Review Article

Dermoscopy basics and melanocytic lesions (Part 2 of 2)

皮膚鏡的基礎知識和黑色素細胞病變（第二部份）

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In this second part of the review, the basic variations of parallel pattern in acral melanocytic lesions will be discussed. The relation between parallel pattern and dermatopathology will be elaborated. Finally, the second step of the 2-step procedure will be presented to illustrate how to judge whether the lesion is malignant or benign based on the distribution of colours and structures.

Keywords: Dermoscope, dermoscopy, melanocytic naevus, melanoma, pigment network

關鍵詞：皮膚鏡，皮膚鏡學，黑素細胞痣，黑色素瘤，色素網絡

Basic variations of parallel pattern in acral melanocytic lesions

There are four basic dermoscopy patterns in acral melanocytic lesions (Figure 17). The parallel furrow pattern (Figure 18) consists of narrow pigmented parallel lines on the furrows. A lattice-like pattern (Figure 19) is composed of short transverse lines on the ridges in addition to parallel furrow pattern. This variation is mainly observed in naevi on the arch area of the sole, where epidermal rete ridges are shallow and transverse ridges are prominent. The fibrillar pattern (Figure 20) is displayed as pigmented lines obliquely crossing the skin markings. This pattern is exclusively seen on the pressure areas of the sole of the foot. These three patterns are regular in colour and structure and are frequently seen in acral melanocytic naevi. Meanwhile, the parallel ridge pattern is composed of broad pigmented lines with irregular pigmentation (Figure 21), which is almost exclusively detected in acral melanoma.

Variations of parallel furrow pattern

Variations of the parallel furrow pattern (Figure 22) include single line (Figure 18), single dotted
The crista reticulated variant tends to occur at the edge of the sole, where the shape of rete ridges transitions from parallel to reticular pattern. The tram-like variant is composed of broad double lines along the furrows. The tram-like and finer parallel variants are extremely rare.

The basic dermoscopy patterns in acral melanocytic lesions are as follows:

1. **Single dotted line** (Figure 23): Dark brown dots/globules are arranged in a row on each furrow.
2. **Double line** (Figure 24): Two parallel pigmented lines are demonstrated on each furrow.
3. **Double dotted line** (Figure 25): Dark brown dots/globules are arranged in two rows on each furrow.

### Figure 17
Basic dermoscopy patterns in acral melanocytic lesions. There are four basic dermoscopy patterns.

### Figure 18
Parallel furrow pattern. Narrow pigmented parallel lines are present at the furrows. This case reveals single line variant of parallel furrow pattern.

### Figure 19
Lattice-like pattern. Transverse short lines on ridges are observed in addition to parallel furrow pattern. The pattern is more often observed in naevi on the arch area of the foot.

### Figure 20
Fibrillar pattern. Narrow pigmented lines are obliquely crossing skin markings. This pattern is characteristic of naevi on the pressure areas of the sole.

### Figure 21
Parallel ridge pattern. Broad pigmented parallel lines with irregular pigmentation are exhibited on the ridges. This pattern corresponds to acral melanoma.

### Figure 22
Variations of parallel furrow pattern. There are four variants including single line, single dotted line, double line and double dotted line variants.

### Figure 23
Single dotted line variant. Dark brown dots/globules are arranged in a row on each furrow.

### Figure 24
Double line variant. Two parallel pigmented lines are demonstrated on each furrow.

### Figure 25
Double dotted line variant. Dark brown dots/globules are arranged in two rows on each furrow.
Reason of parallel pattern as explained by scanning electron microscopy

Now, what does the parallel pattern represent? The answer is also shown by scanning electron microscopy (Figure 31).

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**Figure 26.** Further variations of parallel furrow pattern. There are further variants of parallel furrow pattern including crista dotted, crista reticulated, tram-like and finer parallel pattern.

**Figure 27.** Crista dotted variant. Dark brown to blue-grey dots are seen on the centre of cristae often in addition to parallel furrow pattern of single line variant.

**Figure 28.** Crista reticulated variant. Reticular pattern is demonstrated in combination with parallel furrow pattern. This variant tends to occur at the edge of the sole.

**Figure 29.** Tram-like variant. This variation is a broader variant of parallel furrow pattern with double line.

**Figure 30.** Finer parallel pattern. This pattern consists of lines on the furrows as well as lines on the centre of the ridges.

**Figure 31.** Scanning electron microscopy of the epidermis from acral skin. The epidermal rete ridges from acral skin are illustrated as structures arranged parallel to one another, which is equivalent to parallel pattern as seen in acral naevus on dermoscopy (courtesy of Tetsuya Tsuchida, MD). One is flat ridge and the other is connected with dermal eccrine ducts. The former is crista profunda (CP) limitans and the latter is CP intermedia.

This figure displays the dermal side of the epidermis taken from the sole of the foot. There are two kinds of epidermal ridges arranging alternatively. One is flat ridge and the other is connected with dermal eccrine ducts. The former is crista profunda (CP) limitans and the latter is CP intermedia.
The relation between parallel pattern and dermatopathology

When the acral skin specimen is cut perpendicular to skin markings, the configuration in Figure 32 will be obtained. Comparing Figures 31 and 32 helps us to understand the relationship between furrow/ridge on dermoscopy and CP limitans/intermedia on dermatopathology, namely the furrow corresponds to CP limitans and the ridge to CP intermedia. Nests of naevus cells tend to be present either at CP limitans or intermedia and match up to parallel furrow pattern or crista dotted variant. Individual cell proliferation of melanoma is inclined to spread broadly and correspond to the parallel ridge pattern.

The reason for the fibrillar pattern

Melanocytic lesions on weight-bearing areas show a fibrillar pattern (Figure 33). Short pigmented lines are obliquely crossing the skin markings, which are noted as whitish dotted random reflections at the furrows. If the specimen of this naevus is cut perpendicular to the skin markings, the H&E staining of the histopathology shows a slanting horny layer and melanin columns below the furrows, which correspond to nests of melanocytes at the cristae profundae limitans (Figure 34). This observation would be the explanation of the fibrillar pattern.

The oblique view dermoscopy

The observation above is a hint of the oblique view dermoscopy. The fibrillar pattern seen on normal dermoscopy corresponds to the oblique melanin columns viewed from the right above position (Figure 35). An example of fibrillar pattern reveals short pigmented lines obliquely crossing the skin markings, more slanting at the right hand side (Figure 36). Examination with dermoscopy of the same lesion at an oblique angle (Figure 37), namely oblique view dermoscopy, will line up the melanin columns and show up as a parallel furrow pattern, single line variant (Figure 38).

The second step of the 2-step procedure

The second step is to judge if the lesion is malignant or benign based on the distribution of colours and structures.

Firstly, the global features are assessed. They include reticular (Figure 39), globular (Figure 40), homogeneous (Figure 41), parallel (Figure 42), starburst (Figure 43), multi-component (Figure 44) and non-specific patterns (Figure 45). If two patterns are observed, the dominant pattern is mentioned. If three patterns are mixed, it is the multi-component pattern. If no pattern is seen, it will be regarded as non-specific. The former five patterns tend to be benign, though not necessarily so, and could appear in early malignant lesions (Figure 46). On the other hand, the latter two patterns are often found in melanoma, but not all.

Secondly, the local features are considered. Major local features include pigment network, streaks, dots/globules, blue-whitish veil and regression structures. Typical and atypical networks are distinguished, based on whether the network is light or dark, thin or thick, regularly or irregularly distributed (Figures 47 & 48). A typical network is often dim at the periphery (Figure 47) while an atypical pigment network often has an abrupt edge (Figure 48). Streaks are defined as linear structures at the periphery and histopathologically correspond to the elongated nests of melanocytes. They might be regular or irregular in distribution. Dots/globules are defined as black, brown or blue-grey, round or oval structures with various sizes and shapes with regular or irregular distribution. Blue-whitish veil is defined as irregular and confluent blue-grey to blue-white pigmentation. Regression structures are defined as white areas (scar-like white areas) or blue areas...
Figure 32. The relation between parallel pattern and histopathology. CP limitans correspond to furrows and CP intermedia, which is connected with dermal eccrine ducts, to ridges.

Figure 33. Dermoscopy of melanocytic naevus on weight-bearing area. Dermoscopy showing regular fibrillar pattern.

Figure 34. Histopathology of a naevus showing fibrillar pattern. There are slanting horny layers and oblique melanin columns below the furrows, which correspond to nests of melanocytes at cristae profundae limitans.

Figure 35. The reason of fibrillar pattern on ordinary dermoscopy. Ordinary dermoscopy observes oblique melanin columns from the right above position.

Figure 36. An example of fibrillar pattern. Ordinary dermoscopy reveals short pigmented lines obliquely crossing skin markings.

Figure 37. Oblique viewing by dermoscopy. It is a change of direction of dermoscopy observation, namely oblique observation.

Figure 38. An example of oblique view dermoscopy. It demonstrates parallel furrow pattern, single line variant.

Figure 39. Reticular pattern. Clark's naevus showing reticular pattern with typical pigment network.

Figure 40. Globular pattern. Clark's naevus showing globular pattern with regular dots/globules.
Figure 41. Homogeneous pattern. Blue naevus showing homogeneous pattern with blue pigmentation.

Figure 42. Parallel pattern. Acral naevus showing parallel pattern with parallel furrow pattern of single line variant.

Figure 43. Starburst pattern. Pigmented Spitz naevus (Reed naevus) showing starburst pattern with regular streaks.

Figure 44. Multi-component pattern. Malignant melanoma showing multi-component pattern with atypical pigment network, irregular dots/globules and structureless pigmentation.

Figure 45. Non-specific patterns. Seborrhoeic keratosis showing non-specific pattern.

Figure 46. An early melanoma in situ with the reticular pattern. Reticular pattern is usually the hallmark of Clark's naevus, but it may be rarely demonstrated in an early lesion of melanoma in-situ.

Figure 47. Typical pigment network. The pigment network in this Clark's naevus is thin, brown and dim at the periphery.

Figure 48. Atypical pigment network. The pigment network in this melanoma is thick and dark at the periphery, showing an abrupt edge.
(blue-grey areas, peppering and multiple blue-grey dots). White areas and blue areas together reflect the main aspects of regressions, namely fibrosis and melanophages.

References


