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Dermoscopy provides useful information for the management of melanonychia striata

LUC THOMAS & STÉPHANE DALLE
Service de Dermatologie, Université Lyon France and Hôtel Dieu de Lyon, Lyon Cedex France

ABSTRACT: The diagnosis of melanonychia striata is often difficult, and a biopsy of the nail matrix is required in doubtful cases. However, dermoscopic examination of the nail plate offers interesting information in order to better select the cases in which pathologic examination is indicated. In the case of brown longitudinal pigmentation with parallel regular lines, the diagnosis of nail apparatus melanocytic nevus could be made. On the other hand, the presence of a brown pigmentation overlaid by longitudinal lines irregular in their thickness, spacing, color, or parallelism is highly in favor of a melanoma. Gray homogeneous lines are observed in case of lentigo, lentiginoses, ethnic or drug-induced pigmentations, and in post-traumatic pigmentations. Blood spots are characterized by their round-shaped proximal edge and their filamentous distal edge and are highly suggestive of subungual hemorrhages. Dermoscopic examination of the free edge of the nail plate gives information on the lesion location; pigmentation of the dorsum of the nail plate is in favor of a proximal nail matrix lesion, whereas pigmentation the lower part of the nail edge is in favor of a lesion of the distal matrix.

KEYWORDS: dermoscopy, melanoma, melanonychia striata, nail disease, nevus, skin cancer

Introduction

Longitudinal nail plate pigmentation, also known as melanonychia striata, often is a very complex diagnostic problem (1,5–7,14). If melanoma should be feared in all cases (10–12), many benign differential diagnoses exist and in case of doubt a nail matrix biopsy must be performed (5–14). This surgical procedure is often painful and whatever the surgeon's talent regularly leaves definitive nail dystrophy induced by the injury of the nail matrix. Differential diagnosis encompasses melanoma, nail matrix melanocytic nevus, lentigo, and lentiginoses of various types, drug-induced pigmentation, ethnic nail pigmentation, repetitive trauma-induced pigmentation, and subungual hemorrhages (6,7). The main differential diagnosis problem is to distinguish melanoma from benign conditions. On the clinical point of view, a longitudinal nail pigmentation should be considered as suspicious if its onset occurred during adulthood, if monodactylic, if polychromic, if rapidly enlarging (with a triangular shape), and in the absence of other causes of nail pigmentation. On the other hand, benign cases of longitudinal nail pigmentation often occur during childhood, are often polydactylic, monochromic, stable in size and shape, or may have a well-defined cause (drugs, repetitive trauma, dermatologic condition inducing periungual inflammation, predisposing ethnic origin). Performed by trained examiners, dermoscopy has already proven its efficiency in the differential diagnosis of cutaneous pigmented tumors. Dermoscopy is also an interesting tool for nail apparatus examination and the object of this paper is to review its benefits in case of longitudinal nail pigmentation (3,8,9,13).

Address correspondence and reprint requests to: Luc Thomas, MD, PhD, Service de Dermatologie, Hôtel Dieu 69288 Lyon Cedex 02 France, or email: luc.thomas@chu-lyon.fr.

Technique

Dermoscopy consists in the examination of a skin pigmented lesion through a magnifying lens with

FIG. 1. Dermoscopic examination of the nail plate with a regular handheld dermascope.

FIG. 2. Dermoscopic examination of the free edge of the nail plate.

an angled lightening of 20°. An immersion liquid is also used in order to suppress the reflectance of the light by the upper layers of the skin. Other systems use a polarizing filter. On the nail plate, oil or gel immersion is required because of the usual convex shape of the nail (FIG. 1) (13). For nail dermoscopy, systems using a polarizing filter are less efficient than in other locations of the skin because of the optical properties of the nail plate. Examination is usually made with a magnification of 10× with a handheld dermoscope but digital videodermoscopic systems may also be used. Examination of the distal edge of the nail plate is performed with the same system but examination usually requires more immersion gel or oil (FIG. 2) (2).

Observed features

Blood spots

Blood spots are characterized by their round proximal shape and their "filamentous" distal end. Their color varies from purple in recent lesions to brown in older lesions. In the absence of any other symptom, blood spots are highly suggestive of subungual hemorrhages. However, their presence does not rule out melanoma or other malignant tumors (4,13). It is often wise to have a second look at the same nail 3–4 months later to observe the proximal clearance of the pigmentation and its movement toward the distal end (13).

Brown background with regular longitudinal lines

Brown coloration of the background is indicative of a significant melanocytic hyperplasia in the nail matrix. When this brown coloration is overlaid by regularly disposed parallel pigmented lines, regular in their thickness, color, spacing and parallelism, this is in favor of a benign process. This pattern is highly indicative of a nail matrix benign nevus (13).

Brown background with irregular longitudinal lines

The irregular pattern of the longitudinal lines (irregularity in spacing, thickness and color of the lines sometimes associated with areas of parallelism disruption) is in favor of a malignant melanocytic tumor of the nail matrix (13). Biopsy is then mandatory.

Gray band

When pigmentation is not the result of prominent melanocytic hyperplasia, the dermoscopic examination reveals a grayish longitudinal band either homogeneous or overlaid by regular thin gray lines (13). This aspect is observed in lentigo or lentiginoses of different kinds (Laugier-hutziker disease, Leopard syndrome, Peutz × Jeghers-Touraine disease); it is also observed in drug-induced nail pigmentation, ethnic pigmentation of the nails, and in pigmentation resulting from repetitive trauma (onychotillomania and frictional toenail pigmentation).

Hutchinson's sign

The pigmentation of the periungual skin is also known as Hutchinson's sign; it is often considered as a good indicator of melanoma. However, it also can be found in the benign nevi of the nail apparatus, especially in the congenital type. Kawabata et al. have described a dermoscopically atypical

Hutchinson's sign mainly characterized by its polychromia and asymmetry in melanoma that contrasts with a more typical pigmentation in benign lesions (9). Ronger et al. described a micro-Hutchinson's sign that is invisible to a naked eye and only observable by dermoscopy (13). Its observation is rare but it has only been found in association with melanoma.

Other features

Dermoscopic examination of unpigmented tumoral syndromes of the nail apparatus also provides useful information. This new field of application of dermoscopy is in development for tumors of the skin. Some of the features observed in cutaneous achromic melanoma are also observed in nail apparatus unpigmented melanoma. Most of the criteria are found by the precise analysis of the vascular architecture (linear-regular vessels, milky-red areas, points, and globules). The remnants of pigmentation, unobservable with the naked eye, can also be very useful to suspect melanoma in case of unpigmented ungual or periungual tumor.

Diagnoses

Melanoma

In case of longitudinal ail plate pigmentation, melanoma must always be included in the differential diagnosis list. Dermoscopic examination reveals a brown to black pigmentation composed of irregular longitudinal lines (FIGS. 3 and 4). Additional features may be erosion of the nail plate, atypical Hutchinson's sign or micro-Hutchinson's sign (FIG. 5). Blood spots may be present and are observed in 5% of pigmented melanomas.

Achromic melanoma of the nail apparatus is a difficult diagnosis. The nail plate is often partially destroyed by a polycyclic, bleeding, erythematous vegetating lesion. In such case, dermoscopy can provide interesting additional information with areas of remnant pigmentation and vascular disorder (linear-irregular vessels, milky-red areas) (FIGS. 6 and 7).

Nail matrix melanocytic nevus

A benign melanocytic nevus of the nail apparatus is characterized by a regular pattern of the longitudinal lines. In the present authors' opinion, observation of such features allows a simple follow-up without surgical biopsy of the nail matrix (FIGS. 8 and 9).

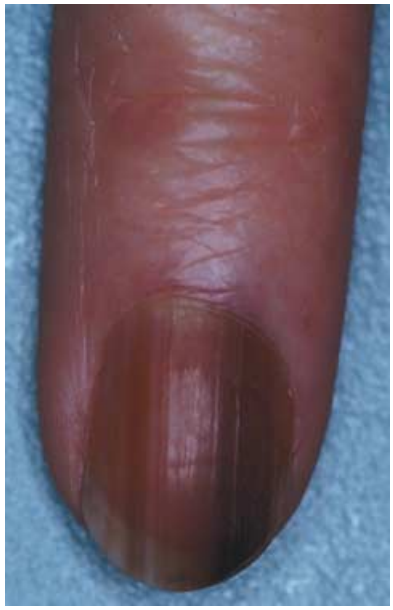

FIG. 3. Nail apparatus melanoma, ALM type, Clark's level II, 0.2 mm.

FIG. 4. Dermoscopic examination of the melanoma presented on FIG. 3. The pattern is irregular with irregular lines in their color, spacing, and thickness (Heine Dermaphot × 10).

Difficult cases, however, exist especially in congenital nevi of the nail apparatus. In such cases, the pigmentation if often irregular and mimics that of the melanoma's. Blue nevi are characterized by a stable hazy-blue coloration seen through the nail plate as described by Causeret et al. (3).

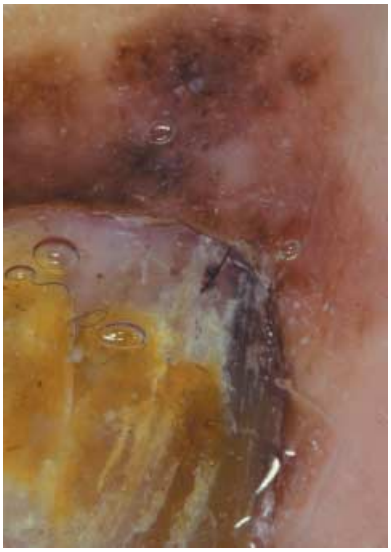

FIG. 5. Atypical Hutchinson's sign. Dermoscopic observation of the periungual skin of a Clark's level III; 0.8 mm ALM type melanoma of the thumb. Pigmentation is asymmetric, polychromic with areas of regression (Heine Dermaphot × 10).

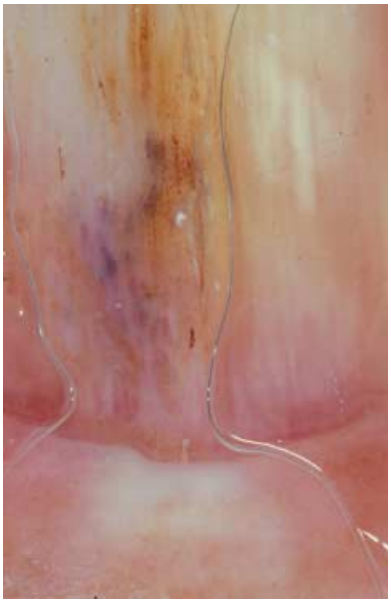

FIG. 7. Dermoscopic examination of the amelanotic melanoma shown on FIG. 6. Dermoscopy reveals remnants of pigmentation, linear-irregular vessels, and erosion of the nail plate (Heine Dermaphot × 10).

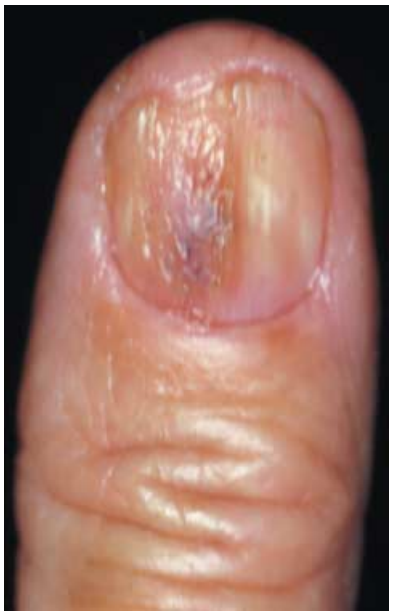

FIG. 6. Achromic melanoma of the thumb, ALM type Clark's level III; 1.2 mm.

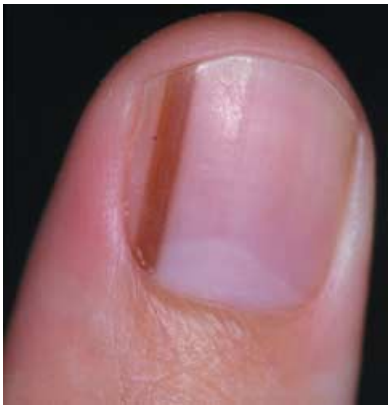

FIG. 8. Benign melanocytic nevus of the proximal nail matrix.

Lentigo and lentiginoses

The dermoscopic pattern of the lentigo of the nail apparatus is characterized by its gray coloration that is either homogeneous or made of thin longitudinal gray lines overlying a gray background (FIGS. 10 and 11). This dermoscopic image is, in the view of the present author, sufficient to avoid the biopsy of the nail matrix. Examination of the other nails, the mucous membranes, and skin is, however, required to better characterize the syndrome.

(Repetitive) trauma-induced pigmentation

Nails are often repetitively traumatized by friction in tight shoes, by compulsive onychotillomania, or by dermatologic inflammatory conditions involving the toes or fingers. In darker skin phototypes, this may induce linear postinflammatory

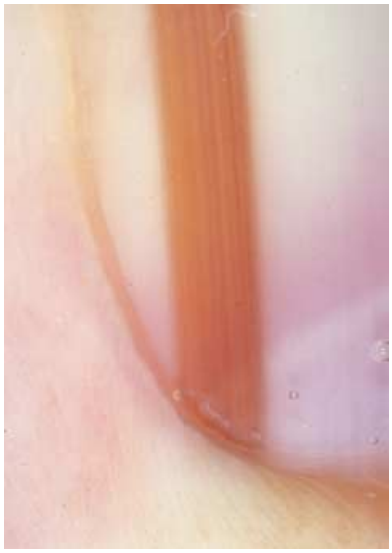

FIG. 9. Dermoscopic examination of the nail matrix nevus presented on FIG. 6. A regular brown pattern is observed: the longitudinal parallel lines are regular in their color, thickness, and spacing (Heine Dermaphot × 10).

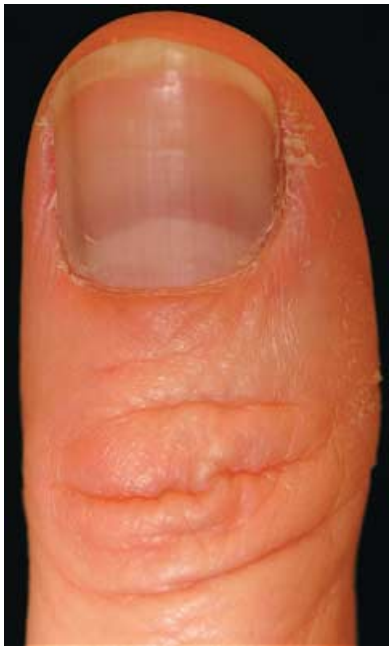

FIG. 10. Lentigo of the nail matrix.

pigmentation of the nail plate. The observed dermoscopic features are similar to lentigo. Splinter hemorrhages may also be seen (FIGS. 12 and 13).

Drug-induced pigmentation

Hydroxyurea, minocyclin, antimalarials, AZT, amiodarone, and many other drugs may induce a

FIG. 11. Dermoscopic examination of the nail matrix lentigo shown on FIG. 8. A homogeneous longitudinal gray band is observed (Heine Dermaphot × 10).

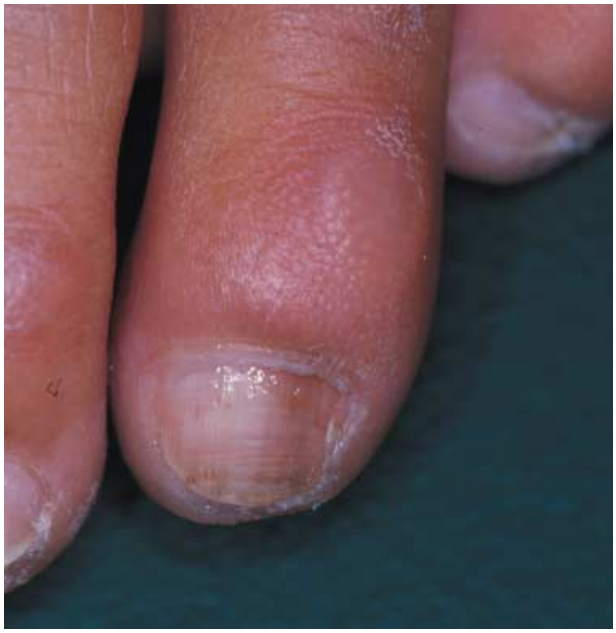

FIG. 12. Longitudinal pigmentation of the fourth toenail as a result of frictional repetitive trauma in tight shoes.

longitudinal pigmentation of the nail plate. Its dermoscopic examination reveals a grayish band similar to those observed in lentigos.

Ethnic pigmentation

Ethnic-type nail pigmentation is rarely a diagnostic problem in communities in which this feature is common. However, patient interrogation on his lineage may help in diagnosing this more unusual

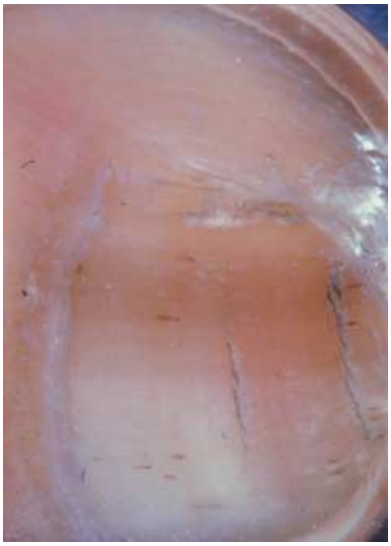

FIG. 13. Dermoscopic examination of the trauma-induced pigmentation presented on FIG. 10. Dermoscopy shows a homogeneous longitudinal gray band and thin splinter hemorrhages (Heine Dermaphot × 10).

finding in clear skin types. Dermoscopy shows grayish longitudinal often multiple and polydactylic bands similar to those observed in lentigo.

Subungual hemorrhage

Subungual hemorrhage is a diagnostic problem when no history of trauma is recalled by the patient. Typical dermoscopic features include blood spots with their round proximal shape and their "filamentous" distal end (FIGS. 14 and 15). Because blood spots can be observed in malignant tumors, the present authors recommend a second examination after 3–4 months to make sure that the heavily pigmented area did not mask a subungual tumoral syndrome and that the pigmentation moved toward the distal end of the nail plate.

Location of the origin of the pigmentation

Dermoscopic examination of the distal edge of the nail plate may help the clinician to better define the origin of the pigmentation as shown by Braun et al. If the pigmentation is located on the lower part of the nail plate, the lesion is likely to be found in the distal matrix; on the other hand, if the pigmentation is found near the dorsum of the

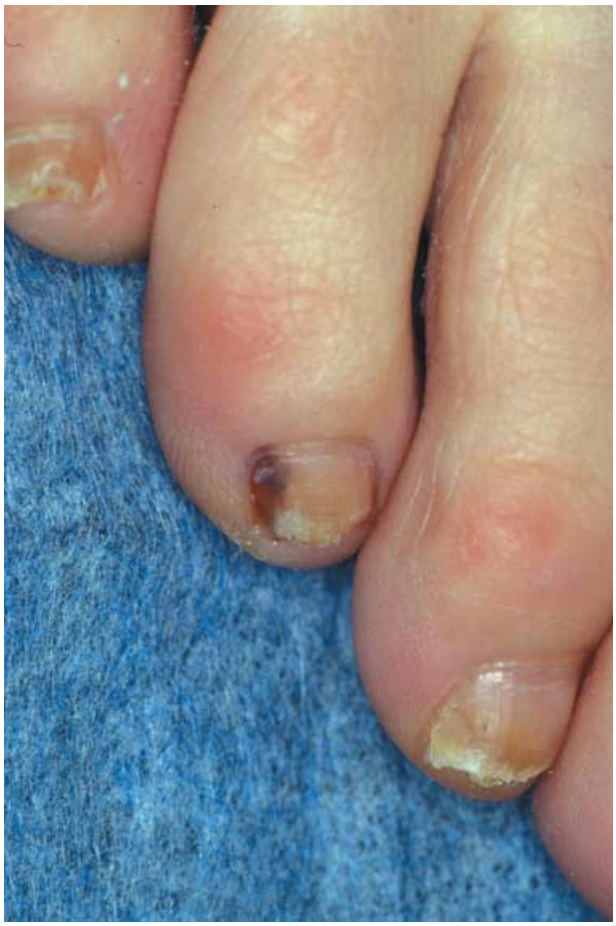

FIG. 14. Band-shaped subungual hemorrhage.

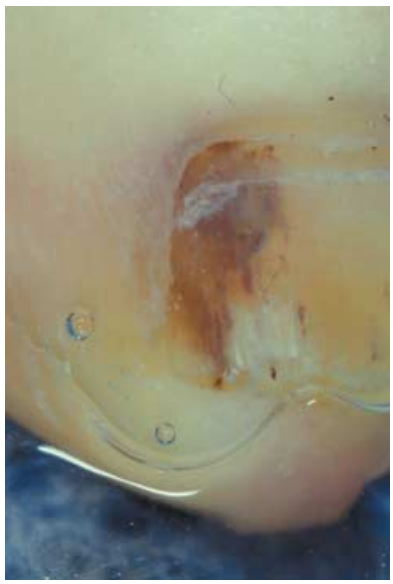

FIG. 15. Dermoscopic examination of the subungual hemorrhage shown on FIG. 14. Blood spots are characterized by their proximal round-shape and their "filamentous" distal end (Heine Dermaphot × 10).

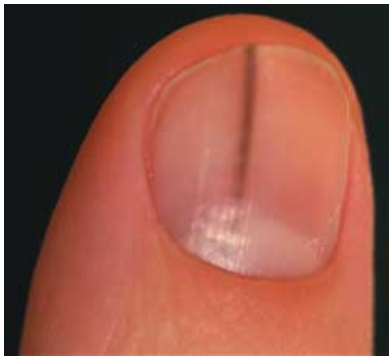

FIG. 16. Benign melanocytic nevus of the distal matrix.

FIG. 17. Dermoscopic examination of the nail free edge of the distal matrix nevus shown on FIG. 12. Pigmentation is concentrated in the lower layers of the nail plate indicating a distal matrix location of the causal lesion (Heine Dermaphot × 10).

nail plate, it indicates a more proximal origin of the pigment (FIGS. 16–18). This information can be used to better target the biopsy and to avoid a visible definitive nail dystrophy if the surgery is limited to the distal matrix.

Conclusion

In case of melanonychia striata, aside from the patient's medical history and clinical examination, dermoscopy provides useful additional information to help the clinician to decide if a nail matrix biopsy is required. In the present authors' opinion, in the presence of a regular pattern of the parallel lines, follow-up is sufficient and there is no need for pathologic confirmation of the benignity of the lesion. On the opposite, the observation of an irregular pattern of the longitudinal lines, even in absence of any other clinical symptoms, is sufficient to justify the nail matrix biopsy. Some difficult and doubtful cases remain and dermoscopy cannot replace pathologic examination in such cases. Further work is needed to determine the diagnostic value of dermoscopic features observed in achromic tumors or in congenital melanocytic nevi of the nail apparatus. Further work is also needed to evaluate the value of digital dermoscopic follow-up of nail pigmentation.

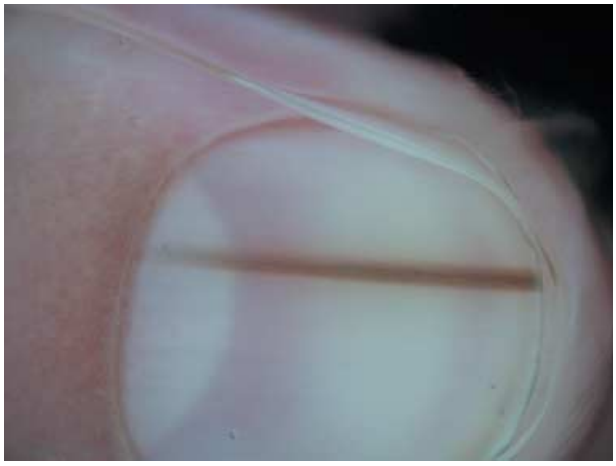

FIG. 18. Dermoscopic examination of the nevus shown on FIGS. 12 and 13 showing a regular pattern and a pigment origin in the lunula.

Acknowledgments

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References

1. Banfield CC, Dawber RP. Nail melanoma: a review of the literature with recommendations to improve patient management. Br J Dermatol 1999: **141**: 628–632.
2. Braun RP, Baran R, Saurat JH, Thomas L. Surgical pearl: dermoscopy of the free edge of the nail to determine the level of nail plate pigmentation and the location of the probable origin in the proximal or distal nail matrix. J Am Acad Dermatol 2006: **55**: 512–513.
3. Causeret A, Skowron F, Viallard A, Balme B, Thomas L. Subungual blue nevus. J Am Acad Dermatol 2003: **49**: 310–312.

4. Dalle S, Depape L, Phan A, Balme B, Ronger-Savle S, Thomas L. Squamous cell carcinoma of the nail apparatus: clinicopathological study of 35 cases. Br J Dermatol 2007 Jan 29. Epub ahead of print.
5. Goettmann-Bonvallot S, Andre J, Belaich S. Longitudinal melanonychia in children: a clinical and histopathologic study of 40 cases. J Am Acad Dermatol 1999: **41**: 17–22.
6. Haneke E, Baran R. Longitudinal melanonychia. Dermatol Surg 2001: **27**: 580–584.
7. Hirsch RJ, Weinberg JM. Evaluation of pigmented lesions of the nail unit. Cutis 2001: **67**: 409–411.
8. Johr RH, Izakovic J. Dermatoscopy/ELM for the evaluation of nail apparatus pigmentation. Dermatol Surg 2001: **27**: 315–322.
9. Kawabata Y, Ohara K, Hino H, Tamaki K. Two kinds of Hutchinson's sign, benign and malignant. J Am Acad Dermatol 2001: **44**: 305–307.
10. Kwon IH, Lee JH, Cho KH. Acral lentiginous melanoma in situ: a study of nine cases. Am J Dermatopathol 2004: **26**: 285–289.
11. O'Leary JA, Berend KR, Johnson JL, Levin LS, Seigler HF. Subungual melanoma. A review of 93 cases with identification of prognostic variables. Clin Orthop Relat Res 2000: **378**: 206–212.
12. Phan A, Touzet S, Dalle S, Ronger-Savié S, Balme B, Thomas L. Acral lentiginous melanoma, clinico-prognostic study about 126 cases. Br J Dermatol 2006: **155**: 561–569.
13. Ronger S, Touzet S, Ligeron C, Balme B, Viallard AM, Thomas L. Dermoscopic examination of nail pigmentation. Arch Dermatol 2002: **138**: 1327–1333.
14. Tosti A, Baran R, Piraccini BM, Cameli N, Fanti PA. Nail matrix nevi: a clinical and histopathologic study of 22 patients. J Am Acad Dermatol 1996: **34**: 765–771.