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REVIEW ARTICLE

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Dermoscopy of melanoma according to different body sites: Head and neck, trunk, limbs, nail, mucosal and acral

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Abstract

Effective cancer screening detects early-stage tumours, leading to a lower incidence of late-stage disease over time. Dermoscopy is the gold standard for skin cancer diagnosis as diagnostic accuracy is improved compared to naked eye examinations. As melanoma dermoscopic features are often body site specific, awareness of common features according to their location is imperative for improved melanoma diagnostic accuracy. Several criteria have been identified according to the anatomical location of the melanoma. This review provides a comprehensive and contemporary review of dermoscopic melanoma criteria according to specific body sites, including frequently observed melanoma of the head/neck, trunk and limbs and special site melanomas, located on the nail, mucosal and acral region.

INTRODUCTION

The incidence of melanoma has steadily increased over recent decades, with thin melanoma detection responsible for most of the increased diagnoses.[1] According to international guidelines[2–4] dermoscopy is an essential strategic tool for accurate and early melanoma diagnosis.

Since the late 1980s, efforts have focused on the development and validation of melanoma dermoscopic diagnostic criteria. A growing body of literature has reported several criteria for pigmented and non-pigmented melanomas. Particular epidemiologic and anatomic distributions of melanomas mirror specific dermoscopic sets of diagnostic criteria.

Melanoma morphology (clinical/dermoscopic and histopathologic overview) is directly correlated with the lesions' anatomic location.[5] Melanomas are most frequently observed on the head/neck, trunk and limbs but differ between them according to location, for example, melanomas located on the head and neck differ from those located on the trunk

Ketty Peris and Giovanni Pellacani share the seniorship.

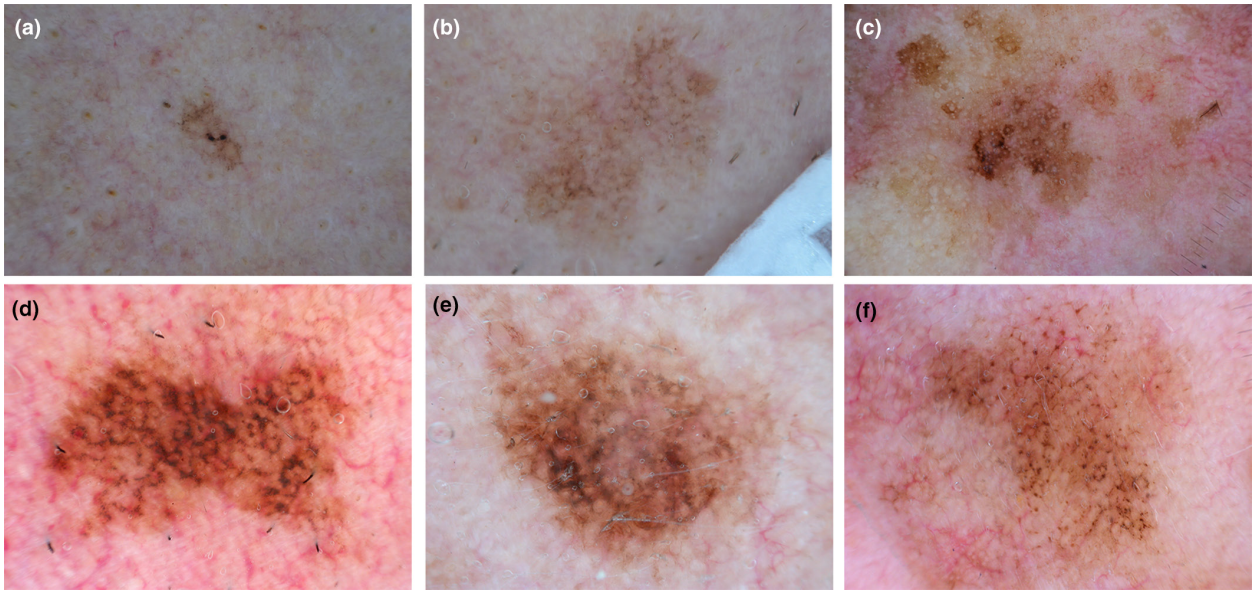

FIGURE 1 Dermoscopy of lentigo maligna on the face. Asymmetric perifollicular pigmentation is the main dermoscopic clue and can be seen in all images (a–f); it can be arranged as asymmetric circle (a–c), rhomboidal structures (d, e) and also perifollicular globules can be found (f).

and limbs due to different skin anatomy and sun exposure. There are also 'special sites' melanomas, located on the genitalia, mucosal, nail, facial and acral areas.[6] Early and accurate diagnoses of site-specific melanomas require specific anatomical knowledge. Melanomas in these locations are rare and therefore, uncommonly observed in routine clinical consultations.

We review the main dermoscopic criteria for melanoma according to distinct body sites, with the aim of providing a comprehensive and practical overview for clinicians involved in everyday skin cancer screening and diagnosis.

MELANOMA OF THE HEAD AND NECK

Key-points

- Lentigo maligna melanoma is the most common melanoma subtype of facial skin. Alterations of dermoscopic features are predominantly located around the hair follicle.
- Dermoscopic criteria associated with lentigo maligna advances from initial pigmentation in and around hair follicles (circles, semicircles and circles-within-circles; usually with a greyish hue) to the appearance of perifollicular grey dots and globules (annular-granular pattern; with blue-grey colour) through to rhomboidal structures/angulated lines in the interfollicular areas (creating rhomboids) and finally, pigmented blotches with obliteration of hair follicles (homogeneous areas).

Lentigo maligna (LM) and lentigo maligna melanoma (LMM) are early and more advanced cutaneous melanoma subtypes, respectively. They arise on chronically sun-damaged skin and together, comprise 4%–15% of all diagnosed melanomas. LM/LMM are the most common melanoma subtypes observed on the head and neck areas.[7–9]

Lentigo maligna usually presents as an ill-defined, irregularly pigmented macule or patch on the face or on the upper extremities. Initially the lesion is difficult to identify, as it appears indistinguishable from surrounding sun-damaged skin. LM slowly progresses and appears as a solitary or outlier lesion, compared to background lentigines or seborrheic keratosis. The 'ABCDE rule,' used for melanoma located elsewhere on the body, cannot be applied to facial melanoma diagnoses, particularly when LM mimics a slow growing solar lentigo.[10]

Lentigo maligna/lentigo maligna melanoma most commonly appear on the cheek and central face area in women and on the scalp, cartilaginous portions of the ear and neck in men.[11,12] Dermoscopic features of facial melanocytic lesions include a flattening or even absence of rete ridges, with the pigment interrupted by hair follicles and adnexal structures ostia, creating a pseudonetwork; unique features due to specific histologic characteristics of facial, chronically sun-damaged skin. This is contrary to classic pigmented network seen elsewhere on the body. Moreover, melanocytes in early disease (LM) mainly proliferate along the hair follicles and adnexal structures, creating specific dermoscopic patterns which are folliculocentric.[13]

Lentigo maligna dermoscopic criteria observed in the initial stage include asymmetric pigmentation in and around hair follicles (circles, semicircles and circles-within-circles; usually with a greyish hue), followed by the appearance of perifollicular grey dots and globules (annular-granular pattern; with blue-grey colour), through to rhomboidal structures/angulated lines formed in the interfollicular areas (creating rhomboids), and finally to pigmented blotches with obliteration of hair

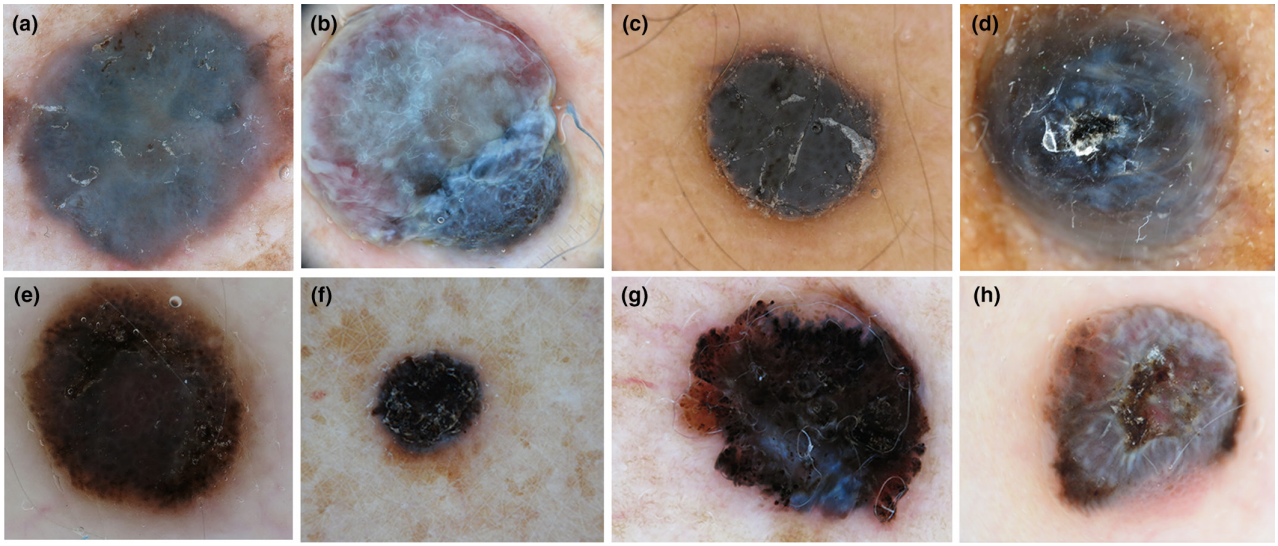

FIGURE 2 Dermoscopy of pigmented nodular melanomas. The presence of blue and black colour (BB-rule), typified melanomas seen in (a–d) images. Peripheral streaks can be seen at the base of the tumours as hallmark of pigmented nodular melanomas (e–g), in association with homogenous dark colours.

follicles (homogeneous areas).[14,15] As these features appear sequentially and are associated with disease progression, the 'LM progression model' has been suggested,[14,16,17] with sensitivity and specificity rates for LM diagnosis of 89% and 96%, respectively.[14]

The single, most important dermoscopic feature for early LM detection is asymmetric pigmentation of follicular openings (Figure 1).[14,16,18] Tschandl et al.[18] showed that more than two-thirds of lesions with any circle presentation as the main dermoscopic pattern were malignant; the 'circle-within-circle' (also known as isobar sign) has a low sensitivity (4.2%–5%), but a high specificity (98.1%) for LM diagnosis.[15,18] Pralong et al.[15] described additional criteria, including (1) 'target-like pattern', (2) 'darkening at dermoscopic examination,' (3) 'red rhomboidal structures' and (4) 'increased density of the vascular network'. These latter two vascular criteria are most useful for rare, amelanotic (non-pigmented) LM variants.[15] Non-specific dermoscopic criteria, also observed in other melanoma subtypes diagnosed in other anatomical locations, include 'regression structures', such as peppering (observed in around 35% of LM) and 'white scar-like depigmentation' (observed in around 10% of LM).[15] Grey colour/structures are also not specific for LM, but are present in 88%–95% of LMs and therefore, the presence of grey colour in a pigmented facial macule warrants LM suspicion.[11,15]

Dermoscopic features of benign pigmented facial lesions are important to outline for LM differential diagnosis. The dermoscopic observation of fingerprint areas, moth-eaten borders, sharp demarcation and milia-like cysts, without any features associated with LM, are indicative of solar lentigo and macular seborrheic keratosis.

Recently, an inverse approach to LM diagnose has been described,[19] proposing the recognition of seven benign features, instead of searching for those associated with malignancy; if benign features cannot be found, a biopsy should be considered to rule out LM.[20]

Less common facial melanoma lesions include nodular melanoma (NM) and other unusual variants, such as desmoplastic and nevoid melanomas.[21,22]

MELANOMA ON THE SCALP

Key-points

- Thin superficial spreading melanomas of the scalp tend to display an atypical network/pseudonetwork and regression upon dermoscopy.
- Blue-white veil, irregular pigmented blotches and unspecific pattern are most commonly observed in thick lesions.

Melanoma on the scalp is more frequent in elderly men with baldness and chronically sun-damaged skin. However, scalp melanoma can also develop in areas protected by hair and in these cases, patients are usually younger. They also often arise in association with pre-existing nevi.[23]

Features associated with scalp melanoma disease progression include atypical network or pseudo-network and regression in thin scalp melanomas and blue-white veil, irregular pigmented blotches and an unspecific pattern in thick lesions.[24] In detail, early disease (LM) and more advanced disease (LMM) are associated with atypical pseudonetwork with increasing hyperpigmentation and obscuration of follicular openings as the lesions' Breslow thickness increases. Additionally, LM may display any of the well-known dermoscopic melanoma features summarized in the 7-point checklist, including atypical network, blue-white veil, atypical

vascular pattern, irregular streaks, irregular pigmentation, irregular dots and globules and regression structures.[25–27]

Nodular melanoma on the scalp may be either pigmented or amelanotic and is mostly thick/invasive and frequently demonstrates an unspecific pattern. For Recently, the blue-black (BB) rule has been introduced to increase dermoscopic diagnostic accuracy of pigmented NM (Figure 2).[28] The 'BB' rule specifies the combination of blue and/or black pigmented areas involving at least 10% of the lesion's surface, reflecting pigment in the dermis (blue colour; such as that observed in blue nevi and haemangiomas) and epidermis (black colour; from atypical melanocytes). Comedo-like openings (commonly seen in seborrhoeic keratoses) or lacunae (commonly seen in haemangiomas) should be visualized in combination with the observation of a black component. This rule is most useful when thick lesions need to be differentially diagnosed from basal cell carcinoma (BCC), squamous cell carcinoma (SCC), angiomas, blue nevi and seborrheic keratoses. BCCs and SCCs can be differentially diagnosed from pigmented NM according to additional dermoscopic characteristics, including vascular pattern and absence of pigment network, streaks, regression structures, irregular brown globules and brown structureless areas. Amelanotic NM diagnosis requires the evaluation of the vascular pattern, as a milky-red background and irregular vessels are the most common features associated with malignancy (Figure 3).

Desmoplastic melanoma is particularly challenging, as it often presents as a non-pigmented nodule or papule upon dermoscopy, with a dermoscopic atypical vascular pattern, grey dots and peppering. When associated with LM, nodules may have coexisting features of LM, such as atypical pseudonetwork, blue-grey areas and peppering. This form of melanoma may be difficult to differentiate from dermatofibroma, both clinically and upon dermoscopy.

MELANOMA ON THE TRUNK

Key points

- Superficial spreading melanoma (SSM) is the most common type of melanoma of the trunk, observed upon dermoscopy with irregular hyperpigmented areas and prominent skin markings in thin lesions and multicomponent pattern, asymmetry, blue-grey veil and colour variety in thick lesions.
- Nevus-associated melanomas are usually typified by dermoscopic island, negative pigment network, globules and streaks.
- NM has different dermoscopic clues according to its pigmentation. In pigmented NM, the so-called BB rule remains the main diagnostic clue; in hypopigmented-pink NM, vascular pattern associated with additional dermoscopic features, is the most important dermoscopic criterion.

Most diagnosed melanomas are located on the trunk in fair-skinned individuals.[29] The most common histologic variant among melanomas of the truck is the superficial spreading melanoma (SSM) which has a higher prevalence among men than women. Almost half of the confirmed SSM cases harbour the BRAFV600E mutation.[30]

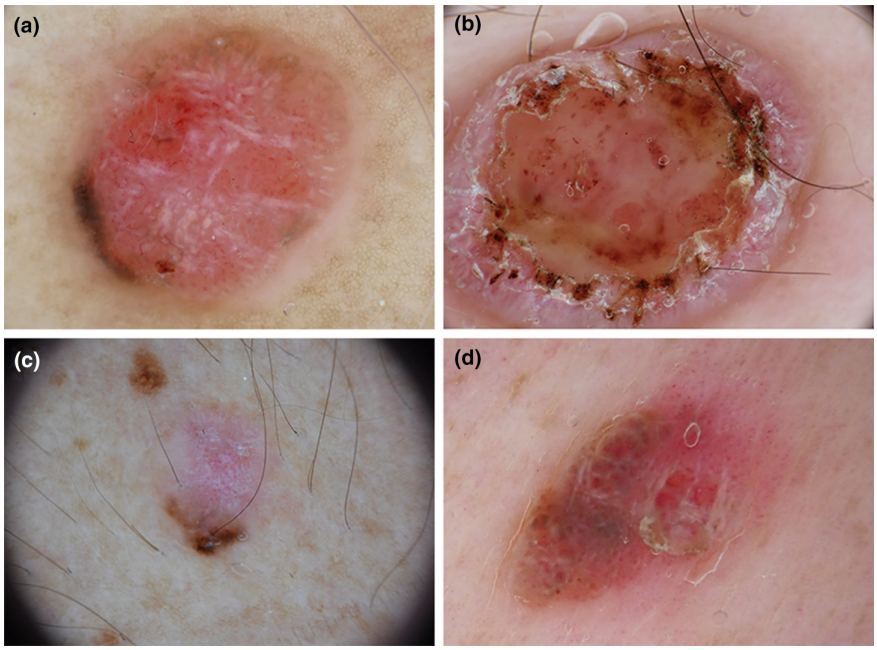

FIGURE 3 Dermoscopy of non-pigmented nodular melanomas. The presence of atypical vascular pattern can be observed as dotted and linear irregular vessels associated to crystalline structures and remnant of pigment at the base of the tumour (a). Central ulceration (b) can present not allowing to discriminate the nature (melanocytic or not) of the tumour; dotted vessels, crystalline structures and remnant of pigmented network (c) strongly favour the diagnosis of melanoma; milky-red globules and atypical vascular pattern typify this non-pigmented nodular melanoma (d).

As suggested by the name, SSM has a slow and progressive horizontal growth phase, which may continue for months or even years. Diagnoses during the horizontal growth phase are classified as in situ or thin melanoma. Later, a vertical growth phase begins. Current dermoscopic criteria have been developed for early melanoma detection, and mainly refer to the SSM histologic subtype. Several diagnostic algorithms[31–34] have been described and when compared with each other, none resulted to be better than the others.[35] Further, the article by Carrera et al. also noted low interobserver agreement on the criteria used in dermoscopy.[36]

The most common dermoscopic findings of thin trunk melanomas are the multicomponent pattern, asymmetry, blue-grey veil and variegated colour (Figure 4). Specific dermoscopic features for melanoma on the trunk include regression structures and shiny white lines for the upper back and negative pigment network for the abdomen.

Nevus-associated melanoma (NAM), coexisting melanoma and nevus remnants reported at histopathological examination, generally occur on the trunk. The melanoma component is usually a SSM subtype,[37] congenital NAMs are generally thicker than acquired NAMs[38] and NAM's dermoscopic appearance seem to be influenced by several factors, such as nevus-type, melanoma stage, as well as the relative components of the nevus and melanoma.[38–43] When located side by side, melanoma may appear as an eccentric atypical area, called dermoscopic island in the context of a harmless lesion, but when the two components are not clearly horizontally segregated, dermoscopic island is generally absent. Other dermoscopic criteria proven to be independently associated with NAM include negative pigment network, globules and streaks. The presence of blue-white veil is more often associated with de novo melanoma (Figure 4).

Although not site-specific, NMs can be found on any part of the body, including the trunk. NM comprises 12%–30% of all melanomas diagnosed and has poor prognosis.[44–46] Diagnosis of NM is extremely challenging due to its rapid onset and growth and clinical appearance, which can simulate benign and other malignant entities. Several dermoscopic criteria are traditionally classified according to tumour pigmentation. Pigmented NMs usually display blue-black colour,[28] irregular dots and globules, crystalline structures and vessels of any calibre and shape.[47] Ulceration is also a common finding (Figure 2). Amelanotic or hypopigmented NMs represent a diagnostic dilemma. Pink NMs are typified by the presence of significant positive vascular predictors that include predominant central vessels, hairpin vessels, milky red-pink areas, more than one shade of pink and a combination of dotted and linear irregular vessels which is identified in 30% of melanomas with (specificity of 85%)[48–50] (Figure 3). Attention should also be made to the polymorphic nature of vessels in pink melanomas. More recently, Deinlein et al.[51] highlighted that tumour thickness might strongly influence the vascular pattern on dermoscopic examination.

A recent International Dermoscopy Society study, demonstrated that light brown coloration and irregular brown dots/globules were most frequently observed in ≤2 mm tumours.[52] Dotted vessels (3.4-fold), white shiny streaks (2.9-fold) and irregular blue structureless area (2.4-fold) were revealed predictors for thinner NMs compared to non-melanoma nodular tumours.

MELANOMA ON THE LIMBS

Key-points

- Most available studies have focused on melanoma of the lower limbs.
- Thick melanomas mostly present well-known melanoma features.
- Early melanomas of the lower limbs may present prominent or delicate network, wider skin markings, polygons/angulated lines, regression and dermoscopic islands.

Few studies have explored dermoscopic features of melanoma on the limbs, and those available have mainly focusing on lower limbs. Lower limbs are the most common site of melanoma in women.

Most lower limb melanoma are clinically unremarkable, even in high-risk patients with multiple nevi. Upon dermoscopy lower limb melanomas may reveal either a prominent or delicate network, hypo-pigmentation with dotted vessels and diffuse light pigmentation with perifollicular pigmentation.[53]

For early stage melanoma of the lower limbs, dermoscopy examination alone may not detect lesions and digital dermoscopy monitoring is advised.[54] Compared to melanoma of the trunk, most melanoma of the lower limbs exhibit prominent skin markings, defined as the presence of linear intercepting furrows, lighter than the lesion's overall pigmentation.[55] Additional associated features include polygons/angulated lines, regression and dermoscopic islands (Figure 5).

NAIL MELANOMA

Key points

- In adults, onychoscopy features of nail melanoma are brown background of the band, irregular pattern of the longitudinal lines and presence of black/brown dots/globules or a black background of the band with areas of different pigmentation hues.
- In children, onychoscopy of nail pigmentation is not reliable for diagnosis.
- Periungual pigmentation, the micro-Hutchinson's sign, is visible only by onychoscopy, and when visualized in adults, is suggestive of malignancy.
- Onychoscopy cannot differentially diagnose amelanotic melanoma, which is observed with polymorphic vascular pattern and milky-red areas.

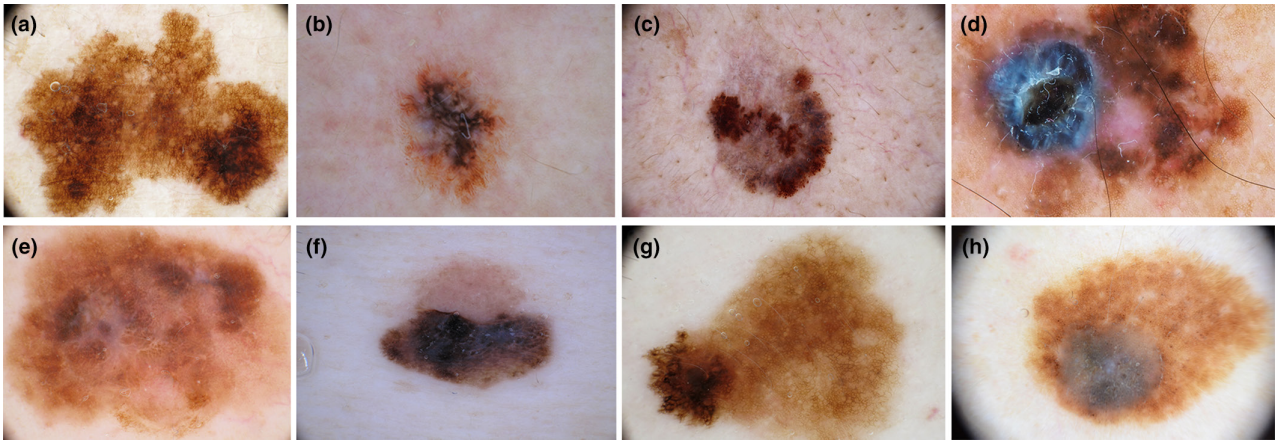

FIGURE 4 Dermoscopy of superficial spreading melanoma of the trunk, de novo melanomas (a–d) and nevus associated melanomas (e–h). (a) Atypical pigment network in an in situ melanoma, two types of network are visible in a overall asymmetric large lesion. (b) Minimally invasive melanoma, displaying network and regression structures. (c) SSM 0.6 mm Breslow thickness, the lesion is asymmetric with a large area with regression, irregular globules at the periphery and irregular pigment blotches. (d) SSM in vertical growth phase. The lesion is asymmetric, with irregular network, regression and a blue-white veil involving an eccentric nodular component. (e) Minimally invasive nevus-associated melanoma showing inverse network and regression. (f) Nevus associated in situ melanoma. The two components are clearly distinguishable, with the banal dermal nevus on the upper part, and the melanoma in situ component with inverse network, black blotch and irregular streaks. (g) Nevus associated melanoma appearing as a dermoscopic island, an eccentric atypical area of the lesion. (h) Invasive melanoma arising on congenital nevus. The melanoma component is represented by a blue nodular area.

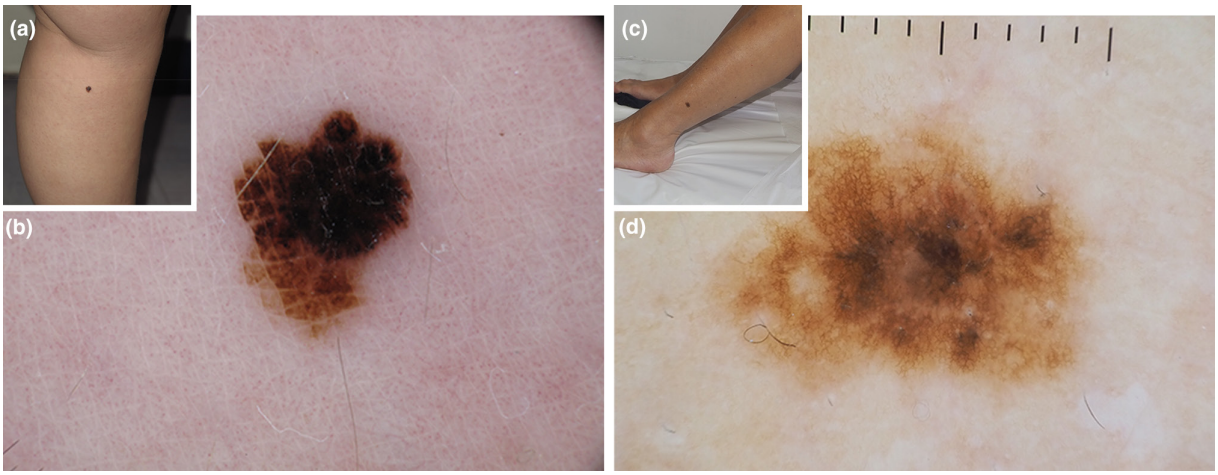

FIGURE 5 Melanoma of the lower limbs. (a) A solitary pigmented lesion on the leg of a 31-year-old woman. (b) The lesion is asymmetric, with a peripheral black blotch and irregular streaks. Wider skin markings are evident. (c) A solitary macule on the leg of a 61-year-old woman with sun-damaged skin. (d) Atypical network and regression are detected in dermoscopy.

Melanomas located on the nail, make up approximately 1%–3% of melanomas in fair- and 15%–20% in dark-skinned individuals.[56] Nail melanoma generally occurs in the fifth to seventh decades of life, both in fingernails and toenails, most commonly located on the thumb or great toenail.[56]

The most common clinical presentations of nail melanoma include a longitudinal band of melanonychia (around 75% of cases) or, less frequently, an ulcerated nodule of the nail bed (around 25% of cases).[57] The periungual spread of pigmentation, the 'Hutchinson's sign', may be associated with both clinical presentation types. In adults, the Hutchinson's sign enables a suspicious clinical diagnosis of nail melanoma.[58] Nail melanoma presenting as a longitudinal band of melanonychia, not associated with nail plate abnormalities or ulceration, is usually in situ and has a good prognosis.[57]

The naked eye identification of longitudinal band of melanonychia is not specific to nail melanoma. A nail matrix excision procedure carries the risk of definitive nail dystrophy, but for histopathological confirmation, excision is necessary. Several clinical scales and algorithms have been proposed to reduce unnecessary excisions[59,60]; bands on a single digit, with onset during adulthood, brown-black in colour with blurred borders and a tendency to enlarge. The presence of Hutchinson's sign is an additional feature suggestive of malignancy.

Onychoscopy increases the diagnostic accuracy of longitudinal melanonichia compared with naked eye examination alone.[57] Magnification of 10x provided by a handled dermatoscope assists evaluation and when necessary, the magnification can be increased using a videodermatoscope.

The use of gel, such as an ultrasound gel, as an immersion medium is recommended to smoothly move over the convex nail plate and avoid artefacts due to a rough nail surface. Onychoscopy observation should include the nail plate, distal edge and periungual tissue. The following features should be assessed when observing melanonychia[61]:

1. Band colour: the band background, which runs longitudinally from the proximal nail fold to the distal edge of the nail plate, may vary in colour from grey to brown to black;
2. Longitudinal thin lines visible over the background (two patterns can be distinguished):
   a. Regular lines, which are all of the same colour and thickness and run from the start to end of the band, oriented parallel to each other,
   b. Irregular lines, which are of variable colours (from light brown to black) and thickness, often interrupted along the length and cross into each other.
3. Presence of pigmentation of the periungual tissues, including proximal and lateral nail fold and hyponychium.
4. Presence of small brown-black granules, with diameters <0.1 mm.

Further, the free edge examination of the nail can help locate where in the matrix the lesion (proximal vs. distal) better perform a nail matrix biopsy.[62]

Nail melanoma observed with onychoscopy is significantly associated with brown coloured background and irregular longitudinal lines.[61] Lack of homogeneity of colour and line width are the most specific features (Figures 6 and 7, Table 1). A black background of the bands with areas of different pigmentation hues is also indicative of nail melanoma. The periungual pigmentation of the proximal and lateral nail folds or hyponychium, the 'Micro- Hutchinson's sign,' is visible only by dermoscopy with magnification >10×.[61] Malignant micro-Hutchinson's sign, which is the spreading of nail melanoma in the hyponychium area, shows a parallel ridge pattern and irregular diffuse pigmentation, typical of melanoma in acral skin.[63] Additional onychoscopy features include the presence of dots/globules of brow-black colour (indicators of melanin granules in the nail plate due to a Pagetoid phenomenon), bandwidth >2/3 of the nail plate, and the presence of nail plate dystrophy.[63] Nail plate dystrophy, also evident by clinical examination, is an indicator of invasive melanoma.

The onychoscopy observation of monodactylic bands of melanonychia in adults has high specificity and sensitivity for nail melanoma detection.[63] However, approximately 20% of melanonychia show dermoscopic features usually associated with benign diagnoses, that is, a brown background with regular coloured lines, spacing and thickness, without any parallel disruption.[57]

Onychoscopy does not have any diagnostic value in melanonychia of children. Melanonychia in childhood is extremely rare, and is mostly due to congenital nevi or lentigo.[64] At onychoscopy, the nail matrix of nevi in children often has a dark brown colour with multicolour background, bands of variable colours and spacing, may contain dots/globules and are associated with Hutchinson's sign, which in these cases represent the presence of nests in the periungual tissue. Nail plate dystrophy is also commonly associated with benign diagnoses.[65]

Approximately 1/4 of all nail melanomas are amelanotic and present as eroded nodules of the nail bed. These lesions have a high Breslow thickness and a worse prognosis compared to pigmented lesions.[57] Onychoscopy features of amelanotic nail melanomas are the same as those observed in amelanotic cutaneous melanoma: polymorphic vascular pattern with milky-red areas. Onychoscopy cannot differentially diagnose amelanotic nodule nail melanomas from other benign or malignant causes of nail bed ulceration,

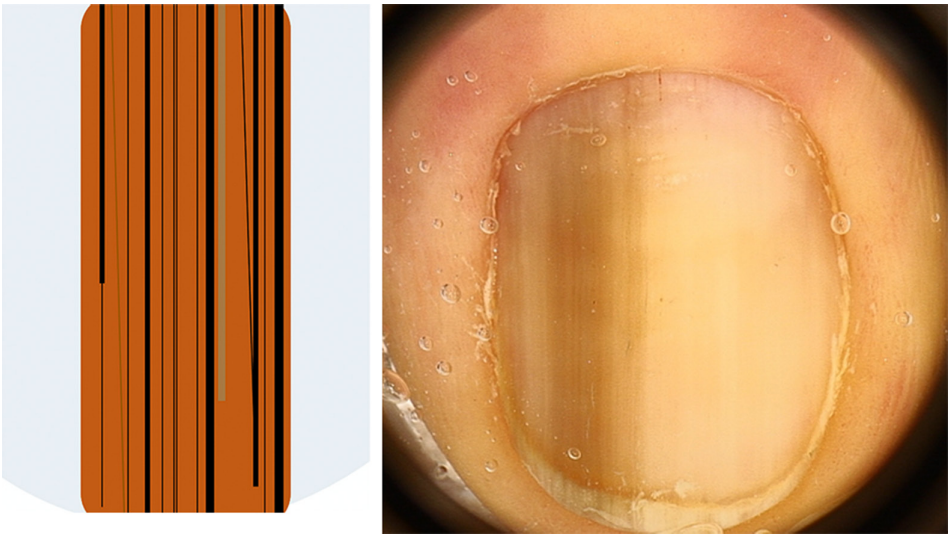

FIGURE 6 Onychoscopy of nail melanoma: a brown background with longitudinal lines, irregular in width, colour and spacing. Some lines are not parallel and interrupted along their length.

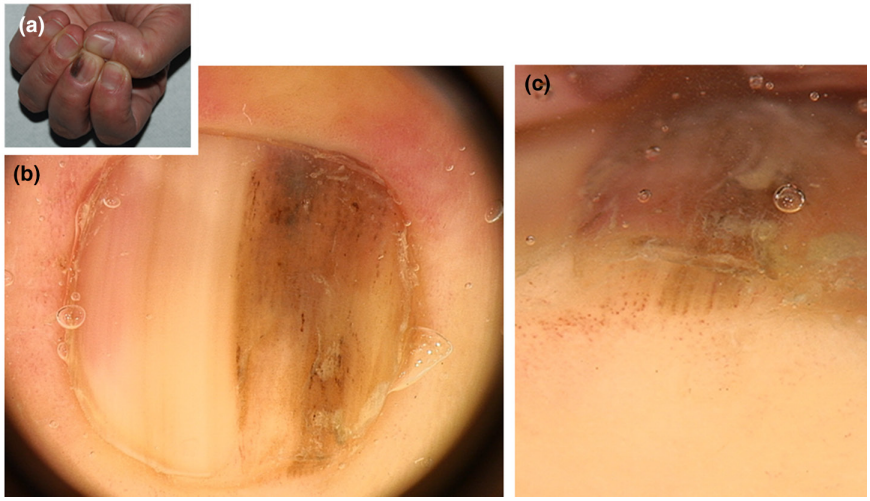

FIGURE 7 (a) Single-digit involvement of nail melanoma; (b) onychoscopy of nail melanoma: a brown background with longitudinal lines, irregular in width, colour and spacing. Black dots scattered along the pigmented band, indicating the presence of melanin within the nail plate, (c) free edge dermoscopy revealing the matrix origin of the tumour.

TABLE 1 List of dermoscopic diagnostic criteria for nail melanoma.

• Brown-black colour of the background and irregular longitudinal lines
• Black background with areas of different pigmentation hues
• Micro-Hutchinson's sign
• Dots/globules of brow-black colour
• Width of the band more than 2/3 of the nail plate
• Nail plate dystrophy

such as pyogenic granuloma and squamous cell carcinoma. Remnants of pigmentation seen in the periungual tissue, such as micro-Hutchinson's sign, are the only onychoscopy diagnostic signs that should be carefully searched for and considered for accurate diagnosis.

MUCOSAL MELANOMA

Clinical features

Key point

- Mucosal melanoma is rare and often diagnosed in advanced stages due to its hidden localisation.

Mucosal melanoma can develop in the glabrous portion of the lip, oral, sinonasal, genital, urinary, gastrointestinal, anorectal and conjunctival areas.[66] Mucosal melanoma is rare, representing about 1.4% of all melanomas. Because of its often-hidden localisation, diagnosis is usually achieved at advanced stages and is therefore associated with poor prognosis.[67] Clinically, mucosal melanoma is visualized as a solitary, asymptomatic, brown to black macule that can be difficult to differentiate from a melanotic macule; the most common cause of acquired mucosal pigmentation.[68] Over time, lesions turn into a nodule or plaque and ulcerate. Moreover, about 1/5 of mucosal melanomas are amelanotic, especially in advanced stages, which complicates correct diagnoses even further.[66]

Dermoscopy of oral and ano-genital melanoma

Key points

- Mucosal melanoma is characterized by the presence of multicomponent and structureless patterns and by multiple colours, especially blue, grey or white.
- Dermoscopic features usually associated with cutaneous melanomas can also be observed in mucosal melanoma.

Few data are available regarding dermoscopy observations due to the rarity of this tumour type and the requirement for both patients and doctors consent for image acquisitions in the genital area. Moreover, mucous membrane locations can be difficult to examine, and contact probes should be protected to prevent infection.[68] As dermoscopy probes can only be applied to external mucosa, dermoscopic features herein described are limited to external portions of oral and genital mucosa only (i.e. lip, gum, vulva, penis and anus).

A recent dermoscopy study of pigmented oral and ano-genital mucosa lesions including 140 lesions, reported an incidence of 11 confirmed melanomas.[69] The presence of multiple colours was observed to be associated with melanoma diagnosis. For the differentiation between malignant from benign pigmented lesions, two simple colour based models were proposed. The presence of blue, grey or white colours in the context of a pigmented mucosal lesion were observed to be the most relevant parameters for melanoma diagnosis, especially when associated with a structureless distribution (Figure 8).

Mucous membrane melanoma often presents a multicomponent (or polymorphous) pattern, defined as the presence of

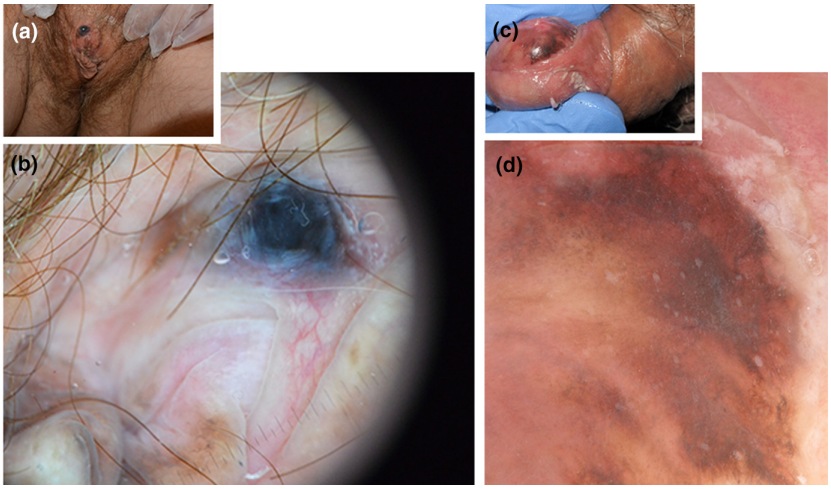

FIGURE 8 Mucosal melanoma: dermoscopic (b, d) and clinical (a, c) images of vulvar and penis located melanomas. Dermoscopy shows the presence of homogeneous (or structureless), blue colour in the nodular component (b). Multiple colours are visible on dermoscopy as brown, grey and white (d).

multiple patterns in the same lesion, such as homogeneous, reticular and globular, combined asymmetrically or as a structureless pattern. This pattern is defined as the absence of any discernible structure (dots, globules or clods, circles or lines).[70] Despite the presence of some features common to cutaneous melanoma, such as asymmetry of structures, multiple colours, blue-white veil, irregular dots or globules, regression structures, irregular vessels and milky-red areas also observed in mucous membrane melanoma,[70,71] dermoscopic algorithms used for skin, including the ABCD rule, Menzies method, 7-point checklist and 3-point checklist have reported variable diagnostic accuracies in different case series.

An algorithm for the early detection of vulvar melanoma (sensitivity = 100%; specificity = 90%)[71] involves the assignment of 1 or 2 points for the presence of multicomponent or polycircular pattern, irregular globules, blue-whitish or white veil, ≥3 colours, irregular vessels, and if the lesion is palpable, unilateral or unifocal. A total score ≥4 was defined as a threshold for melanoma diagnosis.[71] However, data from most mucosal melanoma dermoscopic studies are limited by the inclusion of principally advanced stage lesions.

In a recently reported series of cases, 14 thin (≤0.5 mm Breslow thickness) or in situ vulvar melanomas (diagnosed over 2 years) described dermoscopy features typically associated with thicker cutaneous melanomas, including structureless areas, grey areas, irregular black–brown dots and blue-white structures.[72]

Dermoscopy of conjunctival melanoma

Key point

- Conjunctival melanoma is mainly characterized by the presence of dark brown, black and grey colour and by the presence of dots that can be confluent in a structureless pattern.
- Cysts are absent in conjunctival melanoma but present in conjunctival nevi.

Conjunctival melanomas are mainly characterized by a dark brown pigmentation[73–75] organized in irregularly distributed dark brown and black dots that can be confluent in a structureless pattern.[74] Grey colour is also observed in more than half of the cases.[72] Prominent feeder linear vessels are common, especially for raised tumours.[74–76] Dermoscopic features typical of cutaneous melanoma have also been described in conjunctival melanoma, such as the presence of multiple patterns and colours, asymmetry, irregular dots and globules, regression structures and blue-white veil.[75–77]

Both on the conjunctiva and the eyelid margin, melanoma is usually characterized by a higher number of dermoscopic patterns and colours than benign lesions and by darker pigmentation.[75–77]

ACRAL MELANOMA

Key points

- Acral melanoma (AM) is an anatomical term that refers to melanoma located on glabrous (hairless) skin of the extremities.
- AM in white individuals is a rare disease which is frequently diagnosed at late stages.
- Delayed diagnosis of acral melanoma is mainly due to misdiagnosis (e.g. fungal infection, wart) or neglect.
- Initial misdiagnosis and/or delayed diagnosis result in poor outcome.

Acral melanoma (AM) are lesions located on the palms, soles or subungual regions.[78] Representing around 3% of all melanomas, AM is the most common type of melanoma

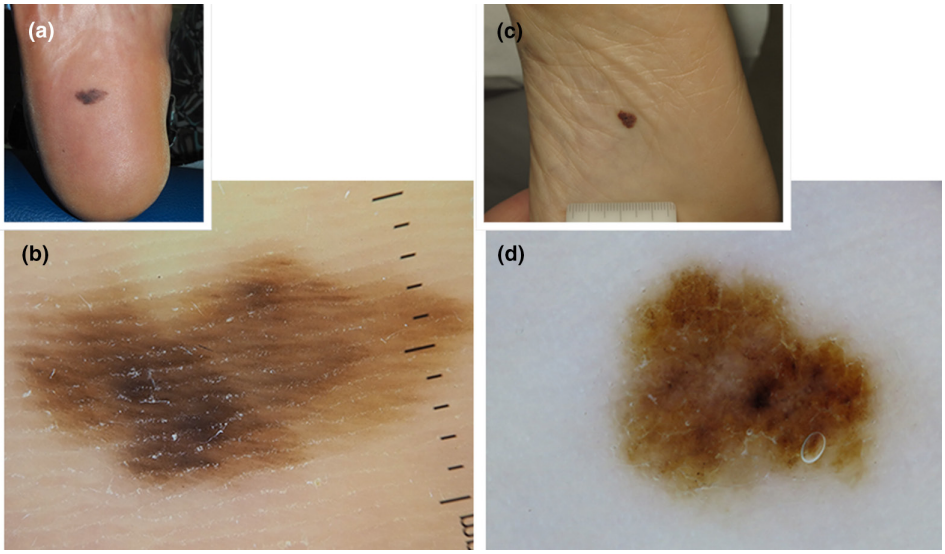

FIGURE 9 Acral melanoma: dermoscopic (b, d) and clinical (a, c) images of melanomas located on the sole. On dermoscopy, the lesion reveals PRP with an irregular diffuse pigmentation (a) and irregular brown to black dots/clods (d).

(20%–40%) in dark skinned people (Asian, African and Hispanic populations), but uncommon in light-skinned individuals (European-descent individuals).[79] AM mostly identified on the rear and front of the foot of Asian individuals led to initially hypothesized to be the result of trauma and mechanical stress, due to its predilection on the rear and front of the foot of Asian individuals.[80] However, a study conducted in the United States reported significantly more AM detected on the heel than on other areas of the plantar surface, independently of weight-bearing and non-weight bearing areas.[81]

Acral melanoma is frequently diagnosed at advanced stages and is associated with poor survival outcomes. Therefore, early diagnosis is of paramount importance.

Clinically, AM in the initial phase presents as a pigmented macule or patch with ill-defined borders and variegated colours. In time, a nodule may develop in the context of a radially growing lesion. The subungual localisation is characterized by a longitudinal or total melanonychia with Hutchinson's sign.[78,79]

Acral skin is identified with dermoscopy by the presence of dermatoglyphics that are constituted by the parallel arrangement of furrows and ridges, which in turn correspond to crista limitans and crista profunda intermedia, respectively. The parallel ridge pattern (PRP), characterized by a band-like pigmentation along the rete ridges, is the prototypical dermoscopic feature of AM and can be detected in both early, often as the unique pattern and advanced stages.[82–85] The PRP corresponds to histopathologically observed nests of melanocytes located around the crista profunda intermedia. However, PRP is not specific to AM and can be observed in other benign lesions, including subcorneal haemorrhage, drug-induced acral pigmentation and lentigines of Peutz-Jeghers and Laugier-Hunziker syndromes. The addition of other clinical and dermoscopic findings along with scraping of the skin lesion may assist in correct diagnosis.

Typical dermoscopic features associated with invasive AM include PRP with an irregular diffuse pigmentation and irregular brown to black dots/clods (Figure 9). The presence of patterns typical of benign acral lesions (i.e. parallel furrow, lattice-like and fibrillar pattern) have also been described in the invasive phase of AM, although they are usually confined to a small area of the lesion and do not represent the main lesion feature. It is interesting to note that an irregular fibrillar pattern can be observed in AM in contrast to the regular fibrillar pattern detected in acral nevus. Irregular fibrillar pattern is characterized by an asymmetric and irregular arrangement of fibrillar pigmentation, with fibrils varying in size and colour. Additional dermoscopic features of the invasive phase include atypical vascular pattern, blue-white veil and ulceration (Figure 9).[86]

Some dermoscopic algorithms and scores have been proposed to assist in both the differentiation of AM from benign lesions and early AM detection. The clinical three-step algorithm recommends a clinical cutoff for surgical excision when an acquired acral melanocytic lesion has a non-typical dermoscopic pattern, lesion diameter ≥7 mm and patient age >50 years,[87] The algorithm has sensitivity, specificity, PPV and NPV rates of 80%, 88%, 44% and 97%, respectively.[88] Notably, the low overall sensitivity may have been related to the relatively high frequency of small multicomponent AM diagnoses. Additionally, fibrillar pattern was commonly misclassified as a high-risk pattern by physicians. Therefore, addressing such educational issues should reduce the number of unnecessary biopsies among acral lesions.

A dermoscopic scoring system named BRAAFF has also been shown to improve AM diagnostic accuracy.[89] It is composed of four positive patterns and two negative predictors: irregular blotches (1 point), PRP (3 points), asymmetry of structures (1 point) and asymmetry of colours (1 point), presence of a parallel furrow pattern (–1 point) and fibrillar pattern (–1 point). A threshold of one point was found to

provide the best sensitivity (93%) with a specificity of 87%, and it's use enabled the correct classification of 88% of the overall group of cases (melanomas vs. nevi).

Amelanotic acral melanoma display microscopic remnants of pigmentation in most cases upon dermoscopy. The vascular pattern found in almost half of these lesions is polymorphous, with combinations of milky-red areas (95%), linear irregular vessels (49%), dotted vessels (43%) and hairpin vessels (41%).[84]

CONCLUSIONS

The combined clinical and dermatoscopic approach enables the diagnosis of distinct melanoma types that differ according to body site location. A quick overview of the main dermoscopic features may assist the Clinician in the decision-making process whether to biopsy or not a given lesion.

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