Master of Science in Dermoscopy and Preventive Dermato-Oncology

Master Thesis:

Correlation beetwen sundamage of skin and dermoscopy in melanoma

Written by

lek Paweł Falkowski

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Statutory declaration

I declare that I have written this work independently and without assistance other than those specified sources, and have not used sources or means without declaration in the text. Any thoughts from others or literal quotations are clearly marked. The Master Thesis was not used in the same or in a similar version to achieve an academic grading or is being published elsewhere.

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Abstract

Melanoma is the third most common malignant skin tumor but accounts for the majority of skin cancer-related deaths. The correlation between sundamage and the biology of melanoma remains incompletely understood. The aim of this study was to assess the correlation between the patient's skin condition and the dermatoscopic features exhibited by melanoma.

The study involved a retrospective analysis of clinical and dermatoscopic images obtained from the archives of the Dermatology Clinic at the Medical University of Graz between 2016 and 2023. A total of 98 patients (51 males and 47 females) were included in the analysis. The dermatoscopic features were analyzed in four groups of patients categorized as having undamaged skin, mild sundamage, moderate sundamage, and severe sundamage.

Patients with undamaged skin exhibited a significantly higher frequency of peripheral rim of brown globules, irregular dots, and irregular blotch, and a borderline significance for the presence of a blue-whitish veil. In the group of patients with moderate sundamage, structureless areas and polygons were more commonly observed.

Previous data have indicated better prognosis for patients with sundamage, and it has been suggested that skin elastosis may be the main contributing factor. Further studies should focus on assessing the correlation under investigation, along with a detailed analysis of histopathological features and treatment outcomes data.

Introduction

Epidemiology

Melanoma, arising from pigment-producing cells called melanocytes, is a form of skin cancer. Despite being the third most prevalent skin cancer type, following basal cell carcinoma and squamous cell carcinoma, it carries the highest mortality rate among skin cancer cases [1]. It ranks as the sixth most common malignancy in the European population, with over 100,000 cases diagnosed in European Union countries in 2020. Melanomas account for approximately 4% of all newly diagnosed malignant tumors, contributing to 1.3% of cancer-related deaths [2]. The continuous and substantial increase in melanoma cases presents a significant challenge to modern medicine. It is estimated that the incidence of new cases doubles approximately every 30 years, and this upward trend is expected to persist in the upcoming years [3]. Notably, melanoma predominantly affects the younger population, with the average age of diagnosis being 57 years. Among individuals under the age of 40, melanoma is the predominant cancer in women, while in individuals above 75 years of age, it occurs three times more frequently in men. Furthermore, melanoma accounts for the highest number of cancer-related deaths among young adults [4].

Risk factor

The primary risk factor for melanoma is exposure to UV radiation. Extensive research conducted by Elwood et al. has established that excessive intermittent sun exposure is the leading cause of melanoma [5]. UVA radiation induces the formation of free radicals, while UVB radiation directly affects the DNA's chemical structure [6]. Recent data suggests that sunburns not only increase the risk of melanoma in children but also in adults [7]. Furthermore, artificial sources of UV radiation, including medical phototherapy and tanning beds, have been identified as contributors to the development of melanoma [8, 9].

Additional risk factors include the total number of moles, with patients having over 100 nevi experiencing a 7-fold higher risk of developing melanoma. The presence of atypical moles is another significant risk factor, as patients with five or more atypical moles have a sixfold increased risk [10]. Family history also plays a role in melanoma risk, as the familial occurrence

of melanoma and atypical moles is associated with an elevated risk of developing melanoma. Furthermore, melanoma is more prevalent among individuals with lower skin phototypes, such as those with red hair, fair skin and eyes, a high number of freckles, and a heightened susceptibility to sunburn [11].

Subtypes of melanoma

There are three primary histopathological subtypes of melanoma: superficial spreading melanoma, nodular melanoma, and lentiginous melanoma. They differ both in clinical appearance and biology.

Superficial spreading melanoma is the most prevalent type, accounting for approximately two-thirds of all melanoma cases. It is characterized by an initial radial growth phase, during which it exhibits horizontal expansion. Clinically, superficial spreading melanoma presents as a dark and flat lesion. Depending on the stage of the disease, it may display the ABCDE criteria, including asymmetry, irregular borders, color variegation, diameter greater than 6mm, and evolution. During the radial growth phase, the lesion can reach a diameter of approximately 1 cm before progressing to the invasive phase. Subsequently, melanoma undergoes a transition to a vertical growth phase, resulting in accelerated invasion into deeper layers of the skin. Clinically, this is evident by the emergence of nodules or bumps within the initially flat lesion. Furthermore, bleeding or ulceration may occur within the lesion. Notably, around 30% of cases arise from pre-existing nevi [12]. Superficial spreading melanoma demonstrates an intermediate growth rate, with an approximate monthly increase in Breslow thickness of 0.12 mm [13].

Nodular melanoma is another subtype of melanoma characterized by the absence of a radial growth phase, unlike superficial spreading melanoma. Instead, it presents as a nodular lesion from the outset. Clinically, nodular melanoma typically manifests as a dark blue or black nodule, while hypomelanotic or amelanotic variants may exhibit a pink or red coloration. Dermatoscopic examination of nodular melanoma may reveal a minimal presence of pathological melanocytes at the lesion's periphery in the surrounding skin. Despite accounting for only 10-15% of diagnosed melanomas, nodular melanoma contributes to the highest

mortality rates among melanoma cases [14]. Its aggressive nature is reflected in its accelerated growth rate, with an average monthly invasion depth of 0.5 mm in the Breslow thickness [13].

Lentiginous melanoma also known as lentigo maligna melanoma, is predominantly diagnosed in elderly individuals. It is directly associated with photo-damaged skin. The majority of lentiginous melanoma cases are located on the head and neck, and occasionally on the trunk or extremities in the presence of significant photodamage. Similar to superficial spreading melanoma, it initially exhibits a phase of radial growth. A pre-invasive form, known as lentigo maligna, is often distinguished, and in cases where an invasive component develops, it is referred to as lentigo maligna melanoma. This slow growth pattern is well-documented in the literature, with only approximately 5% of lentigo maligna cases progressing to invasive disease, which can take 5 to 20 years or even several decades. Studies conducted by Weinstock and Sober indicate that for patients aged 45 years with lentigo maligna in situ, the risk of progression to invasive disease is approximately 3.3% by the age of 75. This probability decreases to 1.2% for patients diagnosed after the age of 65 [15]. Clinically, lentigo maligna melanoma presents as a dark-colored lesion with asymmetrical and irregular borders. In cases of invasive transformation, a nodule may develop within the lesion, typically appearing dark blue. Due to its slow growth, it is classified as an indolent melanoma.

Distribution

According to a study conducted by Anderson on a cohort of 96,900 patients, the location of melanoma differs depending on gender. In males, melanoma was found to occur more frequently on the facial skin (25% vs. 14%) and torso (43% vs. 26%). In females, melanomas were most commonly diagnosed on the lower extremities (34% vs. 10%). The incidence of melanoma on the upper extremities was comparable between the genders [4].

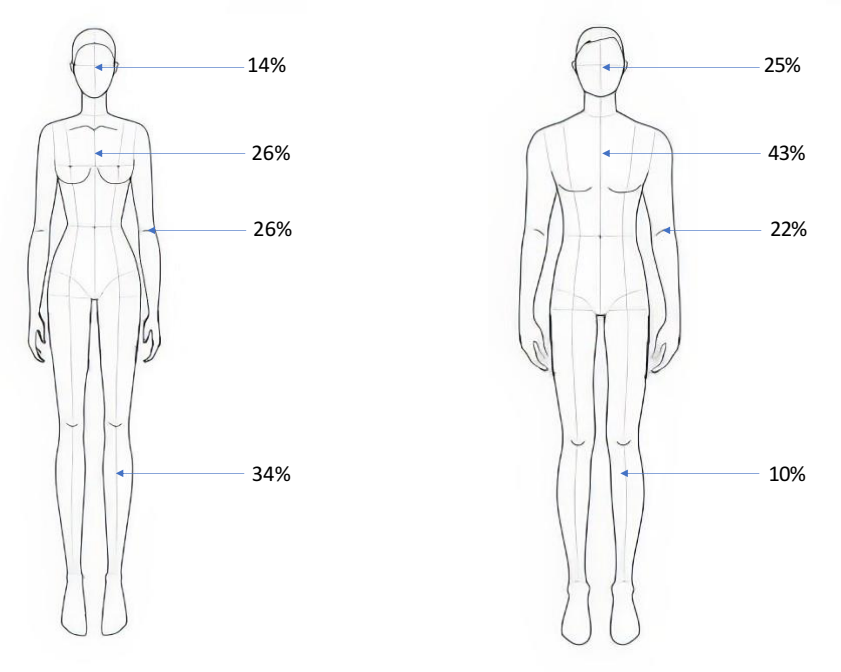


Fig.1 Distribution of melanoma according to Andersons et. al.

Skin sundamage

Excessive exposure to UV radiation is not only a risk factor for melanoma but also results in skin sundamage. UV radiation from sunlight accompanies us in our daily lives. Depending on the intensity of exposure and skin phototype, it can lead to tanning or, in the case of excessive exposure, sunburn. Sunburn, along with prolonged exposure to sunlight, eventually leads to the accumulation of mutations within skin cells and the development of skin sundamage. While skin aging does occur with age, approximately 80% of skin aging is primarily caused by UV radiation exposure. This process is due to UV radiation-induced oxidative stress resulting in DNA damage within cells. Additionally, there are structural changes in the skin, including alterations in collagen structure and a decrease in collagen synthesis, as well as an exacerbation of inflammatory processes. This leads to epidermal hyperplasia and the accumulation of melanin within keratinocytes, resulting in the appearance of hyperpigmentation [16]. These changes contribute to the development of lentigines and actinic keratoses, while DNA damage serves as a factor in the development of skin tumors.

While changes in the skin are visible to the naked eye, clinical examination allows for the identification of approximately 75% (literature reports 66% to 85%) of melanomas [17].

Dermoscopy is currently recognized as a valuable tool in the diagnosis of melanoma. The examination involves the evaluation of the morphology of skin lesions using a dermatoscope (sometimes referred to as an epiluminescence microscope). The dermatoscope consists of a light source and an optical system. It not only provides a tenfold magnification of the examined lesion but also allows for the assessment of structures located beneath the stratum corneum of the epidermis. The structures visible under the dermatoscope represent cellular nests, and the image seen in the device is closely related to the histopathological image of the examined lesion. The ability to evaluate structures below the surface significantly increases the sensitivity to well above 90% (87% to 95%) [17].

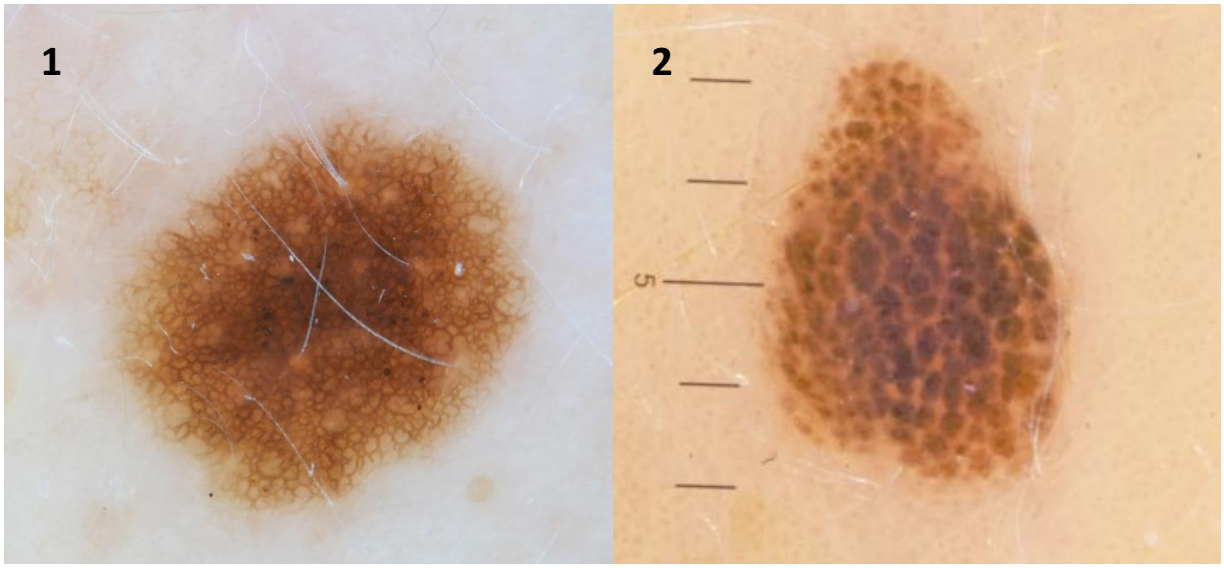
Introduction to dermoscopy

Dermoscopy is a method used to evaluate skin lesions under tenfold magnification using a dermatoscope. Typically, a dermatoscope consists of an optical system that provides tenfold magnification of the lesion. The second essential component is the light source, most commonly LED diodes. Depending on the model, a dermatoscope may utilize polarized light, non-polarized light, or both. When using a non-polarized dermatoscope, the application of a contact medium is necessary, such as alcohol, water, or ultrasound gel (especially for elevated lesions), along with direct contact with the examined lesion. This is due to the light wave refraction depending on the refractive index of the medium through which it propagates [18, 19].

The observed image under a dermatoscope is determined by the presence of chromophores in the skin, including melanin, as well as hemoglobin, keratin, collagen, and lipids. The color of the visible structures depends on their depth within the skin, which is a result of the Tyndall effect— the phenomenon of light scattering in a medium. Shorter wavelengths, such as blue light, exhibit greater reflection and scattering compared to longer wavelengths, such as red light. Consequently, the color observed under a dermatoscope allows us to predict the depth at which the pigment, particularly melanin, is located. Melanin situated in the stratum corneum appears black in color, while melanin near the dermo-epidermal junction appears light brown or dark brown. Melanin found in the dermis will have a gray or blue color if it is located in the deeper layers of the dermis [20].

Unlike microscopic images, dermatoscopic images provide a horizontal view of the skin. Among the various skin lesions, pigmented nevi are frequently observed. Histopathologically, a nevus exhibits a linear growth pattern of melanocytes along the dermo-epidermal junction. On nonglabrous skin surfaces, the presence of skin ridges causes undulations in the dermo-epidermal junction. Consequently, under dermatoscopic examination, a distinct mesh-like pattern becomes visible, composed of vertically aligned melanocytes along the skin ridges. The pigment network of a pigmented nevus typically consists of thinner lines with interlacing spaces between them, gradually diminishing towards the periphery.

A pattern consists of multiple repetitions of a single basic element. Every basic element may be part of a pattern, but only when they are repeated over a significant portion of a lesion [21]. The pigment network pattern is one of the four fundamental dermatoscopic patterns observed on smooth skin. It is describet as net-like pattern tipicaly whit lines thiner than its holes. Additionally, we observe the globular pattern, which consists of globules (oval or round well-defined structures with a size exceeding 0.1 mm and comparable sizes). In benign lesions, this pattern is characteristic of nevi in the pediatric population and is often referred to as cobblestone pattern in intradermal nevi. The homogeneous pattern is described by the presence of pigment throughout the lesion and is typical for blue nevi. When at least three patterns are present, we refer to it as a multicomponent pattern.



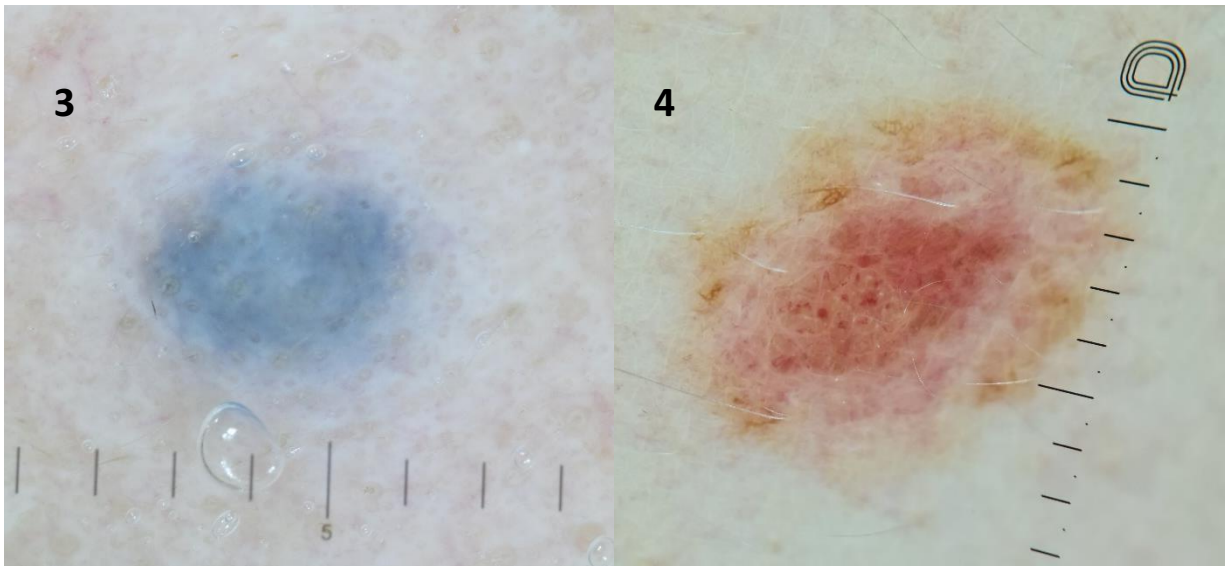


Fig.2 Basic pattern presented presented in benign lesions: 1. reticular pattern in congenital nevus in adult; 2. globular pattern in nevus in pediatric patient; 3. homogenous pattern in blue nevus; 4. multicomponent pattern (reticular, homogenous and globular pattern) in compound nevus.

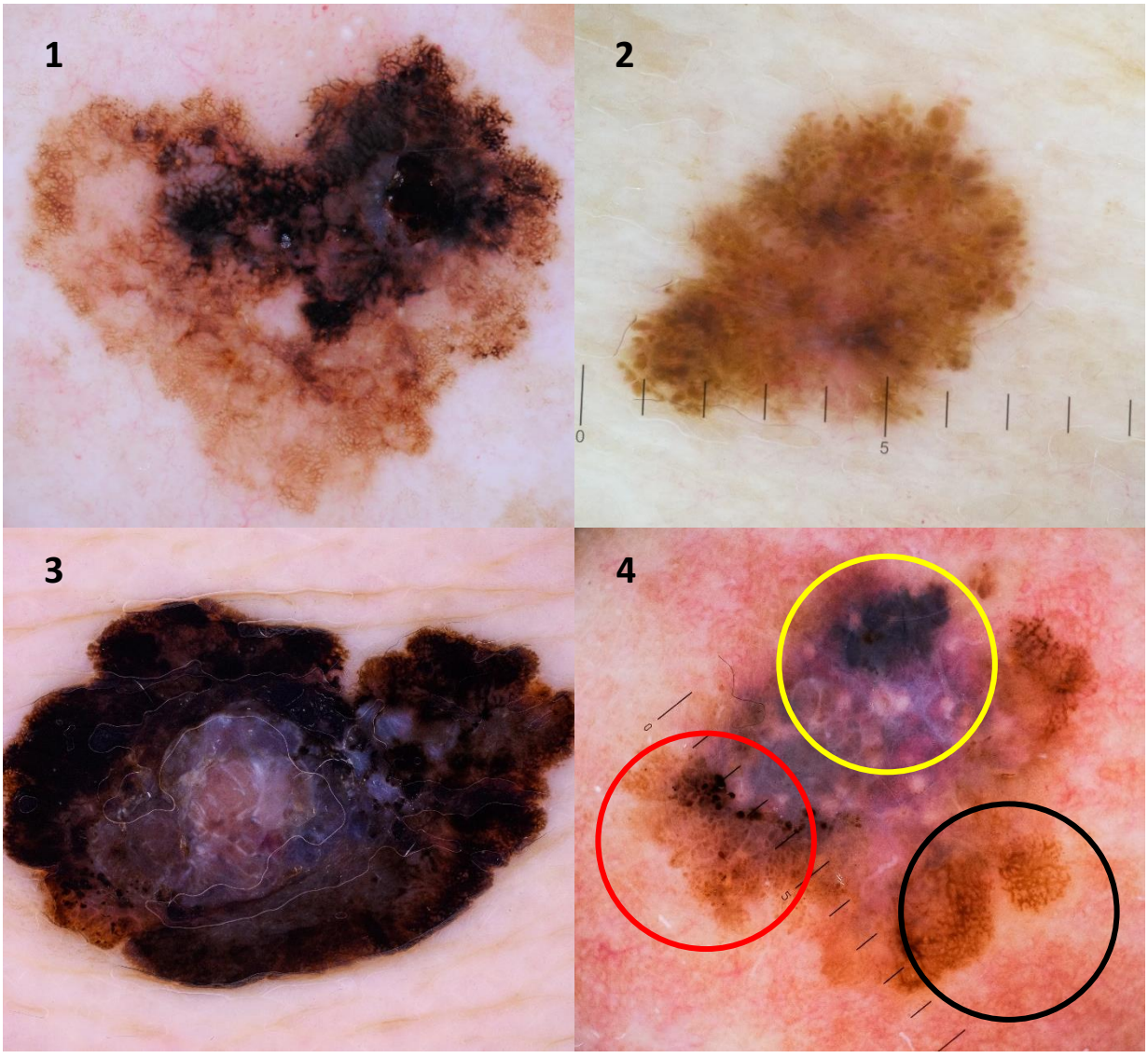


Fig. 3 Basic pattern presented presented in melanoma: 1. reitcular pattern in melanoma with atypical netword and irregular bloch, 2. globular pattern in melanoma with irregular globules and central structureless area, 3 homogenous pattern in melanoma with central nodule, 4. multicomponent pattern in melanoma (reticular – black circle, globular – red circle, homogenous – yellow circle) presenting negative network, irregular globules, hypopigmented structureless areas.

There are two methods of describing structures observed under dermatoscopy. The metaphorical terminology, as the name suggests, is based on associations that researchers have made with the visual appearance of the observed structures, such as the blue whitish veil. The second method is descriptive terminology, where dermatoscopic structures are described based on basic geometric shapes and basic colors.

Table 1 Terminology of basic dermoscopic structures in melanoma accoriding to Results of the third consensus conference of the International Society of Dermoscopy [22].

Names of dermoscopic strucutres	Descripiton of dermoscopic strucutres
Irregular dots	Dots clustered outside the center of the lesion, or located outside the network lines (also called target network)
Irregular globules	Globules with variability in color, size, shape, or spacing and distributed in an asymmetric fashion
Atypical network	Network with increased variability in the color, thickness, and spacing of the lines of the network; asymmetrically distributed; gray color
Irregular bloch	More than one blotch (dark structureless areas) or a blotch that is located off center
Blue whitish veil	An irregular shaped blotch of blue hue with an overlying whitish ground-glass haze
Regression structures Peppering/granularity	Consists of fine dots with a blue-gray color

Scarlike depigmentation	Area of white that is whiter than surrounding normal-appearing skin (true scarring); it should not be confused with hypopigmentation or depigmentation caused by simple loss of melanin; shiny white structures and blood vessels are not seen in areas of regression
Hypopigmented structureless areas	Structureless areas have a lighter pigment compared with the rest of the lesion
Negative network	Serpiginous interconnecting broadened hypopigmented lines that surround elongated and curvilinear globules
Milky-red area	Milky-white appearance or pinkish structureless areas (strawberry and ice cream–like), consisting a red vascular blush with no specific distinguishable vessels
Rim of brown globules	Globules distributed at the periphery of lesion
Polygons	Gray-brown lines that are connected at an angle or coalescing to form polygons
Pseudopods	Bulbous and often kinked projections seen at the lesion edge, either directly associated with a network or solid tumor border
Shiny white streaks	Short discrete white lines oriented parallel and orthogonal (perpendicular) to each other seen only under polarized dermoscopy
Radial streaming	Radial linear extensions at the lesion Edge
Ulceration	Ulcerations are larger red to orange structureless areas

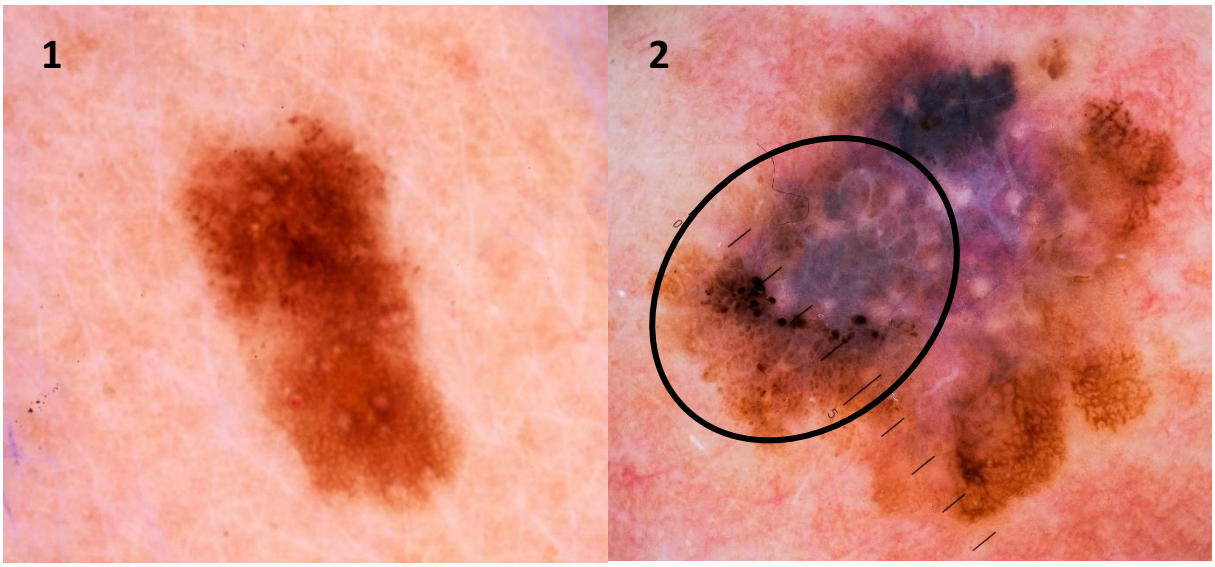


Fig. 4 Basic dermoscopic structures: 1. Irregular dots, 2. Irregular globules (circle).

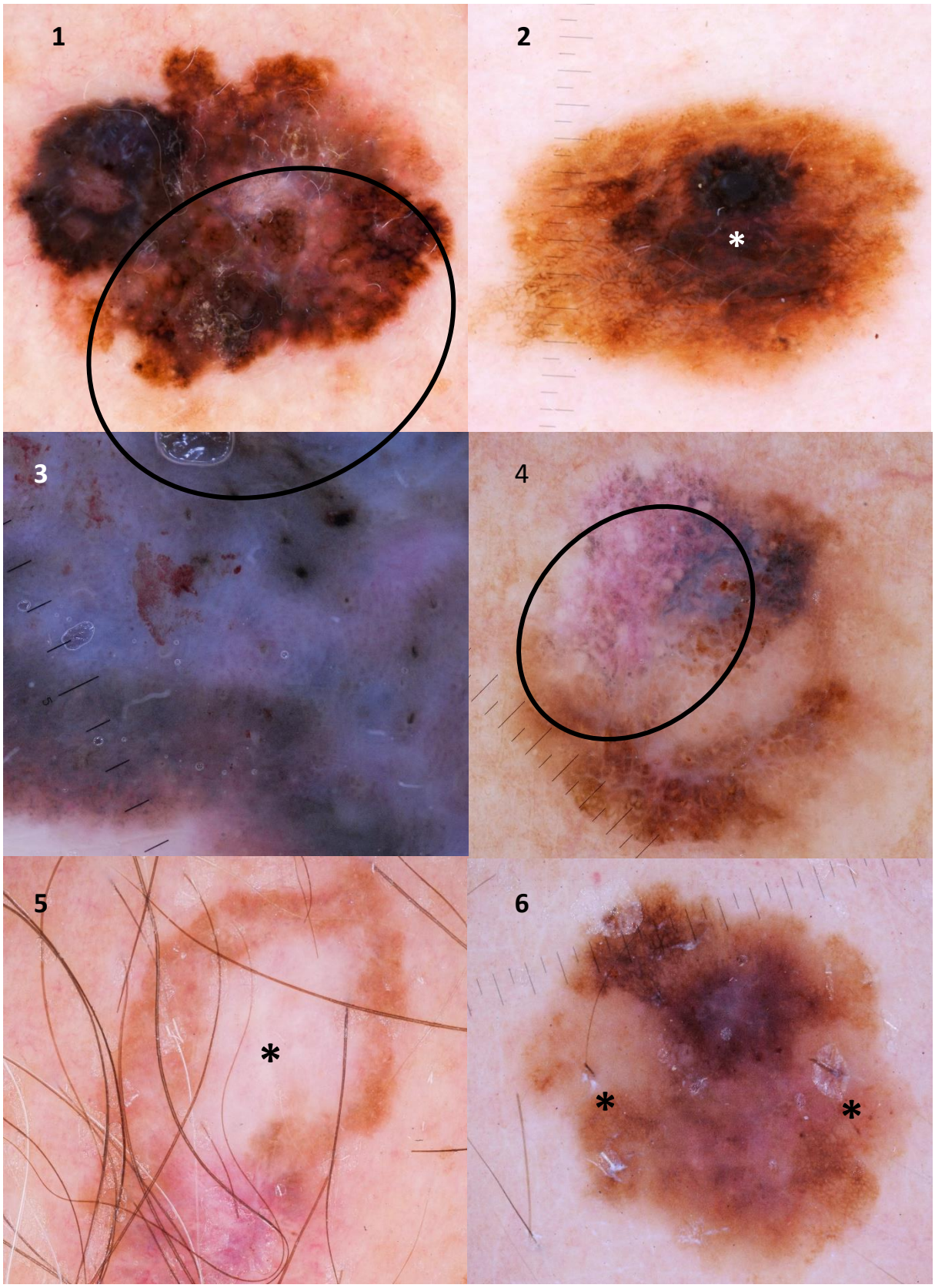


Fig. 5 Basic dermoscopic structures: 1. atypical network (circle), 2. irregular bloch (*), 3. blue whitish vail. Regresion structures: 4. Peppering (circle) and 5 scarlike depigmentation (*). 6. hypopigmented structureless areas (*).

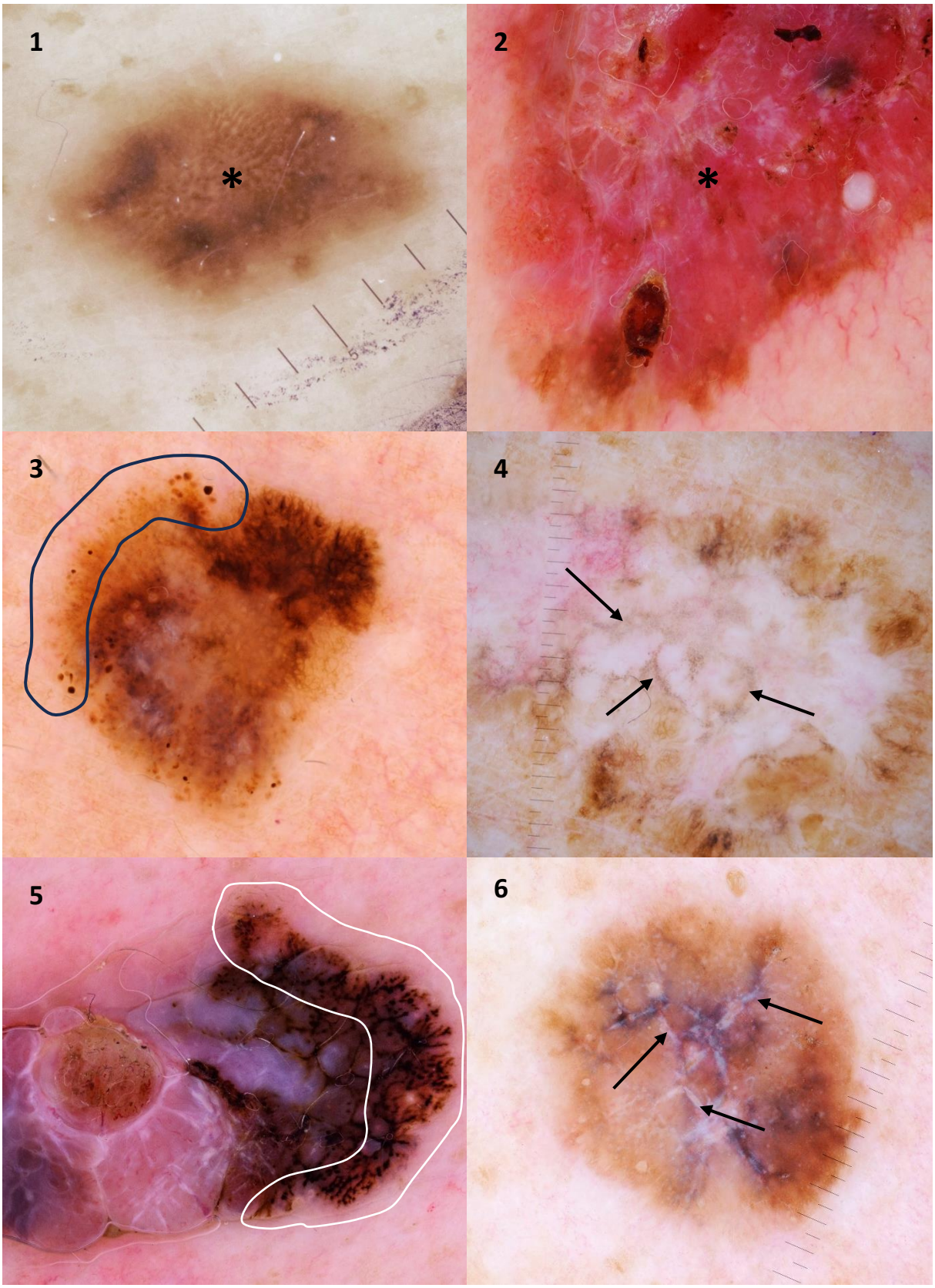


Fig. 6 Basic dermoscopic structures: 1 negative network in the center (*), 2. milky-red area (*), 3. rim of brown globules (ellipsoid), 4. polygons (arrows), 5. pseudopods (ellipsoid), 6. shiny white streaks (arrows).

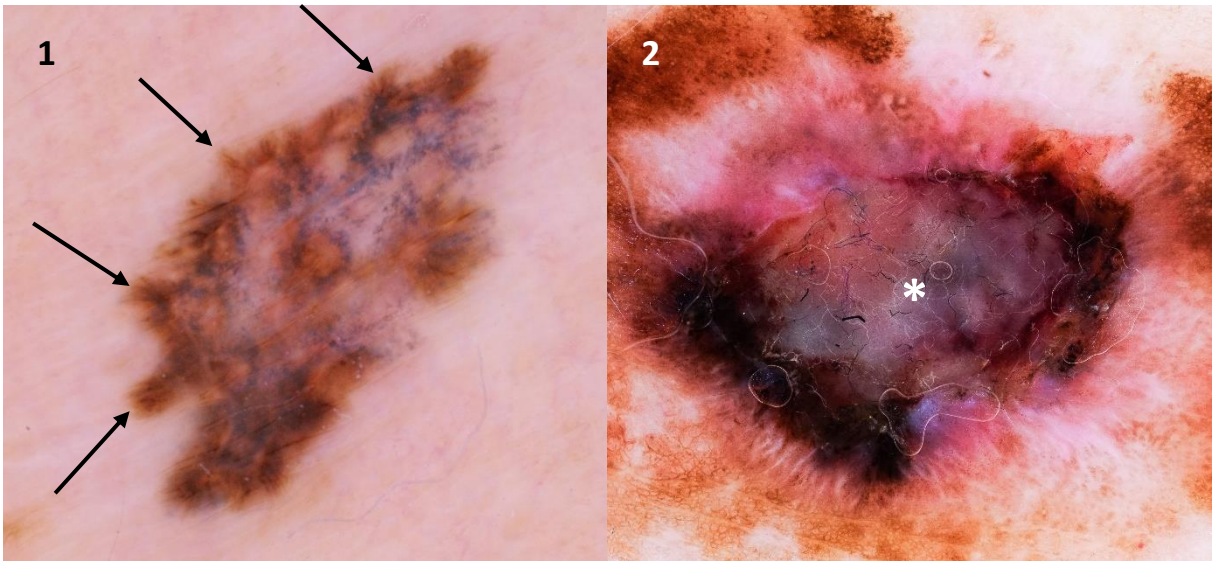


Fig. 7 Basic dermoscopic structures: 1. radial streaming (arrows), 2. ulceration (*) (note sticky fiber sign).

Materials and Methods

Study Design:

This study involved a retrospective assessment of clinical and dermatoscopic images of patients diagnosed with melanoma, excluding nodular melanoma, obtained from the archives of the Dermatology Clinic at the Medical University of Graz from the years 2016 to 2023. Only images with clinical photos of sorunding skin available were selected. The study also included demographic data and information on the location of the lesions. Clinical images were evaluated to assess the degree of skin photodamage in the patients. The patients were categorized into four groups based on the extent of photodamage: Group 1 - no sundamage (lesions affecting less than 1% of the skin), Group 2 - mild (lesions affecting approximately 1% to 5% of the skin), Group 3 - moderate (lesions affecting approximately 5% to 15% of the skin), and Group 4 - severe (lesions affecting more than 15% of the skin).

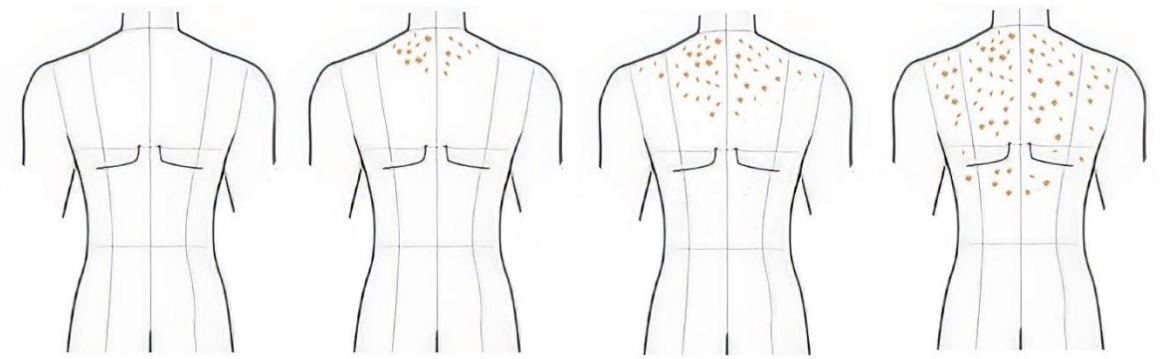


Fig. 8 Graphic representation of the studied groups based on the approximate degrees of sundamage (from left to right: none, mild, moderate, severe).

Dermatoscopic Image Analysis:

The analysis of dermatoscopic images involved the assessment of patterns and the identification of dermatoscopic structures based on metaphoric terminology. The images were carefully examined twice in beetwen two weeks period to reduce bias.

Data Processing:

The collected data were initially processed using MS Excel 2019 (Microsoft). This step involved organizing and preparing the data for further statistical analysis.

Statistical Analysis:

Statistical analysis was performed using Statistica 12.5 software (StatSoft Inc). The evaluation of statistical significance was conducted using the chi-square test for categorical variables and the Student's t-test for dependent variables, as appropriate for the data being analyzed.

Results

The study included a total of 98 individuals, 51 males and 47 females. The average age of the patients enrolled in the study was 61.5 years (M – 63). The female group was significantly

younger (p value 0,0004), with an average age of 55.2 years (M – 55), while males had an average age of 67.1 years (M – 73). The group of patients without sundamage consisted of 39 individuals, including 16 males and 23 females. The average age in the group without sundamage was 52.6 years (M - 52.5), with males having an average age of 55.5 years (M - 59.5) and females 50.4 years (M - 52 years). In total, there were 59 individuals with sundamage, including 35 males (12 with mild changes, 17 with moderate changes, and 6 with severe photo damage) and 24 females (13 with mild changes, 8 with moderate changes, and 3 with severe sundamage). The average age for the group with mild damage was 60.3 years (M – 59) (63.25 years for males on average (M - 63.5) and 57 years for females (M – 59)), for the group with moderate damage it was 72 years on average (74.5) (77.3 years for males on average (M – 79) and 61.4 years for females (M - 62.5)), and for the group with severe sundamage, it was 74.7 years (M – 75) (78.2 years for males on average (M – 77) and 67.7 years for females (M – 74)).

Out of the 98 patients, 28 melanomas were located on the torso, 56 on the back, 8 on the upper limbs, and 6 on the lower limbs. In the female group, 14 melanomas were located on the torso, 25 on the back, and 4 on the limbs. In the male group, 14 melanomas were located on the torso, 31 on the back, 4 on the upper limbs, and 2 on the lower limbs.

Table 2 Localisation of melanoma.

		Sundamage			
	Site	None	Mild	Moderate	Severe
Males					
14	Trunk	4	2	5	3
31	Back	8	10	10	3
4	Upper extremity	2	0	2	0
2	Lower extremity	2	0	0	0
Females					
14	Trunk	8	5	1	0
25	Back	11	7	6	1
4	Upper extremity	3	0	0	1
4	Lower extremity	1	1	1	1
Total					
28	Trunk	12	7	6	3
56	Back	19	17	16	4
8	Upper extremity	5	0	2	1
6	Lower extremity	3	1	1	1

Among the 98 patients included in the study, 37 melanomas were characterized by a reticular pattern, 4 had a globular pattern, 46 showed a multicomponent pattern, and 11 had a structureless pattern. In all groups, the predominant pattern was the multicomponent pattern, followed by the reticular pattern. The globular and structureless patterns were observed only in patients with undamaged skin or minor sundamage.

Tab. 3 Dermoscopic patterns among melanoma.

	Sundamage									
Pattern	Total		None		Mild		Moderate		Severe	
Reticular	37	38%	14	14%	7	7%	14	14%	2	2%
Glubular	3	3%	3	3%	1	1%	0	0%	0	0%
Multicomponent	47	48%	15	15%	13	13%	11	11%	7	7%
Structureles	11	11%	7	7%	4	4%	0	0%	0	0%

Table 4 Distribution of dermoscopic structures according to sundamage in men

		Sundamage			
	Dermatoscopic structure	None	Mild	Moderate	Severe
Males					
25	Irregular dots	5	6	10	4
9	Irregular globules	3	1	4	1
33	Atypical network	10	6	12	5
13	Irregular bloch	6	3	2	2
11	Blue whitish veil	5	3	2	1
19	Peppering/granularity	5	4	9	1
19	Hypopigmented structureless areas	3	3	10	3
12	Negative network	4	3	3	2
2	Milky-red area	0	2	0	0
8	Rim of brown globules	6	1	1	0
15	Polygons	2	3	8	2
3	Pseudopods	2	1	0	0
9	Scarlike depigmentation	1	3	5	0
18	Shiny white streaks	7	5	3	3
5	Radial streaming	1	3	1	0
3	Ulceration	1	2	0	0

.

Table 5 Distribution of dermoscopic structures according to sundamage in woman

		Sundamage			
	Dermatoscopic structure	None	Mild	Moderate	Severe
Females					
22	Irregular dots	9	6	5	2
11	Irregular globules	7	1	2	1
34	Atypical network	14	12	6	2
23	Irregular bloch	16	4	3	0
14	Blue whitish veil	9	4	1	0
15	Peppering/granularity	9	3	2	1
27	Hypopigmented structureless areas	13	7	6	1
12	Negative network	7	4	0	1
2	Milky-red area	1	0	0	1
8	Rim of brown globules	6	0	2	0
6	Polygons	2	2	2	0
6	Pseudopods	4	2	0	0
7	Scarlike depigmentation	3	2	1	1
19	Shiny white streaks	9	6	3	1
3	Radial streaming	2	0	1	0
5	Ulceration	4	0	1	0

Table 6 Distribution of dermoscopic structures according to sundamage in both sexes (ns – no significatn, * - p value < 0.10, ** - p value < 0,05)

	Dermatoscopic structure	Sundamage											
		None			Mild			Moderate			Severe		
Total		Number	*p* value		Number	*p* value		Number	*p* value		Number	*p* value	
47	Irregular dots	14	0,042	**	12	0,861	ns	15	0,180	ns	6	0,251	ns
20	Irregular globules	10	0,296	ns	2	0,074	*	6	0,606	ns	2	0,887	ns
67	Atypical network	24	0,237	ns	18	0,651	ns	18	0,651	ns	7	0,524	ns
36	Irregular bloch	22	0,001	**	7	0,294	ns	5	0,044	**	2	0,343	ns
25	Blue whitish veil	14	0,062	*	7	0,661	ns	3	0,068	*	1	0,291	ns
34	Peppering/granularity	14	0,886	ns	7	0,486	ns	11	0,276	ns	2	0,397	ns
46	Hypopigmented structureless areas	16	0,340	ns	10	0,421	ns	16	0,048	**	4	0,875	ns
24	Negative network	11	0,487	ns	7	0,636	ns	3	0,092	*	3	0,517	ns
4	Milky-red area	1	0,537	ns	2	0,251	ns	0	0,232	ns	1	0,263	ns
16	Rim of brown globules	12	0,002	**	1	0,053	*	3	0,498	ns	0	0,164	ns
21	Polygons	4	0,028	**	5	0,840	ns	10	0,009	**	2	0,951	ns
9	Pseudopods	6	0,084	*	3	0,572	ns	0	0,065	*	0	0,317	ns
16	Scarlike depigmentation	4	0,186	ns	5	0,565	ns	6	0,229	ns	1	0,657	ns
37	Shiny white streaks	16	0,587	ns	11	0,455	ns	6	0,100	ns	4	0,664	ns
8	Radial streaming	3	0,890	ns	3	0,417	ns	2	0,972	ns	0	0,348	ns
8	Ulceration	5	0,171	ns	2	0,972	ns	1	0,378	ns	0	0,348	ns

Statistically significant differences in occurrence based on skin damage were found only in the following observed dermatoscopic structures: rim of brown globules, irregular blotch, hypopigmented structureless areas, and polygons.

Irregular blotch was observed to a lesser extent in cases of melanoma on sun-damaged skin. This particular structure was more commonly found in younger patients. The average age of patients with irregular blotch was 55.9 years, compared to 64.7 years for patients without it. The difference was statistically significant (p-value = 0.022). It occurred more frequently in women, with 23 cases, compared to 13 cases in men. The difference was statistically significant (p-value = 0.016).

Rim of brown globules was also observed more often in younger patients. The average age of patients with its presence was 50.8 years, while the average age of patients without peripheral globules was 63.7 years. The difference was statistically significant (p-value = 0.009). Rim of brown globules occurred comparably in both genders, with 8 cases each in women and men. No statistically significant difference was found (p-value = 0.858).

Polygons, on the other hand, were usually observed in older individuals. The average age of patients presenting polygons was 69.9 years, while the average age of patients without them was 59.3 years. This difference was statistically significant (p-value = 0.020). They also differed in distribution among genders, with 15 men and only 6 women presenting polygons. This difference was statistically significant (p-value = 0.045).

The last feature showing a statistically significant association with sundamage is hypopigmented structureless areas. Unlike the previous dermatoscopic structures, their occurrence was not related to the patient's age. The average age of patients exhibiting hypopigmented structureless areas was 63.3 years, while patients without these structures had an average age of 60 years. The differences were not statistically significant (p-value = 0.387). However, hypopigmented structureless areas were much more common in women, with 27 cases, compared to 19 cases in men. This gender difference was statistically significant (p-value = 0.045).

Discussion

Previous studies have indicated a correlation between sundamage and prognosis in patients diagnosed with melanoma. Patients with sundamaged skin have better prognosis. The presence of elastosis has been suggested as a possible explanation for this effect. However, to date, no one has undertaken an analysis of the dermoscopic image of melanoma in relation to the degree of sundamage to the skin [23, 24].

Existing literature data have focused on the correlation between dermoscopic features and the prognosis of treatment outcomes in patients. For instance, irregular blotch and ulceration have been associated with a higher likelihood of positive sentinel lymph node biopsy (SLNB) results. Furthermore, there are publications suggesting a correlation between the presence of BRAF mutations in melanoma exhibiting a blue whitish veil and melanoma presenting with ulceration and radial streaming [25, 26]. The presence of a blue-white veil, milky-red areas, and shiny-white streaks has also been linked to a mitotic activity > 1/mm and the presence of distant metastases [27].

The results of my study indicate differences in the dermoscopic features depending on the degree of sundamage in patients. In patients with undamaged skin, peripheral rim of brown globules, irregular dots, and irregular blotch were more frequently observed. Blue witish veil was also observed more frequenly but the differences were not statistically significant. In melanomas on sundamaged skin, peripheral structureless areas and polygons were more commonly observed in the group of patients with moderate sundamage.

Differences in the dermoscopic structures may suggest the presence of different subtypes of melanoma in the studied group, particularly superficial spreading melanoma and lentiginous melanoma. This is especially relevant as polygons are one of the typical structures seen in lentiginous melanoma. However, the available data did not allow for a definitive differentiation between these subtypes. Nevertheless, when comparing the group of patients with undamaged skin to the group with mild sundamage, the differences in the frequency of peripheral globules and irregular blotch remained statistically significant (accordingly p-value was p=0,009 and p=0,026).

Due to the fact that the degree of sundamage to the skin increases with age, it is challenging to directly determine the underlying cause of the differences in dermoscopic features. The mean age of patients with peripheral globules was 50.7 years, while for irregular blotch it was 55.9 years, compared to a mean age of 52.6 years for patients without sundamage. Polygons observed on sun-damaged skin were also more common in the older age group, with a mean age of 69.9 years, compared to a mean age of 72 years for patients with moderate damage. No significant differences were observed in the group of patients presenting with hypopigmented areas.

In comparison to the existing literature, the conducted study showed an overrepresentation of lesions located on the trunk, which is associated with the requirement of being able to assess the patient's skin condition [4, 28] . The demographic data align with expectations, with women predominating in the group of patients under 40 years of age, while men significantly outnumbered women in the elderly age group [4].

As anticipated, the degree of photoaging increased with age, which is an expected observation as it is a result of exposure to UV radiation, primarily from sunlight.

The observed dominant dermoscopic patterns are consistent with the data reported in previous studies. The difference I observed is a slightly higher number of melanomas presenting a globular pattern [29, 30].

Study limitation

The main limitation of the study is the lack of assessment of melanoma subtypes, especially the differentiation between superficial spreading melanoma and lentiginous melanoma, as well as the limited number of cases evaluated. It would be beneficial to expand the study group and include histopathological evaluation of the melanomas included in the study. Further considerations include the analysis of mutations present in the observed melanomas and the comparison of treatment outcomes among the studied groups.

Appendix

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References

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