopie, Facteurs extrinsèques

Correspondance
Nadia Handous
Abdelmalek Essaâdi University, Faculty of Medicine and Pharmacy of Tangier, BP 2117, University Hospital Center Mohammed VI, BP 398, Dermatology Department, Tangier, Morocco.
Email: dr.handousnadia@gmail.com

LA TUNISIE MEDICALE-2025; Vol 103 (10): 1438-1443 DOI: 10.62438/tunismed.v103i10.5821

Introduction

The facial skin prominently displays visible signs of aging over time due to the synergistic effects of intrinsic and extrinsic factors. Intrinsic aging includes genetics, cellular metabolism, hormonal changes, and metabolic processes (1). Extrinsic aging, develops due to various external factors such as UV radiation exposure, smoking, ionizing radiation, severe physical and psychological stress, poor nutrition, overeating, alcohol consumption, and environmental pollution. Among these, UV radiation is the most significant factor, contributing up to 80% of skin aging, particularly premature aging (2).

Dermoscopy is a non-invasive diagnostic tool that allows for the rapid and magnified in vivo observation of the skin surface, enabling the visualization of morphologic features invisible to the naked eye (3). To this end, Isik et al. (2013) developed the Dermoscopy Photoaging Scale (DPAS) to assess skin photoaging (4). This tool provides reliable and objective results compared to using clinical criteria alone.

This study aims to investigate and compare the dermoscopic features of facial photoaging in Moroccan females and males across various age groups and to relate these findings to Glogau's Photoaging Scale. Additionally, it seeks to assess the impact of other factors associated with premature skin aging, particularly smoking. The ultimate goal is to support the prevention and treatment of skin aging and to monitor the effectiveness of therapeutic interventions.

Methods

This descriptive and comparative study employed a cross-sectional, non-randomized design included 207 subjects with facial aging at the Mohammed VI University Hospital Center in northern Morocco. The study period extended from September 2023 to July 2024. Informed consent was obtained from all participants prior to their inclusion in the study. Male and female subjects aged 35 years and older, with a minimum average daily sun exposure of one hour, were included.

Subjects with Genodermatoses, those receiving medications that could affect skin aging such as topical or systemic anti-aging pharmaceuticals (e.g., topical vitamin C preparations, systemic hormone replacement therapy, topical or systemic retinoids) were excluded.

Individuals who had undergone plastic surgery or medical-aesthetic procedures within at least 12 months prior to the study entry (e.g., chemical peels, botulinum toxin injections, dermal fillers, radiofrequency microneedling, or laser resurfacing) were also excluded.

A detailed history was collected to gather patient data, including age, gender, occupation, smoking and alcohol habits, sunburn history, amount of sun exposure, type of clothing, and sunscreen usage. All subjects were photographed in three positions (front view, 45° right lateral, and 45° left lateral). The Glogau scale was assessed based on the clinical examination of facial skin (Fig 1- 2). Glogau's photoaging classification was determined by evaluating wrinkles, pigmentation, keratosis, and the use of foundation (5).

The face was divided into four areas (forehead, right cheek, left cheek, and chin). Each area was examined using a DermLite DL4 dermatoscope to calculate the Dermoscopic Photoaging Scale (DPAS) score according to the criteria established by Isik et al. (4).

These criteria included (Fig 3): yellowish discoloration (a), hypo-/hyperpigmented macules (b), yellowish papules (c), telangiectasia (d), white lines/skin atrophy (e), senile comedones (f), superficial wrinkles (g), solar lentigines (h), actinic keratosis (i), deep wrinkles, and criss-cross wrinkles. The final DPAS score was calculated by aggregating scores from the four facial areas (4). The data were compiled and analyzed using the Statistical Package for the Social Sciences (SPSS) software, version 21.0. A P-value ≤ 0.05 was considered statistically significant.

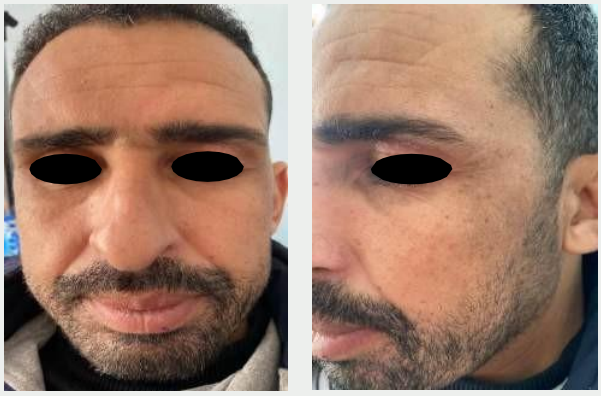

Figure 1. A 38-year-old male, non-smoker, with a history of prolonged sun exposure, presents with deep wrinkles on the forehead and yellowish macules on the cheeks. Clinical examination also reveals areas of hypo-/hyperpigmentation, telangiectasia along with lentigines, consistent with Glogau Type III photoaging.

Figure 2. A 63-year-old female, non-smoker, presents with deep wrinkles, a criss-cross wrinkle pattern, and yellowish papules on the left cheek that are subtle and difficult to distinguish. Clinical examination also reveals hyperpigmentation and lentigines, consistent with Glogau Type III–IV photoaging.

Results

A total of 207 subjects were included in this study: 106 (51.2%) were female, and 101 (48.8%) were male. The subjects were divided into three age groups: 35 to 49 years, 50 to 64 years, and 65 years and older.

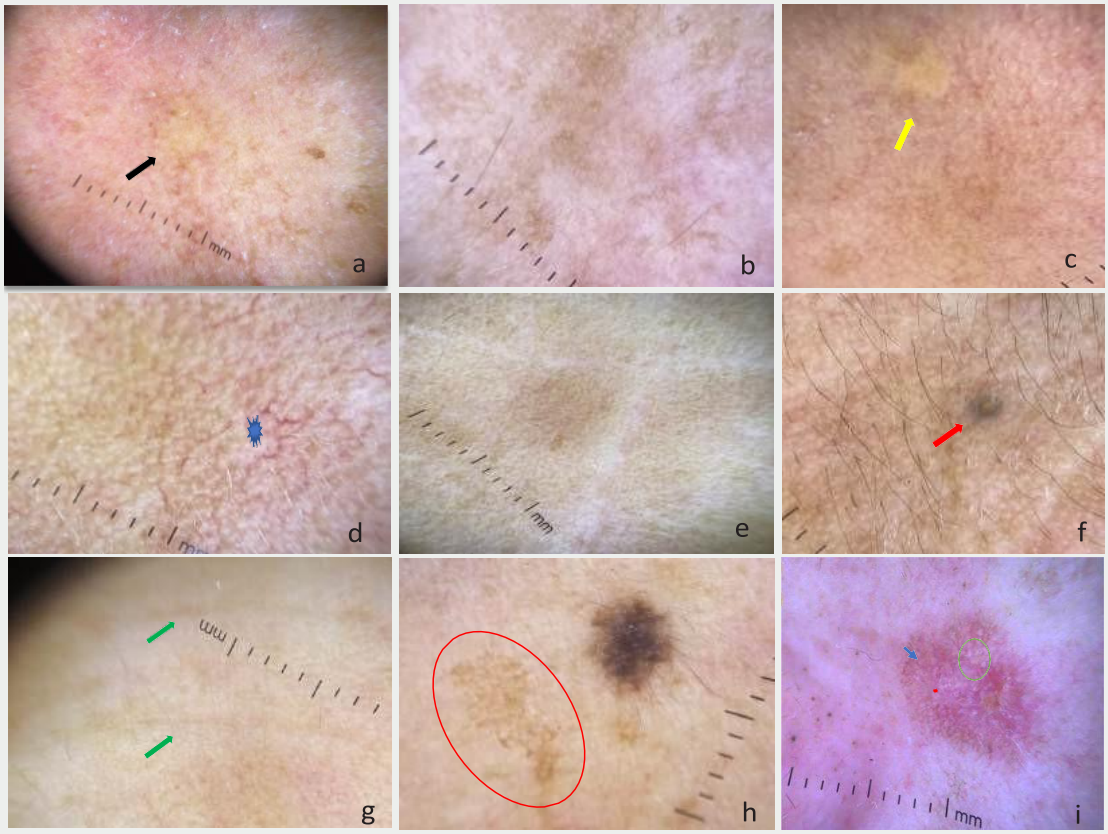

Figure 3. Dermoscopic criteria of Photoaging:
a. yellowish discoloration (black arrow); b. hypo-/hyperpigmented macules;
c. yellowish papules (yellow arrow); d. telangiectasia (blue star); e. white lines/skin atrophy;
f. senile comedones (red arrow); g. superficial wrinkles (green arrow);
h. solar lentigines (pseudonetwork, homogeneous pigmentation with ill-defined border [red circle]);
i. actinic keratosis (erythematous reversed network, whitish scale [yellow star], linear or wavy vessels [blue arrow] surrounding follicular openings surrounded by a white halo [green circle].

The photoaging characteristics of the subjects, based on the Glogau scale, varied across these groups: 66% of individuals aged 35 to 49 years were classified as Glogau II, 54% of those aged 50 to 64 years were classified as Glogau III, and 70% of individuals aged 65 years and older were classified as Glogau IV.

Skin phototypes ranged from II to V. The majority of patients were Fitzpatrick skin type III (68.1%), followed by Fitzpatrick skin type IV (28.5%). Only 1.9% and 1.4% of subjects were classified as phototype II and V, respectively.

Dermoscopic features based on gender:

We studied the effect of photoaging on dermoscopic findings in the group aged 35 to 49 years, comparing females and males (Table 1). A significant difference was observed between genders regarding yellowish discoloration (P = 0.001), white lines/skin atrophy (P = 0.036), hypo-/hyperpigmented macules (P = 0.003), and deep wrinkles (P = 0.02), all of which were more prevalent among males. The DPAS scores were also higher in males (10.5 ± 4.4) compared to females (6.14 ± 3).

For subjects aged 50 to 64 years (Table 2), males exhibited a significantly higher prevalence of yellowish discoloration (P = 0.006) and skin atrophy (P = 0.04) compared to females.

However, females had a higher prevalence of superficial wrinkles (P = 0.02). The DPAS scores were again higher in males (16.4 ± 2.4) than in females (12.5 ± 2.9).

In the group (table 3) aged 65 years and older, significant differences were observed between females and males regarding white lines/skin atrophy (P = 0.04), actinic keratosis (P = 0.003), and senile comedones (P = 0.006), all of which were more prevalent in males.

Conversely, females showed a significantly higher prevalence of superficial wrinkles (P = 0.02) compared to males. In this age group, the DPAS scores were also higher in males (18.3 ± 2.6) than in females (16.4 ± 3.2).

Chronic sun exposure:

A propartion of (54,6%) of persons included in this study had 1 to 2 hours daly sun exposure history, regarded as mild sun exposure; (26,6%) of persons exposed for 2 to 3 hours per day were regarded as moderate sun exposure, and (18,8%) of persons exposed for more than 3 hours per day was regarded as severe sun exposure.

When the dermoscopic features of facial photoaging were examined (fig1), it was seen that people having moderate to severe sun-exposure history had higher prevalence of Yellowish discoloration, white lines/ skin atrophy, Hypo-/ hyperpigmented macules, Telangiectasia,
Deepwrinkles and Criss-cross wrinkles and a higher DPSA photoaging scores (P < 0.001).

Table 1. Dermoscopic features between females and males aged from 35 to 49 years old.

AGE_CATEGORIE : 35-49 years old	Females		Males		
	N	%	N	%	P
Yello wish discoloration					0.001
Yes	16	31.4%	35	76.0%	
NO	35	68.4%	11	24.0%	
Yellowish papules					0.172
Yes	5	9.8%	9	19.6%	
NO	46	90.2%	37	80.4%	
White lines/ Skin Atrophy					0.036
Yes	11	21.6%	19	41.3%	
NO	40	78.4%	27	58.7%	
Lentigo					0.890
Yes	6	11.8%	5	10.9%	
NO	45	88.2%	41	89.1%	
Hypohyperpigmentedma cules					0.003
Yes	20	39.2%	32	69.6%	
NO	31	60.8%	14	30.4%	
Telangiectasia					0.087
Yes	28	54.9%	33	71.7%	
NO	23	45.1%	13	28.3%	
Actinickeratosis					-
Yes	0	0.0	0	0.0	
NO	51	100.0%	46	100%	
Senilecomedones					1.00
Yes	1	2.0%	1	2.2%	
NO	50	98.0%	45	97.8%	
Superficial wrinkles					1.00
Yes	50	98.0%	45	97.8%	
NO	1	2.0%	1	2.2%	
Deep wrinkles					0.02
Yes	15	29.4%	29	63.0%	
NO	36	70.6%	17	37.0%	
Crisscross wrinkles					0.222
Yes	0	0.0	2	4.3%	
NO	51	100.0%	44	95.7%	

Table 2. Dermoscopic features between females and males aged from 50 to 64 years old.

AGE_CATEGORIE : 50-64 years old	Females		Males		
	N	%	N	%	P
Yello wish discoloration					
Yes	12	44.4%	19	82.6%	0.006
NO	15	55.6%	4	17.4%	
Yellowish papules					0.670
Yes	9	33.3%	9	39.1%	
NO	18	66.7%	14	60.9%	
White lines/ Skin Atrophy					0.04
Yes	15	55.5%	18	78.2%	
NO	12	44.5%	6	21.8%	
Lentigo					0.408
Yes	10	37.0%	6	26.1%	
NO	17	63.0%	17	73.9%	
Hypohyperpigmented macules					0.760
Yes	25	92.6%	22	95.6%	
NO	2	7.4%	1	4.3%	
Telangiectasia					
Yes	20	74.1%	20	87.0%	0.308
NO	7	25.9%	3	13.0%	
Actinickeratosis					
Yes	3	11.1%	3	13.0%	-
NO	24	88.9%	20	87.0%	
Senilecomedones					1.00
Yes	1	2.0%	1	2.2%	
NO	50	98.0%	45	97.8%	
Superficial wrinkles					
Yes	22	81.5%	12	52.2%	0.027
NO	5	18.5%	11	47.8%	
Deep wrinkles					
Yes	25	92.6%	23	100.0%	0.493
NO	2	7.4%	0	0.0%	
Crisscross wrinkles					0.325
Yes	5	18.5%	7	30.4%	
NO	22	81.5%	16	69.6%	

Smoking

In our study, the majority of participants were non-smokers (56%). A total of 31.4% of the volunteers had a history of smoking, all of whom were male, while 12.6% were passive smokers, including both males and females (Fig 4 - 5).

The results showed that smoking was associated with yellowish discoloration, senile comedones, and deep and criss-cross wrinkles ($P < 0.001$) on sun-exposed skin. The total DPAS score ($P < 0.001$) was significantly higher in the active smoker group compared to the passive smoker and non-smoker groups.

Figure 3. A 70-year-old male patient, active smoker, clinical examination reveals hyperpigmentation, deep wrinkles and Criss-cross wrinkles, Yellowish papules on the left cheek, subtle and difficult to distinguish, also hyperpigmentation and Senile comedones suggesting Glogau Type IV photoaging.

Table 3. Dermoscopic features between females and males aged 65 years and older 159

AGE_CATEGORIE : >= 65 years old					
	Females		Males		
	N	%	N	%	P
Yellowishdiscoloration					0.355
Yes	22	78.6%	28	87.5%	
NO	6	21.4%	4	12.5%	
Yellowish papules					
Yes	9	32.1%	11	34.4%	0.855
NO	19	67.9%	21	65.6%	
White lines/ Skin Atrophy					0.031
Yes	23	82.1%	18	56.3%	
NO	5	17.9%	14	43.8%	
Lentigo					
Yes	13	46.4%	20	62.5%	
NO	15	53.6%	12	37.5%	0.212
Hypohyperpigmentedma cules					-
Yes	28	100.0%	32	100.0%	
NO	0	00.0%	0	00.0%	
Telangiectasia					0.432
Yes	26	92.9%	27	84.4%	
NO	2	7.1%	5	15.6%	
Actinickeratosis					0.003
Yes	1	3.6%	11	34.4%	
NO	27	96.4%	21	65.6%	
Senilecomedones					0.006
Yes	6	21.4%	18	56.3%	
NO	22	78.6%	14	43.8%	
Superficial wrinkles					0.042
Yes	12	42.9%	6	18.8%	
NO	16	57.1%	26	81.3%	
Deep wrinkles					-
Yes	28	100.0%	32	100.0%	
NO	0	00.0%	0	00.0%	
Crisscross wrinkles					0.225
Yes	20	71.4%	27	84.4%	
NO	8	28.6%	5	15.6%	

Figure 4. A 37-year-old female patient, passive smoker. Clinical examination revealshyperpigmentation, yellowish discoloration, deep wrinkles especially on the glabellar region and forehead and the presence of telangiectasia on the cheeks and nose, suggesting Glogau Type III (Advanced) photoaging

Discussion

The Dermoscopic Photoaging Assessment Scale has proven effective in detecting signs of photoaging that are otherwise invisible to the naked eye. Isik et al. (2013) found that many cases of premature photoaging could be easily detected by dermoscopy and subsequently classified into the second group of the Glogau Photoaging Scale (4).

Our study aimed to investigate and compare the dermoscopic features of facial photodamage in males and females across various age groups. The results showed an overexpression of most photoaging signs in men across different age groups compared to women, particularly yellowish discoloration, hypo-/hyperpigmented macules, white lines/skin atrophy, and deep wrinkles. This may be attributed to the high prevalence of veiled females in our country and the fact that Moroccan males are more likely to be exposed to extrinsic factors such as smoking and prolonged outdoor work.

In the first group, aged 35 to 49 years, our findings aligned with a study conducted in Egypt by El Sayed and al., where they also observed significant differences in yellowish discoloration, white lines, hypo-/hyperpigmented macules, and deep wrinkles among men compared to women. Additionally, their study identified telangiectasias, superficial wrinkles, and criss-cross wrinkles as significant features in men (6).

Akiba et al. investigated gender differences in sun exposure among individuals under 60 years old and suggested that lower levels of sun exposure in women may result in fewer wrinkles (7). These findings align with our study, where females aged 50 years and older showed a higher prevalence of superficial wrinkles than males. This could be explained by the fact that hormonal decreases in females heighten the skin's sensitivity to UV radiation, causing wrinkle progression to increase markedly with long-term UV exposure. This suggests that female hormones may suppress UV-induced wrinkle development. Additionally, the milder wrinkling observed in women under 60 years old may be attributed to lower sun exposure and the protective effects of female hormones (8).

We also noted that hypo-/hyperpigmented macules were the most commonly detected DPSA sign in our sample. This finding aligns with previous literature, which states that individuals with Fitzpatrick skin types III and IV living in coastal areas tend to experience earlier and more rapid pigmentation changes (9–10).

Another study conducted in Jakarta in 2022 revealed that among both genders, aged 30–39 years up to ≥60 years, lentigines and hypo-/hyperpigmented macules were the most commonly observed features (11). This could be explained by the predominance of phototype IV in their sample, where the impact of melanin on UV absorption is more significant, leading to earlier pigmentation changes in the skin during the aging process.

Yaldiz M. in Turkey reported that the prevalence of actinic keratosis was higher in individuals with Fitzpatrick skin types I and II but decreased significantly in those with Fitzpatrick skin types IV and V (12). These findings align with our study, where a prevalence of 5.8% for actinic keratoses was observed in the male and female population. The prevalence significantly decreased in individuals with Fitzpatrick skin types III and IV, which were the most common phototypes in our sample.

Our study showed that prolonged sun exposure was associated with a significant increase in yellowish discoloration, skin atrophy, hypo-/hyperpigmented macules, telangiectasia, and wrinkles. These findings are consistent with the literature, which suggests that pigmentary changes result from the uneven distribution of melanocytes in the epidermis in response to solar exposure. Vascular changes are thought to occur due to the effects of VEGF (vascular endothelial growth factor) secondary to solar exposure, leading to thickening of the hyaline basement membrane, dilation, and tortuosity of blood vessels. This increases the fragility of blood vessels in photodamaged skin, contributing to the appearance of telangiectasias (13).

Furthermore, photoaging results in a yellowish discoloration of the skin, an early sign of elastosis (14), which is characterized by increased deposition of abnormal, degraded elastin fibers and collagen breakdown products in the dermis (15). This process also contributes to the development of wrinkles, which result from the loss of normal dermal structural integrity (16).

In our study, only males were smokers. This could be explained by the cultural traditions in northern Morocco, where women typically do not smoke.

Additionally, our results showed a significant increase in yellowish discoloration, senile comedones, and deep and criss-cross wrinkles among smokers. Numerous other studies have highlighted the role of smoking in extrinsic aging. For instance, Isik et al. found that tobacco users exhibited yellowish discoloration regardless of solar exposure and had an increased prevalence of senile comedones and telangiectasias (4). Similarly, El Sayed et al. observed that yellowish macules, senile comedones, and all types of wrinkles were more prominent among smokers (6).

Conclusion

Dermoscopy is a precise and straightforward method for better assessing facial aging and selectively detecting early signs of photoaging in both men and women.

A prominent American dermatologist, Nicholas Perricone, begins his book with the words: “Wrinkled, sagging skin is not the inevitable result of getting older. It’s a disease, and you can fight it” (17). Based on this perspective, we recommend larger-scale studies to evaluate the effectiveness of preventive and therapeutic anti-aging procedures, using dermoscopy as a reliable evaluation tool.

References

1. Cevenini E, Invidia L, Lescai F, Salvioli S, Tieri P, Castellani G, et al. Human models of aging and longevity. Expert Opin Biol Ther. 2008;8(9):1393-405. doi: 10.1517/14712598.8.9.1393.
2. Ferguson J, Dover JS. Photodermatology. London: Manson Publishing; 2006.
3. Lacarrubba F, D'Amico V, Nasca MR, Dinotta F, Micali G. Use of dermatoscopy and videodermatoscopy in therapeutic follow-up: A review. Int J Dermatol. 2010;49(8):866-73. doi: 10.1111/j.1365-4632.2010.04581.x.
4. Isik B, Gurel MS, Erdemir AT, Kesmezacar O. Development of skin aging scale by using dermoscopy. Skin Res Technol. 2013;19(2):69-74. doi: 10.1111/srt.12033.
5. Glogau RG. Aesthetic and anatomic analysis of the aging skin. Semin Cutan Med Surg. 1996;15(3):134-8.
6. El-Sayed MH, Saleh HM, El Zawahry KMA, Mostafa AE. The dermoscopic features of facial aging among Egyptians: a comparative study between males and females. J Cosmet Dermatol. 2019;18(6):1803-13.
7. Akiba S, Shinkura R, Miyamoto K, Hillebrand G, Yamaguchi N, Ichihashi M. Influence of chronic UV exposure and lifestyle on facial skin photo-aging – Results from a pilot study. J Epidemiol. 1999;9(6 Suppl):S136-42.
8. Tsukahara K, Kakuo S, Moriwaki S, Hotta M, Ohuchi A, Kitahara T, et al. The characteristics of aromatase deficient hairless mice indicate important roles of extragonadal estrogen in the skin. J Steroid Biochem Mol Biol. 2008;108(1-2):82-90.
9. Knaggs H. Skin aging in the Asian population. In: Dayan N, editor. Skin Aging Handbook. 1st ed. New York: Elsevier; 2008. p. 177-201.
10. Lym CI, Azeveo CM, Cohen S, Cunha MG. Characteristics of asian skin–revision. J Dermatol Cosmetol. 2018;2(6):121-33.
11. Respati RA, Yusharyahya SN, Wibawa LP, Widaty S. The dermoscopic features of photoaging and its association with sun index score in the coastal population at Cilincing, Jakarta: a cross-sectional study. Clin Cosmet Investig Dermatol. 2022;15:939-46.
12. Yaldiz M. Prevalence of actinic keratosis in patients attending the dermatology outpatient clinic. Medicine. 2019;98:e16465.
13. Fernandez-Flores A, Saeb-Lima M. Histopathology of cutaneous aging. Am J Dermatopathol. 2019;41(7):469-79.
14. Tobin DJ. Introduction to skin aging. J Tissue Viability. 2017;26(1):37-46.
15. Weihermann AC, Lorencini M, Brohem CA, De Carvalho CM. Elastin structure and its involvement in skin photoageing. Int J Cosmet Sci. 2017;39:241-7.
16. Quan T, He T, Kang S, Voorhees JJ, Fisher GJ. Solar ultraviolet irradiation reduces collagen in photoaged human skin by blocking transforming growth factor-beta type II receptor/Smad signaling. Am J Pathol. 2004;165(3):741-51.
17. Perricone N. The wrinkle cure. New York: Warner Books; 2001.