

The most common mistakes on dermatoscopy of melanocytic lesions

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Abstract

Dermatoscopy is a method of *in vivo* evaluation of the structures within the epidermis and dermis. Currently, it may be the most precise pre-surgical method of diagnosing melanocytic lesions. Diagnostic errors may result in unnecessary removal of benign lesions or what is even worse, they can cause early and very early melanomas to be overlooked. Errors in assessment of dermatoscopy can be divided into those arising from failure to maintain proper test procedures (procedural and technical errors) and knowledge based mistakes related to the lack of sufficient familiarity and experience in dermatoscopy. The article discusses the most common mistakes made by beginner or inexperienced dermatoscopists.

Key words: dermatoscopy, dermoscopy, common mistakes, basic mistakes, wrong diagnosis, principles, rules.

*Knowledge rests not upon truth alone,
but upon error also.*

Carl Gustav Jung

Introduction

Dermatoscopy (dermatoscopy, epiluminescence microscopy, skin surface microscopy) is an *in vivo* evaluation method for the structures within the epidermis and dermis. It is a verified, easy to conduct diagnostic test involving the viewing of skin lesions, mainly melanocytic, with 10-times magnification in traditional dermatoscopes and 70 to 100-times magnification in video dermatoscopes [1, 2]. Dermatoscopes/dermoscopes use non-polarized light that requires immersion (ultrasound gel, oil or water) or polarized light that does not require any immersion fluids. The use of dermatoscopy in dermatological consultation extends the total time of the examination by only about 72 s [3], so it is worth using dermatoscopy to assess any lesions on the body of the examined patient during a routine dermatology check up.

That is how it is described in literature, but in practice, dermatoscopy of melanocytic lesions of the whole body with the preparation of the documentation and description takes from 30 to 40 min. Dermatoscopy should be an essential diagnostic tool used not only by experienced dermatologists, but it should also be used in screening of melanocytic lesions performed by various specialists such as oncologists, surgeons, and general practitioners [2, 4]. Dermatoscopy is characterized by 83% sensitivity and 69% specificity for the detection of melanomas [5]. In clinical practice it is extremely important to know the correct assessment of the lesions on the patient's body in terms of technical procedures as well as the basic knowledge of dermatoscopy.

Aim

The article presents authors' own classification of the most common as well as possible errors made during dermatoscopy based on available medical literature PubMed and personal experience.

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Errors

Errors in the assessment of dermatoscopy can be divided into those arising from the failure to maintain proper test procedures (procedural or technical errors) and knowledge based mistakes related to the lack of sufficient familiarity and experience in dermatoscopy. Table 1 presents the authors' classification of possible mistakes made during dermatoscopy.

Procedural (technical) errors

Selection of lesions for dermatoscopy

The most common mistake made by doctors is dermatoscopic assessment of selected lesions only – indicated by the patient or selected by the physician on the basis

of clinical evaluation of ABCDE or morphological lesions – black lesions, the largest in diameter ones, elevated ones or those located in places where they can be irritated (underwear, acral areas). The decision to perform surgical excision of suspicious lesions should be made based on a comparison with other lesions. In a study by Argenziano *et al.* [6], the decision to excise a suspected lesion after a morphologic evaluation of a single site in dermatoscopy was made in 55% of cases, but it was decreased to 14% after a comparative analysis with other lesions. To select several lesions for excision, it is recommended to prepare a map of the body for the patient to provide clues for the surgeon. A photo taken with the patient's own phone to mark the areas and the order of excision could be useful [7]. We should also remember about examining all the lesions on the body, not only melanocytic ones but also

Table 1. The most common mistakes made during dermatoscopy

Knowledge based mistakes:
<p>1. Incorrect assessment of selected lesions in dermatoscopy:</p> <ul style="list-style-type: none"> – Lack of sufficient knowledge connected with defining basic or main dermatoscopic patterns or dermatoscopic structures such as a failure to distinguish pseudopods from peripheral globules or streaks; looking for structures such as crystalline structures with a non-polarized light – Wrong definition of asymmetrical lesions – the asymmetry in structures arrangement should be taken into account, not only the asymmetry of the shape of the lesion – Lack of knowledge of the model criterion melanocytic lesions and so-called "signature nevus" characteristic for the patient, which may result in unnecessary surgical excision (5–10 melanocytic lesions in one dermatoscopic examination) – Lack of knowledge of the dermatoscopic check-point list and assessment only according to the one point list, e.g. ABCD classification by Stolz – Assessing dermatoscopy without using non standard criteria such as "ugly duckling" symptom, a symptom of a "fancy looking" sign among other melanocytic lesions or assessing dermatoscopy without using non standard criteria in relation to those described in the literature – Lack of ability to recognize dermatoscopic features of melanoma in situ when the standard dermatoscopy criteria fail – Therapeutic decision-making based only on isolated dermatoscopic criteria – Lack of clinical and dermoscopic verification as well as dermatoscopic and histological one – Ignorance of melanoma simulators and failure in the context of differential diagnosis of melanoma and melanoma simulators
Procedural (technical) errors:
<p>1. Selection of lesions for dermatoscopy. It is necessary to examine all the lesions on the body according to the number and location:</p> <ul style="list-style-type: none"> – Examination of selected melanocytic lesions only, indicated by the patient – Examination of selected melanocytic lesions only, selected by the physician on the basis of clinical evaluation of ABCDE or blackish foci, the largest lesions, elevated ones or those located in places which put them at risk of malignancy due to anecdotic irritation (underwear rubbing the skin, acral areas) – Avoiding dermatoscopy of pinkish amelanocytic lesions – Using dermatoscopy at time intervals without a possibility to establish the melanocytic nevus profile – Careless examination of the patient, avoiding watching the genital area, buttocks, gluteal cleft, feet or scalp (either because of a false sense of shame or because there is no patient's consent to examination of these areas) – Lack of knowledge about the factors that may affect the dermatoscopic patterns of a benign melanocytic lesion and unnecessary surgical removal (dermatoscopic examination of tanned patients or those using autobronzant may change colour of dermatoscopic pattern) – Lack of patient eligibility for the observation with dermatoscope without planning dermatoscopic follow-up (every three months, every 6 months, every 12 months, less frequently, never) <p>2. Choosing an inappropriate method for dermatoscopy:</p> <ul style="list-style-type: none"> – Careless application of the immersion fluid during the dermatoscopic examination with the non-polarized light – The possibility of misdiagnosis in the detection of melanoma, nodular or featureless melanoma when using the non-polarized light dermatoscope; crystalline structures, glossy white streaks are detected with the polarized light dermatoscope – Lack of archiving of dermatoscopic examinations in long-term observation of selected lesions – failure in detecting new foci, inability to assess the evolution of the observed melanocytic lesion, especially in the slow-growing melanomas or melanomas in situ with a small diameter

pink nodules, so that we will not overlook melanomas which meet EFG criteria (elevated, firm and growth) [8].

Another mistake is ignoring small melanocytic lesions in dermatoscopic evaluation. Most doctors believe, based on the classification of clinical ABCD, that only lesions over 5 mm in diameter can be melanomas. According to the literature, melanomas with less than 6 mm in diameter account for 11.4% to 38.2% of all melanomas [9–12]. In a study by de Giorgi *et al.* [13] 34 melanomas have been identified among 103 melanocytic lesions with < 6 mm in diameter (33%). In a study by Bono *et al.* [14] among 924 melanomas, 22 (2.4%) were micro-melanomas, having a diameter smaller than 3 mm. ABCD clinical criteria in the diagnosis of melanoma with < 6 mm in diameter do not work [13]. Dermatoscopy of melanomas with less than 5 mm in diameter usually detects atypical vessels, irregular colour, presence of atypical globules or dots, irregular radial streaks and regression areas [15] (Figure 1).

Another mistake is using dermatoscopy at time intervals without a possibility to establish the melanocytic nevus profile. Moreover, total body skin examination (TBSE) should be performed [16]. Careless examination of the patient when the patient does not want to undress because of a false sense of shame, avoiding the examination of the genital area, buttocks or when there is no patient's consent to examine distal parts of the body, e.g. the patient does not want to take the shoes off or does not want to comb the hair, which unfortunately is a frequent patients' behaviour, can lead to a misdiagnosis of a melanoma. Absolute consistency in dermoscopic examination should be a permanent habit in medical practice.

The risk of overlooking a malignant lesion because of the failure to perform TBSE is 2.17% [16]. At present, dermatoscopy is considered to be an accurate method for the detection of melanoma, as well as minimizing unnecessary surgical excisions determined by number needed to excise (NNE), defined as the ratio of the number of excised lesions to the number of excised melanomas [17, 18]. Lack of knowledge connected with the factors that may affect dermatoscopic patterns of the lesion according to the "4 × 4 × 6" rule [19] can cause unnecessary surgical excisions of the lesions. Moreover, dermatoscopic examination of tanned patients or those using autobronzant, which may change colour of the dermatoscopic pattern, often leads to misdiagnosis of melanoma [20–22].

It is extremely important to establish dermatoscopic follow-up strategies for the patients according to individual needs. Argenziano *et al.* [23] suggest a dermoscopic follow-up in the preliminary assessment and then, if necessary, an observation of selected lesions every 3 months even for the next 54 months [23]. Dermatoscopy would be performed in a short-term monitoring with follow-up after 3 months (changes characteristic for melanoma are observed within 2–4 months), medium-term monitoring with follow-up after 6 months or long-term monitoring with annual follow-up (especially for slow-growing



Figure 1. Dermatoscopic image of melanoma in situ of less than 5 mm in diameter. Dermatoscopy shows the presence of atypical vessels, irregular colour atypical globules, irregular radial streaks and regression areas [15] (Figure 1).

melanomas) [23]. The rate of compliance is 84% with short-term monitoring protocol, 63% with medium-term monitoring and 30% with long-term monitoring [23]. The follow-up intervals depend also on the age of the patient. Mean dermoscopic follow-up period is 20 months [24] because of the probability of developing slow growing melanoma (SGM). The criteria to include a lesion for dermoscopic observation included asymmetry of colour, reticular pattern and structures of regression [24]. Early melanomas detected by digital follow-up might decrease their diameter. A dermatoscopic feature for the diagnosis of melanoma only in the context of a comparative follow-up was a slight diameter enlargement of a foci less than 2 mm [24]. In the largest dermoscopic study connected with slowly growing melanoma [25], the dermoscopic features suggesting its development included the lack of change in diameter and a lack of enlargement (75% of cases) and at the most a slight increase in diameter to 2 mm, larger structures disorganisation in dermatoscopy, the loss of melanocytic network in favour of structureless areas, the occurrence of new colours (light brown colour disappears, dark brown appears and colours such as red, white, gray, black and blue are more noticeable), and there were new dermatoscopic melanoma features typical of melanoma i.e. negative network and blue-white structures [25]. In melanoma characterized by no symptoms that indicate diagnosis of melanoma, the so called featureless melanoma, only short-term digital observation allows its diagnosis [26].

Choosing an inappropriate method for dermatoscopy

Some misdiagnoses may result from careless use of dermatoscopy. Apart from the above mentioned standard

methods for performing a dermatoscopic examination with a hand-held dermatoscope, it is important to apply the immersion fluid carefully during the dermatoscopic examination with the non-polarized light [2]. A probability of misdiagnosis in detection of nodular melanoma or featureless melanoma may result from using only a non-polarized light dermatoscope, while shiny white streaks (crystalline or chrysalis structures) are detected with polarized light dermatoscopes [27]. Shiny white streaks are associated with malignancy (odds ratio: 10.534), especially in invasive melanoma, melanoma with high Total Dermatoscopy Score (TDS) and thin featureless melanomas [27].

Moreover, lack of archiving of dermatoscopic examinations in a follow-up of selected lesions along with a failure in detecting new foci, inability to assess the evolution of the observed melanocytic lesion, especially in the slow growing melanomas [24, 25] or melanomas in situ with a small diameter may lead to melanoma being overlooked. According to Puig and Malvehy [28], a dermatoscopic examination, total body photography (TBD) and digital dermatoscopy (DD) have a significant impact on the detection of melanoma. Digital follow-up (DFU) in patients with dysplastic nevi enables a detection of new lesions and changes in the existing foci [28]. Combination of total body photography and digital dermatoscopy is called a two-step method of digital follow-up and enables early detection of melanoma based on macroscopic and dermoscopic changes observed in this procedure [29].

Knowledge based mistakes

Broadly defined knowledge based mistakes involve an incorrect diagnostic and therapeutic decisions resulting from insufficient knowledge about dermatoscopy. Incorrect assessment of selected lesions in dermatoscopic examination may be due to lack of knowledge connected with defining the basic dermatoscopic patterns or structures such as a failure to distinguish pseudopods from peripheral globules as well as the lack of knowledge of many dermoscopic check-point lists and assessment only according to one point list, e.g. ABCD classification by

Stolz. Looking for structures such as crystalline structures with a non-polarized scope is not only a technical but also knowledge error.

Dermatoscopic assessment of a selected melanocytic lesion should be based on general structures in the overall pattern (conditional on selected types of patterns) and local structures (based on the selected dermatoscopic structures or features), and based on the algorithms for the analysis of dermatoscopy [1, 2, 19, 30–32]. Each physician who performs dermatoscopy should know the basic dermatoscopic check-point lists – Argenziano’s 3-point check list [4, 33], the Italian 7-point check list [34], algorithm based on pattern analysis (chaos and patterns) [35], Australian Menzies method, 7 features for melanoma or the ABCD method of dermatoscopy by Stolz and ABC-point list by Blum [36] widely reported in the medical literature in terms of their sensitivity and specificity. With the ABCD rule for the diagnosis of cutaneous melanoma, sensitivity is 90.5%, specificity is 72.4% and diagnostic accuracy is 78.1% [36]. The ABC-point list results in 90.5%, 87% and 88.1%, respectively; Menzies score in 95.2%, 77.8% and 83.3%; 7 features for melanoma in 94%, 74.6% and 80.7% and 7-point checklist in 90.5%, 87% and 88.1% [36]. The sensitivity of experts using 3-point checklists of dermatoscopy reaches 89.6% with 94.2% specificity [33].

In accordance with the 3-point check list we should pay attention to the asymmetry in arrangement of dermatoscopic structures, and not to symmetry of the lesion [4, 33]. We should also use other non-standard criteria such as “ugly duckling” sign [37, 38] or “fancy looking” sign, so called a “black sheep” sign [39], not only algorithms for the analysis of dermatoscopy.

The “4 × 4 × 6” rule created by Zalaudek *et al.* [19] allows clinicians to memorize the overall patterns and factors that affect the therapeutic decision making in the dermatoscopic diagnosis of selected melanocytic lesion. Four dermatoscopic criteria are connected with colour, pattern, pigment distribution and lesion location [19]. The six factors that have an influence on dermatoscopic proceedings include age, Fitzpatrick skin phototype, a history of melanoma, UV exposure, pregnancy

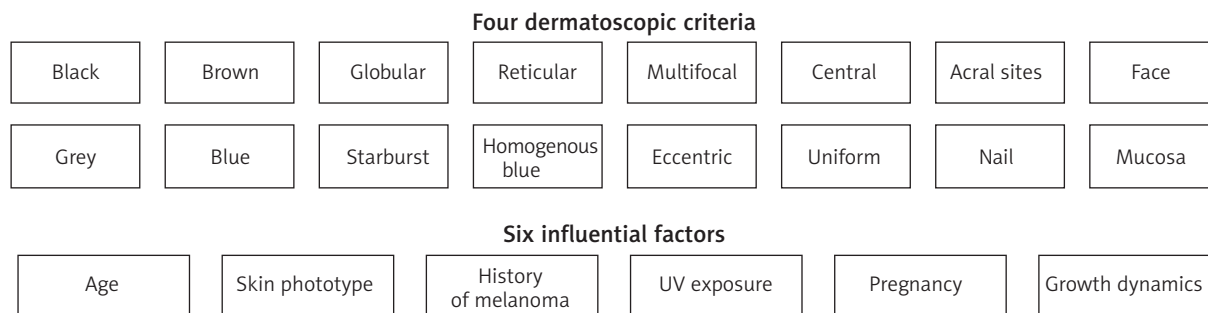


Figure 2. The “4 × 4 × 6” rule created by Zalaudek *et al.* [19]. Four dermatoscopic criteria divided into 4 subgroups with 6 factors affecting the therapeutic decision based on dermatoscopy

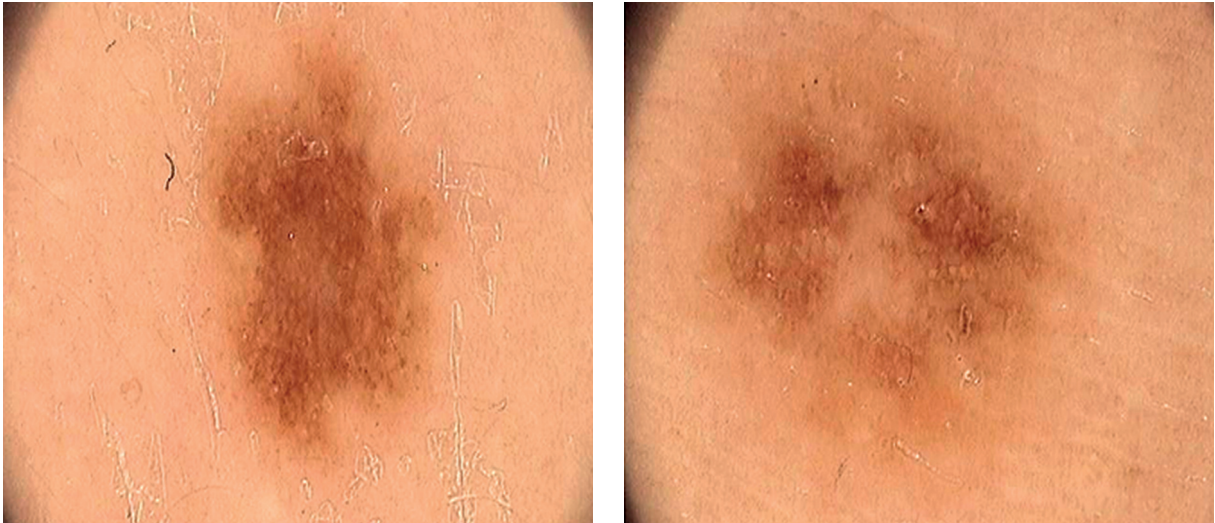


Figure 3. Two different melanocytic lesions of the same patient in a profile typical of the individual

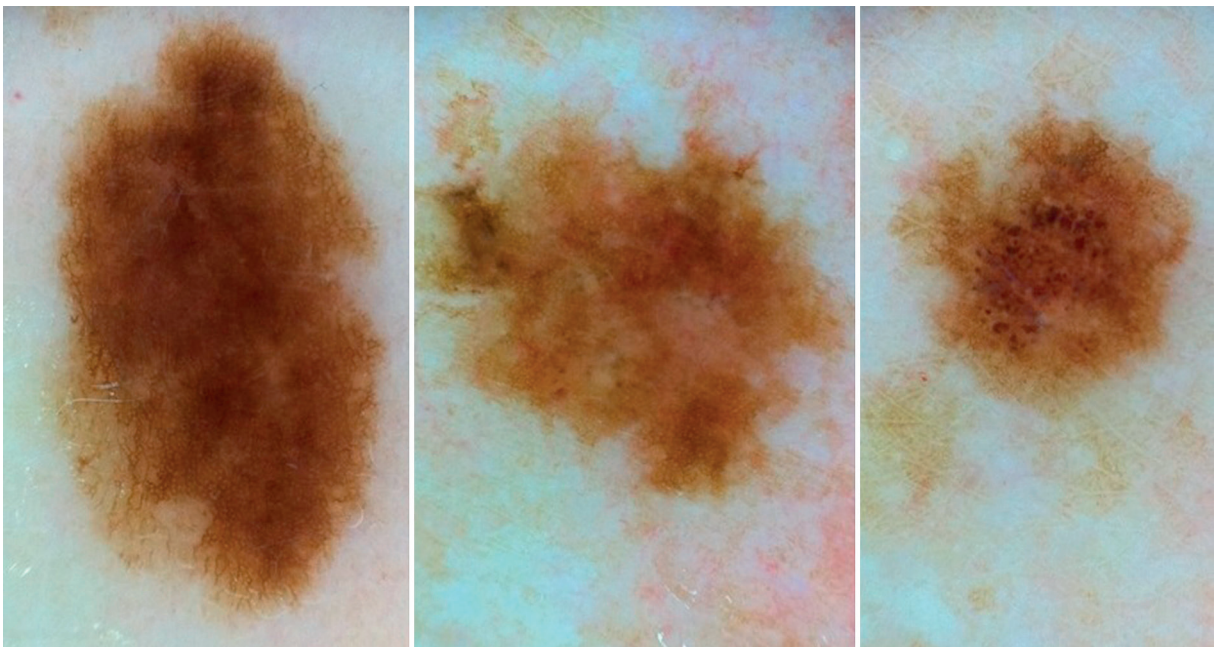


Figure 4. Three different melanocytic lesions of the same patient with a dermoscopic profile “suspicious lesion – to be excised”. In fact, “signature nevus” to be left

and growth dynamics [19]. The “4 × 4 × 6” rule described previously by Zalaudek *et al.* [19] is shown in Figure 2.

In the differential diagnosis of melanocytic lesions it is useful to define so-called melanocytic nevi profile that is very common and characteristic for most of the lesions [6] (Figure 3). Lack of knowledge of criteria for melanocytic lesions and so-called “signature nevus”, which is characteristic and individual for the patient [40] (Figure 4), may lead to unnecessary surgical excision of lesions (e.g. choosing 5–10 melanocytic lesions during a single examination for excision) that seem suspicious.

Currently, dermatoscopy enables detection of melanoma in situ of less than 5 mm in diameter. In such cases, the standard dermoscopic check point lists do not work and, therefore, it is extremely important to know the dermoscopic features of in situ melanoma (MIS). Dermatoscopic features of in situ melanoma are the reticular pattern, reticular grey-blue, multicomponent, island, spitzoid, negative network, blue – globules network and globular network [41]. A new feature of melanoma in situ is also a “mistletoe sign” [42]. In situ melanoma is usually larger in diameter than dysplastic nevi, atypical net-

work covers more than half of the nevus, there are usually several types of pigment network and in the central and peripheral areas there is blue-white regression [43]. In a recent study by Seidenari *et al.* [44], among 22 micro-melanomas (less than 4 mm in diameter), 12 lesions were defined as MIS with the most frequent occurrence of atypical pigment network and irregular colour [44].

In the diagnosis of black nodules, a blue-black rule should be used. Standard dermatoscopic criteria combined with looking for blue and black colours within the lesion gives a 90.6% accuracy and 92% specificity in the detection of nodular melanoma [45]. Extremely helpful in the differential dermatoscopic diagnosis of melanoma is the knowledge of dermatoscopic images of melanoma simulators (black seborrheic keratosis, blue nevus and many others) [46–48].

It is worth emphasizing that therapeutic decisions should be made on the basis of the “4 × 4 × 6” rule [19], and it should never be based only on isolated dermatoscopic criteria. Regarding to Argenziano *et al.* study [49], dermatoscopy improves early melanoma recognition because of three main aspects: dermatoscopic signs of melanoma are much earlier recognized in dermatoscopy than in clinical examination, clinicians check more often not only suspected but also banal-looking lesions and they are more carefully monitoring patients in follow-up [49]. Complete skin examination, monitoring patients with multiple moles, adequate diagnosis of lesion as a number needed to treat; using the comparative approach in patients with multiple nevi is a clue for proper melanoma recognition with avoiding basic mistakes [49].

To summarize, in order to avoid misdiagnosis of melanoma, Lallas *et al.* [50] recommend examining all the lesions on the body, watch all the areas of the body, apply ten seconds’ decision (when the time of examining a lesion is lengthened, it should be surgically excised), to monitor patients with multiple melanocytic lesions, always excise suspicious nodular foci and always combine clinical criteria with dermatoscopic ones as well as correlate clinical criteria with histopathological ones [50]. Currently, the dermatoscope is an irreplaceable diagnostic tool for every physician and it is compared to the stethoscope which is necessary for a physical examination of every patient [51].

Conflict of interest

The authors declare no conflict of interest.

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