Dermoscopy for the Non-Dermoscopist

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What is Dermoscopy (Dermatoscopy)?

- Surface / Epiluminescence microscopy
- Incident light magnification system
- With / without liquid interface
- Standard magnification is 10X
- Most useful for pigmented lesions
- Also helpful for non-pigmented lesions

Historical Perspective

- Dermoscopy first used in 1655
- Nail bed capillaries
- 1st used with oil immersion - Paul G. Unna in 1893
- Superficial layers of epidermis block light from entering the skin
- Riehl Saphier coined the phrase "dermatoscopy" in 1920
To be or not to be... That is the question. Pigmented or non-pigmented... That's the real question.

Melanocytic Seborrheic Keratosis
Pigmented BCC
Hemangioma

Amelanotic Melanoma
BCC

Pattern analysis
ABCD rule
7 point checklist
Menzies method
Revised pattern analysis

Melanocytic
Lentigo
Nevus
Melanoma
Non-melanocytic
Seborrheic Keratosis
Pigmented basal cell carcinoma
Hemangioma/ angiokeratoma
Dermatofibroma
Melanocytic lesion

- Pigment network
- Aggregated brown or black globules
- Pseudopods or radial streaming
- Homogeneous blue pigmentation
- Parallel ridge pattern (on palms/soles)
- Patternless pattern

Melanocytic

- Pigment network
- Aggregated brown or black globules
- Pseudo - network
- Branched streaks
- Parallel pattern

Blue nevus

- Homogeneous pattern
- Parallel ridge pattern (on palms/soles)

Seborrheic keratosis

- Multiple milia – like cysts
- Comedo - like openings
- Fissures/ridges

Blue nevus

- Sharp demarcation
- Mole - like borders
- Patternless pattern

Pigmented BCC

- Spike - like areas
- Large blue - gray ovoid nests/globules

Angioma/Angiokeratoma

- Arborizing vessels
- Maple leaf areas

Seborrheic keratosis

- Red blue homogeneous areas
- Scarlet/scarlet - like areas

Pigment network

- Melanin pigment in keratinocytes or melanocytes
- Grid of thin brown lines (rete)
- Lighter holes (dermal papillae)

Regular pigment network
Pigment Pseudo-Network

- Pseudo-network on face, palms, and soles
- Junctional pigment outlining adnexal structures

- Benign lesions
- Slow growing
- Uniform network pattern
- In melanoma, cells obliterate normal anatomy
- Can stuff the rete pegs
- Enlarged/disrupted network
- Can stream out from periphery
- Radial streaming or pseudopods

Regular pigment network

- Fades gradually toward the periphery
- Histology reveals long pigmented rete ridges
- Melanocytic nests situated at the tips of the rete
Regular pigment network:
“holes” are due to follicles disrupting network ≠ regression

Irregular pigment network

Irregular pigment network:

Regular pigment pseudo-network
Aggregated brown / black globules

- Symmetric, round to oval well demarcated structures
  - Diameter > 0.1 mm
- Nests of benign or malignant melanocytes
  - Benign—regular size, shape, and distribution, central
    - Variant in young patients with symmetric peripheral distribution
  - Malignant—vary in size and shape, irregularly distributed at the periphery
Intraepidermal or junctional confluent melanocytic nests
Connected to pigment network or tumor body
One of the most specific features of SSMM
Spitz/Reed Nevus
- Starburst pattern with symmetric silhouette
- Central hyperpigmentation (black lamella)
  - Pigment within the stratum corneum
- Rim of pigmented streaks regularly distributed at periphery
  - Junctional nests of melanocytes at periphery

Blue Nevus
- Deep-sited pigmentation = blue color
- Homogenous steel-blue pigmentation
  - No local dermoscopic features
- Dermal proliferation of dendritic melanocytes
Parallel-furrow pattern

- Nests of melanocytes at the furrows
- Respecting the normal anatomy of the skin
- Acrosyringia may be visible as “strings of pearls”

Parallel-ridge pattern

- Highly specific to acral melanoma
Labial lentigo

- Grayish-brown lines
- Curvilinear pattern
- Pigmentation of the basal epidermis and a few melanophages in the lamina propria
- No increase of the number of melanocytes
Seborrheic Keratosis

- Multiple milia like cysts
- Irregular crypts / comedo-like openings
- Fissures/ridges
- Fingerprint-like structures

- Milia-like cysts = pseudo-horn cysts
  - (black arrows)
- Comedo-like openings = comedo structures
  - (red arrows)
Fissures and Ridges

- Wedge shaped clefts in the epidermis
- AKA gyri and sulci, fat fingers, or cerebriform pattern
- Can also be seen in melanocytic nevi with congenital patterns, and epidermal nevi

Personal Collection

Congenital type nevus with fissures/ridges

Personal Collection

Fissures/ridges

Personal Collection

Fissures/ridges

Personal Collection
Fingerprint – Like Structures
- Tiny ridges running in parallel
- Typically seen in flat seborrheic keratoses or solar lentigo

Fingerprint – like structures

Multiple milia like cysts

Fingerprint – like structures
The most likely diagnosis is:

A. Pigmented actinic keratosis
B. Inflamed seborrheic keratosis
C. Atypical nevus
D. Lentigo maligna
E. Solar lentigo

Dermoscopic features

- Light brown color
- Fingerprint like structures

Diagnosis: Solar lentigo

Pigmented BCC

- Absent pigment network and:
  - Ulceration
  - Large blue gray ovoid nests
  - Multiple blue gray globules
  - Arborizing (tree-like) vessels
  - Maple leaf areas
  - Spoke wheel areas
Ulceration
- Seen in pigmented and non-pigmented basal cell carcinoma

Large Blue-Gray Ovoid Nests
- Well circumscribed, confluent, pigmented ovoid areas
- Larger than globules
- Not connected to larger tumor body
- Represent large nests of pigmented BCC

Multiple Blue-Gray Globules
**Multiple Blue-Gray Globules**
- Round, well circumscribed structures
- Smaller nests of pigmented basal cells

**Maple Leaf Areas**
- Nests of pigmented epithelial nodules of basal cell carcinoma

**Spoke-Wheel Areas**
- Well circumscribed brown to gray-blue-brown radial projections meeting at a darker central hub
- Nests of basal cell carcinoma radiating from a follicular epithelium
**Hemangioma**
- Red-blue homogeneous color
- Red-blue lacunae

**Angiokeratoma**
- Multiple red to bluish-black lacunae
- Blue-white veil: no diagnostic significance
- Red-blue lacunae, no pigment network
- Hyperkeratosis over thrombosed vessels

**Dermatofibroma**
- Central scar like pallor
- Surrounding delicate pigment network
The most likely diagnosis is:

A. Pigmented actinic keratosis
B. Inflamed seborrheic keratosis
C. Atypical nevus
D. Nodular melanoma
E. Pigmented basal cell carcinoma

Dermoscopic features

- Multiple blue grey globules
- Arborizing blood vessels
- Maple leaf structures

Diagnosis: Pigmented basal cell carcinoma

The most likely diagnosis is:

A. Pigmented actinic keratosis
B. Inflamed seborrheic keratosis
C. Atypical nevus
D. Nodular melanoma
E. Pigmented basal cell carcinoma
The most likely diagnosis is:
A. Pigmented actinic keratosis
B. Inflamed seborrheic keratosis
C. Atypical nevus
D. Nodular melanoma
E. Pigmented basal cell carcinoma

Dermoscopic features
- Maple leaf structures
- Central white scar

Diagnosis: Pigmented basal cell carcinoma

To be a Melanoma . . .
Must satisfy both below
- Absence of both negative features:
  - Single color
  - Symmetry of pattern/texture
- Presence of at least 1 positive feature:
  - Blue white veil
  - Peripheral black dots/globules
  - Multiple brown dots
  - Pseudopods
  - Radial streaming
  - Scar like depigmentation
  - Multiple 5-6 colors
  - Multiple blue grey dots
  - Broadened network
Benign Melanocytic vs Melanoma
Negative Features

- Presence of only a single color
  - tan, dark brown, blue, black, red, grey, pink
- Symmetry of pattern/texture
  - all axes through the centre of a lesion
- Does NOT require symmetry of shape
Positive Features

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

Dots

- Small round structures < 0.1 mm diameter
- Pigment accumulation
- May be black, brown, gray, or blue gray
  - Black = stratum corneum, upper epidermis
  - Brown = DEJ
  - Gray = papillary dermis
- Multiple blue grey dots – peppering
  - Loose melanin in dermis, or melanophages
- Multiple brown dots
  - Focal Pagetoid single and nested melanocytes
- Multiple blue grey dots – peppered
- Loose melanin in dermis, or melanophages
Pseudopods / Radial streaming

- Intraepidermal or junctional confluent melanocytic nests
- Connected to pigment network or tumor body
- One of the most specific features of SSMM
Lentigo Maligna features

- Rhomboidal structures
- Asymmetric pigmented follicular openings
- Slate gray globules
- Annular granular structures

Lentigo Maligna

- Atypical pigment pseudo-network
- Rhomboidal structures around hair follicle
- Pigmentation at “shoulders” of the infundibula

Annular granular structures
Acral Melanoma

- Parallel ridge pattern
  - not respecting normal anatomy => malignant
- Benign parallel patterns
  - Parallel furrow/lattice
  - Fibrillar/filamentous

Acral-Lentiginous Melanoma

Parallel-ridge pattern

- Highly specific to acral melanoma

The most likely diagnosis is:

A. Pigmented actinic keratosis
B. Inflamed seborrheic keratosis
C. Lentigo maligna
D. Atypical nevus
E. Pigmented basal cell carcinoma
The most likely diagnosis is:

A. Pigmented actinic keratosis  
B. Inflamed seborrheic keratosis  
C. Lentigo maligna  
D. Atypical nevus  
E. Pigmented basal cell carcinoma

Dermoscopic findings

- Asymmetric lesion
- Multiple colors
- Irregular broadened pigment pseudonetwork
- Rhomboidal structures

Diagnosis: Lentigo Maligna
The most likely diagnosis is:

A. Pigmented squamous cell carcinoma
B. Inflamed seborrheic keratosis
C. Atypical nevus
D. Pigmented basal cell carcinoma
E. Superficial spreading malignant melanoma
Dermoscopic findings

- Multiple colors
- Pseudopods
- Blue-white veil
- Ulceration

Diagnosis: Superficial Spreading Malignant Melanoma

Non-Pigmented Lesion Dermoscopy

Amelanotic Melanoma - Dermoscopy

- Problem: No pigment!
- Vascular patterns:
  - Depend on the thickness of the tumor
- Early: Irregular dotted vessels
- Advanced: Linear irregular vessels
  - Longer, coarser, and more variable in shape
- Polymorphous vascular pattern
- Linear irregular vessels with milky red/pink areas

Amelanotic Melanoma vs BCC

- Comma-like - BCC
- Dotted -Spitz
- Linear irregular - AMM
- Hairpin - SK, SCC, KA
- Glomerular - SCC/IS
- Arborizing - BCC
- Crown vessels - Seb H
- Strawberry pattern - AK
- Milky red areas/globules -AMM
**Amelanotic Melanoma – Another Example**
- Irregular linear vessels
- Located eccentrically at the edge of the lesion

**Chrysalis Structures**
- AKA Crystalline structures or shiny white streaks (SWS)
- Only seen with polarized dermoscopy
- Most commonly seen in basal cell carcinoma and invasive melanomas, may be seen in dermatofibromas and scars
  - In melanomas may reflect increased tumor thickness and regression

**Amelanotic Melanoma**
- Crystalline/chrysalis structures
- Polymorphous vessels

**Hypomelanotic Melanoma**
- Crystalline/chrysalis structures
- Polymorphous vascular pattern
- Irregular pigment network at periphery
Non pigmented Actinic Keratoses
- Pink-red pseudo-network surrounding follicles
- White-to-yellow surface scale
- Fine wavy vessels surrounding hair follicles
- Yellowish keratotic plugs in follicular ostia

Bowen’s Disease
- Glomerular blood vessels
- Nonspecific global pattern
- Scale
- Ulceration
Clear cell acanthoma
- String of pearls vessels
- Glycogen rich keratinocytes

Scabies
- Triangle indicating the head of the mite
Porokeratosis
- White tract structure = cornoid lamella
- Central white area, red dots, globules and lines

Sebaceous Hyperplasia
- Aggregated white-yellow nodules ~ cumulus cloud
- Crown vessels (radial wreath-like)
  - Bunching vessels that extend towards the center of the lesion without crossing it
Trichoscopy

- Examination of hair follicles with incident light magnification with dermoscopy or videodermoscopy – term introduced in 2006
- Useful for inflammatory, infectious, scarring, and non-scarring alopecia
- Deserves its own lecture

Nevus Sebaceous
Endothrix tinea capitis

Alopecia areata – exclamation point hairs

Androgenetic alopecia – miniaturized hair follicles

Lichen Planopilaris – perifollicular scale and erythema

Discoid lupus erythematosus – Central hypopigmented atrophic scar and dilated follicular orifices

Hair casts (pseudonits)
CASE #1

The most likely diagnosis is:

A. Pigmented actinic keratosis
B. Inflamed seborrheic keratosis
C. Atypical nevus
D. Superficial spreading melanoma
E. Pigmented basal cell carcinoma
The most likely diagnosis is:

A. Pigmented actinic keratosis
B. Inflamed seborrheic keratosis
C. Atypical nevus
D. Superficial spreading melanoma
E. Pigmented basal cell carcinoma

Dermoscopic features

- Asymmetric
- Peripheral irregular pigment network
- Chrysalis structures
- Irregular vascularity

Diagnosis: Superficial spreading melanoma

CASE #2

The most likely diagnosis is:

A. Pigmented actinic keratosis
B. Inflamed seborrheic keratosis
C. Atypical nevus
D. Superficial spreading melanoma
E. Pigmented basal cell carcinoma
The most likely diagnosis is:

A. Pigmented actinic keratosis
B. Inflamed seborrheic keratosis
C. Atypical nevus
D. Superficial spreading melanoma
E. Pigmented basal cell carcinoma

Dermoscopic features

- Maple leaf structures
- Central white scar
- Arborized telangiectasias

Diagnosis: Pigmented basal cell carcinoma

CASE #3

The most likely diagnosis is:

A. Nodular melanoma
B. Inflamed seborrheic keratosis
C. Atypical nevus
D. Angiokeratoma
E. Pigmented basal cell carcinoma
The most likely diagnosis is:

A. Nodular melanoma
B. Inflamed seborrheic keratosis
C. Atypical nevus
D. Angiokeratoma
E. Pigmented basal cell carcinoma

**Dermoscopic features**

- Asymmetric
- Blue grey ovoid nests
- Arborizing telangiectasias
- Chrysalis structures
- Epidermal ulceration

Diagnosis: Pigmented basal cell carcinoma
The most likely diagnosis is:

A. Stasis dermatitis
B. Actinic keratosis
C. Porokeratosis
D. Clear cell acanthoma
E. Squamous cell carcinoma in situ

Dermoscopic findings
- Glomeruloid blood vessels
- Focal keratin crust
- Scale

Diagnosis: Squamous Cell Carcinoma In Situ
The most likely diagnosis is:

A. Pigmented actinic keratosis
B. Inflamed seborrheic keratosis
C. Superficial spreading melanoma
D. Atypical nevus
E. Pigmented basal cell carcinoma

Dermoscopic findings
- Asymmetric lesion
- Multiple colors
- Irregular pigment network
- Scar-like depigmentation
- Chrysalis structures

Diagnosis: Superficial Spreading Melanoma
The most likely diagnosis is:

A. Pigmented actinic keratosis
B. Inflamed seborrheic keratosis
C. Atypical nevus
D. Superficial spreading melanoma
E. Pigmented basal cell carcinoma
Dermoscopic features

- Asymmetric
- Broadened irregular pigment network
- Pseudopods

Diagnosis: Superficial spreading melanoma

CASE # 7

The most likely diagnosis is:

A. Actinic keratosis
B. Inflamed seborrheic keratosis
C. Atypical nevus
D. Clear cell acanthoma
E. Basal cell carcinoma
**Dermoscopic features**

- String of pearls blood vessels

**Diagnosis:**
Clear cell acanthoma

**The most likely diagnosis is:**

A. Lentigo maligna  
B. Inflamed seborrheic keratosis  
C. Atypical nevus  
D. Solar lentigo  
E. Pigmented basal cell carcinoma
The most likely diagnosis is:

A. Lentigo maligna  
B. Inflamed seborrheic keratosis  
C. Atypical nevus  
D. Solar lentigo  
E. Pigmented basal cell carcinoma

Dermoscopic findings

- Asymmetric lesion
- Multiple colors
- Irregular pigment network
- Scar-like depigmentation

Diagnosis: Lentigo maligna

CASE # 9

The most likely diagnosis is:

A. Pigmented actinic keratosis  
B. Inflamed seborrheic keratosis  
C. Superficial spreading melanoma  
D. Atypical nevus  
E. Pigmented basal cell carcinoma
The most likely diagnosis is:

A. Pigmented actinic keratosis
B. Inflamed seborrheic keratosis
C. Superficial spreading melanoma
D. Atypical nevus
E. Pigmented basal cell carcinoma

Dermoscopic findings:
- Asymmetric lesion
- Scar-like regression
- Irregular-broadened pigment network
- Blue-white veil
- Multiple blue-grey dots

Diagnosis: Superficial spreading melanoma
**BONUS CASE 3**

**Dermoscopic features**
- Asymmetric
- White, pink, light brown
- Central scar like area

*Diagnosis: Retained buckshot*

**BONUS CASE 4**
BONUS CASE 7

BONUS CASE 8