

Dermoscopy

Diagnostic Algorithm for Differentiating Benign Melanocytic Lesions from Melanoma

Summary of basic dermoscopy features

Menzies Scoring System
7 point Scoring System

Paul Tervit

Sept 2006

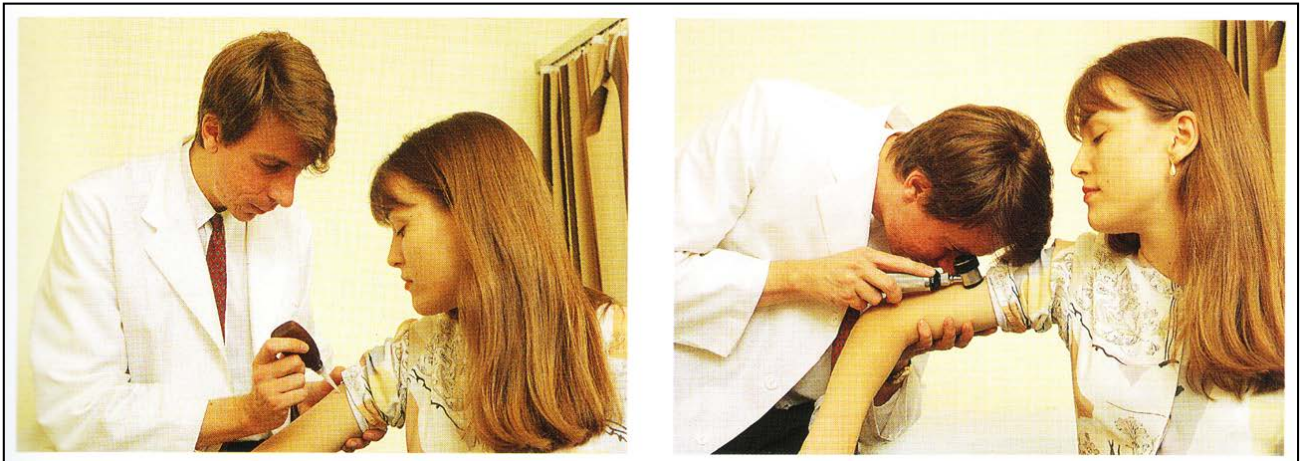
Dermascope/Dermatoscope/Episcope

[ELM : epiluminescence microscopy]



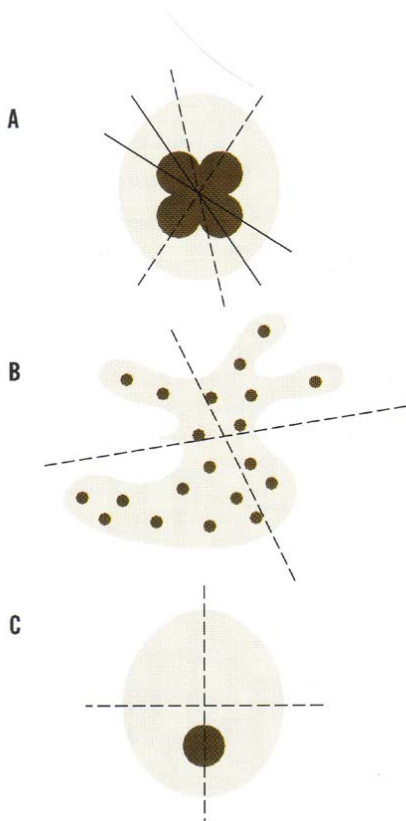
Skin surface microscopy started in 1663 by **Kolhaus** and was improved with the addition of immersion oil in 1878 by **Abbe**. The German dermatologist, **Johann Saphier**, added a built-in light source to the instrument. **Goldman** was the first dermatologist to coin the term "dermascopy" and to use the dermoscope to evaluate pigmented cutaneous lesions

Dermoscopy with topical Mineral Oil



Symmetry of Pattern

Symmetrical pigmentation pattern refers to symmetry of pattern/texture over **all** axis through the centre of the lesion. It does **not** require symmetry of shape.



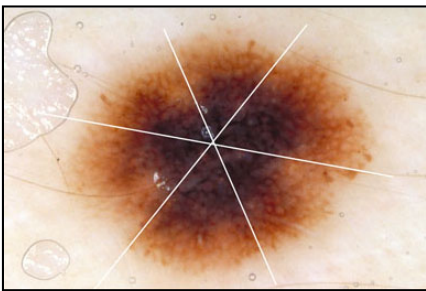
A. The schematic lesion has mirror symmetry across any axis through its centre – hence it has symmetrical pigmentation pattern

B. While this lesion lacks symmetry of shape, its repeated pattern results in symmetrical pigmentation pattern.

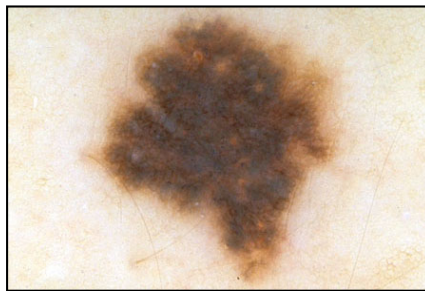
C. While this lesion has symmetry of pattern over its long axis, it lacks symmetry over its short axis. Hence this lesion has an **asymmetrical pigmentation pattern**

Symmetry of Pattern

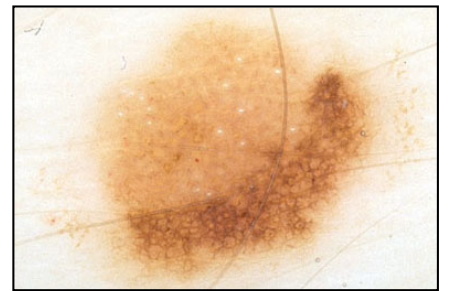
Symmetry of pattern is required across all axes through the lesion's center of gravity (centre of the lesion). Symmetry of pattern does not require shape symmetry



This lesion has **symmetry of pattern** across all axes through the center of the lesion

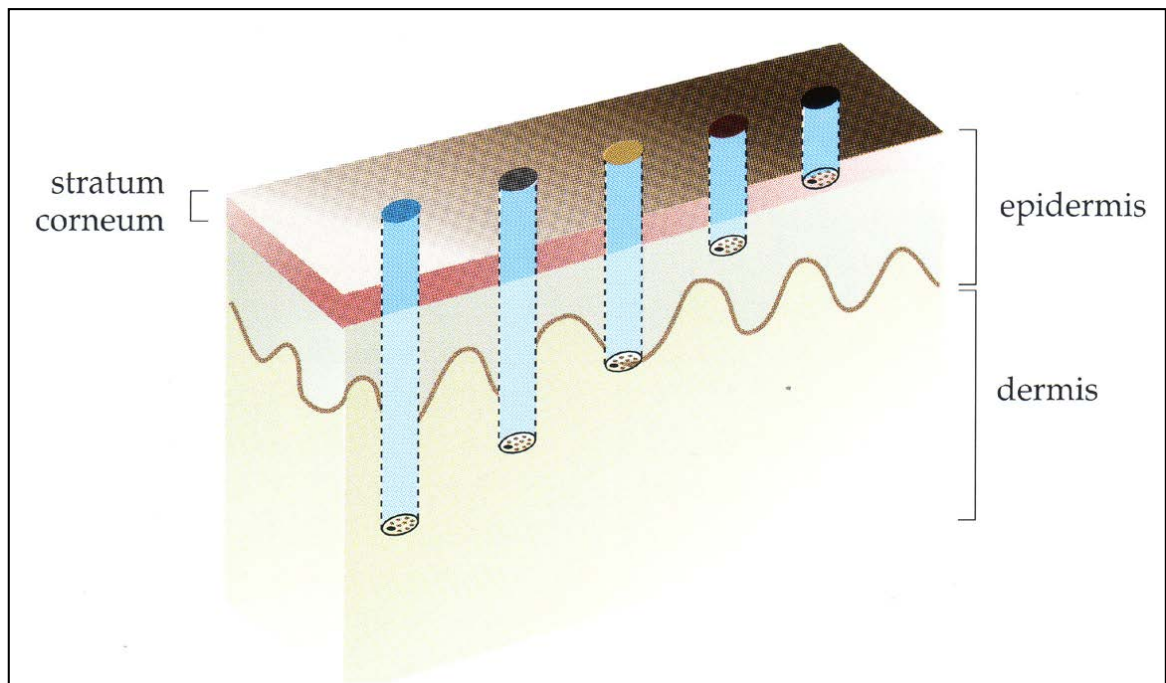


This lesion has **symmetry of pattern**. While the lesion is asymmetrical in shape, it has symmetry of pattern across any axis through the center of the lesion. Symmetry of shape is not required for symmetry of pattern.



While the lesion has symmetry of pattern through one axis (short axis), it lacks symmetry around some other axes (such as the long axis) and therefore this lesion **lacks symmetry of pattern**.

Colour



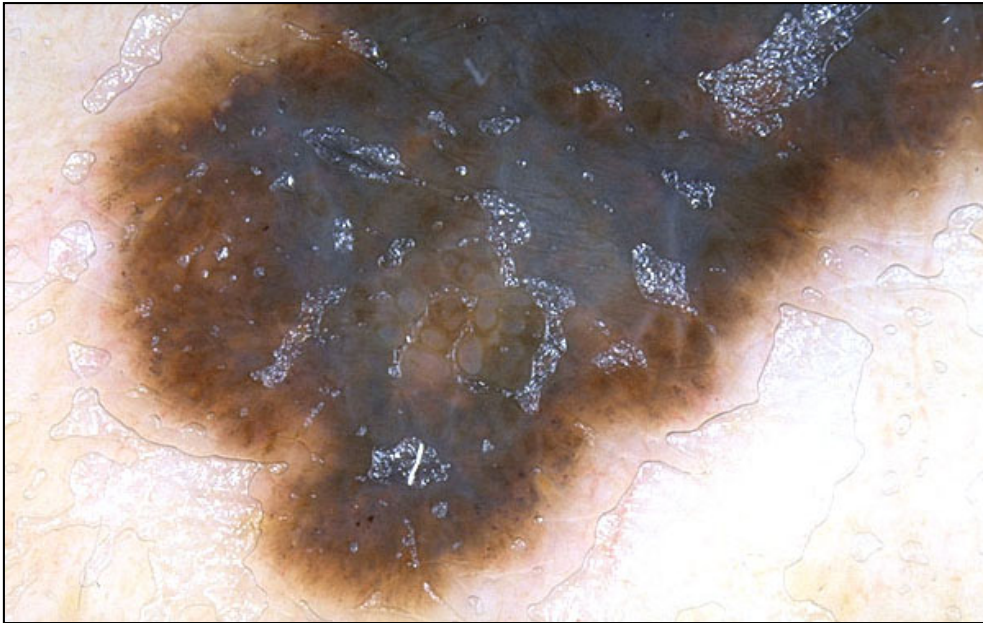
The colors are black, gray, blue, dark brown, tan and red.

Colour



Blue White Veil

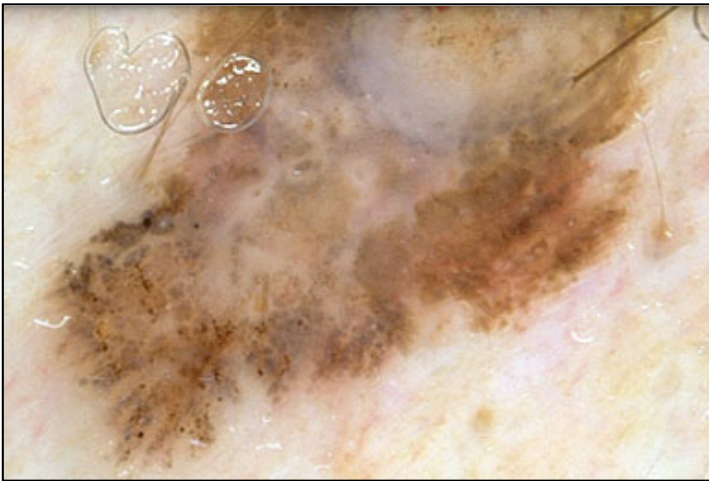
An irregular, structureless area of confluent blue pigmentation with an overlying white "ground-glass" haze. The pigmentation **cannot occupy the entire lesion** and cannot be associated with red-blue lacunes.



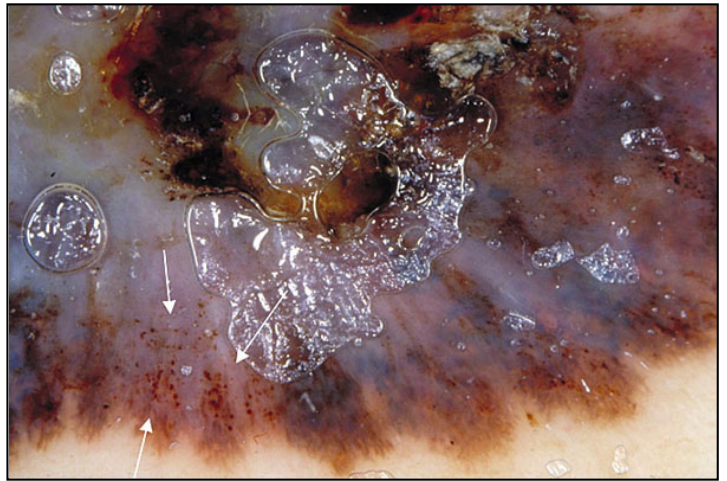
This lesion has **blue-white veil**, seen as an irregular, structureless area of confluent blue pigmentation with an overlying white "ground glass" haze, never occupying the entire lesion.

Multiple brown dots

Focal areas of multiple brown (usually dark brown) dots (not globules).



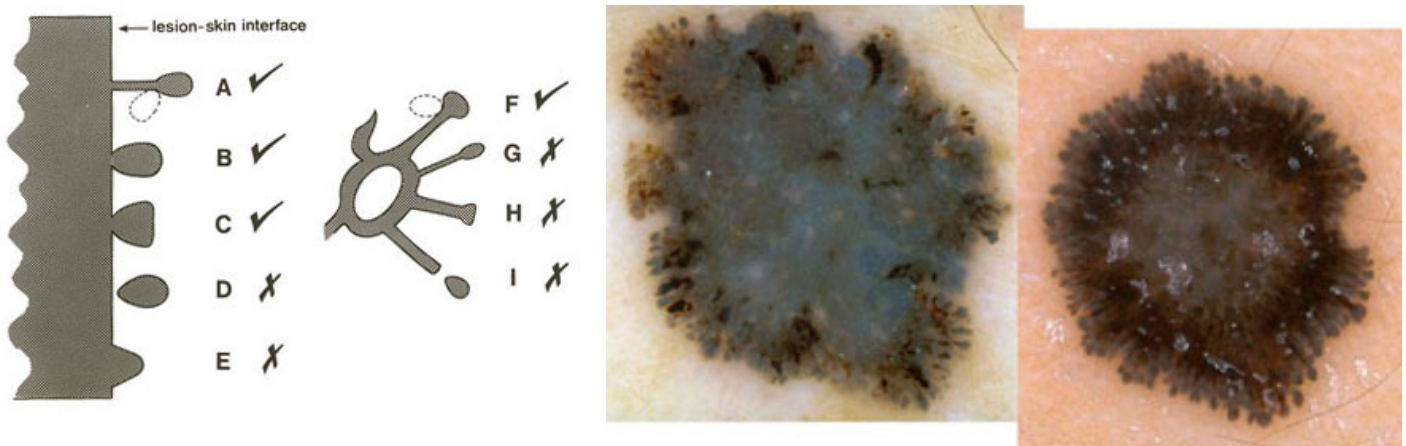
Multiple brown dots are seen as irregularly distributed focal areas of multiple brown (usually dark brown) dots (not globules).



Multiple brown dots - note again the focal nature and small size (dots).

Pseudopods

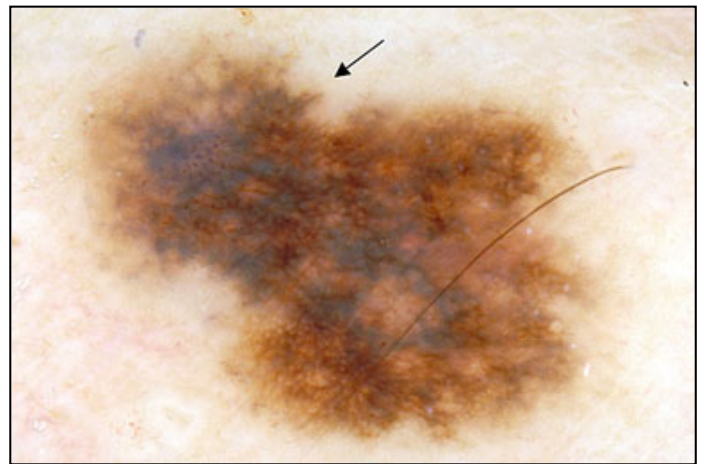
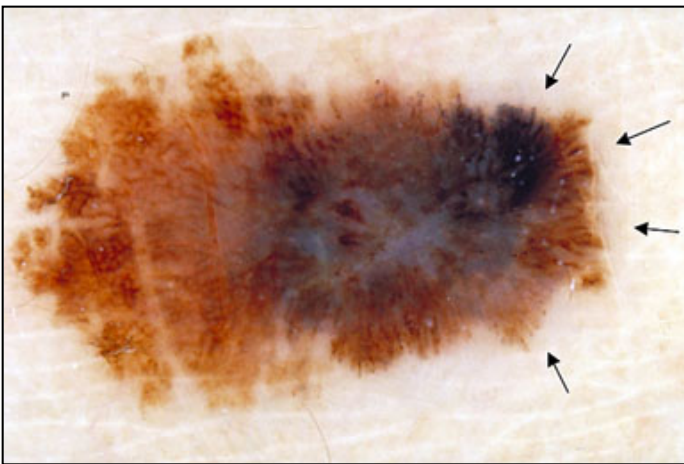
Bulbous and often kinked projections that are found at the edge of a lesion directly connected to either the tumor body or pigmented network.



Pseudopods are found at the edge of lesion directly connected to either the tumor body or the pigmented network. They can never be seen distributed regularly or symmetrically around the lesion. When connected directly to the tumor body, they must have an acute angle to the tumor edge (B and C, not E) or arise from linear or curvilinear extensions (A). When connected to the network (F), the width of the bulbous ending must be greater than the width of any part of the surrounding network (therefore not G) and at least double that of its directly connected network projection (therefore not H).

Radial Streaming

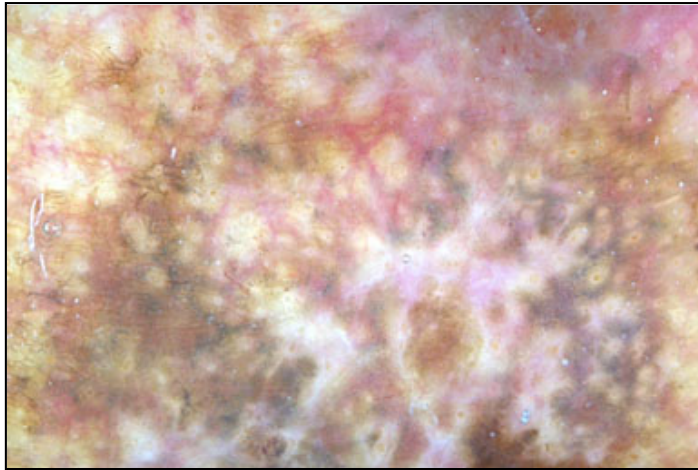
Finger-like extensions at the edge of a lesion that are never distributed regularly or symmetrically around the lesion.



Radial streaming refers to finger-like extensions at the edge of a lesion that are not distributed regularly or symmetrically around the lesion.

Scar like depigmentation

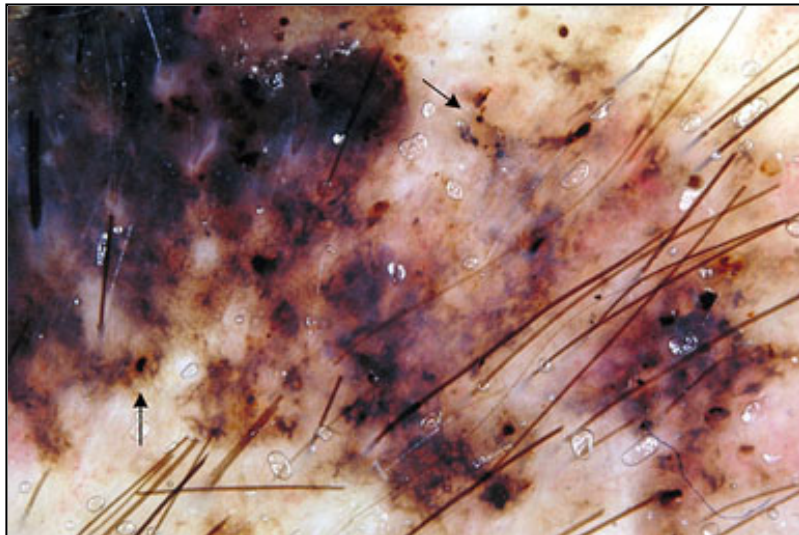
Areas of white, distinct, irregular extensions (true scarring), which should not be confused with hypo- or depigmentation due to simple loss of melanin.



Scar-like depigmentation is seen here as areas of white, distinct, irregular extension (true scarring).

Peripheral black dots/globules

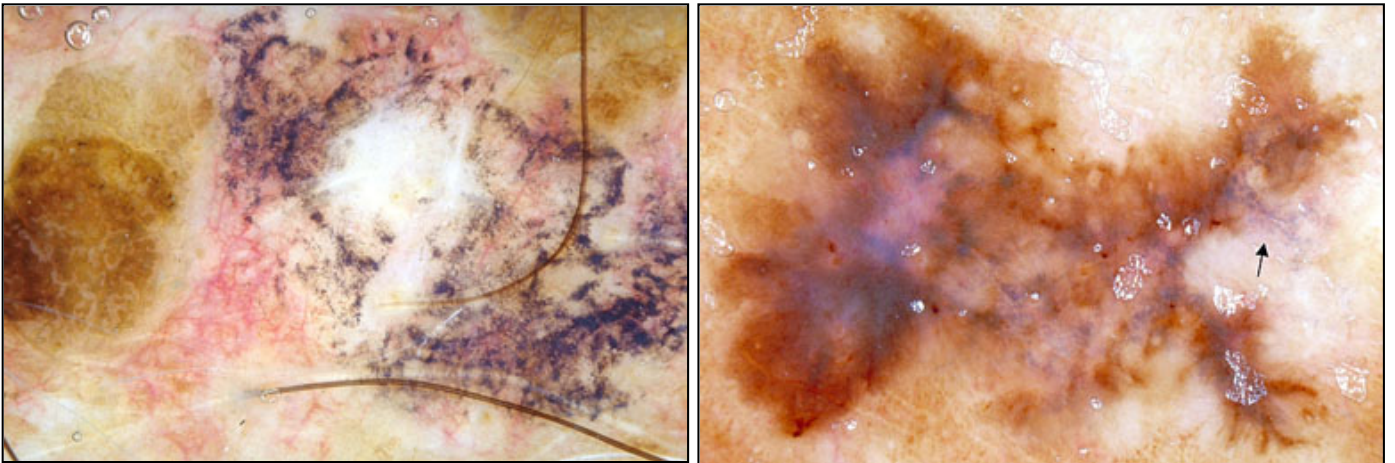
Black dots/globules found at or near the edge of the lesion.



Peripheral black dots/globules must be at the edge or near the edge of the lesion and must be black, not brown or dark brown.

Multiple blue grey dots

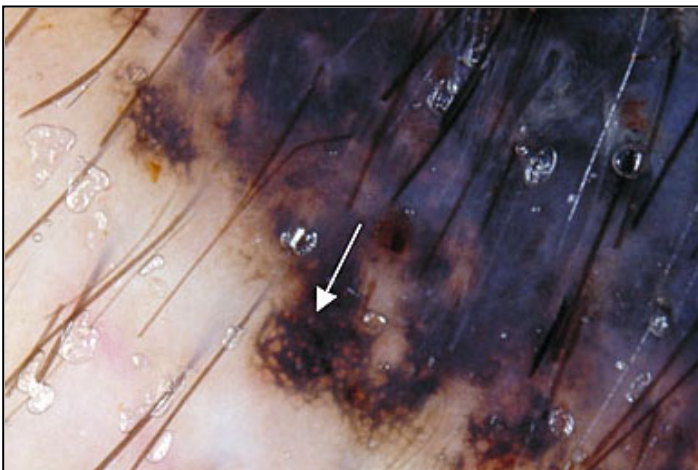
Foci of multiple blue or gray dots (not globules) often described as "pepper-like" in pattern



Multiple blue/gray dots Areas of multiple "pepper-like" blue or gray dots (not globules).

Broadened network

A network made up of irregular, thick "cords", often seen focally thicker.



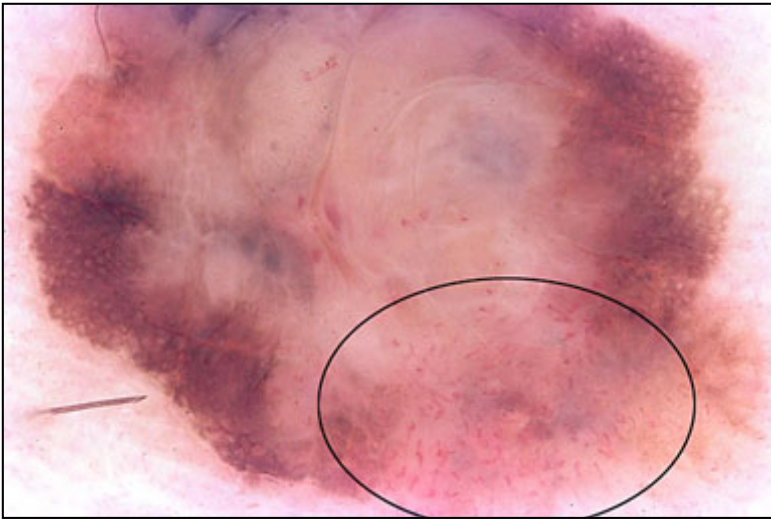
Broadened network is seen as areas (often focal) of thicker "cords" of the net.



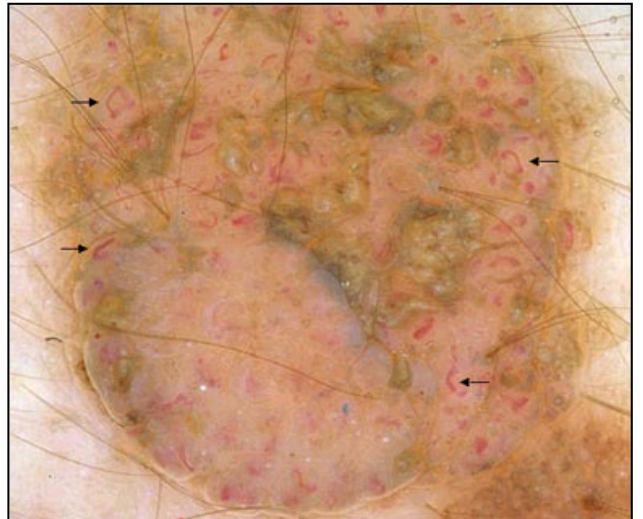
Broadened network While a pseudo-broadened network can be seen on the face, here a true broadened network is found because the holes of the net are not entirely formed by the follicular openings.

Vascular Pattern

Black, brown, and/or gray, localized or diffuse pigmented areas with regular or irregular shape



Linear-irregular vessels in a melanoma



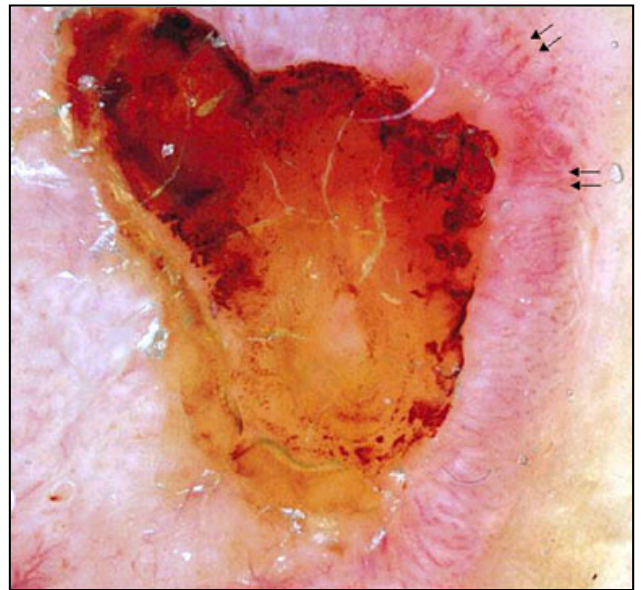
Comma-like vessels in a dermal nevus

Vascular Pattern

Black, brown, and/or gray, localized or diffuse pigmented areas with regular or irregular shape



Dotted vessels in a melanoma



Hairpin vessels in a melanoma

Menzies' Method for the Diagnosis of Melanoma

[Menzies et al. Arch Dermatol 1996]

For melanoma to be diagnosed a lesion must have neither of both negative features and 1 or more of the 9 positive features.

Negative features (Cannot be present)

- Symmetry of pattern
- Presence of a single color

Positive features (At least one must be present)

- Blue-white veil
- Multiple brown dots
- Pseudopods
- Radial streaming
- Scar-like depigmentation
- Peripheral black dots/globules
- Multiple (5-6) colors
- Multiple blue/gray dots
- Broadened network

7-Point Checklist

[Argenziano et al. Arch Dermatol 1998]

Criteria	Definition	Histopathological Correlates
1. Atypical Pigment Network	Black, brown, or gray network with irregular meshes and thick lines	Irregular and broadened rete ridges
2. Blue White Veil	Irregular, confluent, gray-blue to whitish-blue diffuse pigmentation	Acanthotic epidermis with focal hypergranulosis above sheets of heavily pigmented melanocytes in the dermis
3. Atypical Vascular Pattern	Linear-irregular or dotted vessels not clearly combined with regression structures	Neovascularization
4. Irregular Streaks	Irregular, more or less confluent, linear structures not clearly combined with pigment network lines	Confluent junctional nests of melanocytes
5. Irregular Pigmentation	Black, brown, and/or gray pigmented areas with irregular shape and/or distribution	Hyperpigmentation throughout the epidermis and/or upper dermis
6. Irregular Dots/globules	Black, brown, and/or gray round to oval, variously sized structures irregularly distributed within the lesion	Pigment aggregates within stratum corneum, epidermis, dermo-epidermal junction, or papillary dermis
7. Regression Structures	White areas (white scarlike areas) and blue areas (gray-blue areas, peppering, multiple blue-gray dots) may be associated, thus featuring so-called blue-whitish areas virtually indistinguishable from blue-whitish veil	Thickened papillary dermis with fibrosis and/or variable amounts of melanophages

7-Point Checklist
[Argenziano et al. Arch Dermatol 1998]

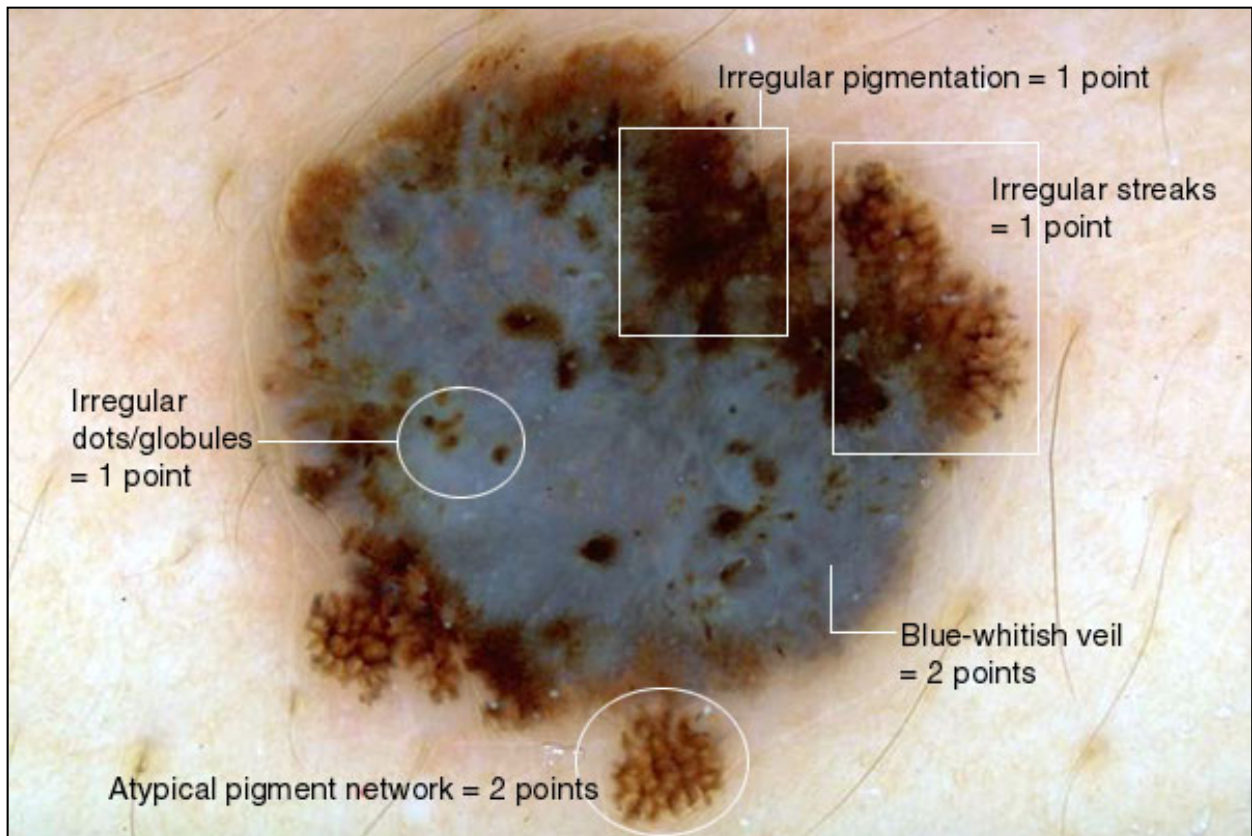


ELM criterion	Odds ratio ^a	7-point score ^b
Major criteria:		
1. Atypical pigment network	5.19	2
2. Blue-whitish veil	11.1	2
3. Atypical vascular pattern	7.42	2
Minor criteria:		
4. Irregular streaks	3.01	1
5. Irregular pigmentation	4.90	1
6. Irregular dots/globules	2.93	1
7. Regression structures	3.89	1

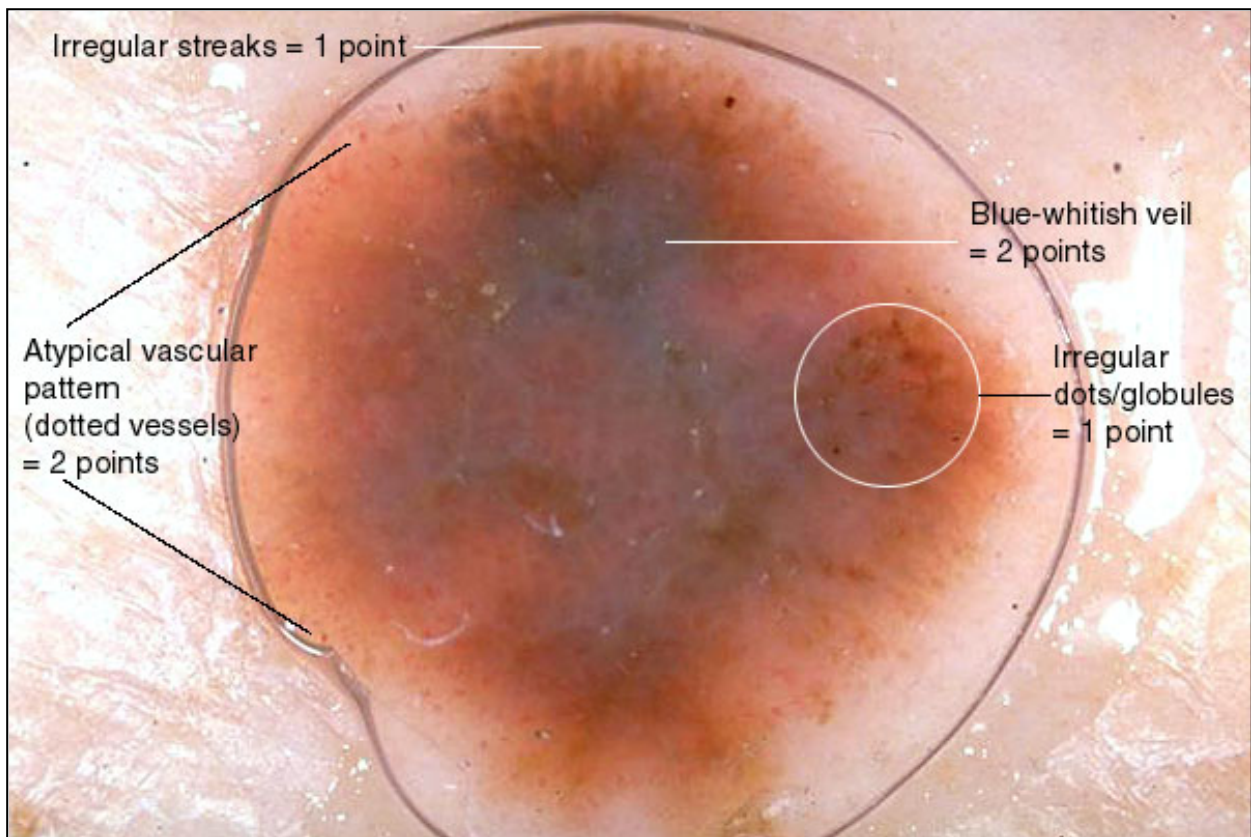
a Odds ratios measuring the capacity of each criterion to increase the probability of melanoma diagnosis.

b The score for a given criterion is determined on the basis of the odds ratio: >5 (score = 2), and <5 (score = 1).

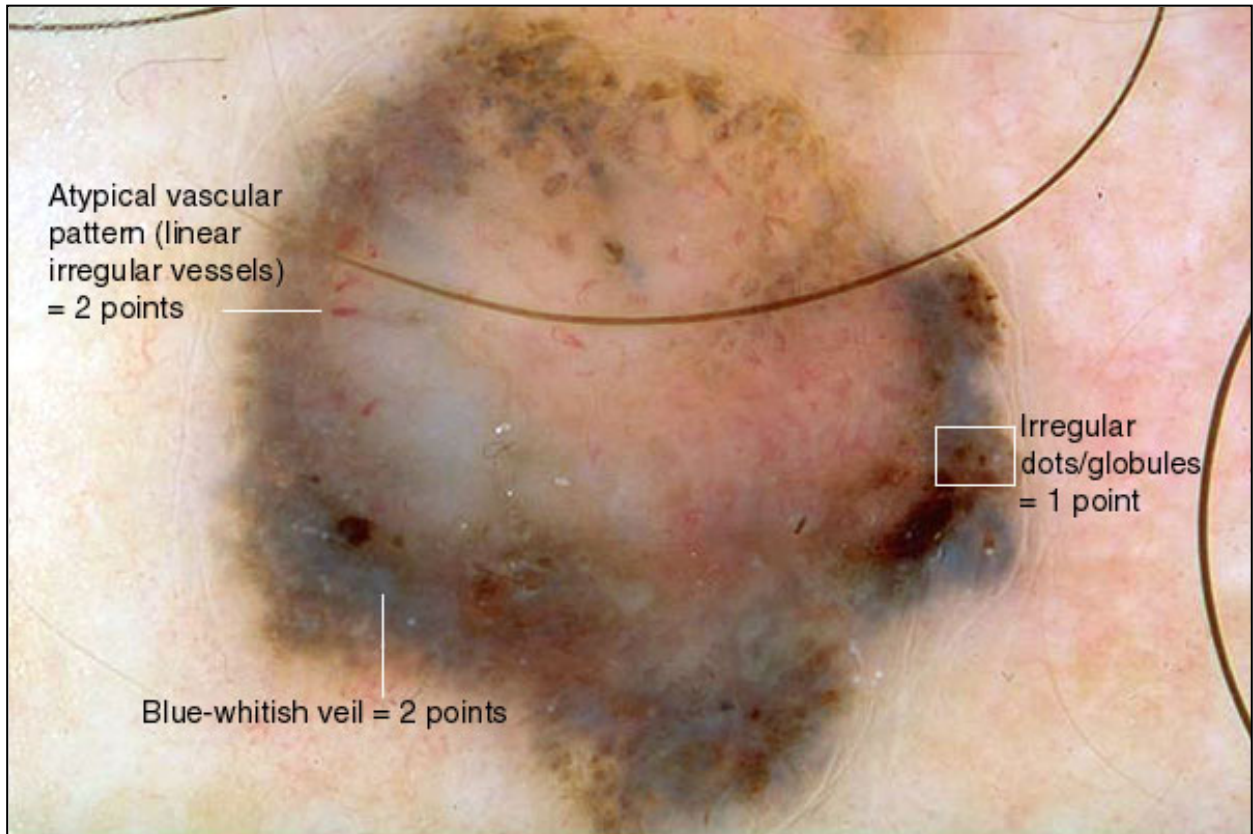
Score > 3 is indicative of a melanoma



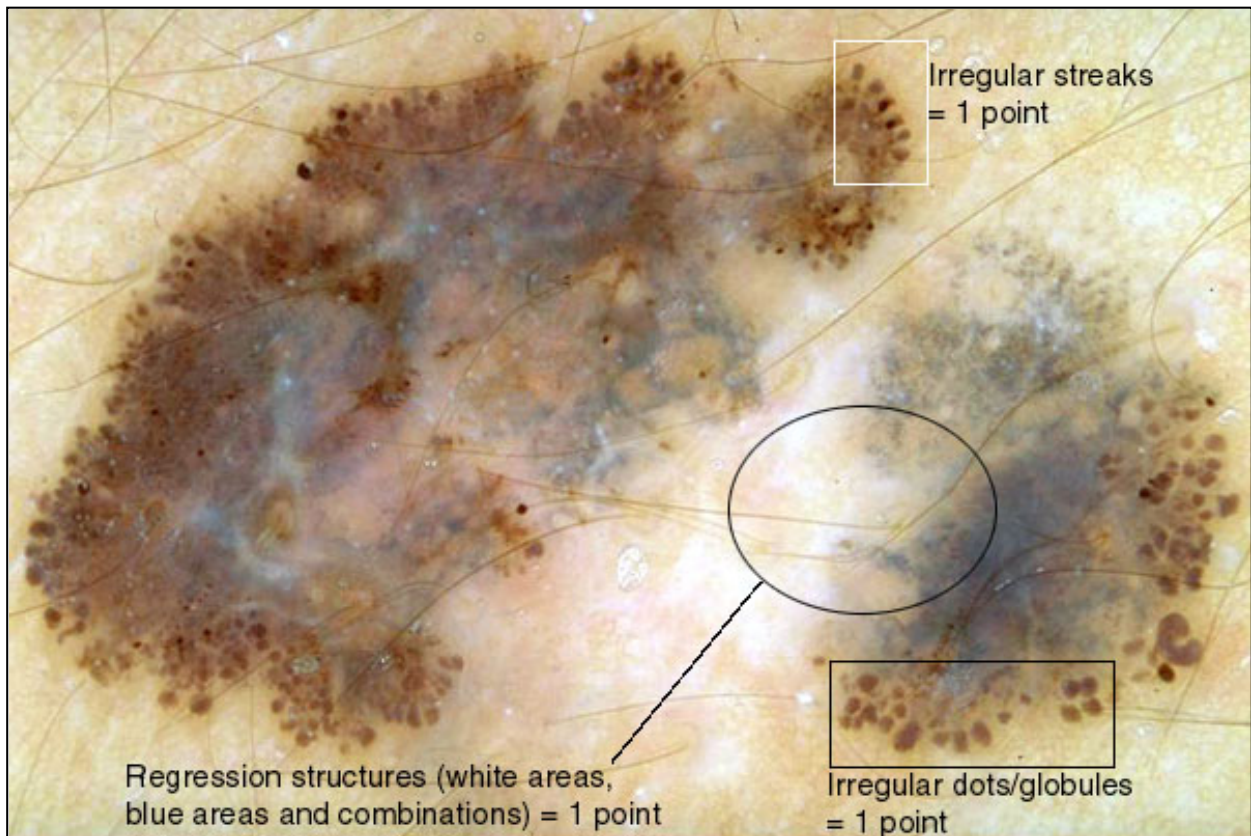
Melanoma:
7point score = 7



Melanoma:
7point score = 6



Melanoma:
7point score = 5



Melanoma:
7point score = 3

ABCD Rule

[Stolz et al. Eur J Dermatol 1994]

To calculate the ABCD score, the 'Asymmetry, Border, Colours, and Dermoscopic structures' criteria are assessed semi-quantitatively.

Each of the criteria is then multiplied by a given weight factor to yield a total dermoscopy score (TDS).

TDS values less than 4.75 indicate a benign melanocytic lesion, values between 4.8 and 5.45 indicate a suspicious lesion, and values of 5.45 or greater are highly suggestive of melanoma.

ABCD Rule

[Stolz et al. Eur J Dermatol 1994]

Asymmetry	To assess asymmetry, the melanocytic lesion is bisected by two 90° axes that were positioned to produce the lowest possible asymmetry score. If both axes dermoscopically show asymmetric contours with regard to shape, colors and/or dermoscopic structures, the asymmetry score is 2. If there is asymmetry on one axis only, the score is 1. If asymmetry is absent with regard to both axes the score is 0.
Border	The lesion is divided into eighths, and the pigment pattern is assessed. Within each one-eighth segment, a sharp, abrupt cut-off of pigment pattern at the periphery receives a score 1. In contrast, a gradual, indistinct cut-off within the segment receives a score of 0. Thus, the maximum border score is 8, and the minimum score is 0.
Colour	Six different colors are counted in determining the color score: white, red, light brown, dark brown, blue-gray, and black. For each color present, add +1 to the score. White should be counted only if the area is lighter than the adjacent skin. The maximum color score is 6, and the minimum score is 1.
Dermoscopy	Evaluation of dermoscopic structures focuses on 5 structural features: network, structureless (or homogeneous) areas, branched streaks, dots, and globules. The presence of any feature results in a score +1 Structureless (or homogenous) areas must be larger than 10% of the lesion to be considered present. Branched streaks and dots are counted only when more than two are clearly visible. The presence of a single globule is sufficient for the lesion to be considered positive for globules.

ABCD Rule

[Stolz et al. Eur J Dermatol 1994]

Criteria	Description	Score	Weight Factor
Asymmetry	In 0, 1, or 2 axes; assess not only contour, but also colors and structures	0-2	X 1.3
Border	Abrupt ending of pigment pattern at the periphery in 0-8 segments	0-8	X 0.1
Colour	Presence of up to 6 colors (white, red, light brown, dark brown, blue-gray, black)	1-6	X 0.5
Dermoscopic Structures	Presence of network, structureless or homogeneous areas, branched streaks, dots, and globules	1-5	X 0.5

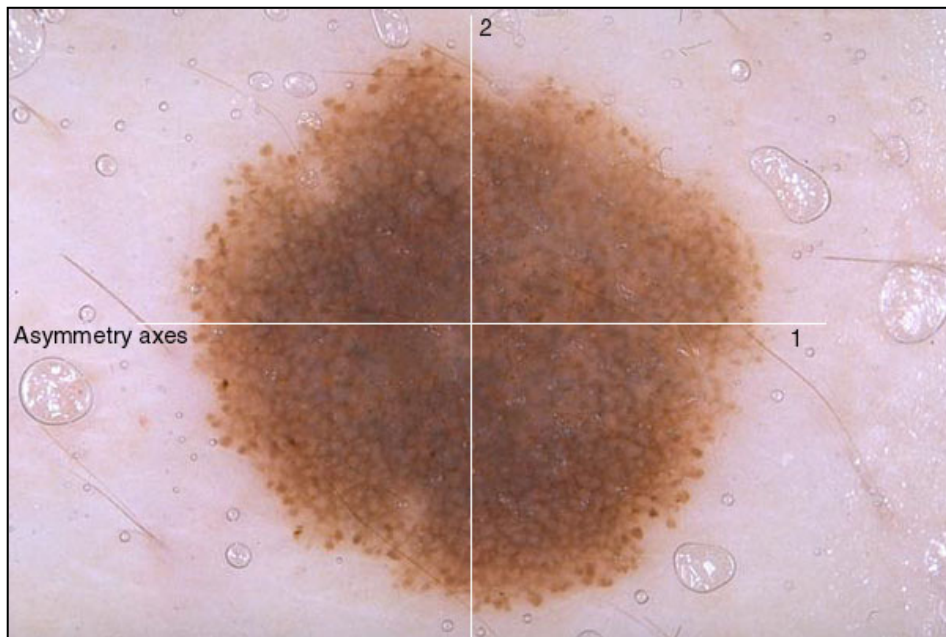
ABCD Rule

[Stolz et al. Eur J Dermatol 1994]

Formula for TDS:

[(A score x 1.3) + (B score x 0.1) + (C score x 0.5) + (D score x 0.5)]

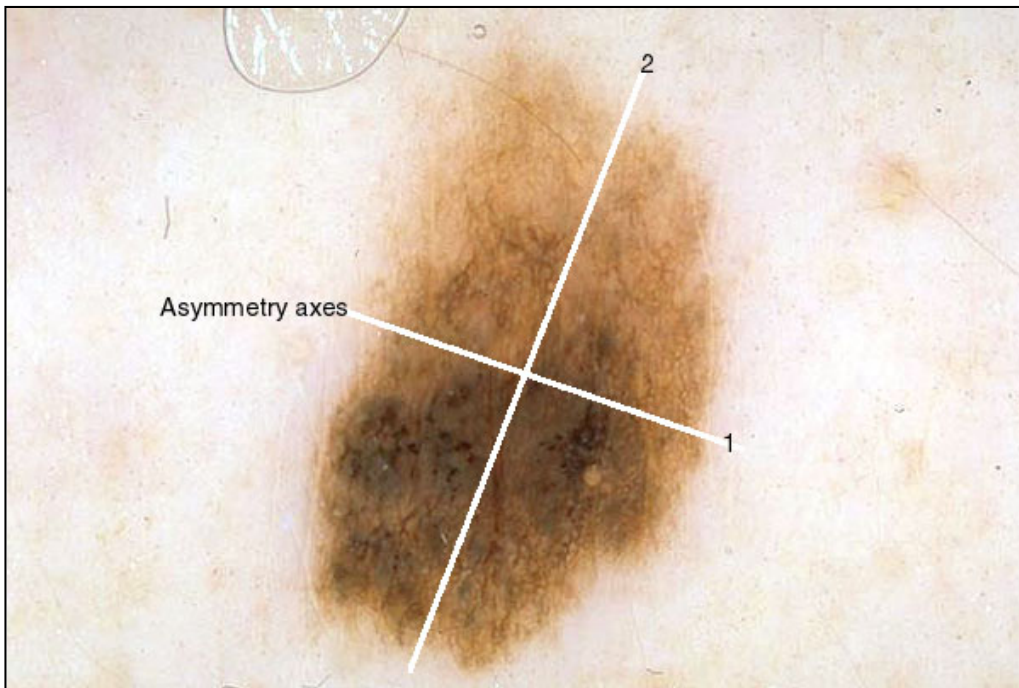
Total Dermoscopy Score TDS	Interpretation
<4.75	Benign melanocytic lesion
4.8-5.45	Suspicious lesion; close follow-up or excision recommended
>5.45	Lesion highly suggestive of melanoma
False-positive score (>5.45) sometimes observed in:	<ul style="list-style-type: none">• Reed and Spitz nevus• Clark nevus with globular pattern• Congenital melanocytic nevus



A = 0 (x 1.3);
B = 8 (x0.1);
C = 2 [light-brown, dark-brown] (x 0.5);
D = 2 [network, globules] (x 0.5)

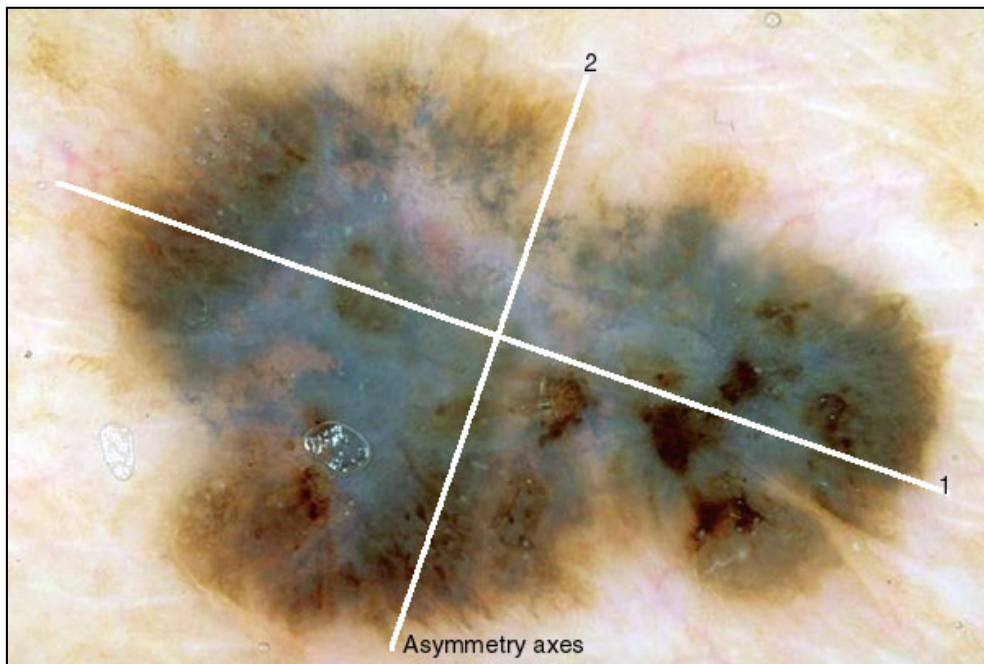
--- TDS = 2.8 (benign) ---

Histopathologic diagnosis: Clark nevus



A = 1 (x 1.3);
B = 4 (x 0.1);
C = 3 [light-brown, dark-brown, black] (x 0.5);
D = 2 [network, dots] (x 0.5)

--- TDS = 4.2 (benign) ---
Histopathologic diagnosis: Clark nevus



A = 2 (x 1.3);

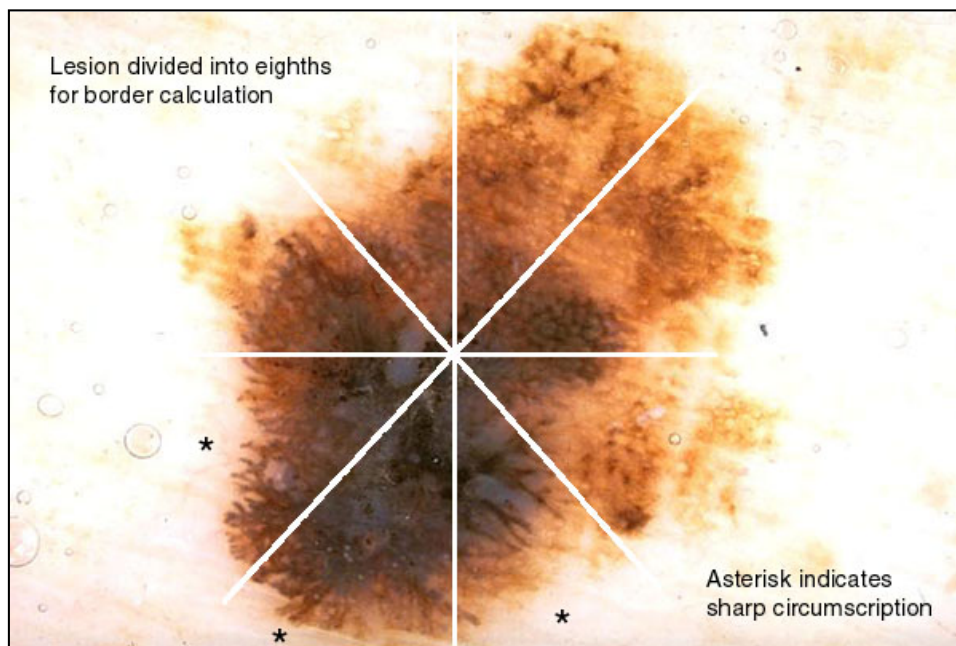
B = 5 (x 0.1);

C = 5 [light-brown, dark-brown, blue-gray, black, white] (x 0.5);

D = 4 [homogeneous areas, streaks, dots, globules] (x 0.5)

--- TDS = 7.6 (malignant) ---

Histopathologic diagnosis: melanoma



A = 2 (x 1.3);

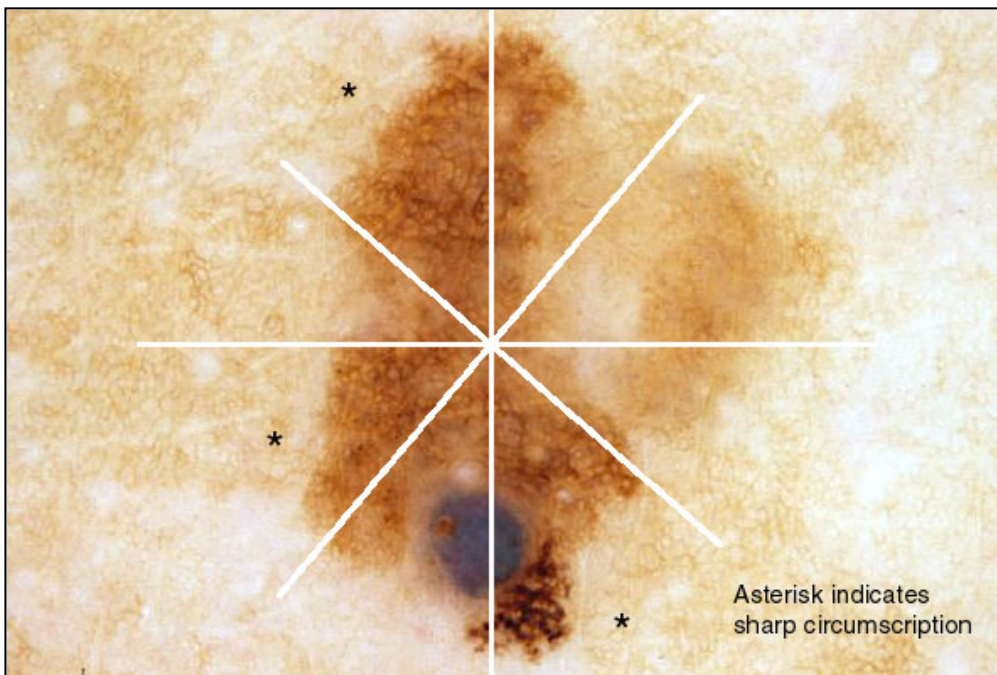
B = 3 * (x 0.1);

C = 4 [light-brown, dark-brown, blue-gray, black] (x 0.5);

D = 4 [network, streaks, dots, globules] (x 0.5)

--- TDS = 6.9 (malignant) ---

Histopathologic diagnosis: melanoma



A = 2 (x 1.3);

B = 3 * (x 0.1);

C = 4 [light-brown, dark-brown, blue-gray, black] (x 0.5);

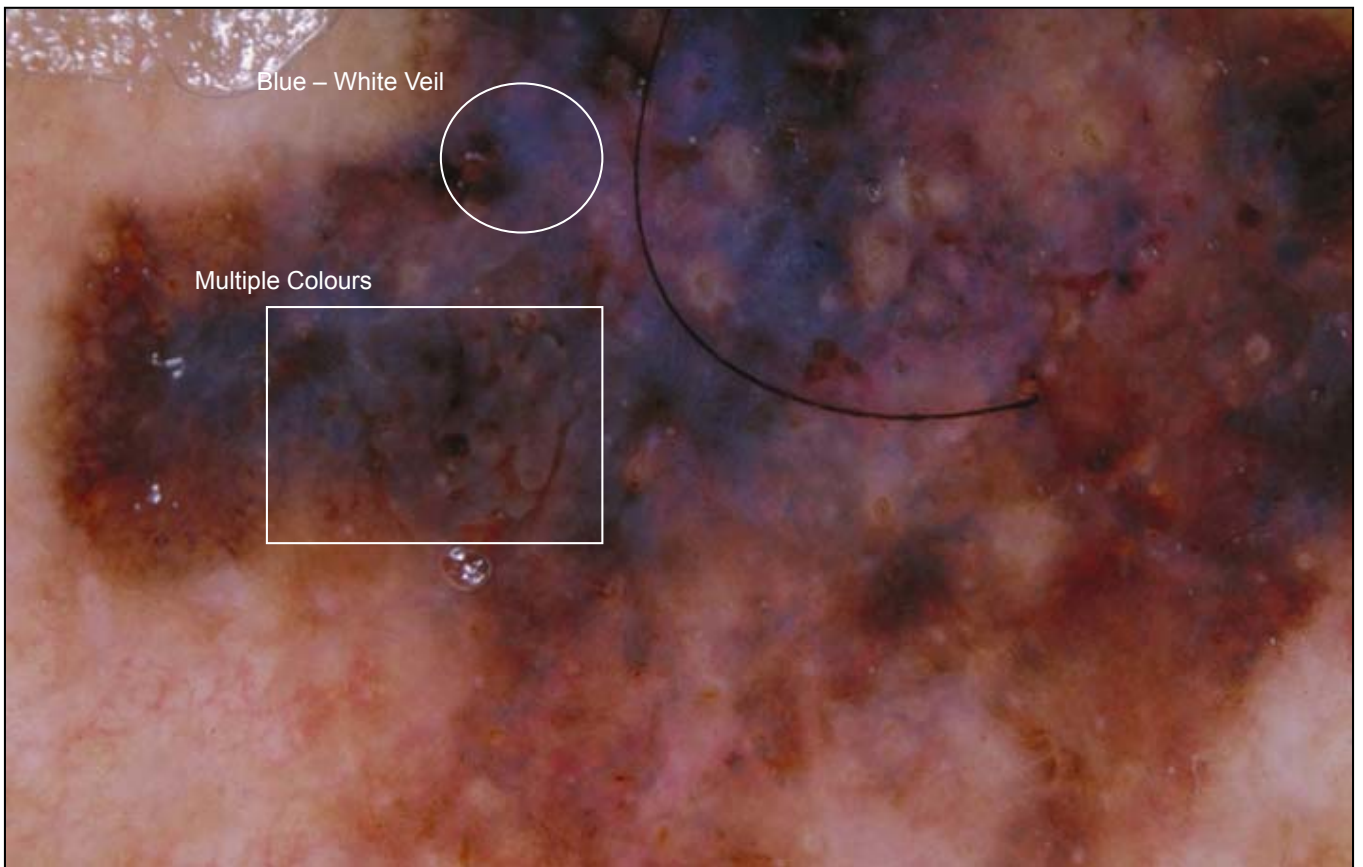
D = 4 [network, homogeneous areas, streaks, globules] (x 0.5)

--- TDS = 6.9 (malignant) ---

Histopathologic diagnosis: melanoma

Some Examples of Dermoscopic features of Melanoma

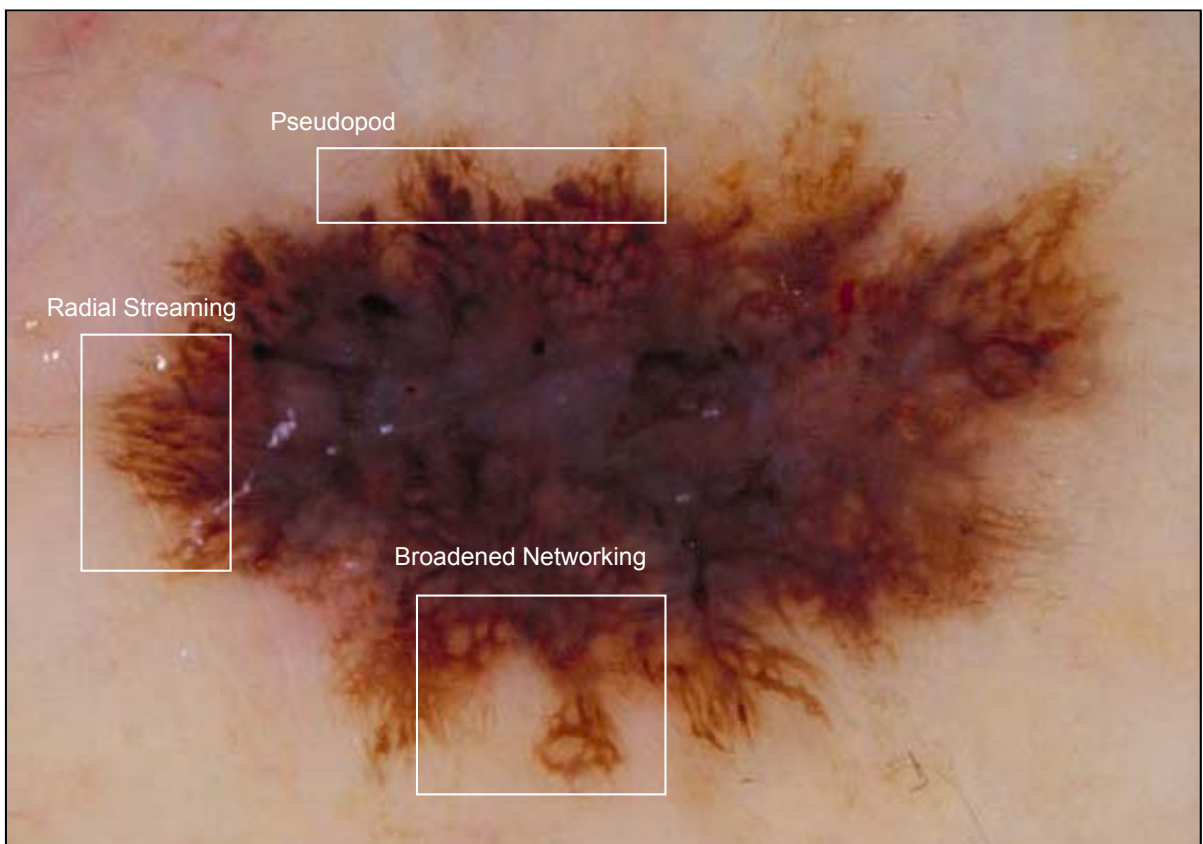
Have a go: #1



Have a go: #2



Have a go: #3



Have a go: #4

And finally

