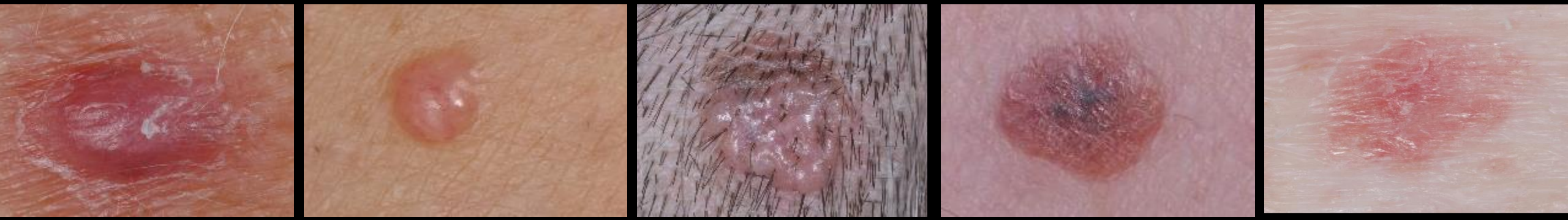


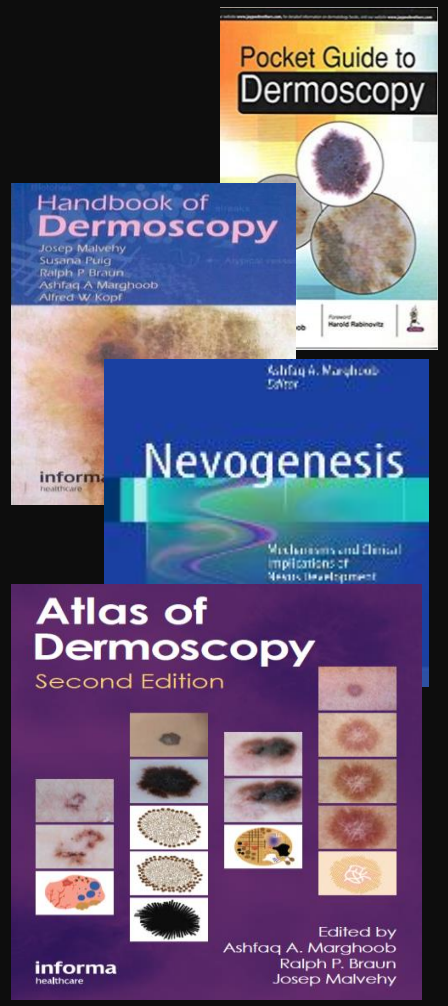
TADA: Dermoscopy simplified

Ashfaq A. Marghoob, M.D.
Attending Physician

Saturday 28th 2017
8:00-8:50AM

Memorial Sloan Kettering Cancer Center

Disclosure Statement (Conflict of Interest)



Book:
royalties

adm american dermoscopy meeting

Meeting:
paid to organize

Speaking:
Honorarium (3GEN & others)

Grants:
Partnered with industry (3GEN, Canfield, others)

Melanoma Specific Structures	OR
 **Atypical network, including angulated lines**	1.1 - 9
 **Negative network**	1.8
 **Streaks** (pseudopods & radial streaming)	1.6 – 5.8
 **Atypical dots and/or globules**	2.9 – 4.8
 **Off-centered blotch**	4.1 – 4.9
 **Peripheral tan structureless areas**	2.8 – 2.9
 **Blue-white veil overlying raised areas**	2.5 – 13
 **Regression structures** • Blue-white veil overlying macular areas, scar-like areas and/or peppering	3.1– 18.3
 **Atypical vascular structures** • Dotted, serpentine, corkscrew, and polymorphous vessels (>1 morphology), milky-red areas, red globules	1.5– 7.4
 **Shiny white lines** (Crystalline structures)	9.7

Original Investigation

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A Web-Based International Dermoscopy Society Study

Cristina Carrera, MD, PhD; Michael A. Marchetti, MD; Stephen W. Dusza, DrPH; Giuseppe Argenziano, MD; Ralph P. Braun, MD; Allan C. Halpern, MD; Natalia Jaimes, MD; Harald J. Kittler, MD; Josep Malvehy, MD; Scott W. Menzies, MBBS, PhD; Giovanni Pellacani, MD; Susana Puig, MD; Harold S. Rabinovitz, MD; Alon Scope, MD; H. Peter Soyer, MD; Wilhelm Stolz, MD; Rainer Hofmann-Wellenhof, MD; Iris Zalaudek, MD; Ashfaq A. Marghoob, MD

CONCLUSIONS AND RELEVANCE Important dermoscopic criteria for melanoma recognition were revalidated by participants with varied experience. Six algorithms tested had similar but modest levels of diagnostic accuracy, and the interobserver agreement of most individual criteria was poor.

Intraclass correlation for any given melanoma specific structure was poor ranging from 0.05 to 0.34!

Melanoma specific structures

1. Angulated lines-Atypical network (*ICC = 0.05-0.21*)
2. Irregular streaks (pseudopods &/or radial streaming) (*ICC = 0.21-0.23*)
3. Negative pigment network (*ICC = 0.15*)
4. Shiny white lines or Crystalline structures (only with PD)(*ICC = 0.16*)
5. Atypical dots & globules (*ICC = 0.06-0.14*)
6. Irregular blotch (*ICC = 0.18*)
7. Blue-white veil over raised areas (*ICC = 0.34*)
8. Regression structures (BWV over flat, peppering, scar)(*ICC = 0.11-0.2*)
9. Atypical vascular structures (*ICC = 0.16*)
10. Peripheral tan/brown structureless areas (*ICC = 0.08*)

Original Investigation

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While the intraclass correlation for any given melanoma specific structure was poor, each of these structures were in fact associated with melanoma!

Table 3. Association Between Dermoscopic Criteria With Melanoma Status (continued)

Dermoscopic Criterion	No. (%) of Lesions		OR (95% CI)	*P* Value	ICC (95% CI)[a]
	Nevus (n = 4064)	Melanoma (n = 1541)			
Total colors			1.4 (1.3-1.5)	<.001	0.36 (0.31-0.40)
1	340 (8.4)	78 (5.1)			
2	1373 (33.8)	344 (22.3)			
3	1344 (33.1)	463 (30.1)			
4	678 (16.7)	348 (22.6)			
5	229 (5.6)	171 (11.1)	NA	NA	NA
6	68 (1.7)	84 (5.5)			
7	21 (0.5)	34 (2.2)			
8	6 (0.2)	11 (0.7)			
9	4 (0.1)	8 (0.5)			
Network					
None	1155 (28.4)	496 (32.2)	2.5 (2.1-3.0)	<.001	0.39 (0.34-0.43)
Typical	1057 (26.0)	181 (11.8)	1 [Reference]	NA	0.19 (0.16-0.23)
Atypical	1560 (38.4)	756 (49.1)	2.8 (2.4-3.4)	<.001	0.21 (0.17-0.25)
Both	292 (7.2)	108 (7.0)	2.2 (1.6-2.8)	<.001	0.11 (0.08-0.13)
Network					
Pseudo: present	161 (4.0)	57 (3.7)	0.9 (0.7-1.3)	.65	0.07 (0.05-0.09)
Negative: present	204 (5.0)	107 (6.9)	1.4 (1.1-1.8)	.005	0.15 (0.12-0.18)
Target: present	122 (3.0)	30 (2.0)	0.6 (0.4-1.0)	.03	0.06 (0.05-0.08)
Structureless areas: present	1934 (47.6)	877 (56.9)	1.5 (1.3-1.6)	<.001	0.08 (0.06-0.10)
Hypopigmented areas: present	1244 (30.6)	618 (40.1)	1.5 (1.3-1.7)	<.001	0.17 (0.14-0.20)
Blotch					
Regular: present	374 (9.2)	67 (4.4)	0.4 (0.3-0.6)	<.001	0.08 (0.06-0.10)
Irregular: present	1037 (25.5)	615 (39.9)	1.9 (1.7-2.2)	<.001	0.18 (0.14-0.21)
Blue-white veil: present	759 (18.7)	537 (34.9)	2.3 (2.0-2.7)	<.001	0.34 (0.30-0.39)
Blue-gray granules: present	348 (8.6)	164 (10.6)	1.3 (1-1.5)	.02	0.11 (0.08-0.14)
Scar: present	277 (6.8)	233 (15.1)	2.4 (2.0-2.9)	<.001	0.20 (0.16-0.24)
Peripheral brown dots: present	366 (9.0)	195 (12.7)	1.5 (1.2-1.8)	<.001	0.04 (0.03-0.06)
Blue-gray dots: present	341 (8.4)	172 (11.2)	1.4 (1.1-1.7)	.001	0.16 (0.13-0.19)
Streaks: present	761 (18.7)	402 (26.1)	1.5 (1.3-1.8)	<.001	0.21 (0.17-0.24)
Pseudopods: present	296 (7.3)	215 (14.0)	2.1 (1.7-2.5)	<.001	0.23 (0.19-0.27)
Structures					
White shiny: present	84 (2.1)	78 (5.1)	2.5 (1.8-3.5)	<.001	0.16 (0.13-0.19)
Rhomboid: present	74 (1.8)	16 (1.0)	0.6 (0.3-1.0)	.04	0.05 (0.03-0.06)
Regression: present	391 (9.6)	275 (17.9)	2.0 (1.7-2.4)	<.001	0.11 (0.08-0.13)
Dots					
Regular black: present	123 (3.0)	40 (2.6)	0.9 (0.6-1.2)	.39	0.05 (0.03-0.07)
Regular brown: present	494 (12.2)	98 (6.4)	0.5 (0.4-0.6)	<.001	0.06 (0.04-0.08)
Irregular black: present	392 (9.7)	245 (15.9)	1.8 (1.5-2.1)	<.001	0.13 (0.10-0.16)
Irregular brown: present	854 (21.0)	413 (26.8)	1.4 (1.2-1.6)	<.001	0.12 (0.09-0.14)
Irregular blue: present	116 (2.9)	65 (4.2)	1.5 (1.1-2.0)	.01	0.06 (0.04-0.08)
Irregular red: present	59 (1.5)	34 (2.2)	1.5 (1.0-2.3)	.05	0.06 (0.04-0.08)
Globules					
Regular black: present	76 (1.9)	33 (2.1)	1.1 (0.8-1.7)	.51	0.05 (0.03-0.07)
Regular brown: present	558 (13.7)	121 (7.9)	0.5 (0.4-0.7)	<.001	0.17 (0.13-0.20)
Regular blue: present	45 (1.1)	10 (0.7)	0.6 (0.3-1.2)	.12	0 (0-0.01)
Irregular black: present	286 (7.0)	191 (12.4)	1.9 (1.5-2.3)	<.001	0.14 (0.11-0.17)
Irregular brown: present	786 (19.3)	326 (21.2)	1.1 (1.0-1.3)	.13	0.11 (0.08-0.13)
Irregular blue: present	143 (3.5)	113 (7.3)	2.2 (1.7-2.8)	<.001	0.07 (0.05-0.09)
Vessels					
None	3260 (80.2)	1000 (64.9)	0.5 (0.4-0.5)	<.001	0.46 (0.42-0.51)
Comma	236 (5.8)	40 (2.6)	0.4 (0.3-0.6)	<.001	0.44 (0.40-0.49)
Atypical	293 (7.2)	293 (19.0)	3.0 (2.5-3.6)	<.001	0.26 (0.22-0.30)
Pink veil	251 (6.2)	221 (14.3)	2.5 (2.1-3.1)	<.001	0.15 (0.12-0.18)
Polymorphous	115 (2.8)	127 (8.2)	3.1 (2.4-4.0)	<.001	0.16 (0.13-0.19)

Insights from UDA study by IDS

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- While many structures have the power to discriminate nevi from melanoma, most have extremely poor inter-observer agreement.
- The most powerful discriminator was "architectural disorder" (disorganized/dermoscopic asymmetry) with an OR of 6.6.
- The feature with highest inter-observer agreement was also "architectural disorder" (*the subjective view had higher agreement than the objective view!*)

Entropy - Chaos

This does not require knowing or being able to identify the presence or absence of specific colors or structures within a lesion (objective). It simply requires (blink) determining whether the colors and structures (whatever they may be) are distributed in an organized or disorganized manner (subjective).

Next slide

Organized or disorganized?

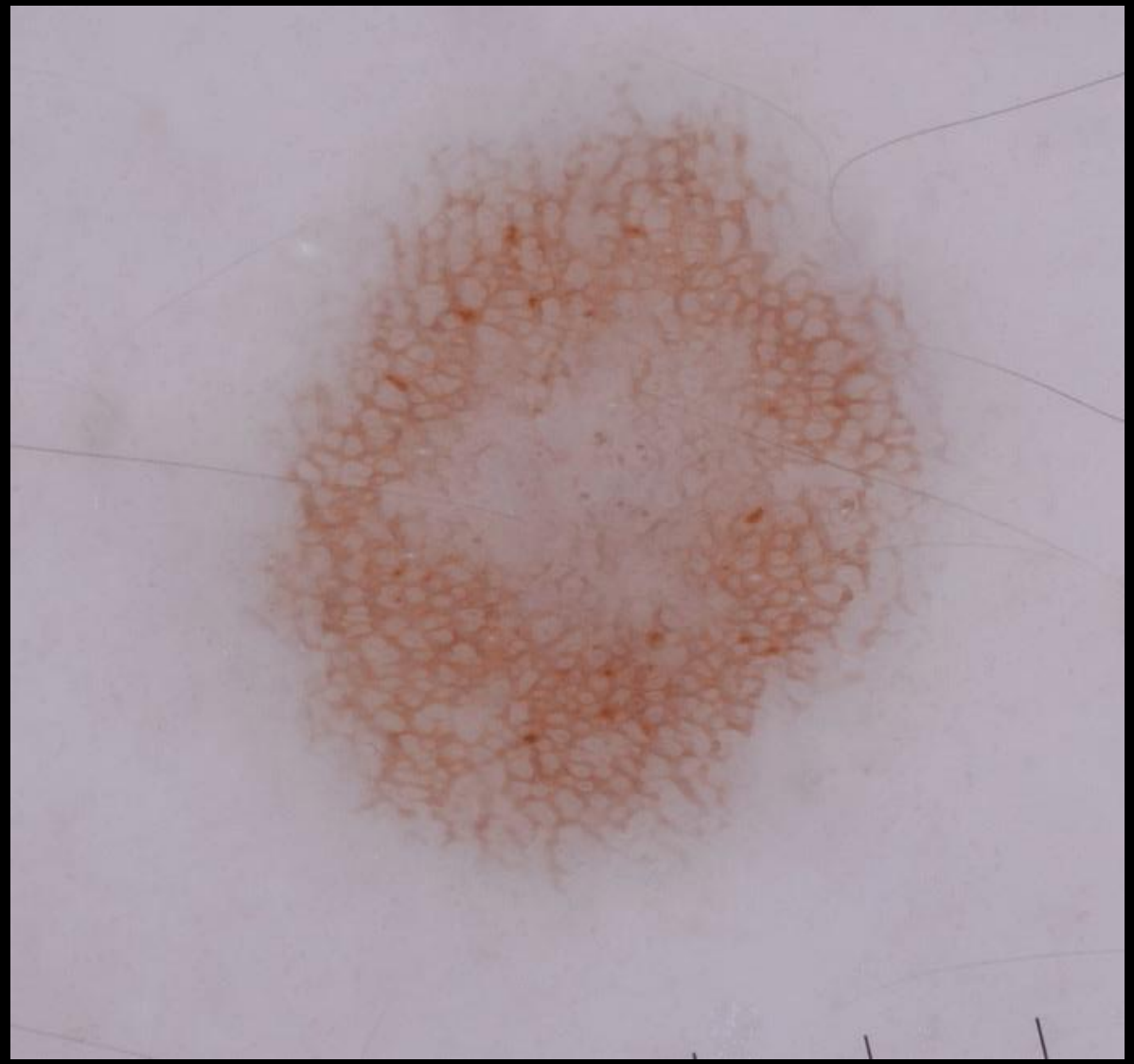

Pink Pearl.
Pink Pearl.
Pink Pearl.
Pink Pearl.
Pink Pearl.
Pink Pearl.

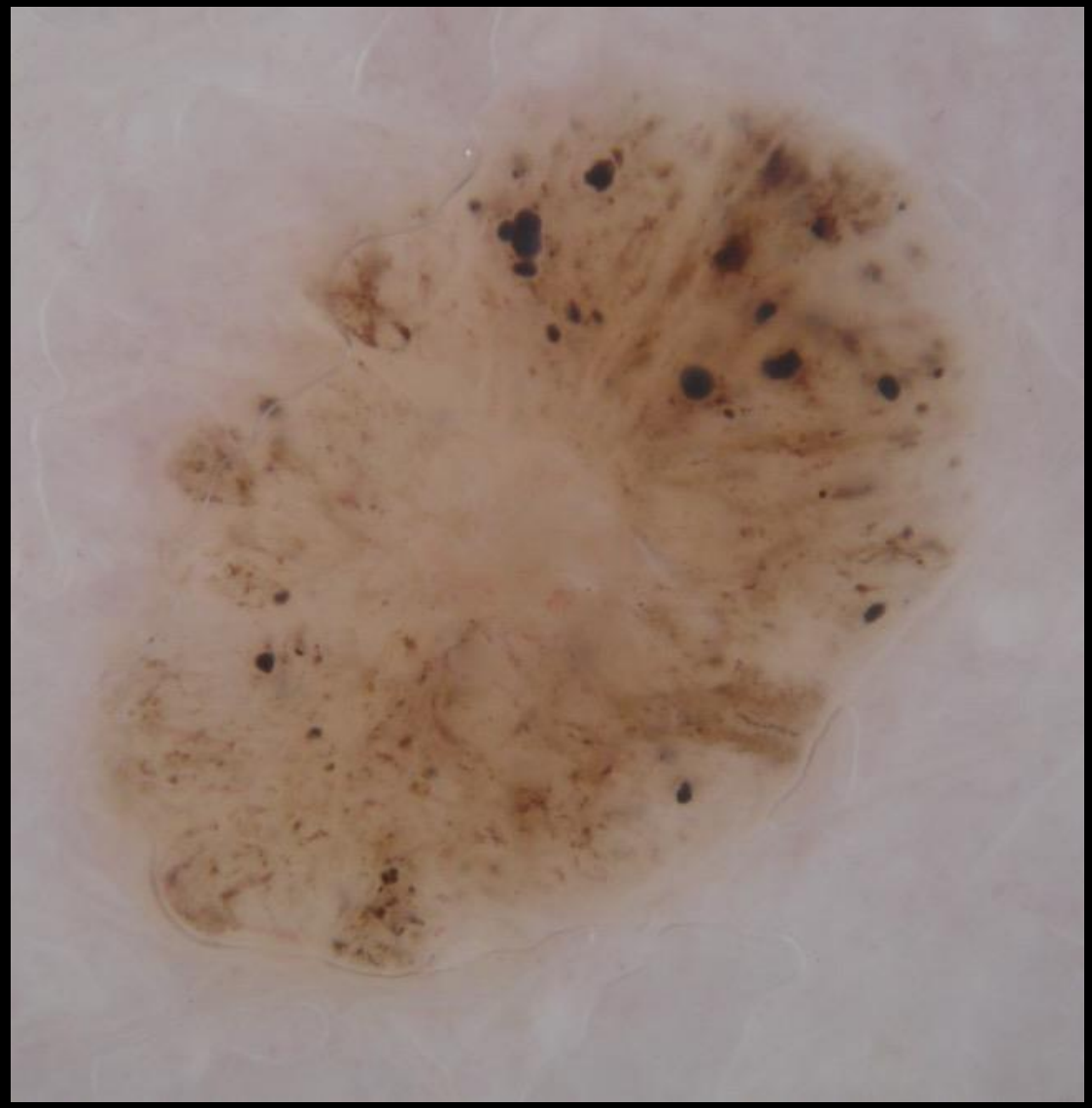
Next slide

Organized or disorganized?

You do not need to be able to identify the objects on the table to know if the desktop is organized or disorganized

Similarly, you do not need to be able to identify specific structures to know if lesion is organized or disorganized





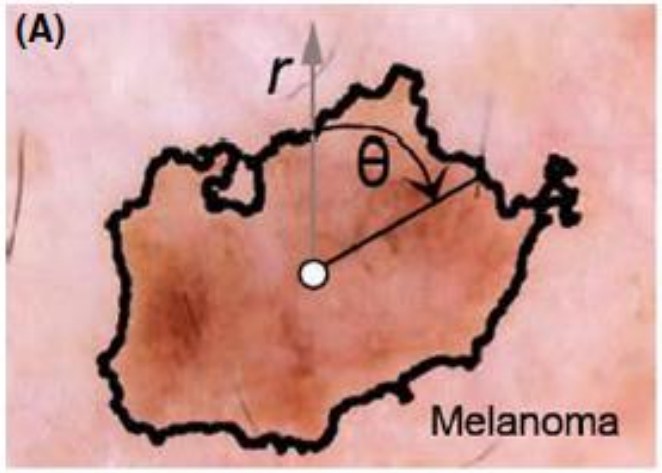
Accepted: 19 October 2016
DOI: 10.1111/exd.13250

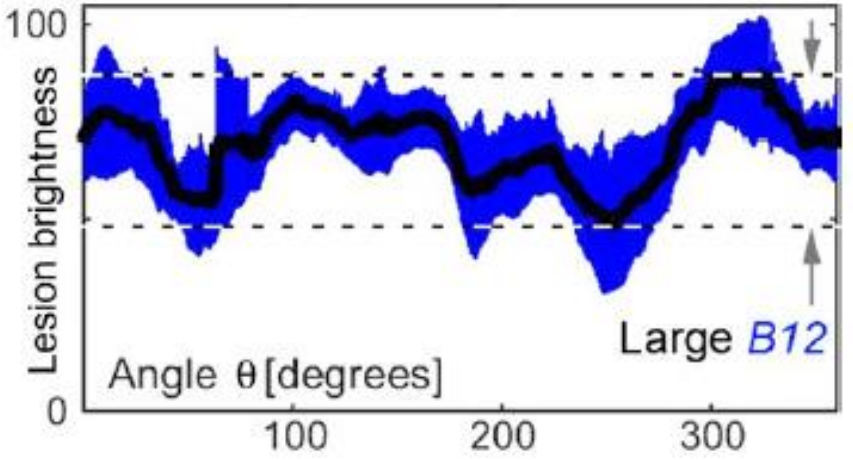
METHODS LETTER TO THE EDITOR

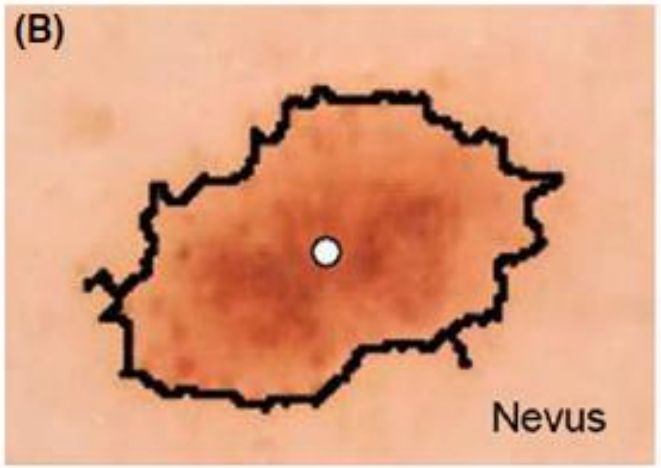
WILEY Experimental Dermatology

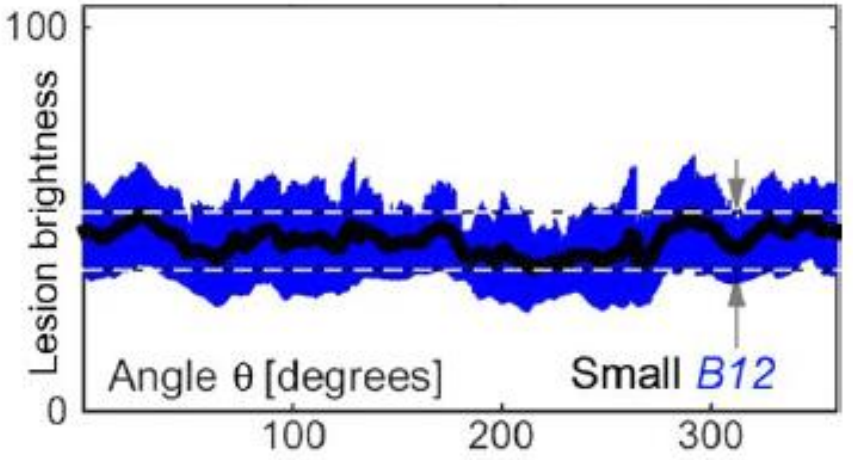
Digital imaging biomarkers feed machine learning for melanoma screening

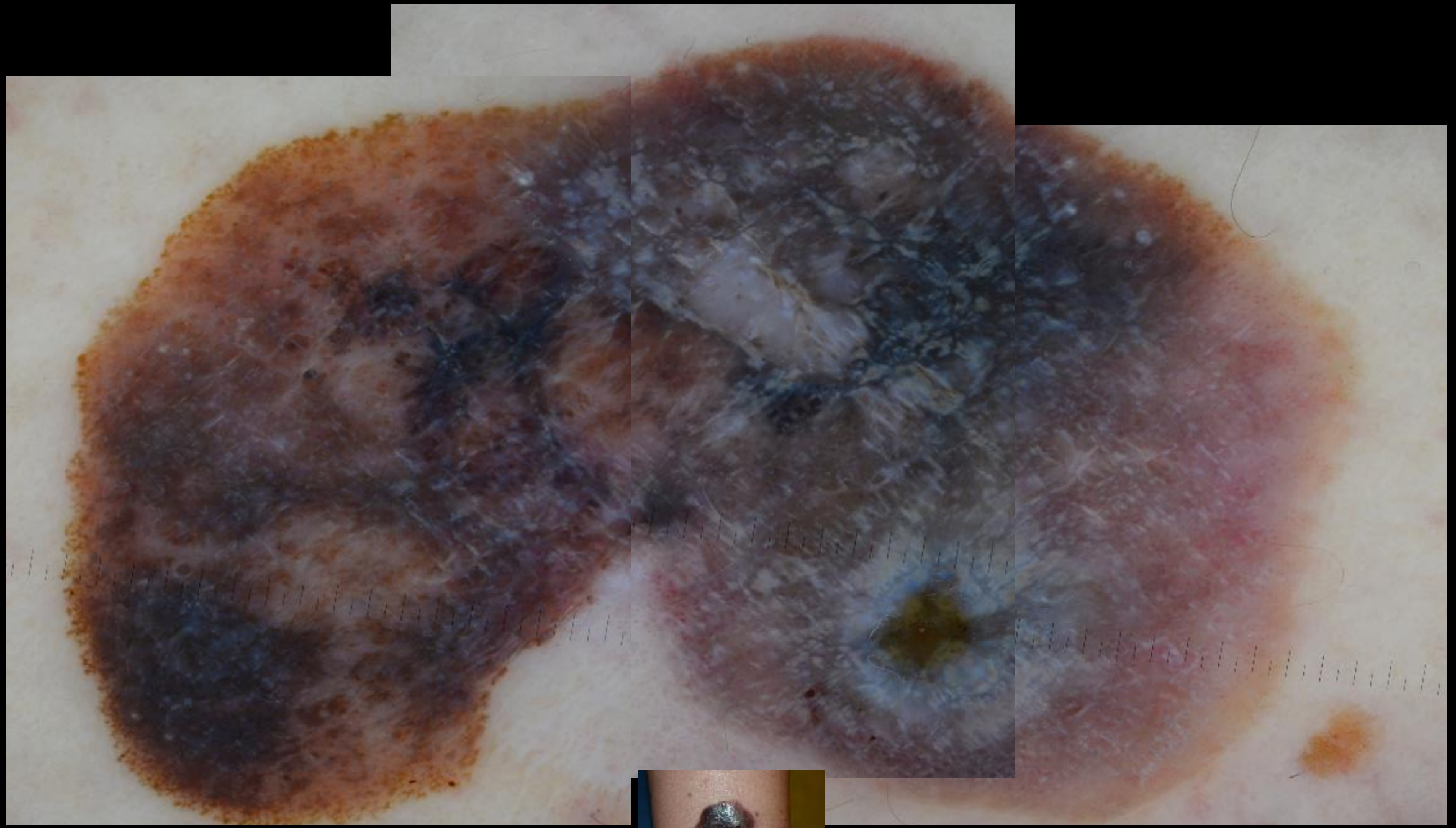
Degree of entropy:

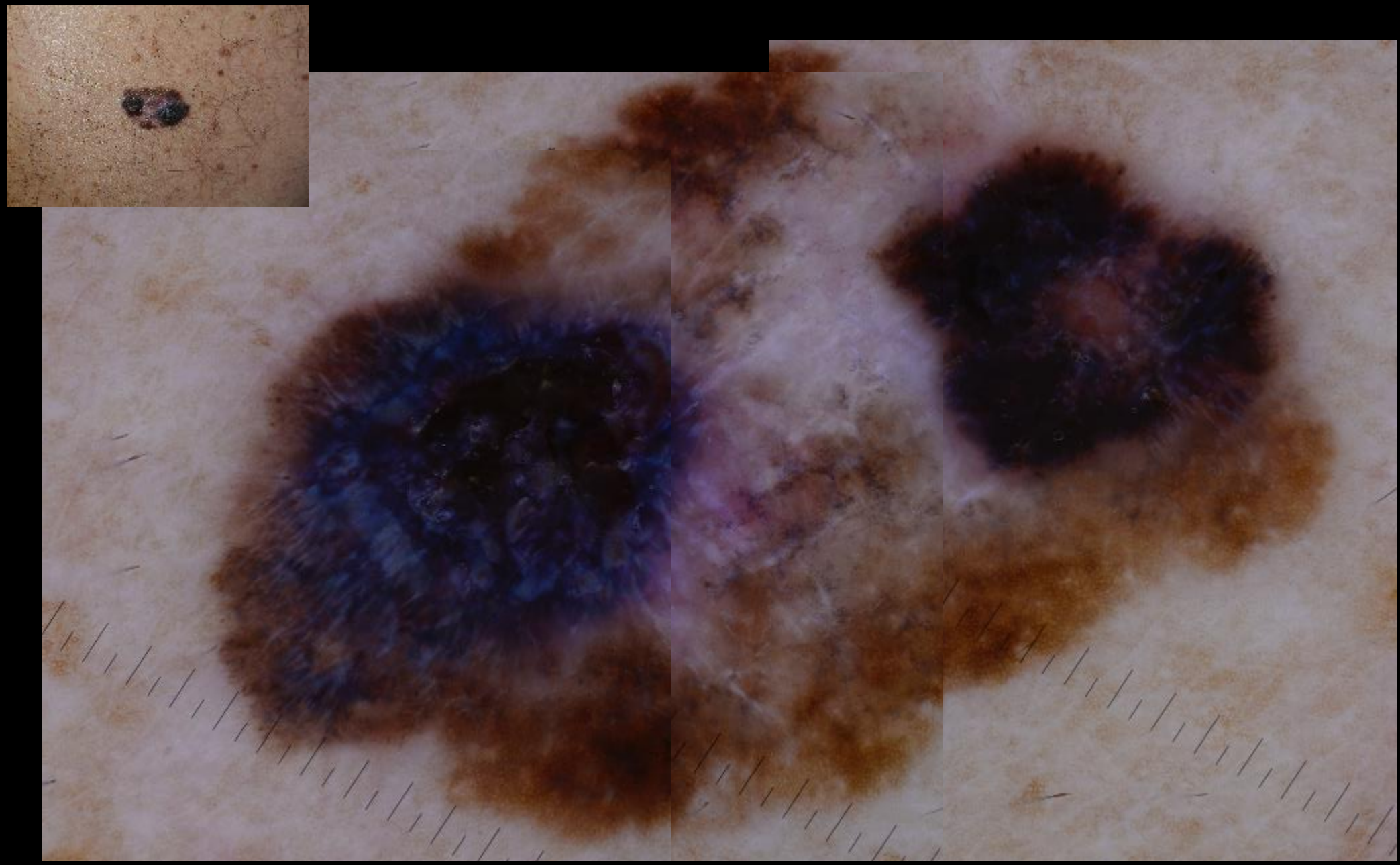


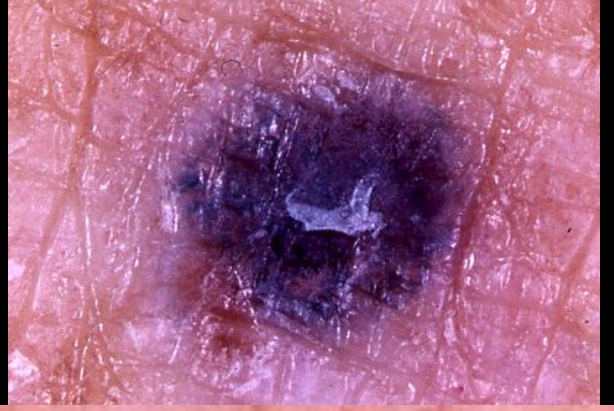


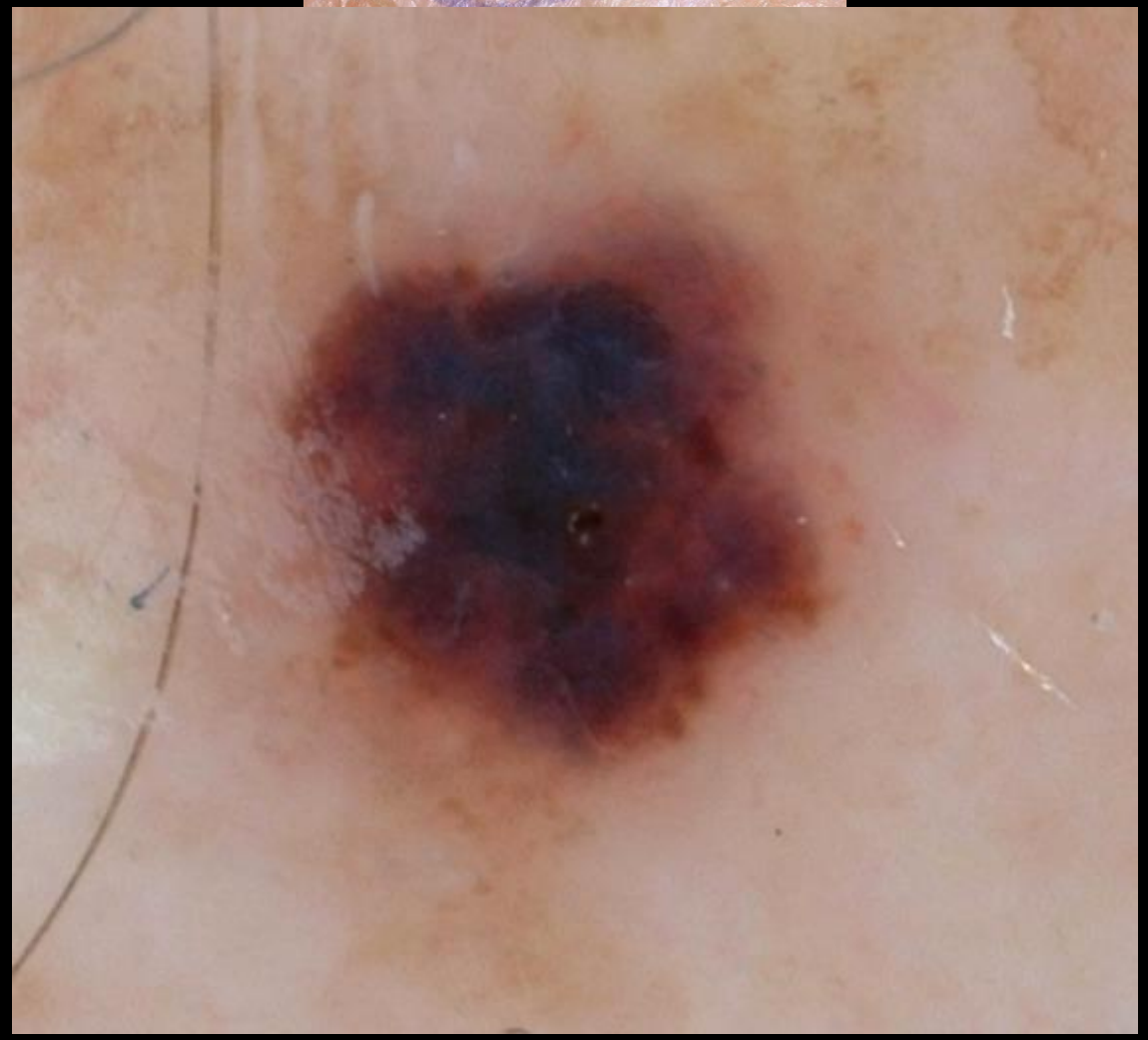


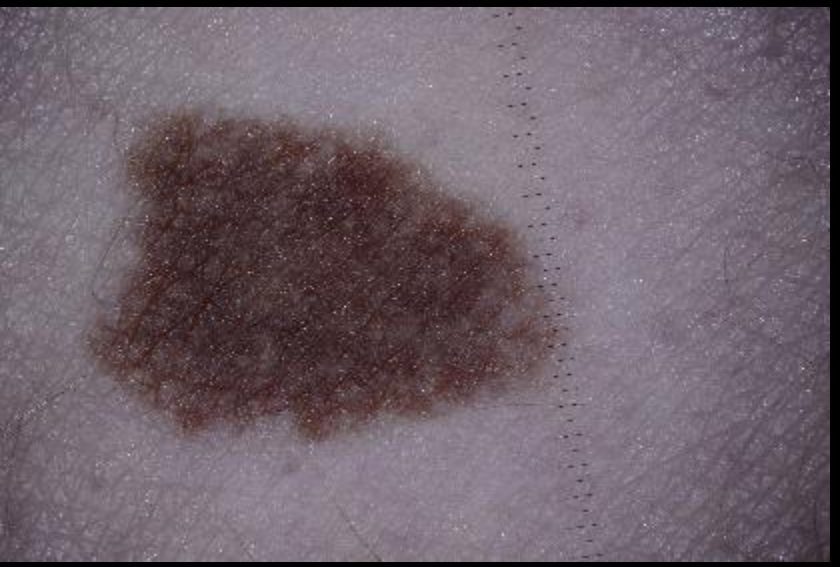


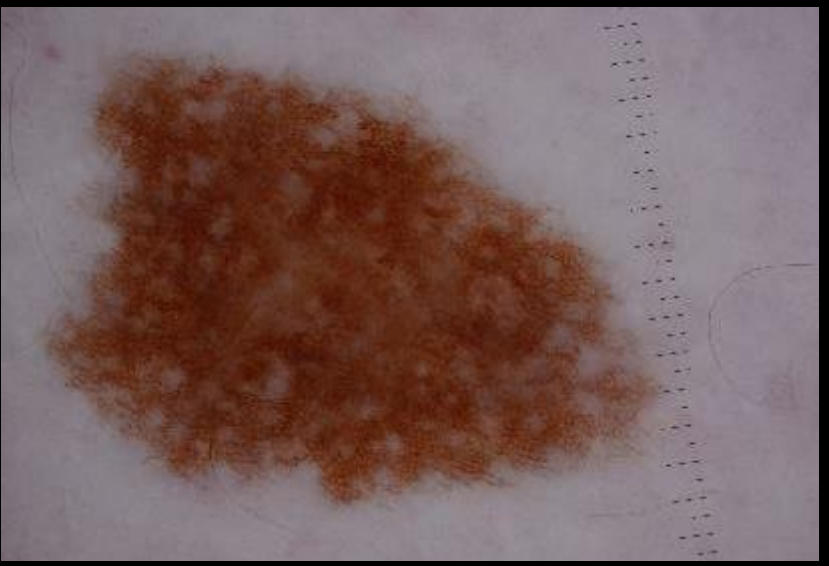










First Step

Level 1 → Melanocytic Lesion → Second Step

Second Step: Nevus | Indeterminate | Melanoma

Level 1 → DF

Level 2 → BCC

Level 3 → SCC

Level 4 → SK

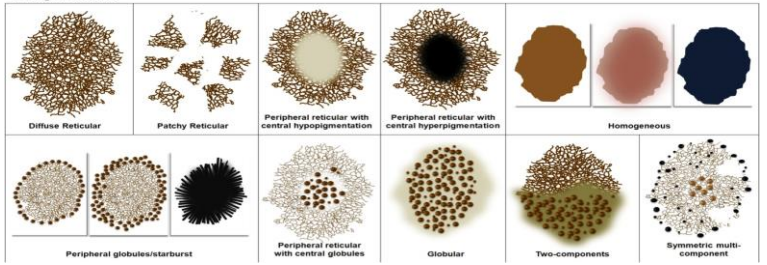
Level 5 → Hemangioma/ angioma/ angiokeratoma

Level 6 → Vascular structures in non-melanocytic tumors

Level 7 → Vascular structures in melanocytic tumors

Level 8 → Unclassifiable lesion

Benign Patterns



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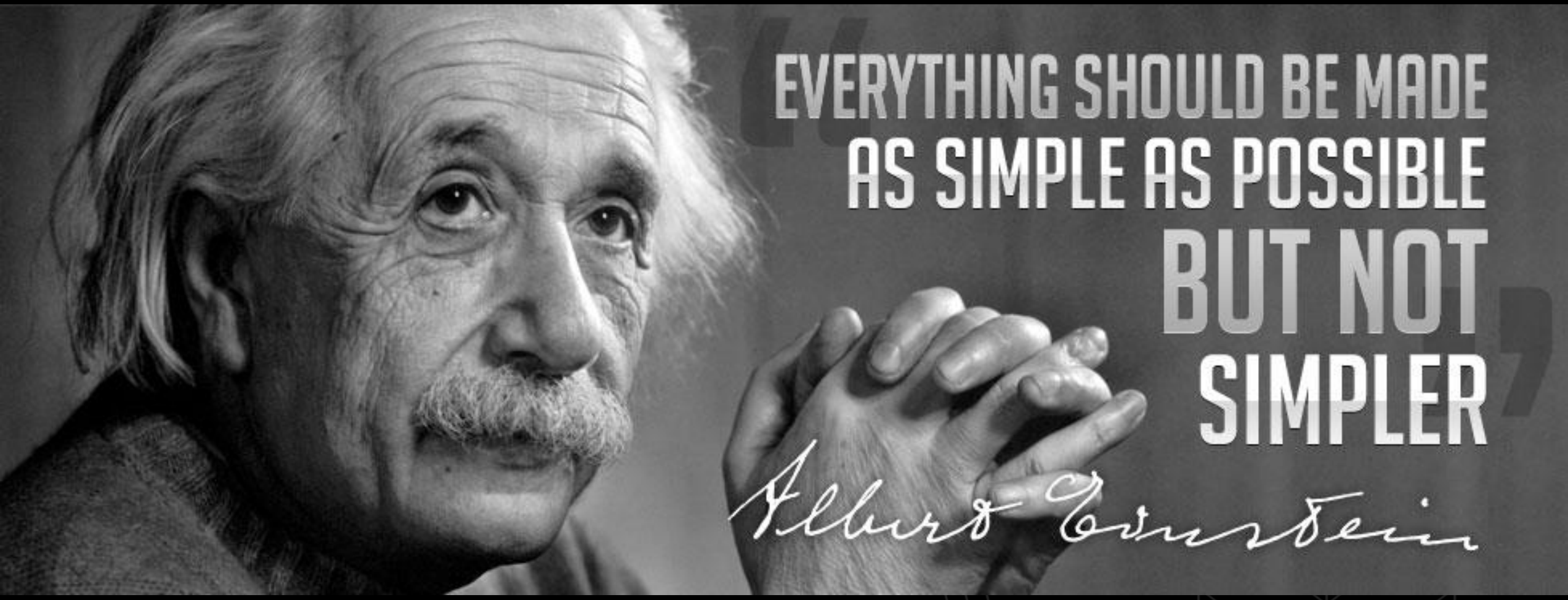
Concept and design by Natalia Jaimes, MD and Ashfaq A. Marghoob, MD


EVERYTHING SHOULD BE MADE
AS SIMPLE AS POSSIBLE
BUT NOT
SIMPLER
Albert Einstein

Goal

Find skin cancer!

Are there simpler dermoscopic methods for melanoma (skin cancer) detection?

Triage algorithm

- Simplify dermoscopy (bare-bones)
- Identify concerning lesions
- High sensitivity with reasonable specificity
- Easy to teach, learn, & implement

What has been published

- 3-point checklist
- AC rule
- BB rule
- Chaos & clues
- Prediction without pigment algorithm

What are their deficiencies?

- 3-point checklist (2004)
  - *Only for pigmented lesions (not amelanotic)*
  - *Designed to detect MM & pBCC (not pSCC)*
  - *Miss non-SSMM such as nodular*
- AC rule (2011)
  - *Cannot be used for amelanotic lesions*
  - *Miss detection of symmetric cancers such as nodular MM*
- BB rule (2011)
  - *Miss all cancers w/o blue-black color*
- Chaos & Clues (2012 – recognize importance of SWS)
  - *Only for pigmented lesions (not amelanotic)*
  - *Miss symmetric cancers such as nodular MM*
  - *More complex – requires looking for 8 structures (poor kappa)*
- Prediction without pigment
  - *Only for non-pigmented lesions. Complex*

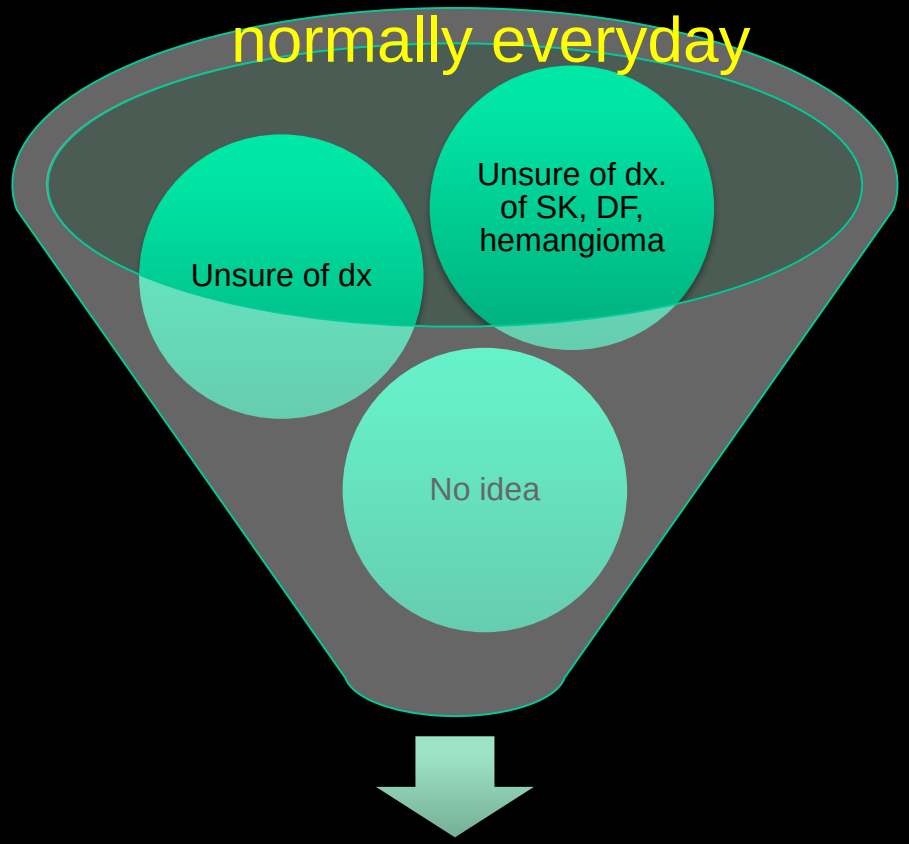
Insights gained from teaching experience

- SK, hemangioma & DF are usually easy to identify (for dermoscopists) and should be excluded from entering algorithm

- Clear cut benign or malignant lesions should be excluded from entering algorithm

- Only lesions for which the diagnosis is unknown enter the algorithm

Pre-selection is what we do normally everyday



Only evaluate preselected group of lesions where diagnosis remains unknown

Newer structures that have been shown to have discriminatory power

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Structures				
White shiny: present	84 (2.1)	78 (5.1)	2.5 (1.8-3.5)	<.001
Rhomboid: present	74 (1.8)	16 (1.0)	0.6 (0.3-1.0)	.04
Regression: present	391 (9.6)	275 (17.9)	2.0 (1.7-2.4)	<.001

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CONCLUSIONS AND RELEVANCE Important dermoscopic criteria for melanoma recognition were revalidated by participants with varied experience. Six algorithms tested had similar but modest levels of diagnostic accuracy, and the interobserver agreement of most individual criteria was poor.

Intraclass correlation for any given melanoma specific structure was poor ranging from 0.05 to 0.34!

Architectural disorder					0.43 (0.39-0.48)
None	2115 (52.1)	379 (24.6)	1 [Reference]	NA	
Mild	1435 (35.4)	556 (36.2)	2.2 (1.9-2.5)	<.001	
Marked	509 (12.5)	603 (39.2)	6.6 (5.6-7.8)	<.001	

Aim: amalgamate these triage algorithms & new insights into something better

- Select features from each with the most discriminatory power to identify malignancy
- Address deficiencies found in each
- Add newly described features with high sensitivity for skin cancer (SWS) – This requires use of polarized dermoscopy!
- Harness features with high kappa (harness brains normal power – UDA)

Triage Amalgamated Dermoscopy Algorithm

ORIGINAL RESEARCH

A Clinical Aid for Detecting Skin Cancer: The Triage Amalgamated Dermoscopic Algorithm (TADA)

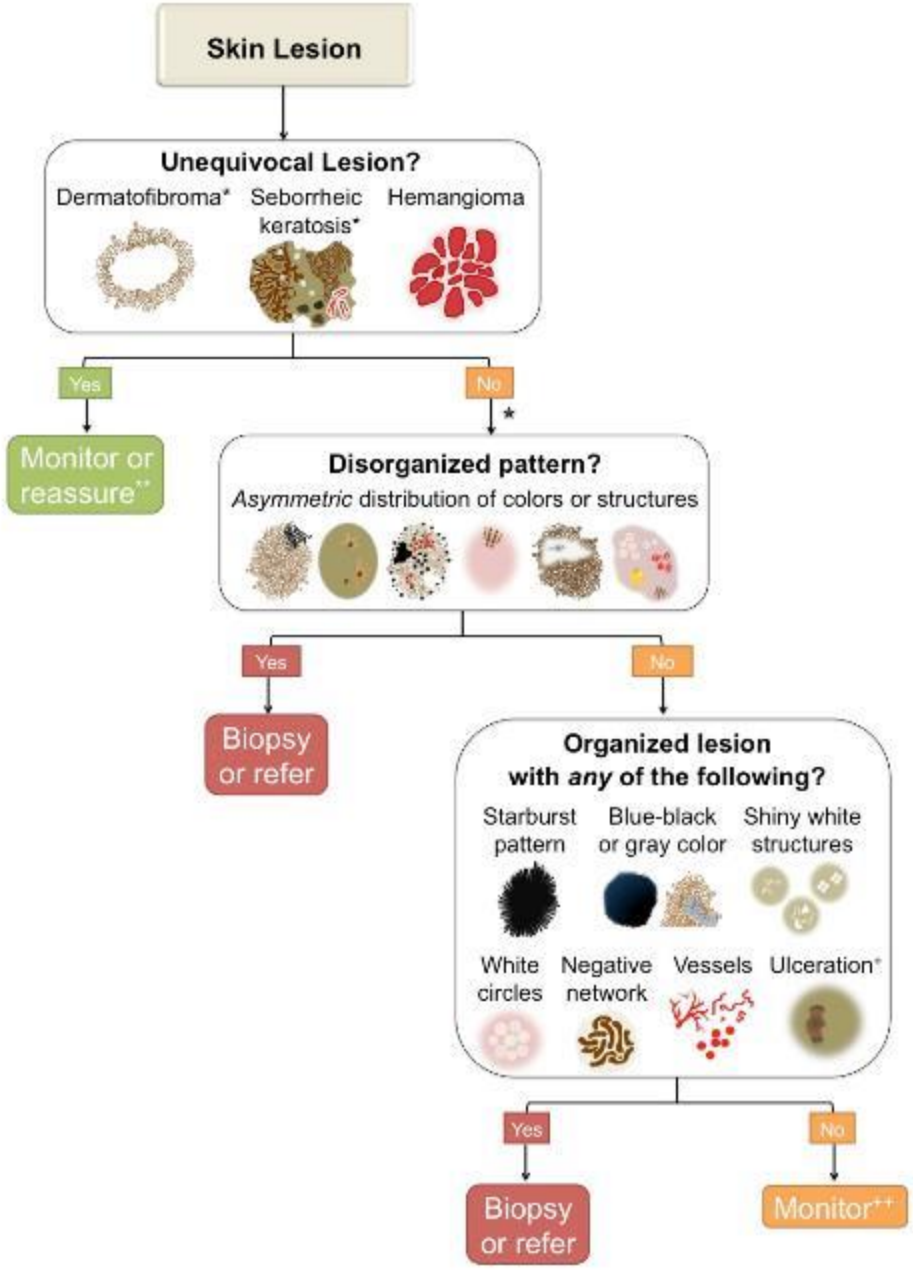
T. Rogers, MFA, M. L. Marino, MD, S. W. Dusza, DrPH, S. Bajaj, MD, R. P. Usatine, MD, M. A. Marchetti, MD, and A. A. Marghoob, MD

JABFM November–December 2016 Vol. 29 No. 6

DERMATOLOGY PRACTICAL & CONCEPTUAL
www.derm101.com

Triage amalgamated dermoscopic algorithm (TADA) for skin cancer screening

Tova Rogers[1], Maria Marino[1], Stephen W. Dusza[1], Shirin Bajaj[1], Michael A. Marchetti[1], Ashfaq Marghoob[1]



*** This algorithm does not apply to lesions on glabrous skin (i.e., palms, soles, mucosal surfaces) and nails.**

**** May require toggling between PD & NPD since SK and DF are easier to diagnose with NPD.**

[1] Patients should continue self-monitoring & changes in morphology or symptoms should raise concern.

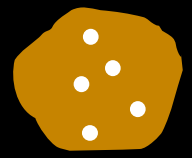
[2] Colors & structures distributed in an asymmetric/chaotic fashion.

[3] Monitoring can include short-term monitoring, long-term monitoring or self-monitoring for change.

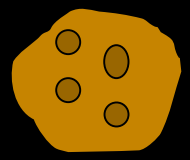
Seborrheic Keratoses (SK)

1. Sharply demarcated borders

1. Milia-like cyst



2. Comedo-like opening

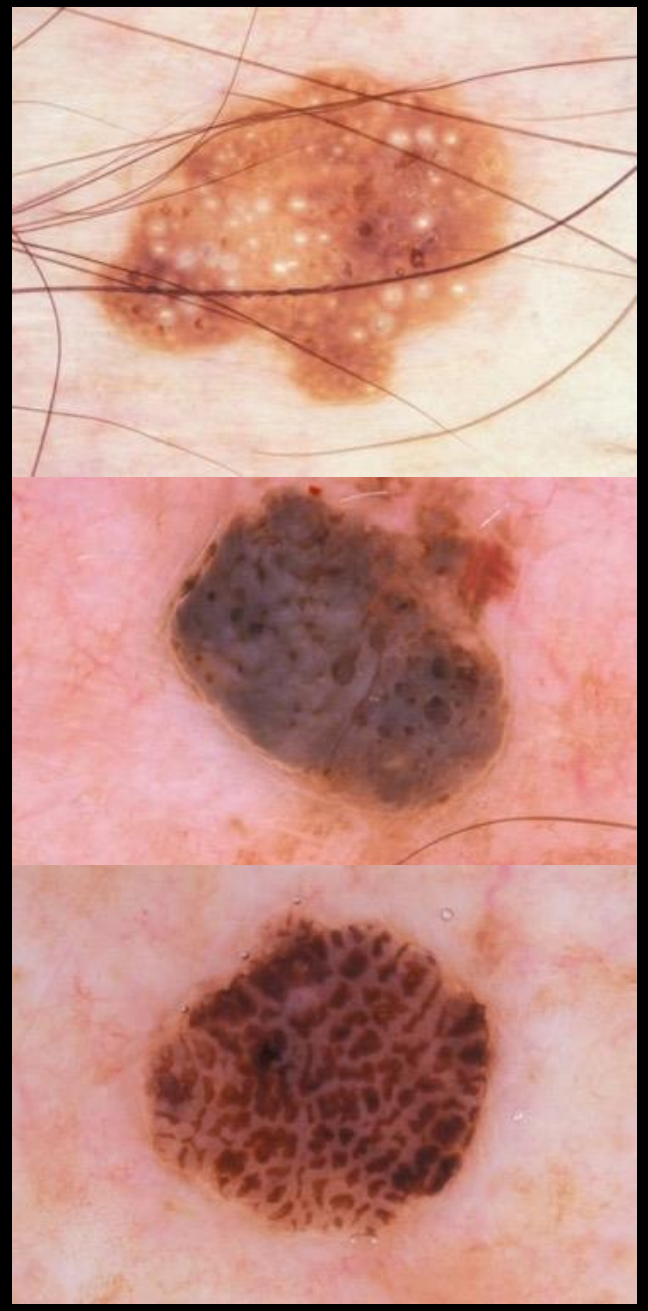


3. Fissures & ridges (gyri & sulci)

4. Fingerprint-like

5. Hairpin vessels

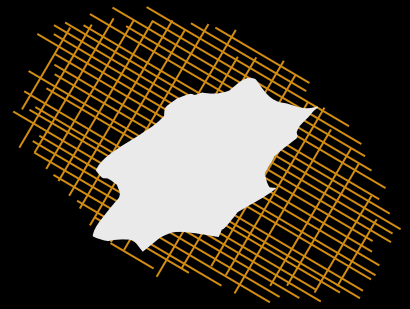
6. Moth-eaten borders

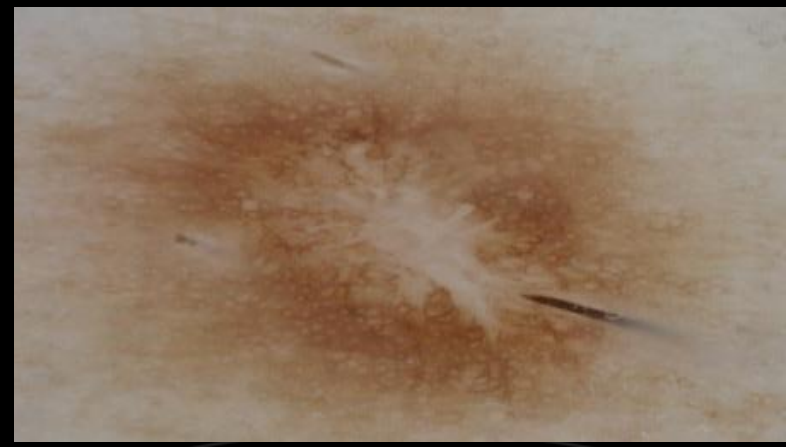


Dermatofibroma

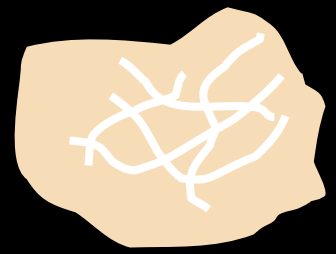
(clinical info is critical)

Delicate network (exception)



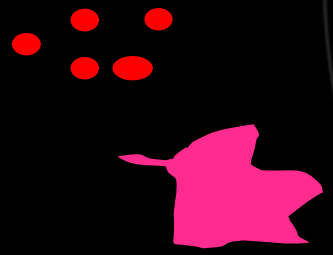


Central scar-like/crystalline



Ring-like globules

Vessels / blush in center



Angioma / hemangioma

Lacunae separated by BWV septae

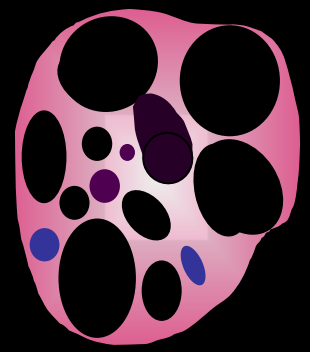
red

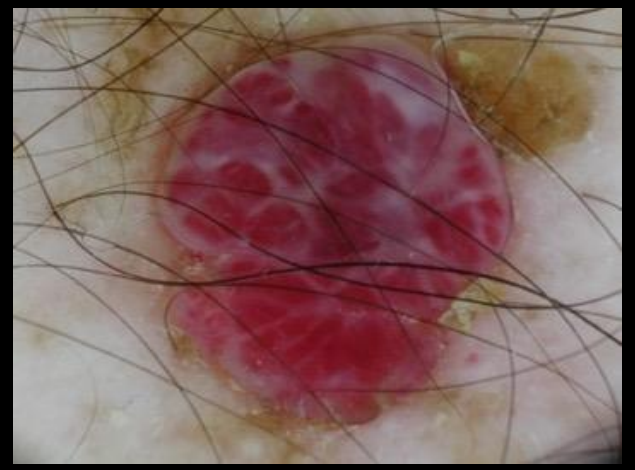
maroon

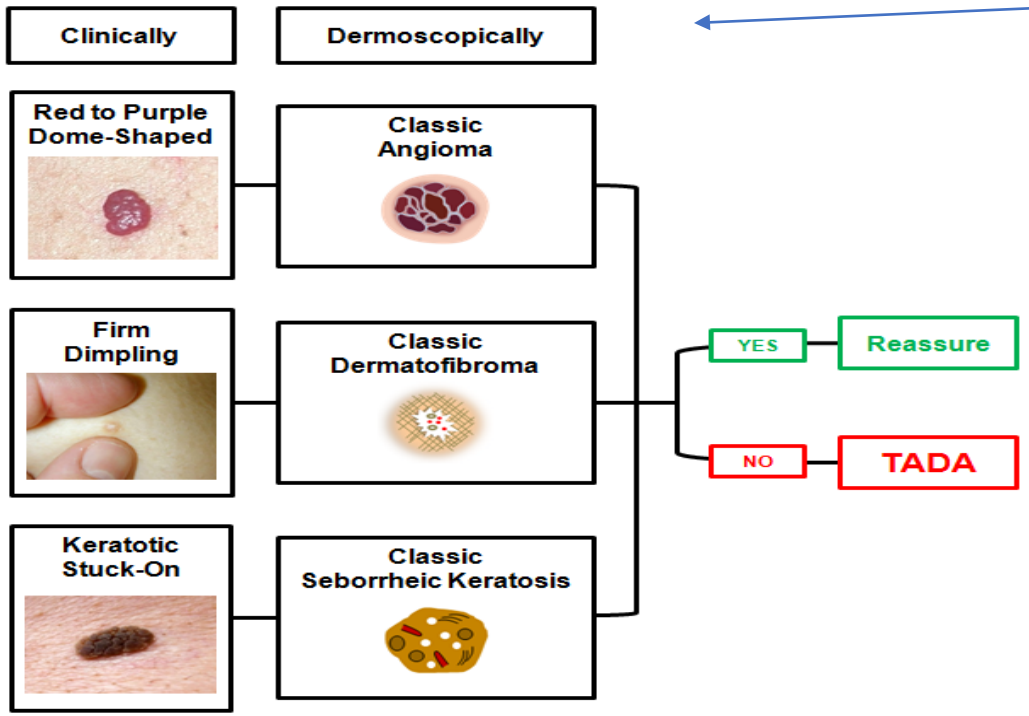
blue

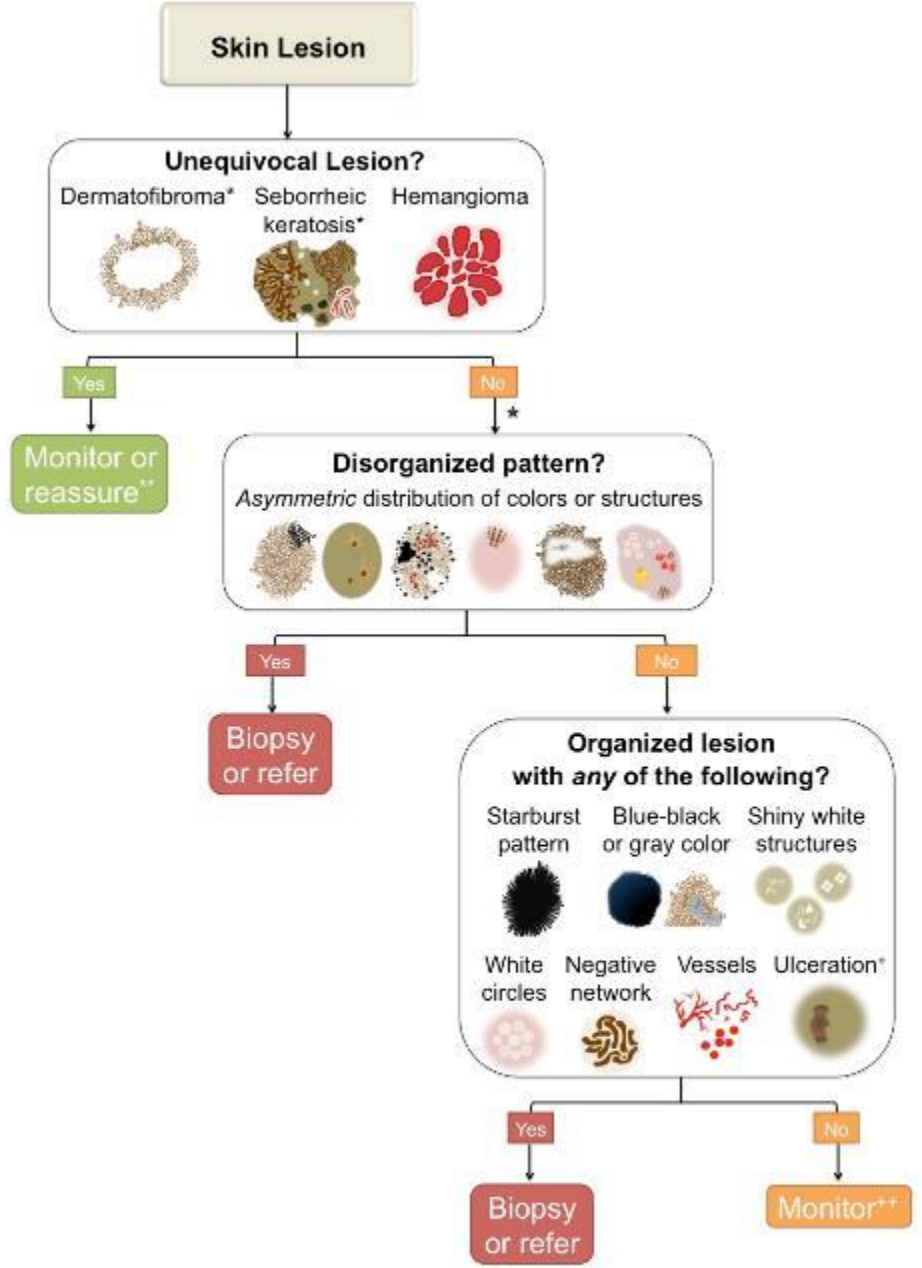
black

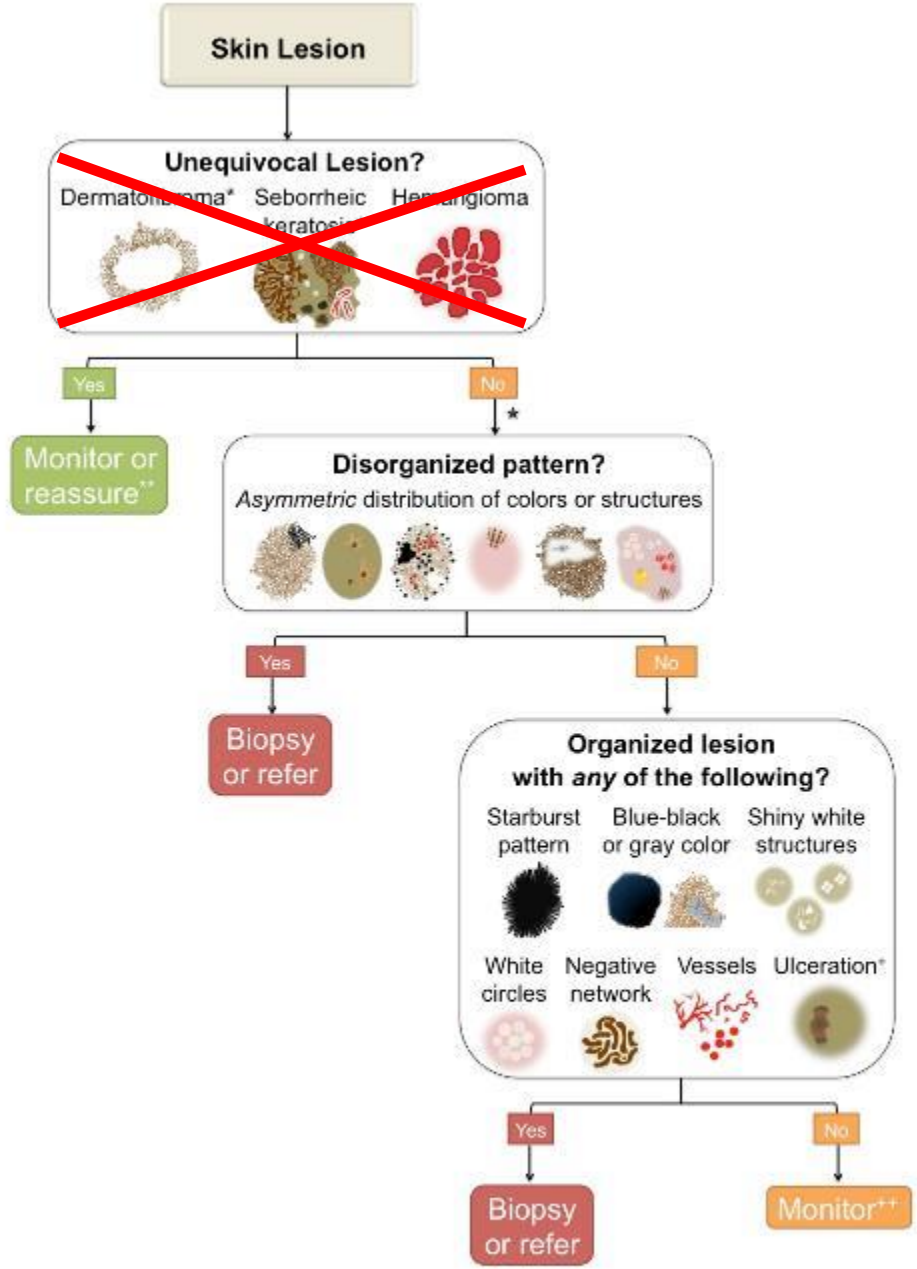
clear






Clinically
Dermoscopically
Red to Purple Dome-Shaped
Classic Angioma
Firm Dimpling
Classic Dermatofibroma
Keratotic Stuck-On
Classic Seborrheic Keratosis
YES
Reassure
NO
TADA


Skin Lesion
Unequivocal Lesion?
Dermatofibroma*
Seborrheic keratosis*
Hemangioma
Yes
No
Monitor or reassure**
Disorganized pattern?
Asymmetric distribution of colors or structures
Yes
No
Biopsy or refer
Organized lesion with any of the following?
Starburst pattern
Blue-black or gray color
Shiny white structures
White circles
Negative network
Vessels
Ulceration+
Yes
No
Biopsy or refer
Monitor++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No
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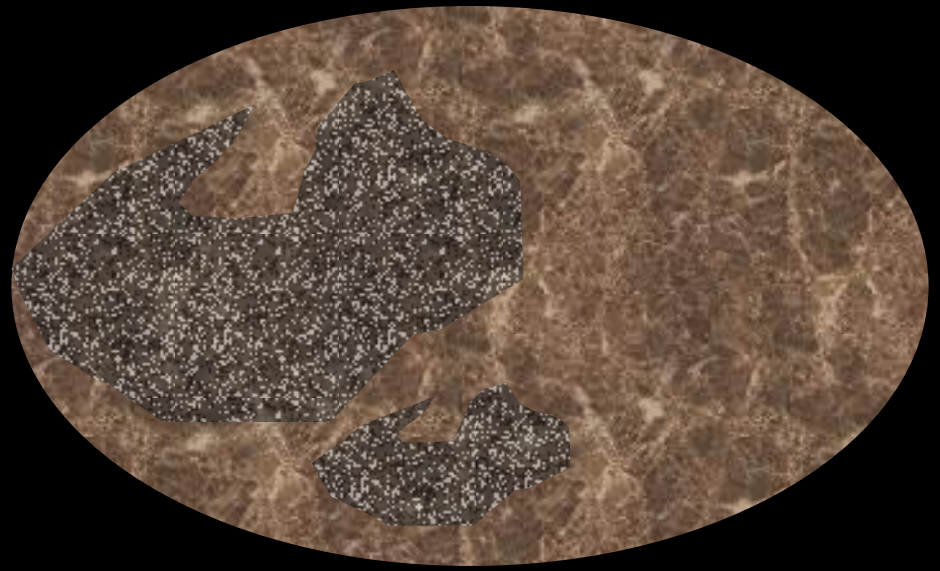
Monitor++

Definition of:

Symmetry (organized) / Asymmetry (disorganized)

Symmetry of SHAPE
(but disorganized pattern)



According to dermoscopy this lesion
is considered asymmetric
(disorganized)

Organized PATTERN
(but asymmetry of shape)

According to dermoscopy this lesion
is considered symmetric (organized)

Examples

-Symmetry in pattern

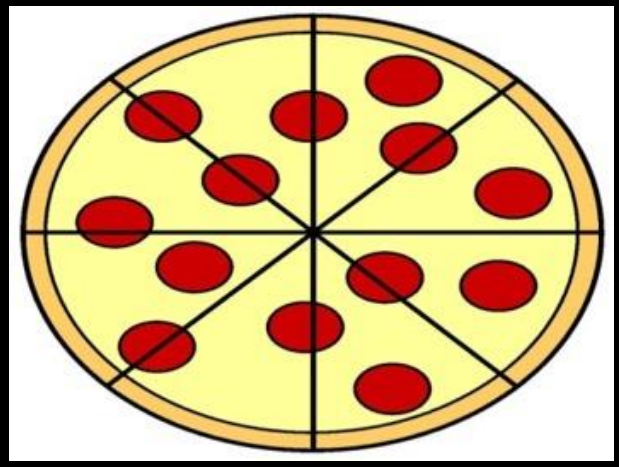
-No symmetry of shape (asymmetric shape)

-According to dermoscopy this is symmetric & organized

-No symmetry in pattern (asymmetric pattern)

-Symmetry of shape

-According to dermoscopy this is asymmetric & disorganized

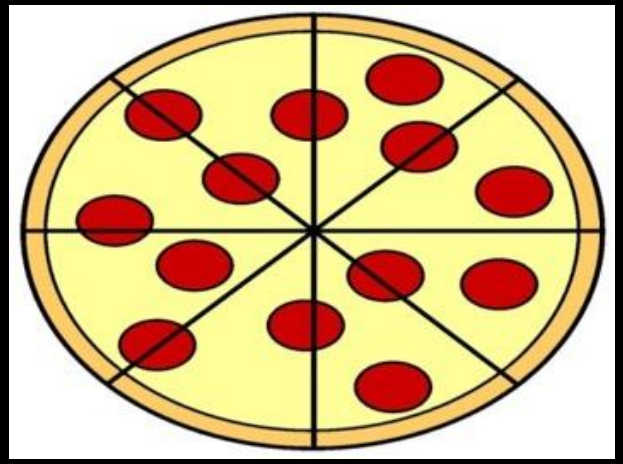


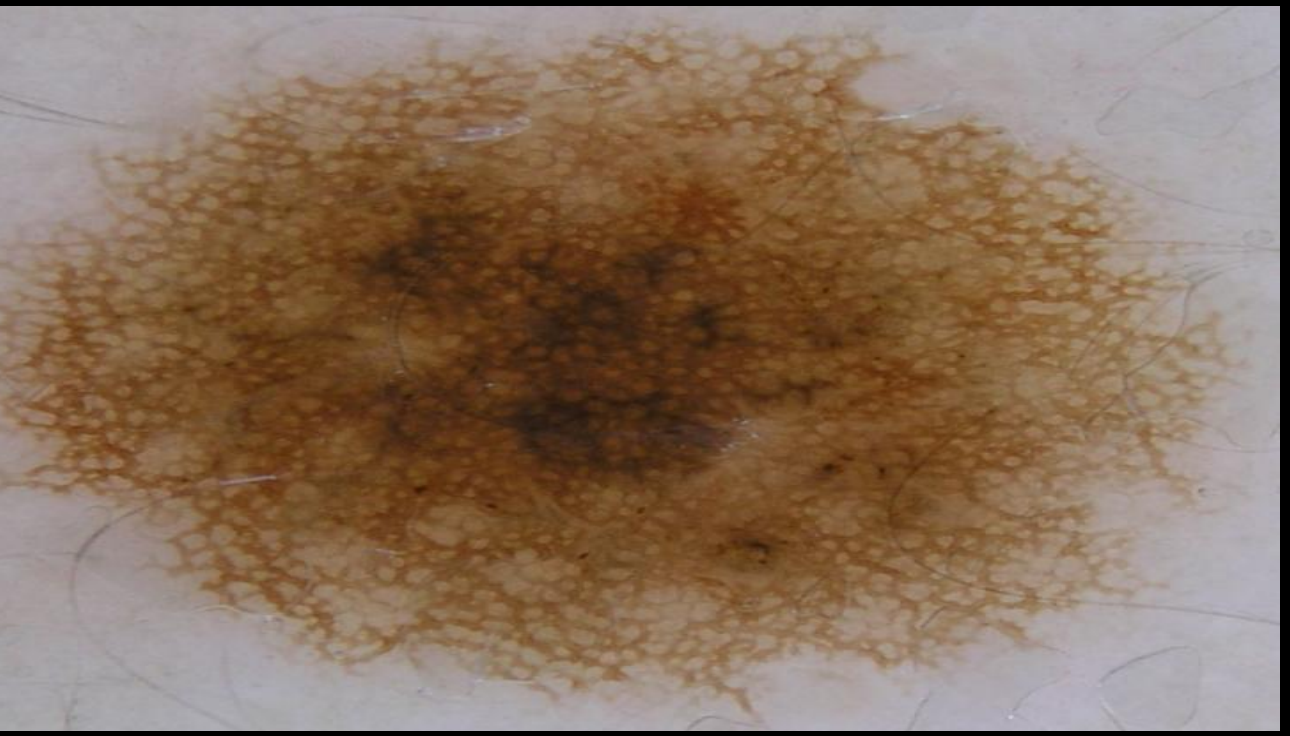
Pizza Margherita

SYMMETRY (organized)

Pizza Quattro Stagioni

ASYMMETRY (disorganized)

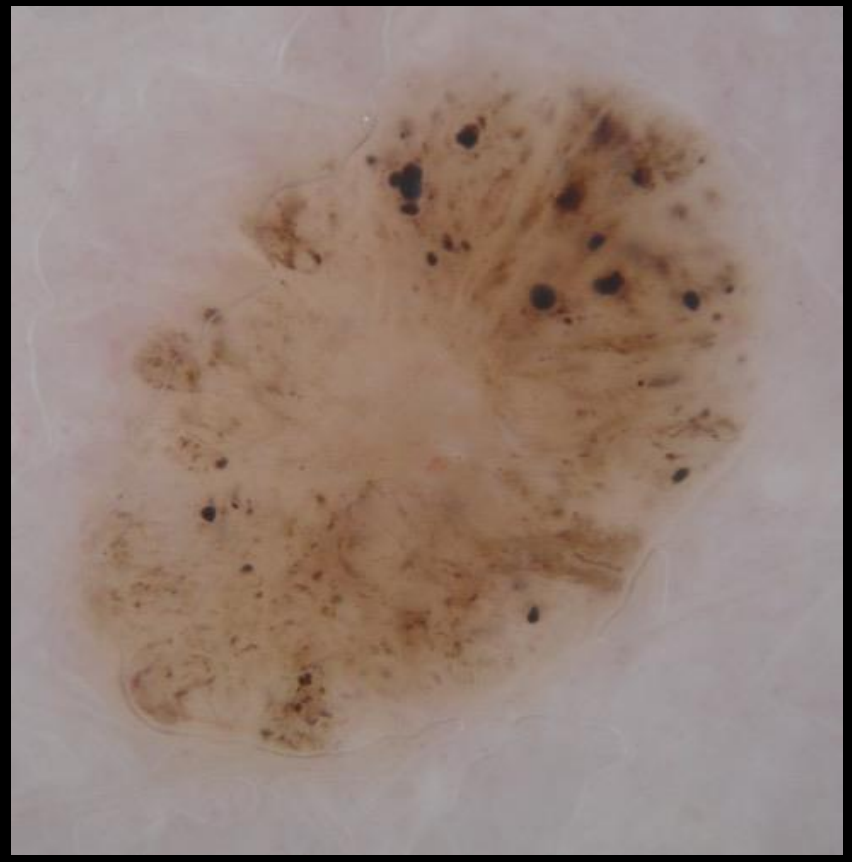


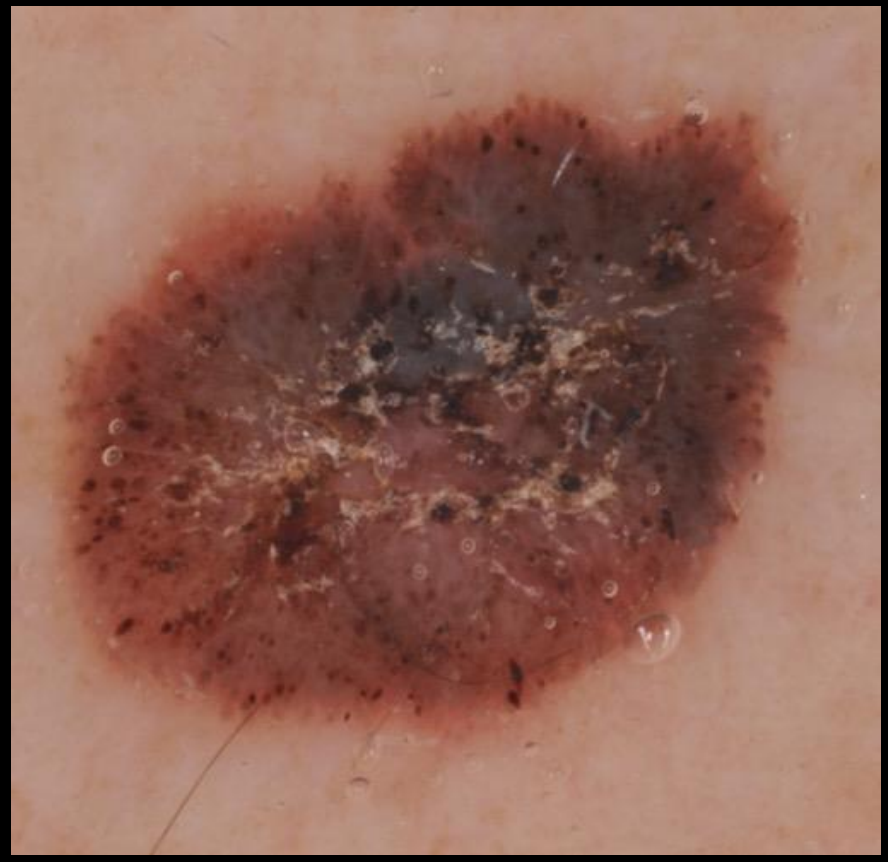


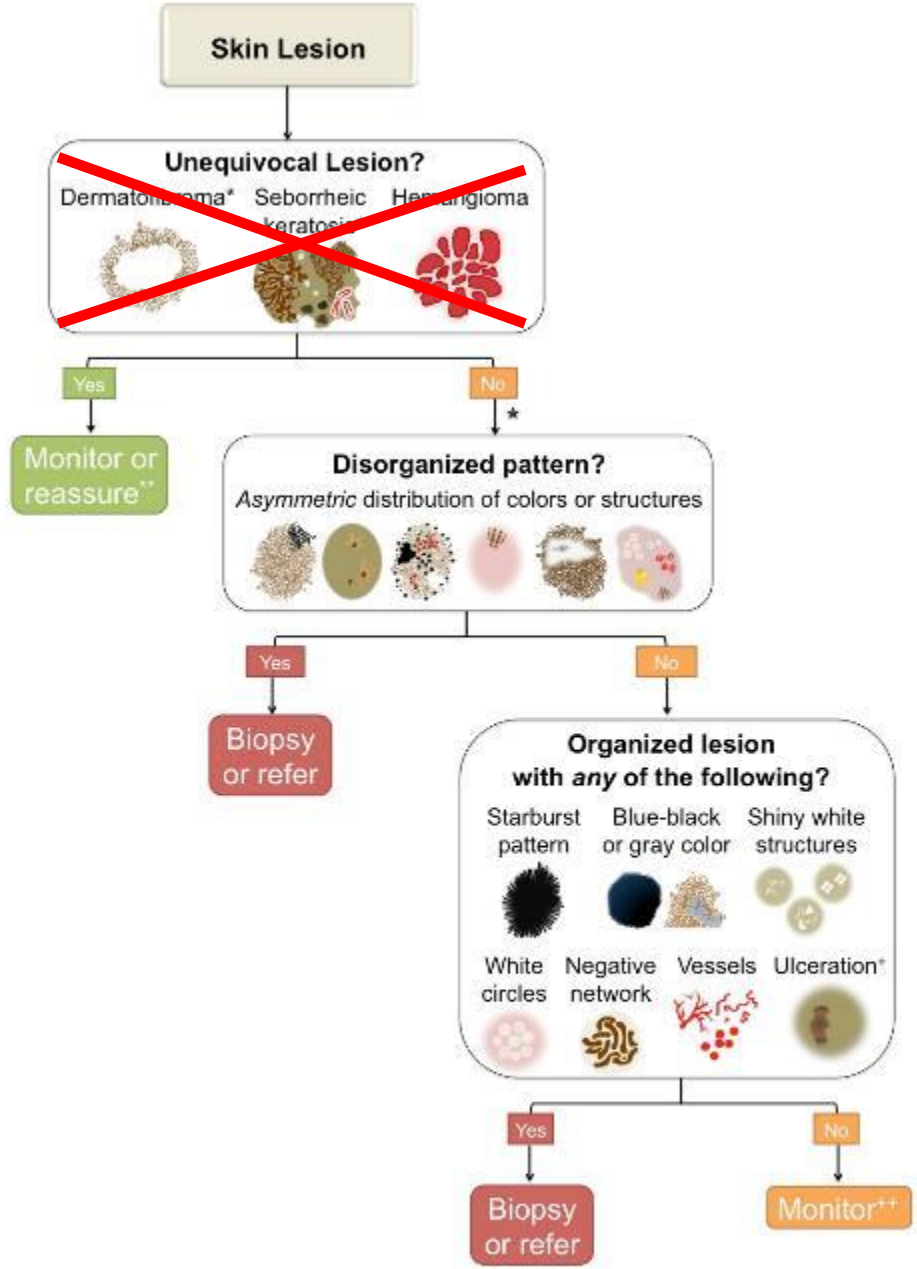
SYMMETRY (organized)

ASYMMETRY (disorganized)

Disorganized: BCC, SCC, MM



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Vessels
Ulceration+
Yes
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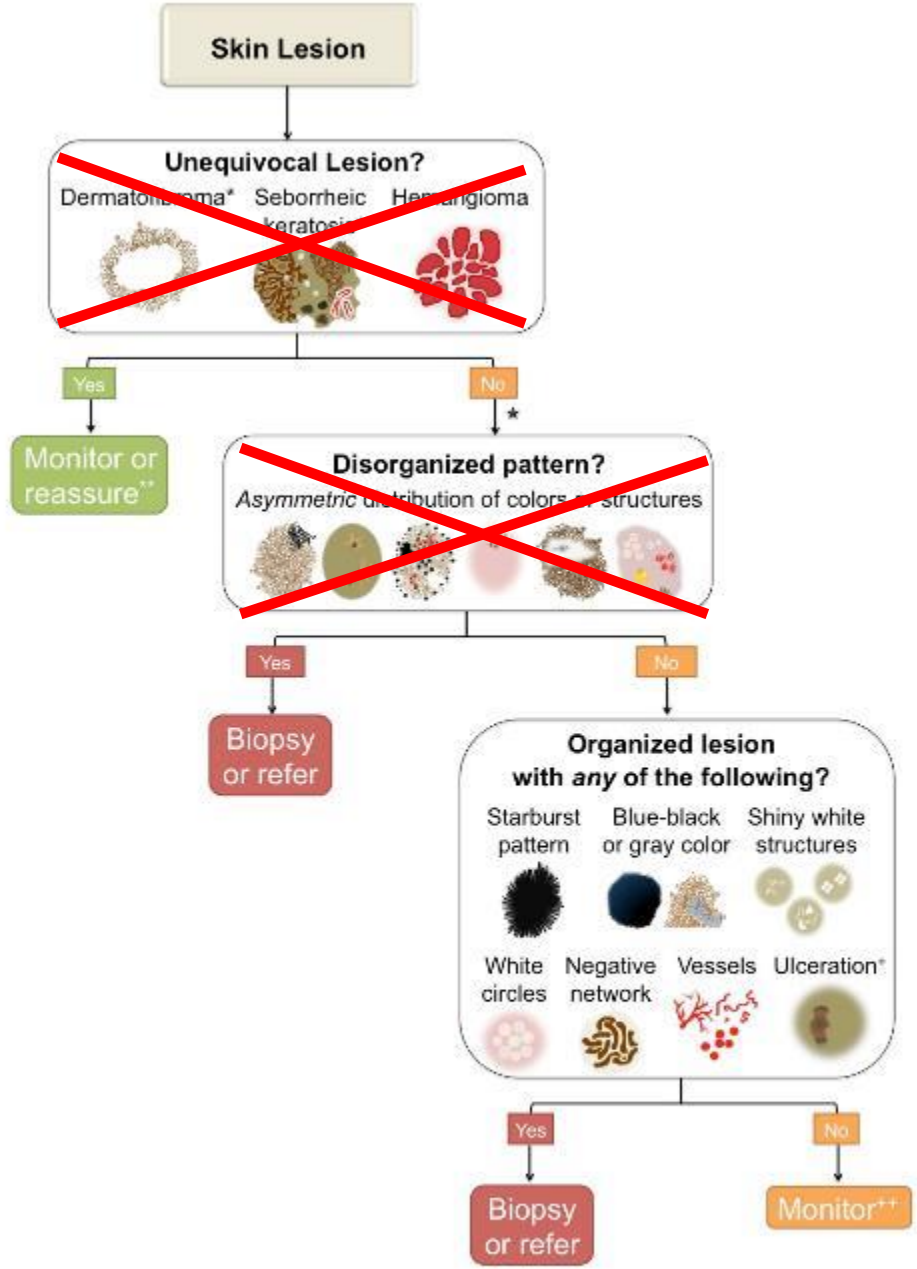
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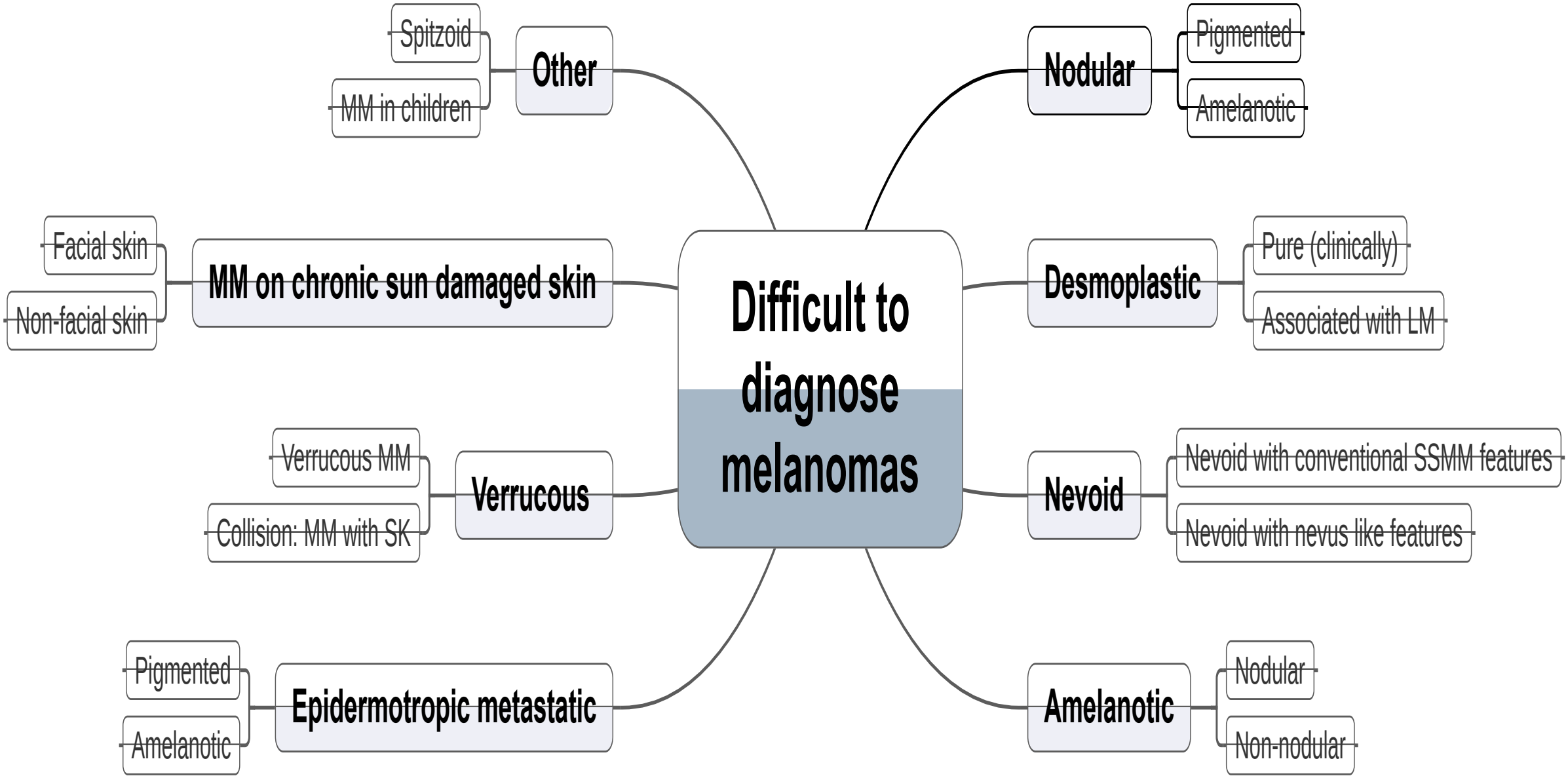
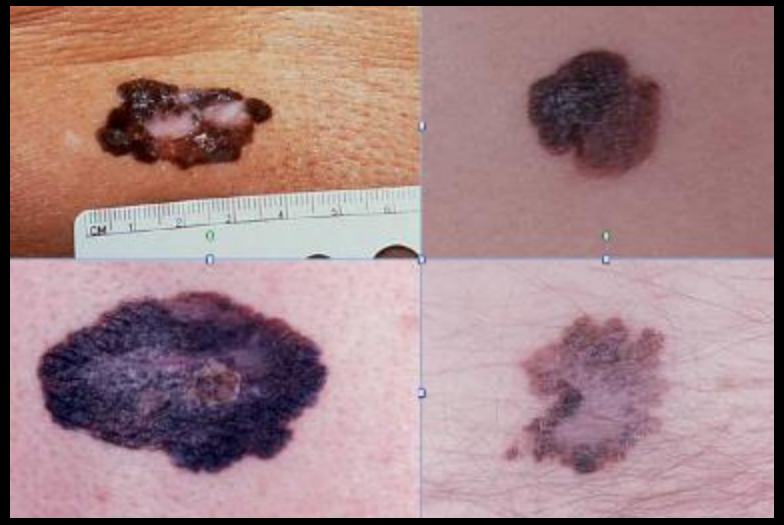
Vessels
Ulceration+
Yes
No
Biopsy or refer
Monitor++

Cancers on occasion manifest an organized pattern

- Nodular MM / MM on sun damaged skin
  - blue, black, gray
- Spitzoid MM
  - negative network or starburst pattern
- Amelanotic cancers (BCC, KA, MM)
  - SWS, vessels, ulceration

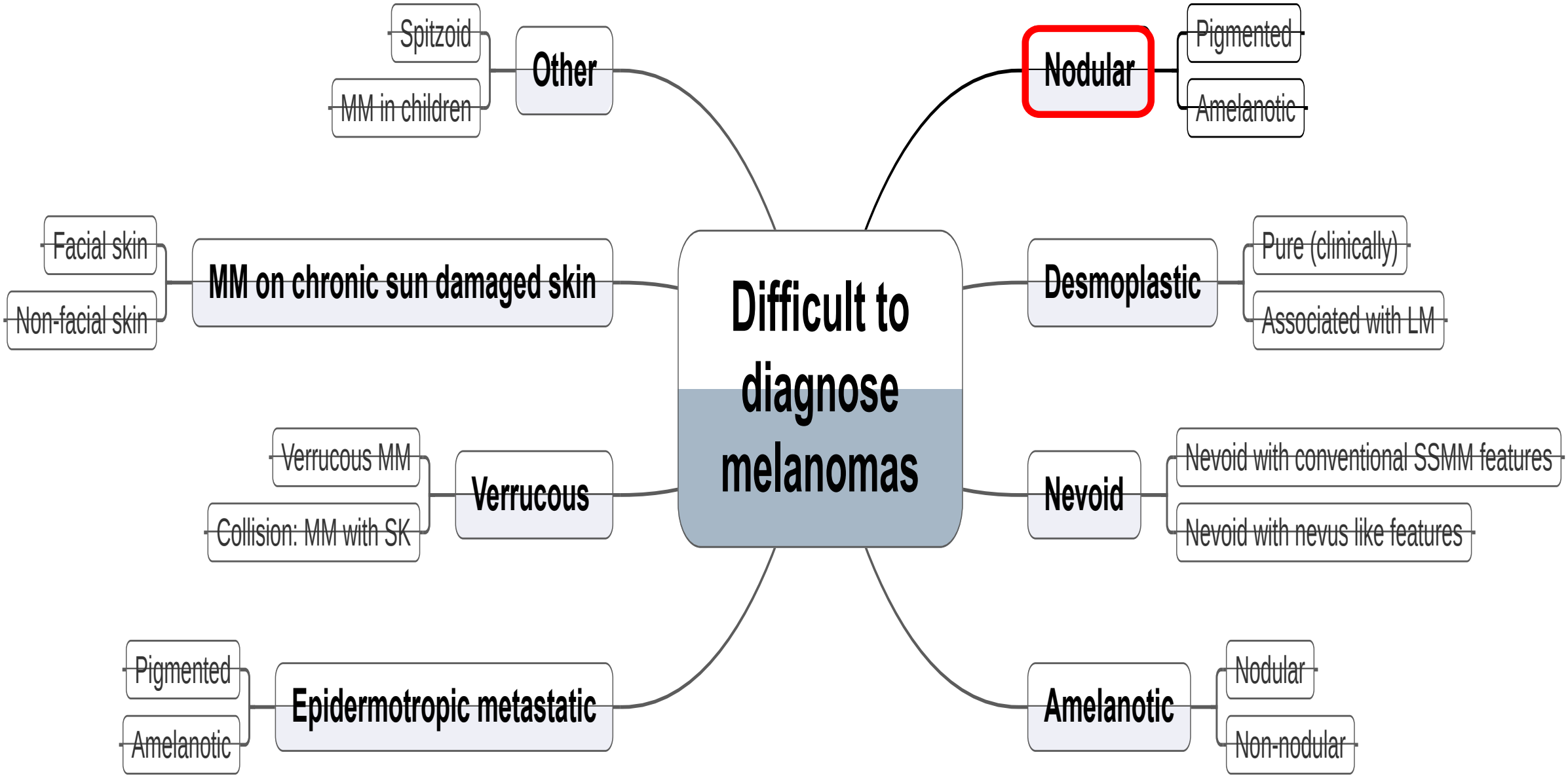

Difficult to diagnose melanomas
Other
Spitzoid
MM in children
Nodular
Pigmented
Amelanotic
MM on chronic sun damaged skin
Facial skin
Non-facial skin
Desmoplastic
Pure (clinically)
Associated with LM
Verrucous
Verrucous MM
Collision: MM with SK
Nevoid
Nevoid with conventional SSMM features
Nevoid with nevus like features
Epidermotropic metastatic
Pigmented
Amelanotic
Amelanotic
Nodular
Non-nodular

Difficult due to morphology



- Up to 2/3 of melanomas fail to manifest clinical morphologic features to aid in their detection (lack ABCD)

- Dermoscopy has been the beacon in helping to define the morphologic features of subsets of melanoma that were routinely being missed on clinical examination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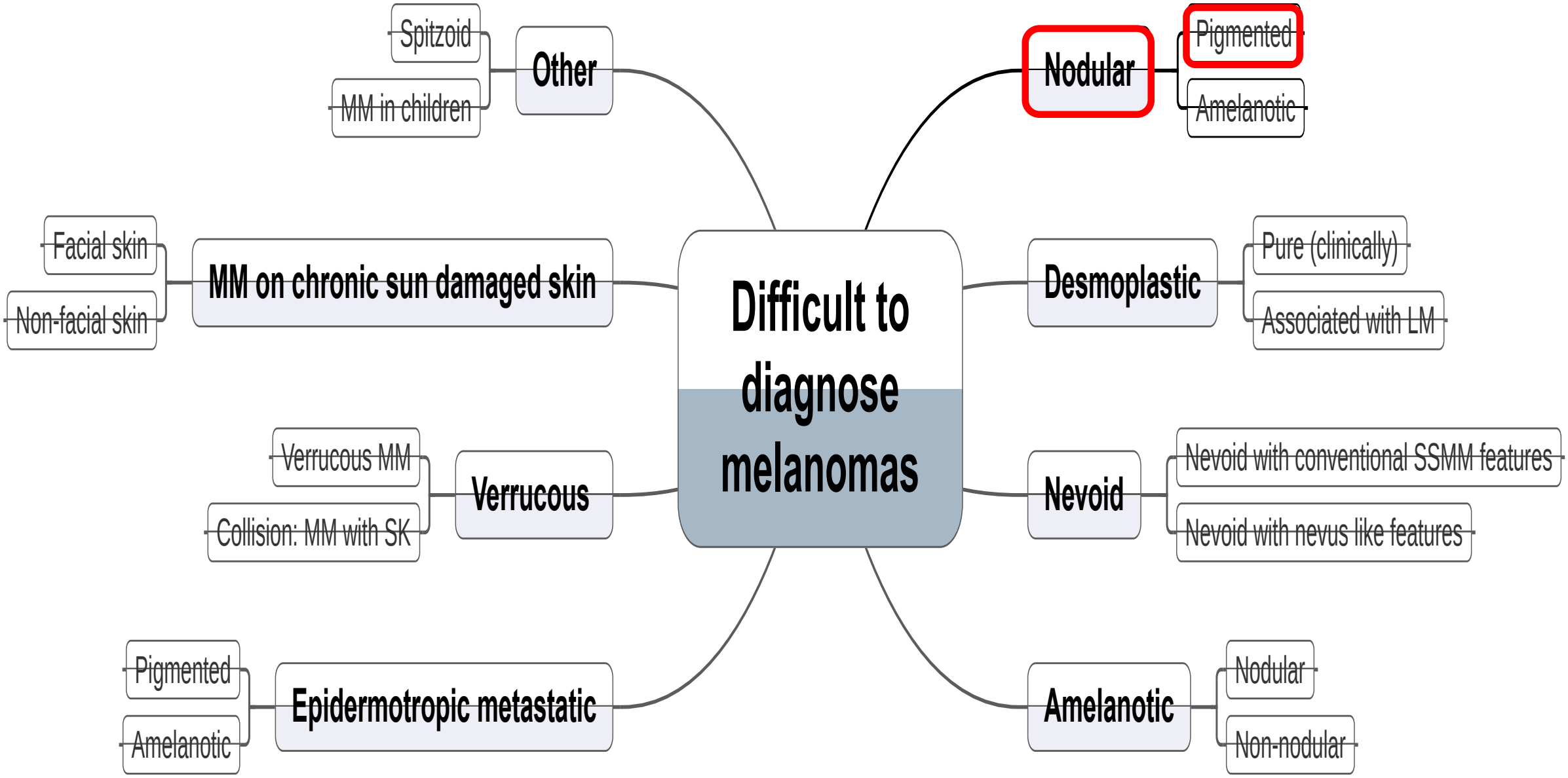
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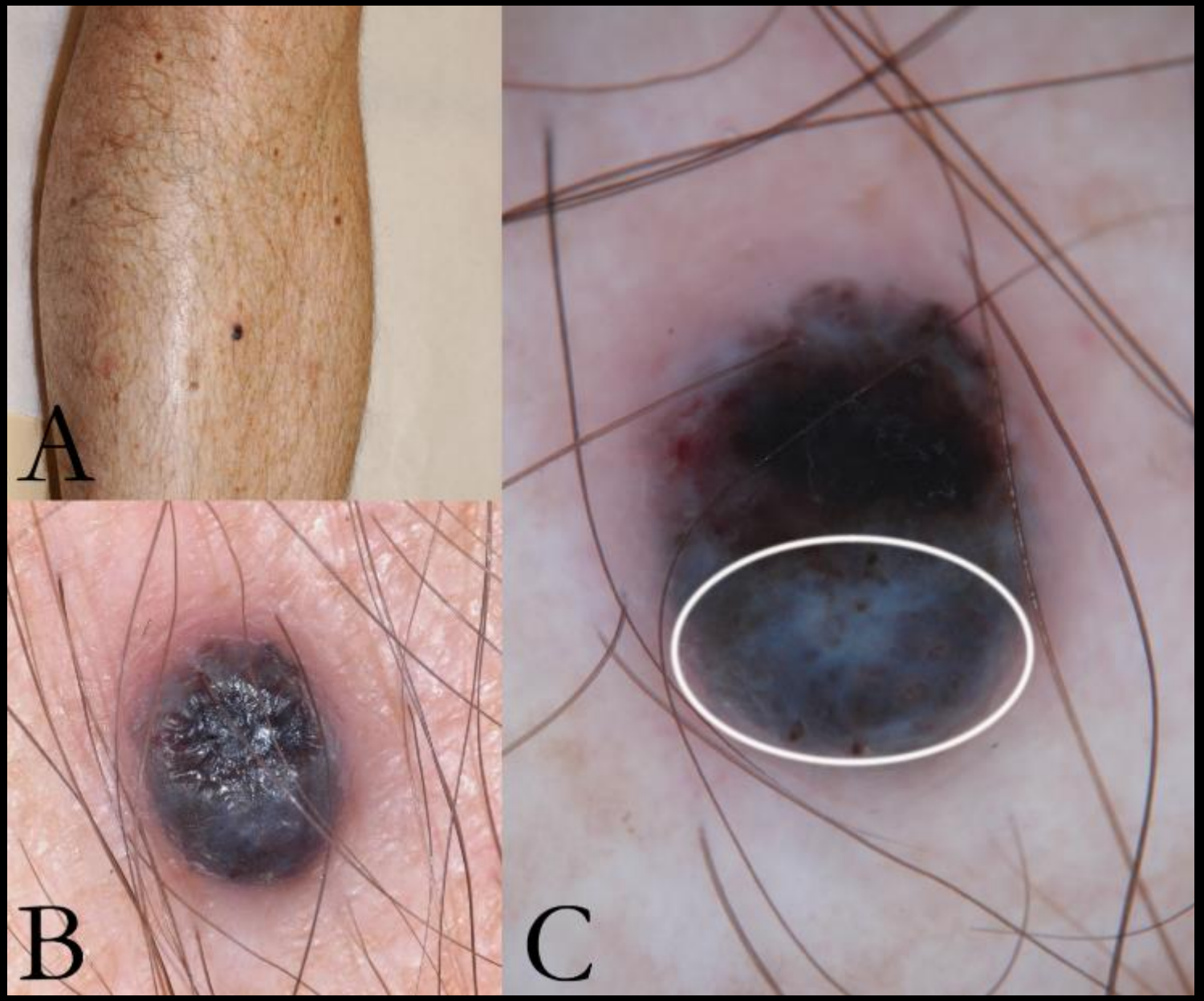
Non-nodular

Dermoscopic features of Nodular Melanoma

They lack features of BCC, banal nevi & SK

Pigmented	**Amelanotic**
- Network	- Arborizing vessels
- Streaks	- Comma vessels
- Regression	
+ Symmetry	+ Symmetry
+ BWV	+ Atypical vessels
+ Blue/Black color	+ Crystalline structures
+ Multi-colored	
+ Atypical vessels	



Pigmented

- Network
- Streaks
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+ Symmetry
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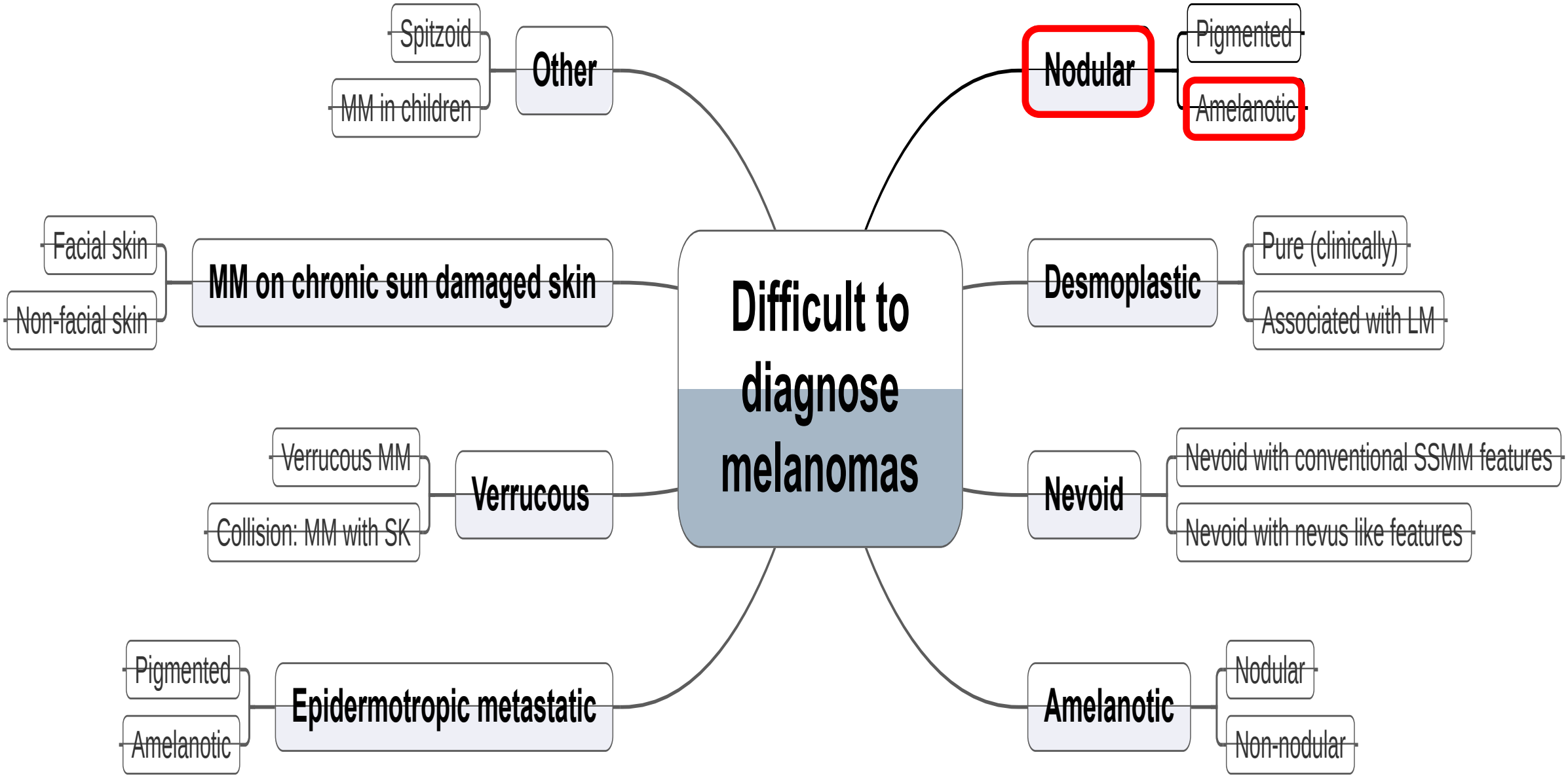
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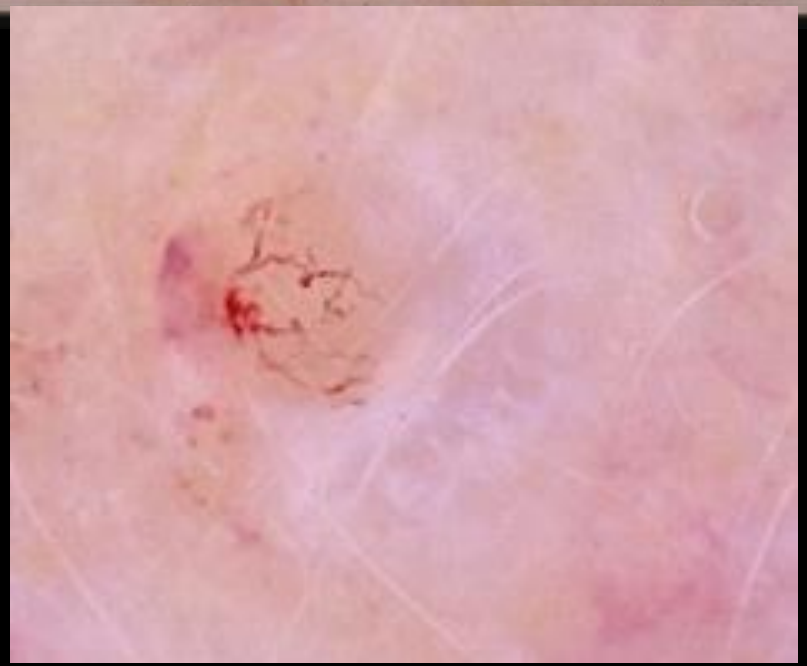
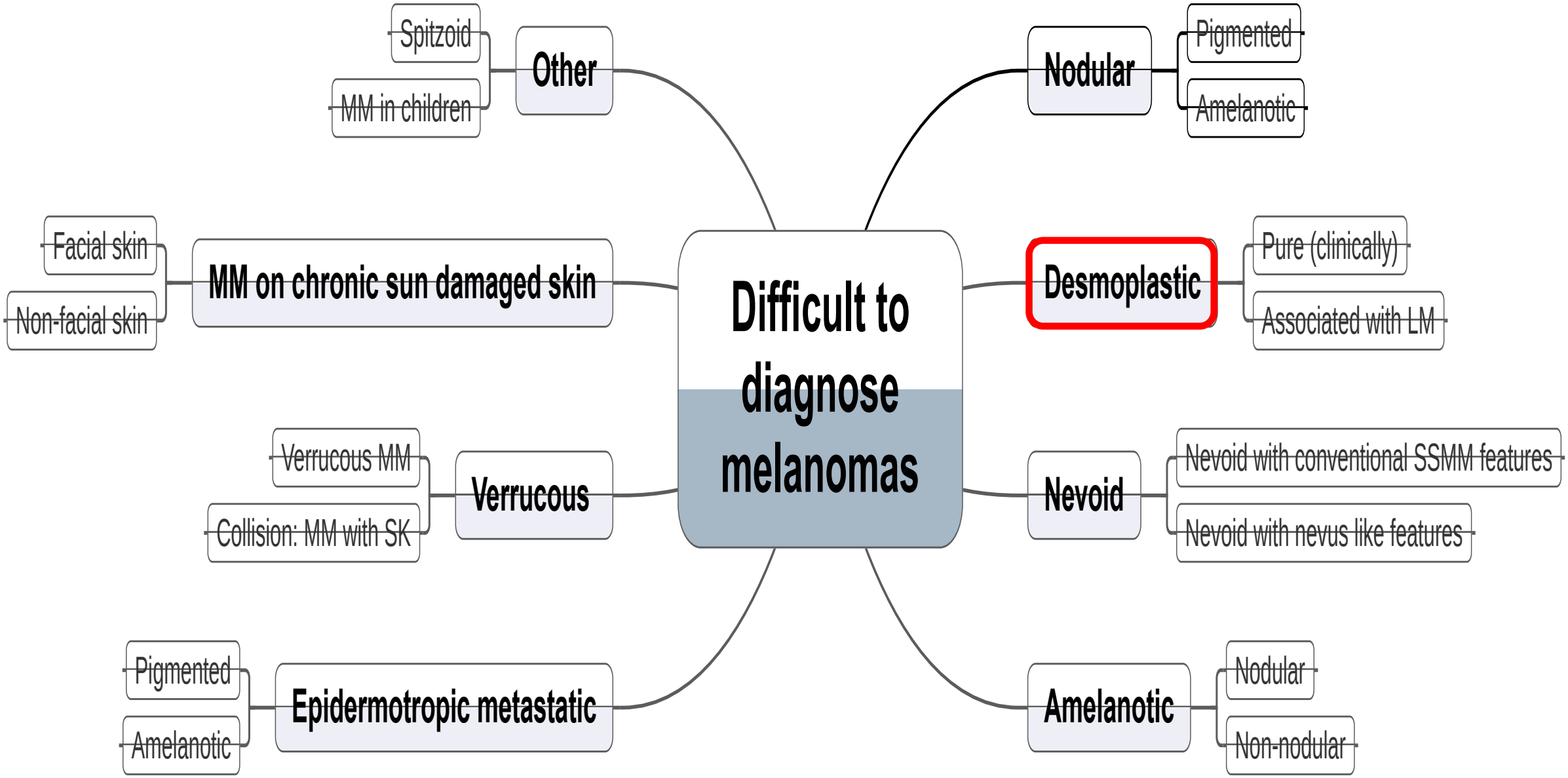


Amelanotic

- Arborizing vessels
- Comma vessels

+ Symmetry
+ Atypical vessels
+ Crystalline structures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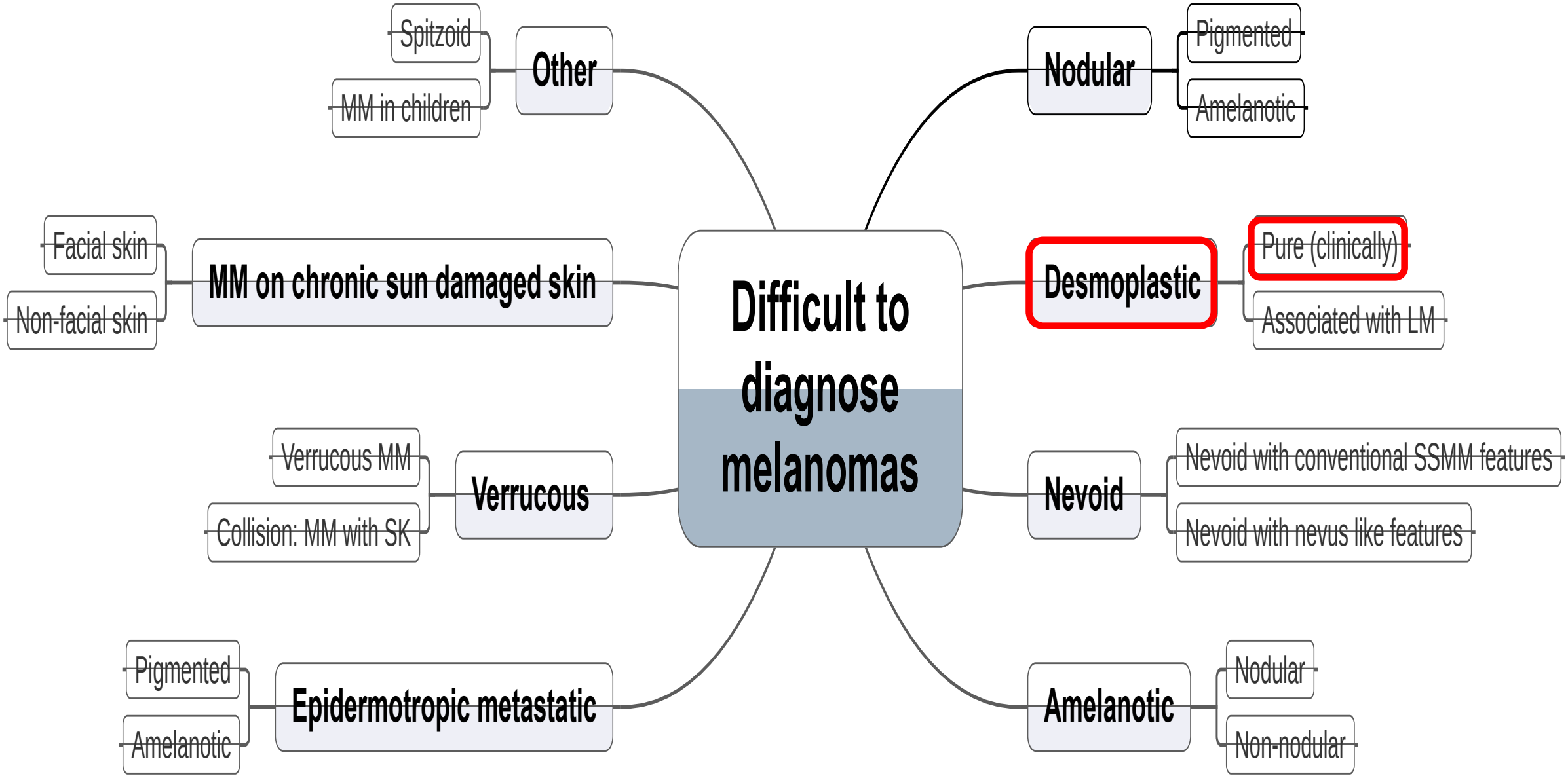
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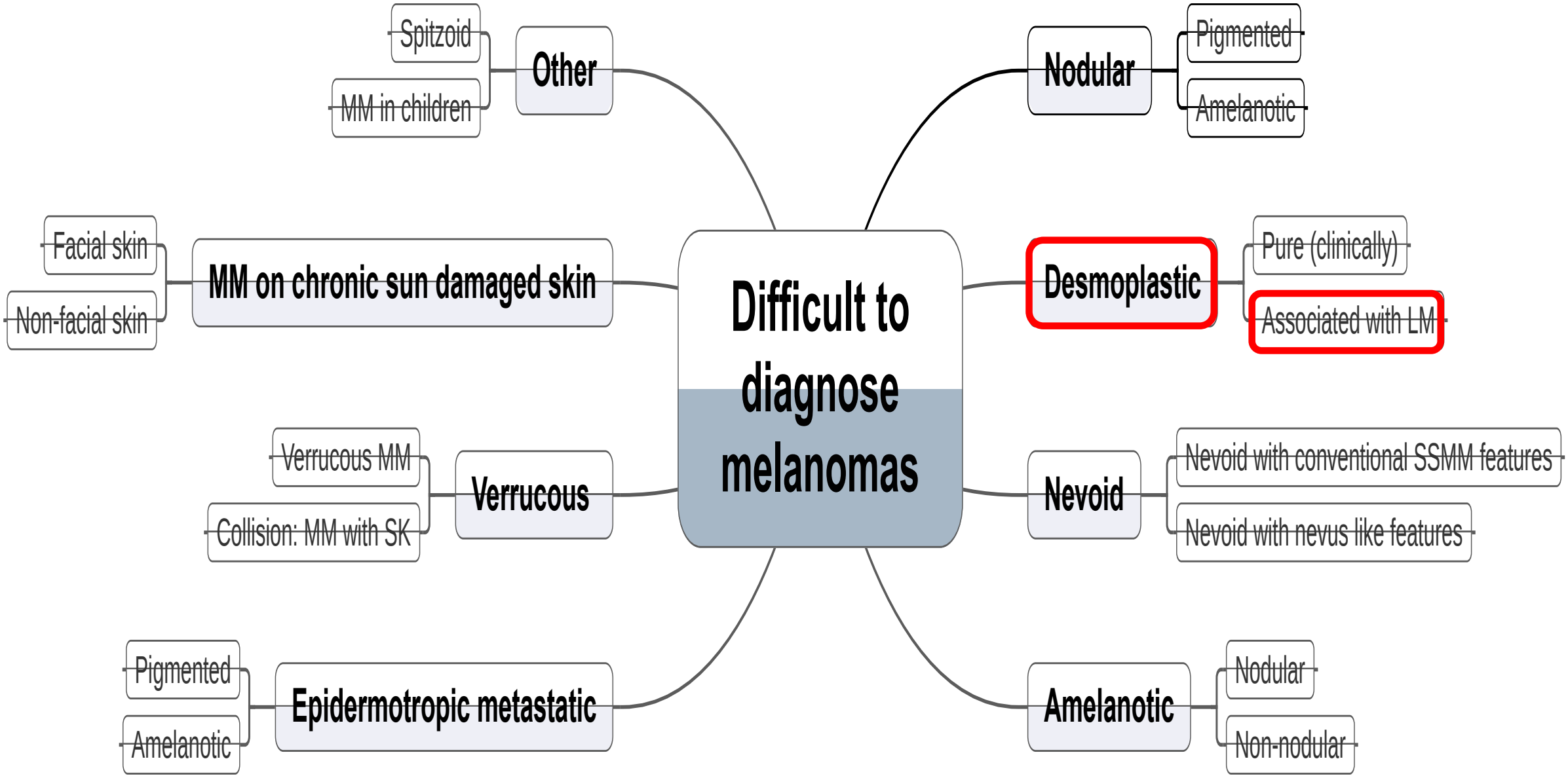
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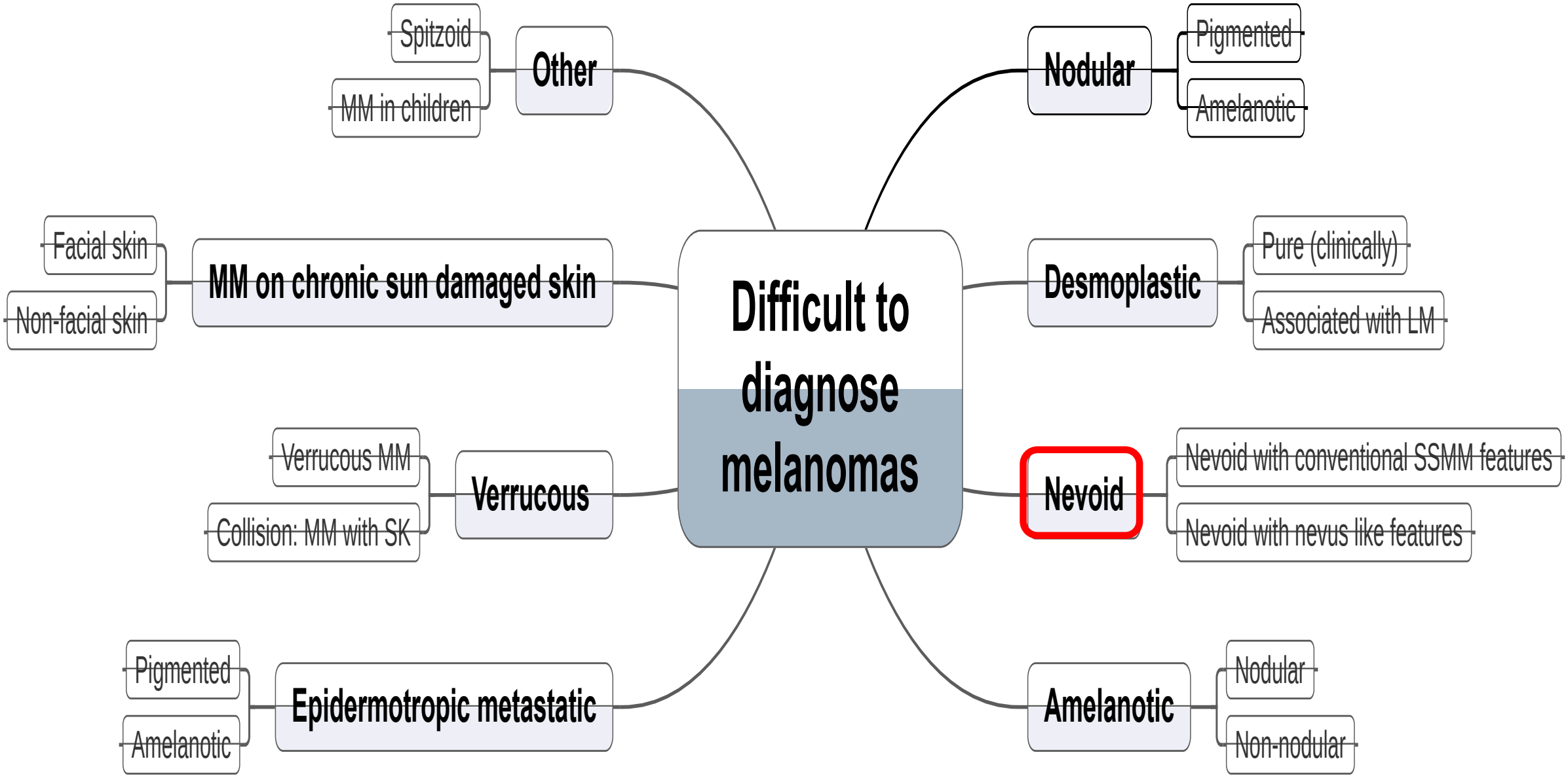
Circle within a circle (isobar)
Serpentine and tortuous vessels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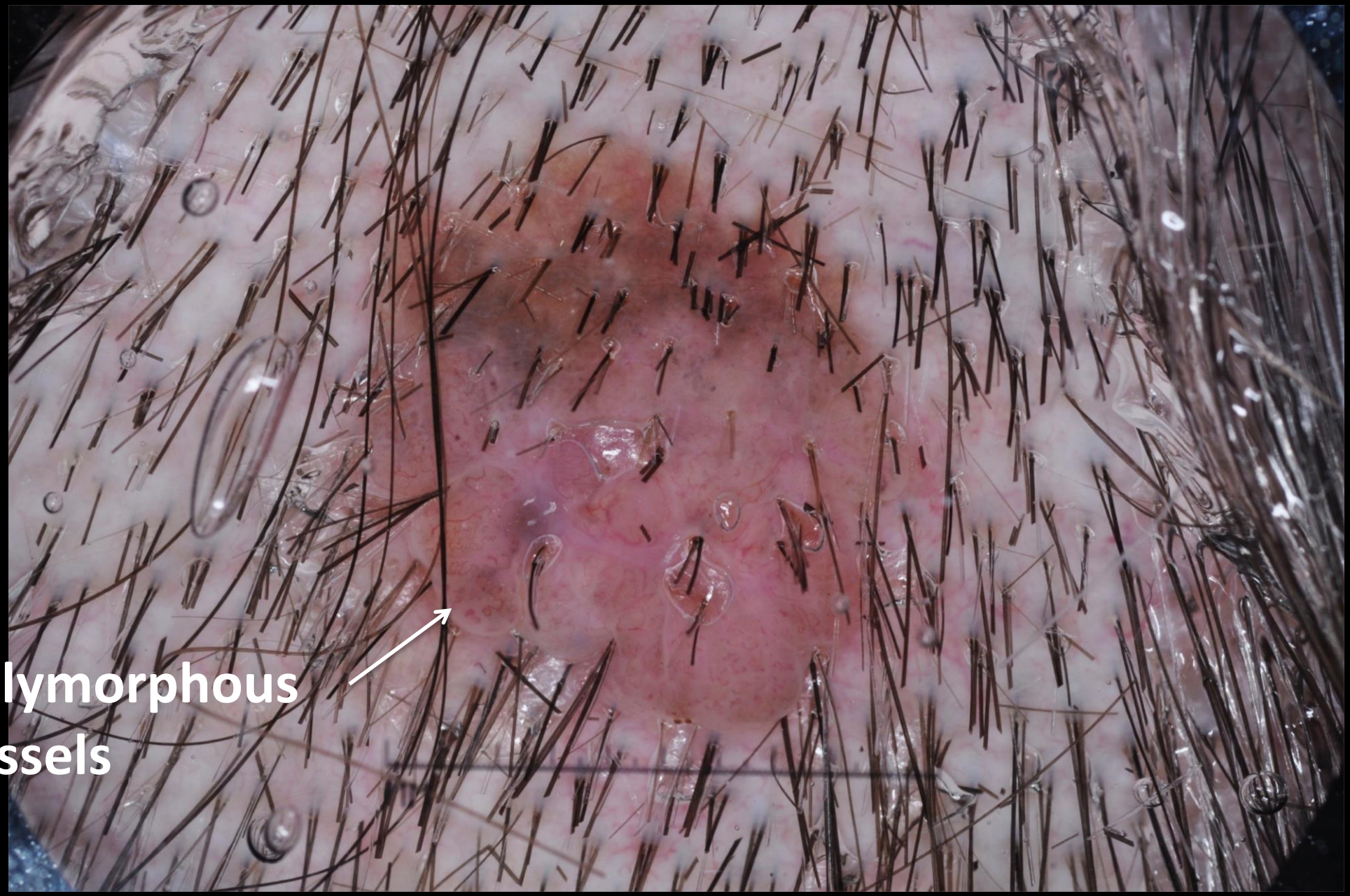
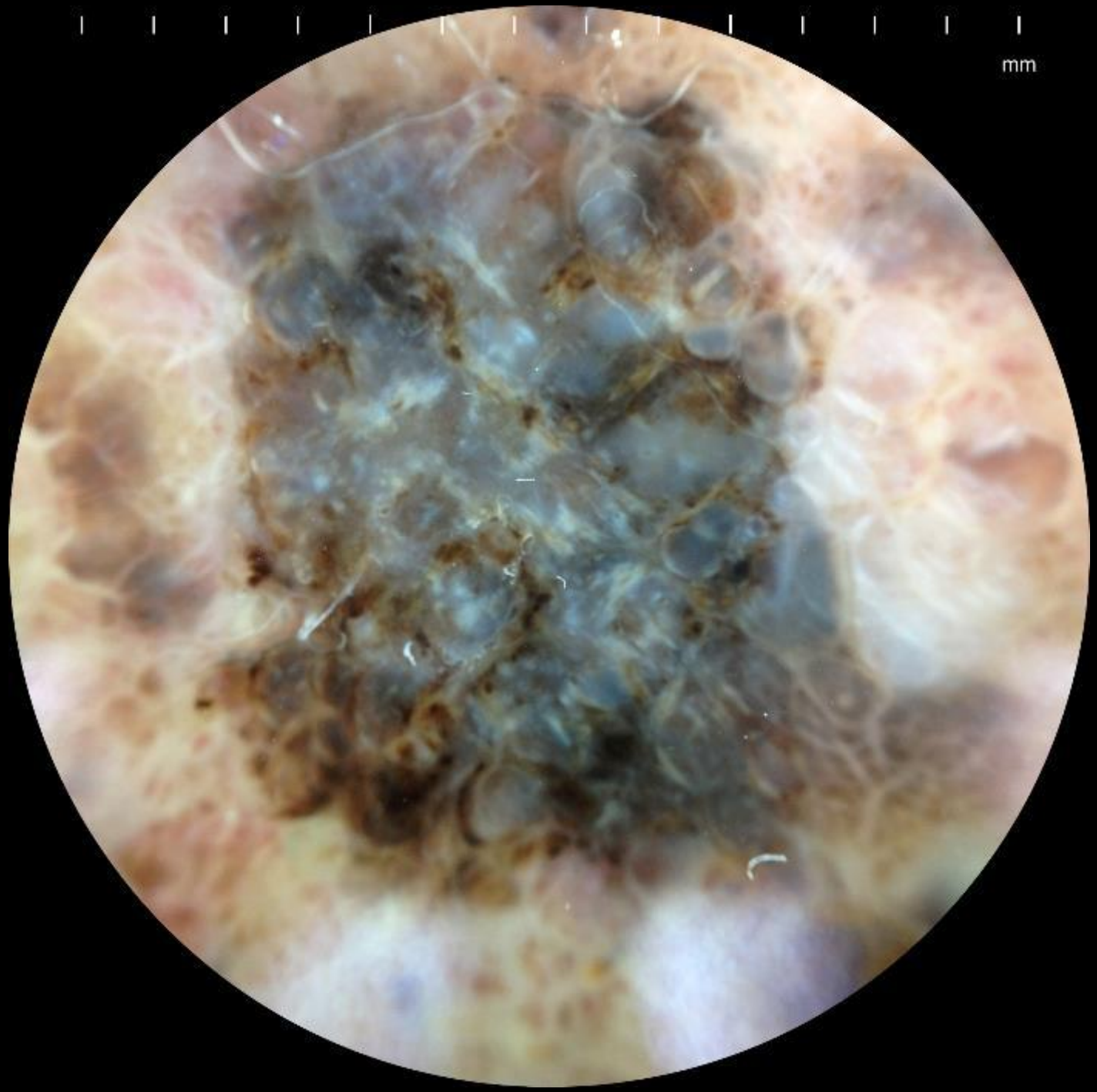
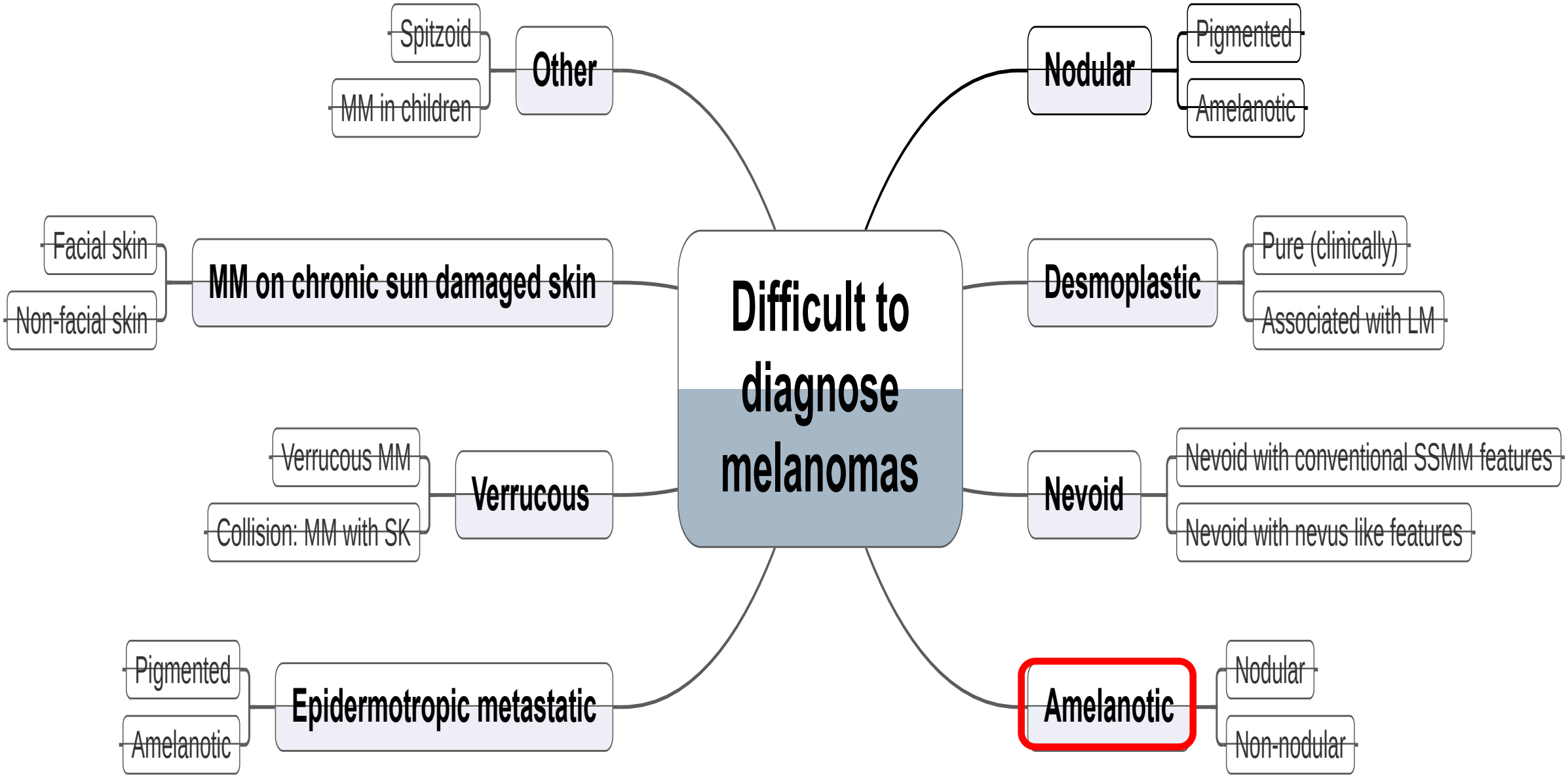

Polymorphous
vessels

Milky red globules


mm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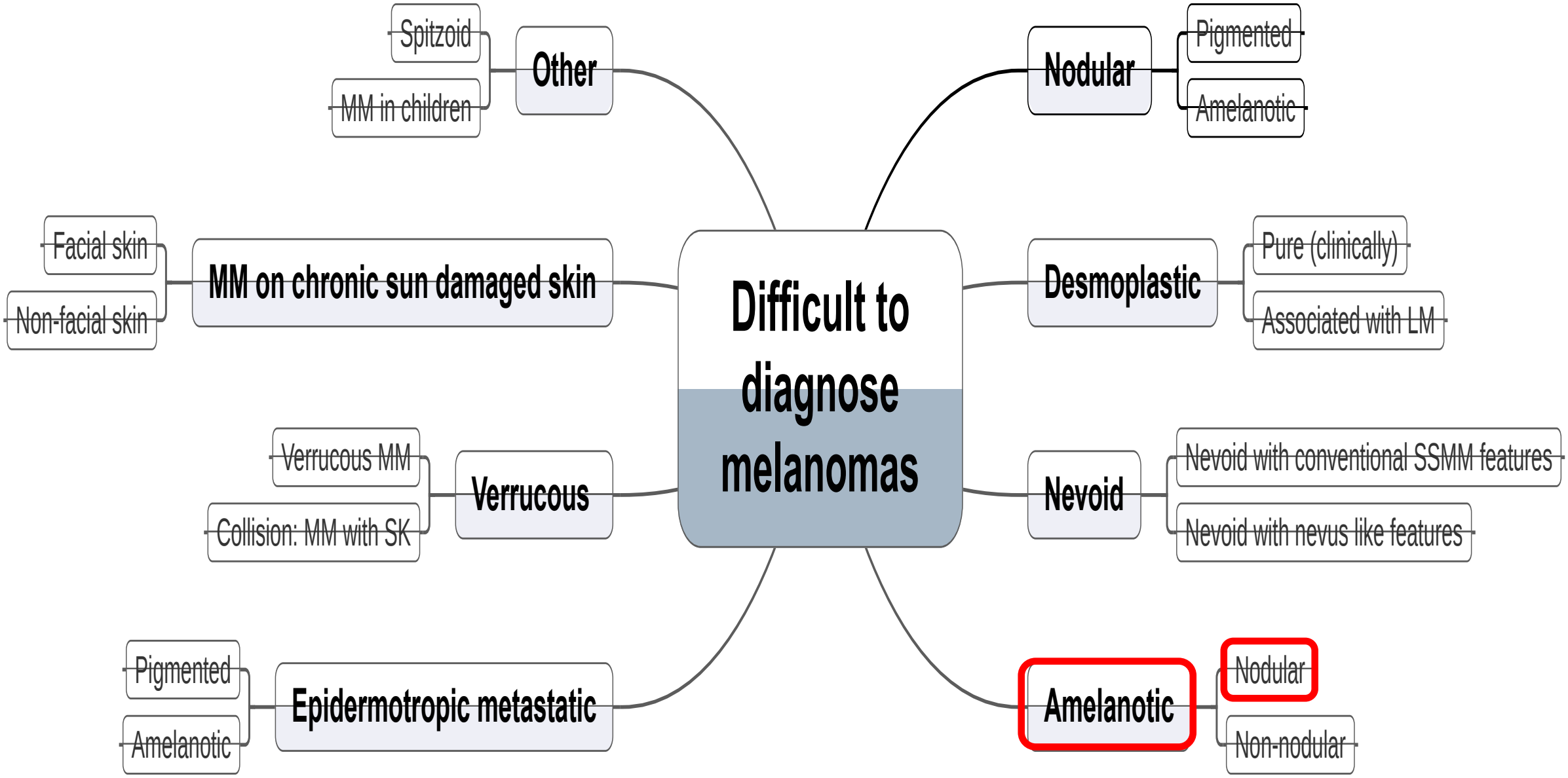
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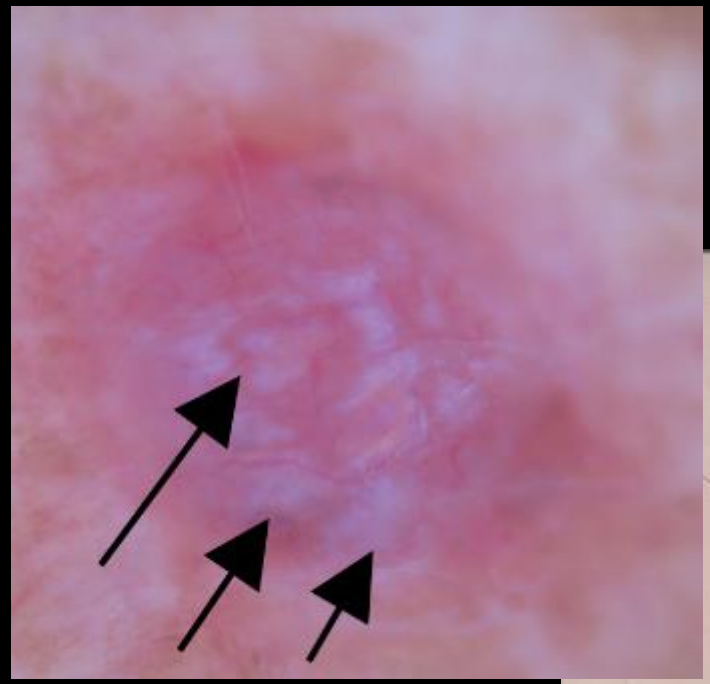
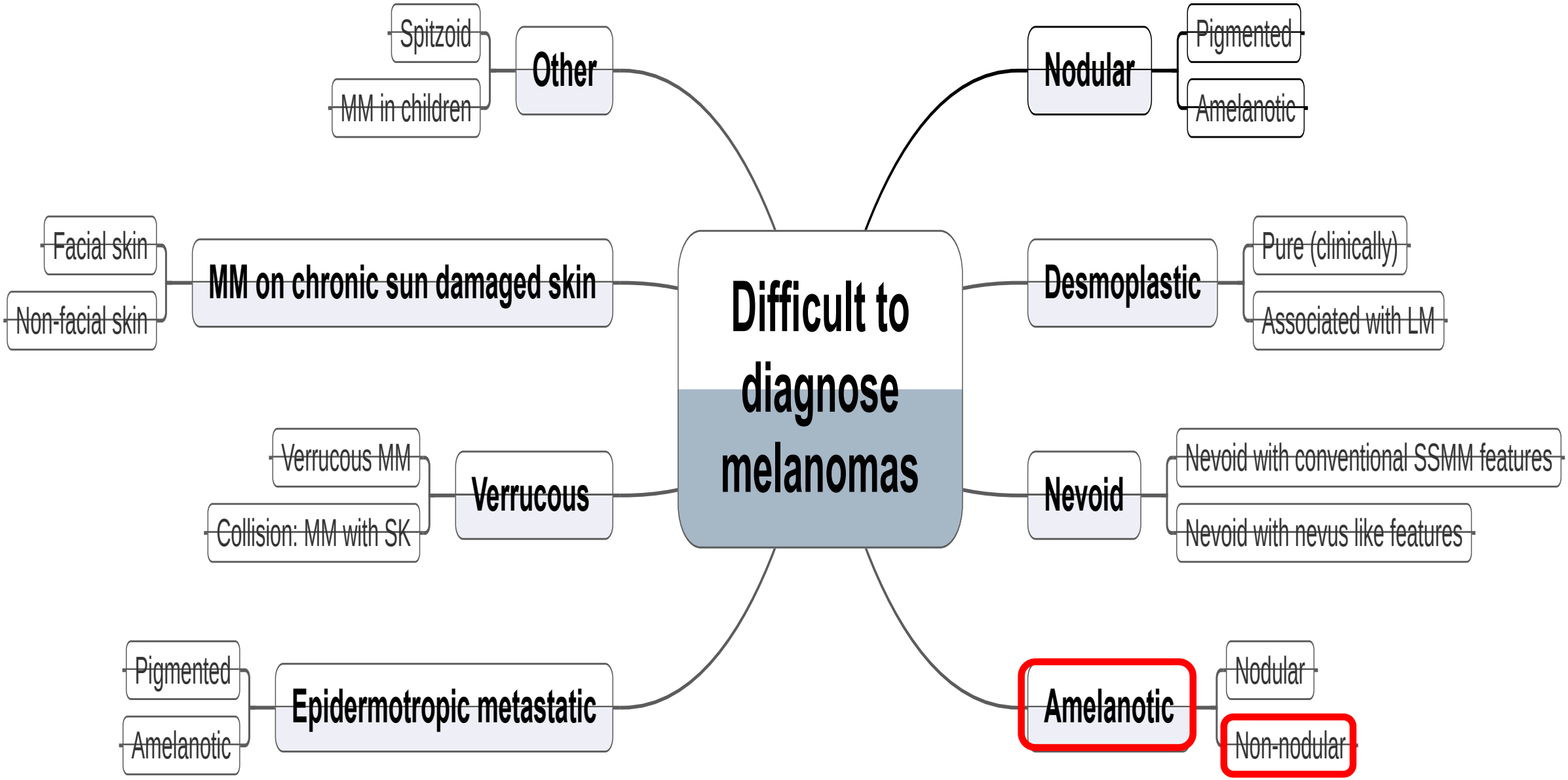
Dermoscopic features of Nodular Amelanotic Melanoma

Already Discussed

Amelanotic
- Arborizing vessels
- Comma vessels
+ Symmetry
+ Atypical vessels
+ Crystalline structures

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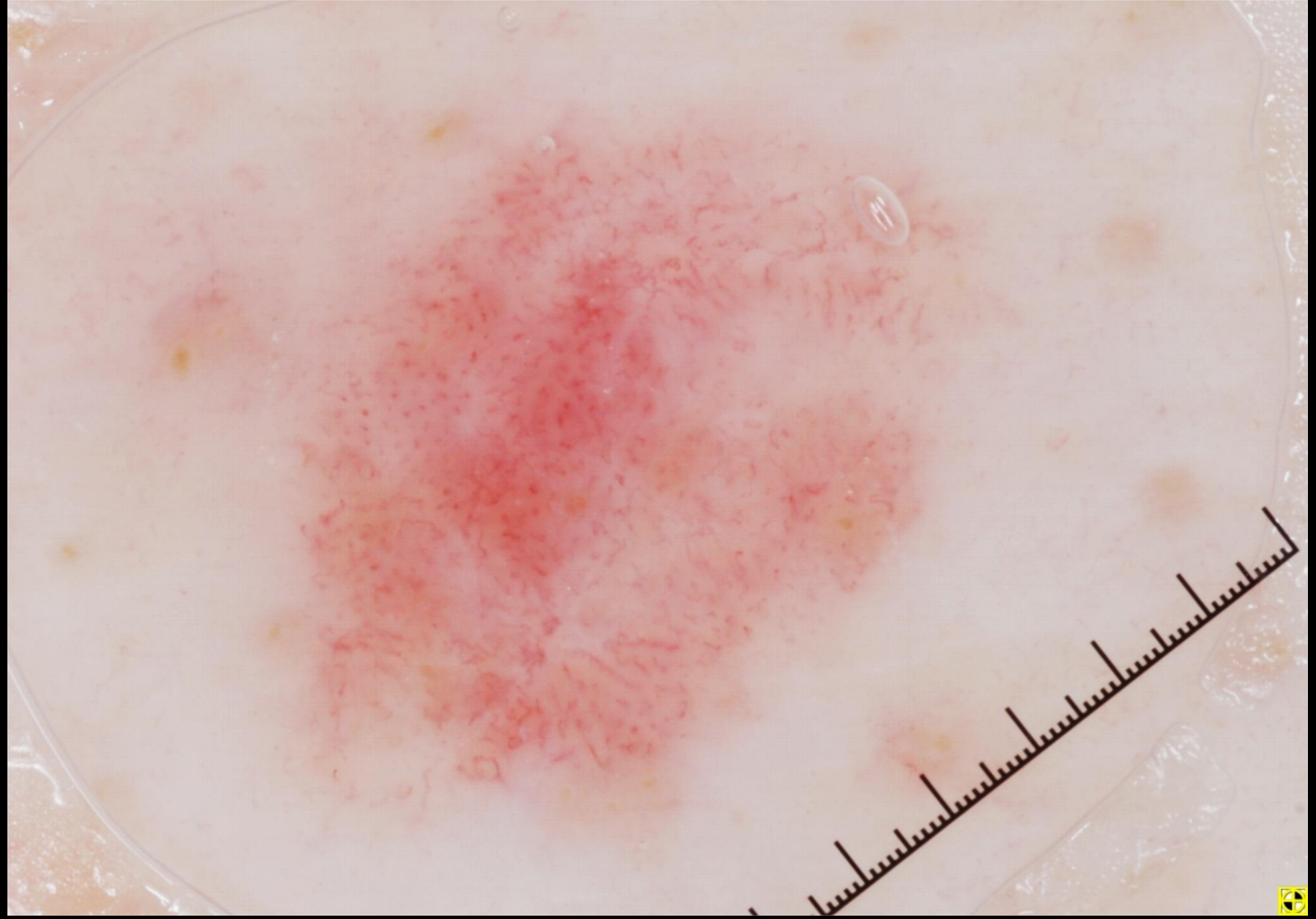
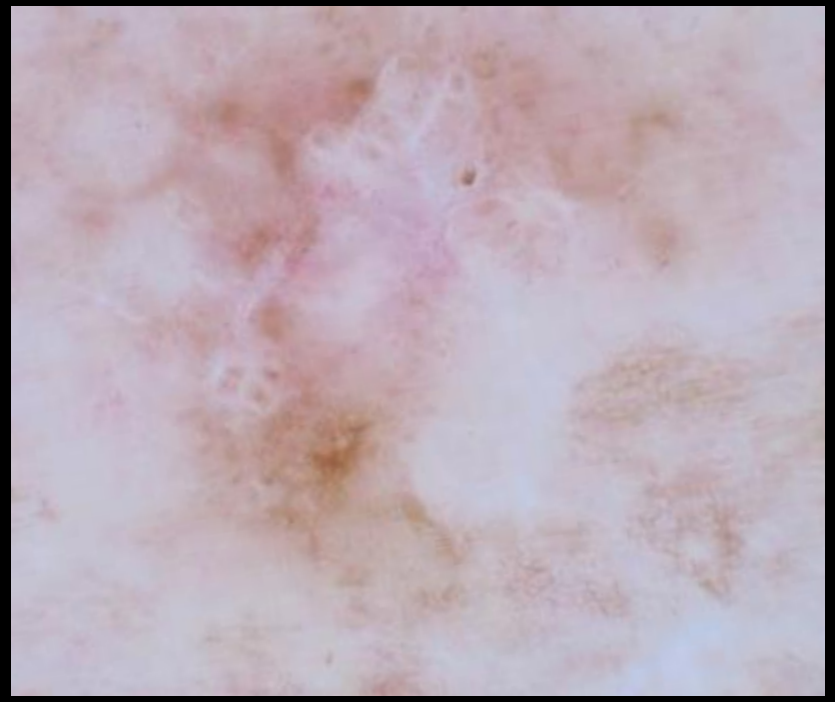
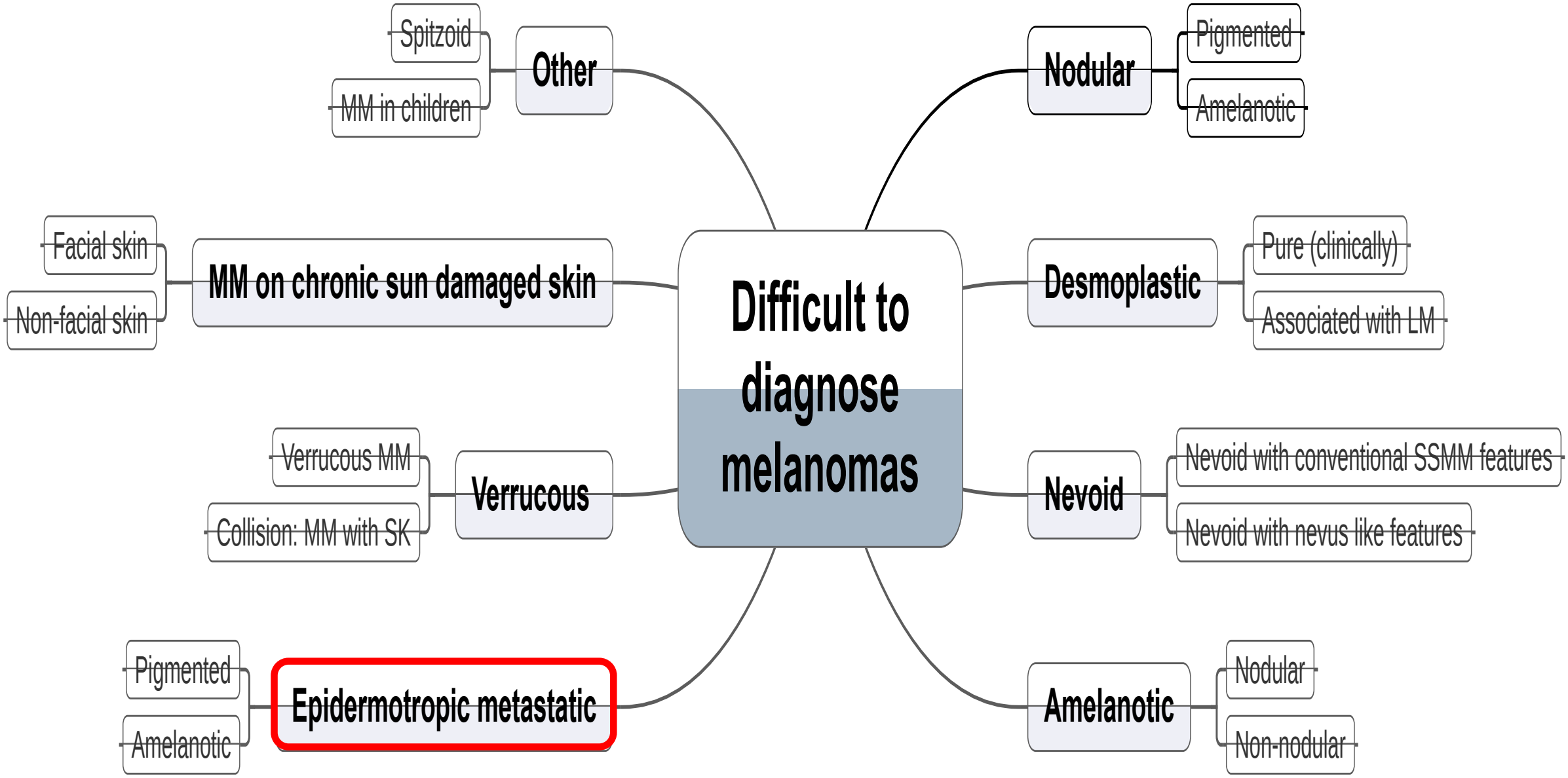


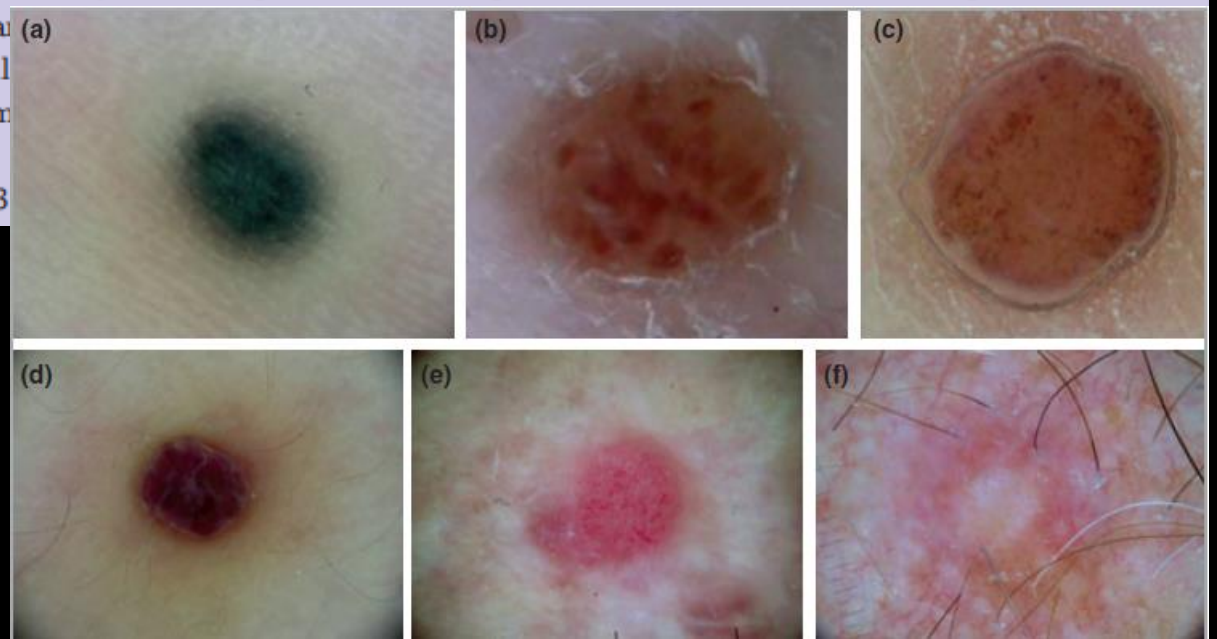
The Blink sign

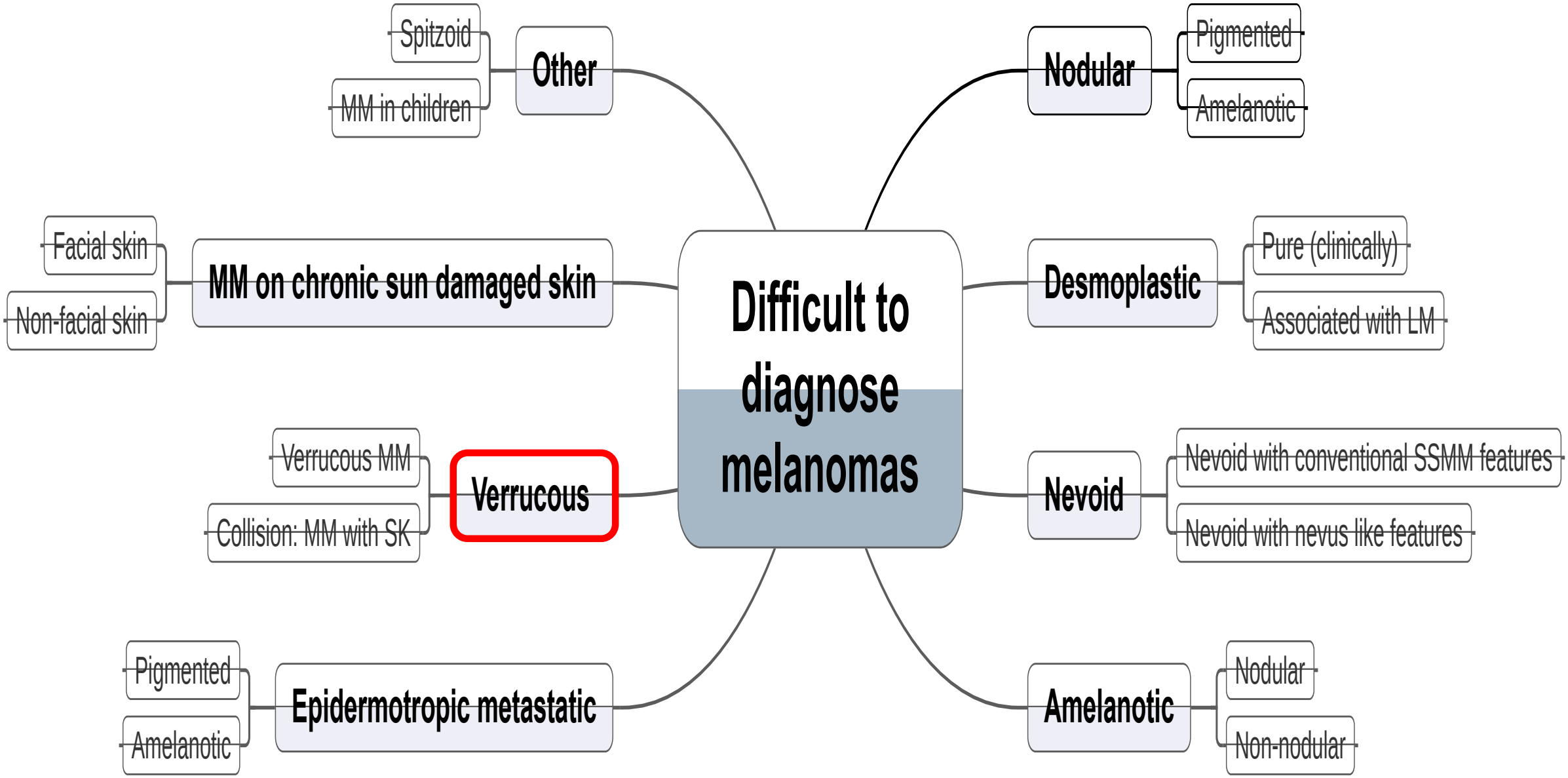



Difficult to diagnose melanomas
Other
Spitzoid
MM in children
Nodular
Pigmented
Amelanotic
MM on chronic sun damaged skin
Facial skin
Non-facial skin
Desmoplastic
Pure (clinically)
Associated with LM
Verrucous
Verrucous MM
Collision: MM with SK
Nevoid
Nevoid with conventional SSMM features
Nevoid with nevus like features
Epidermotropic metastatic
Pigmented
Amelanotic
Amelanotic
Nodular
Non-nodular

Dermoscopic patterns of melanoma metastases: interobserver consistency and accuracy for metastasis recognition

Pattern	Description
Blue naevus-like	Homogeneous diffuse grey-blue to grey-black or grey-brownish pigmentation indistinguishable from blue naevus
Globular naevus-like	Aggregation of brown to black or bluish globules. Some reddish globules may be present. If all the globules are reddish, an angioma-like pattern is considered. Atypical vessels can be present
Nonglobular naevus-like	Homogeneous brown pigmentation that can be associated with multiple blue-grey dots or atypical vessels
Angioma-like	Homogeneous reddish or purplish coloration and/or lacunae with a red, red-blue, purplish or nearly black hue separated from each other by whitish septa. If vessels are present, it is classified as a vascular pattern. Pink homogeneous areas a
Vascular	Three or more atypical component is predom globules
Unspecific	Presence of fewer (< 3

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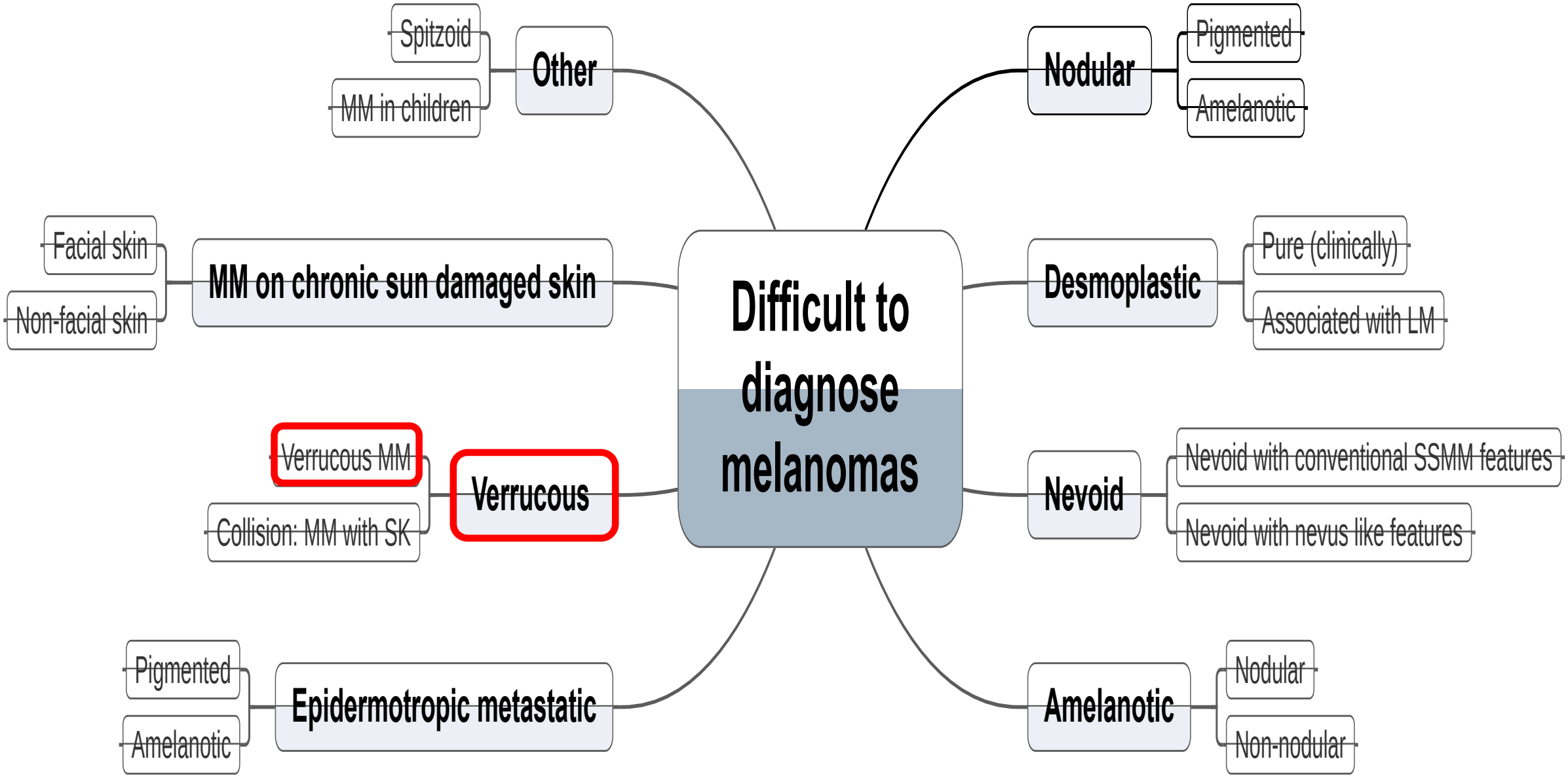
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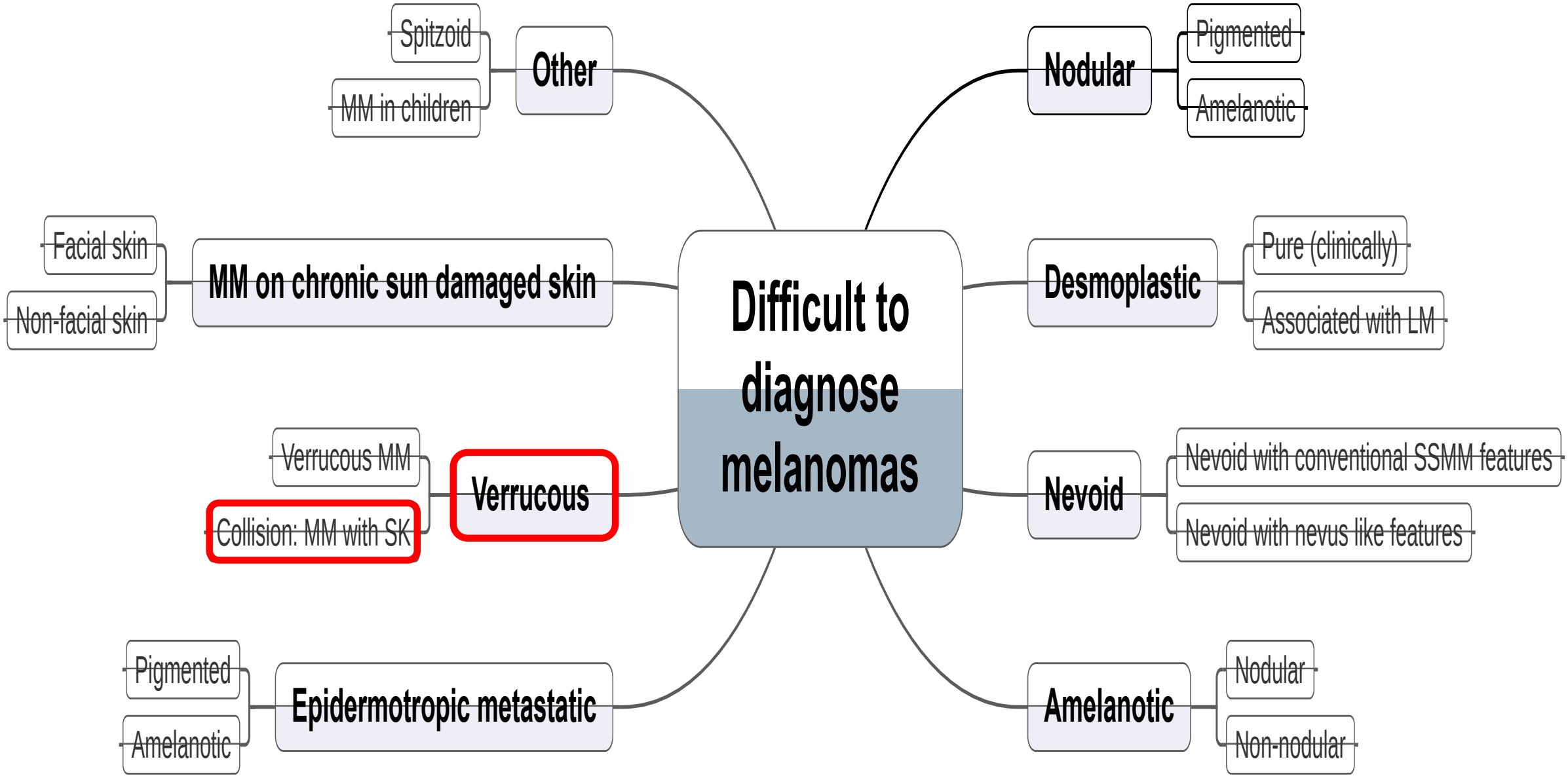
JAMA Dermatology | Original Investigation

Dermoscopic Clues for Diagnosing Melanomas That Resemble Seborrheic Keratosis

Cristina Carrera, MD, PhD; Sonia Segura, MD, PhD; Paula Aguilera, MD, PhD; Massimiliano Scalvenzi, MD; Caterina Longo, MD, PhD; Alicia Barreiro, MD; Paolo Broganelli, MD; Stefano Cavicchini, MD; Alex Llambrich, MD, PhD; Pedro Zaballos, MD, PhD; Luc Thomas, MD, PhD; Josep Malvehy, MD, PhD; Susana Puig, MD, PhD; Iris Zalaudek, MD, PhD

CONCLUSIONS AND RELEVANCE Seborrheic keratosis–like melanomas can be dermoscopically challenging, but the presence of the blue-black sign, pigment network, pseudopods or streaks, and/or blue-white veil, despite the presence of other SK features, allows the correct diagnosis of most of the difficult melanoma cases.

-Blue-black color
-Network
-Streaks
-Blue-white veil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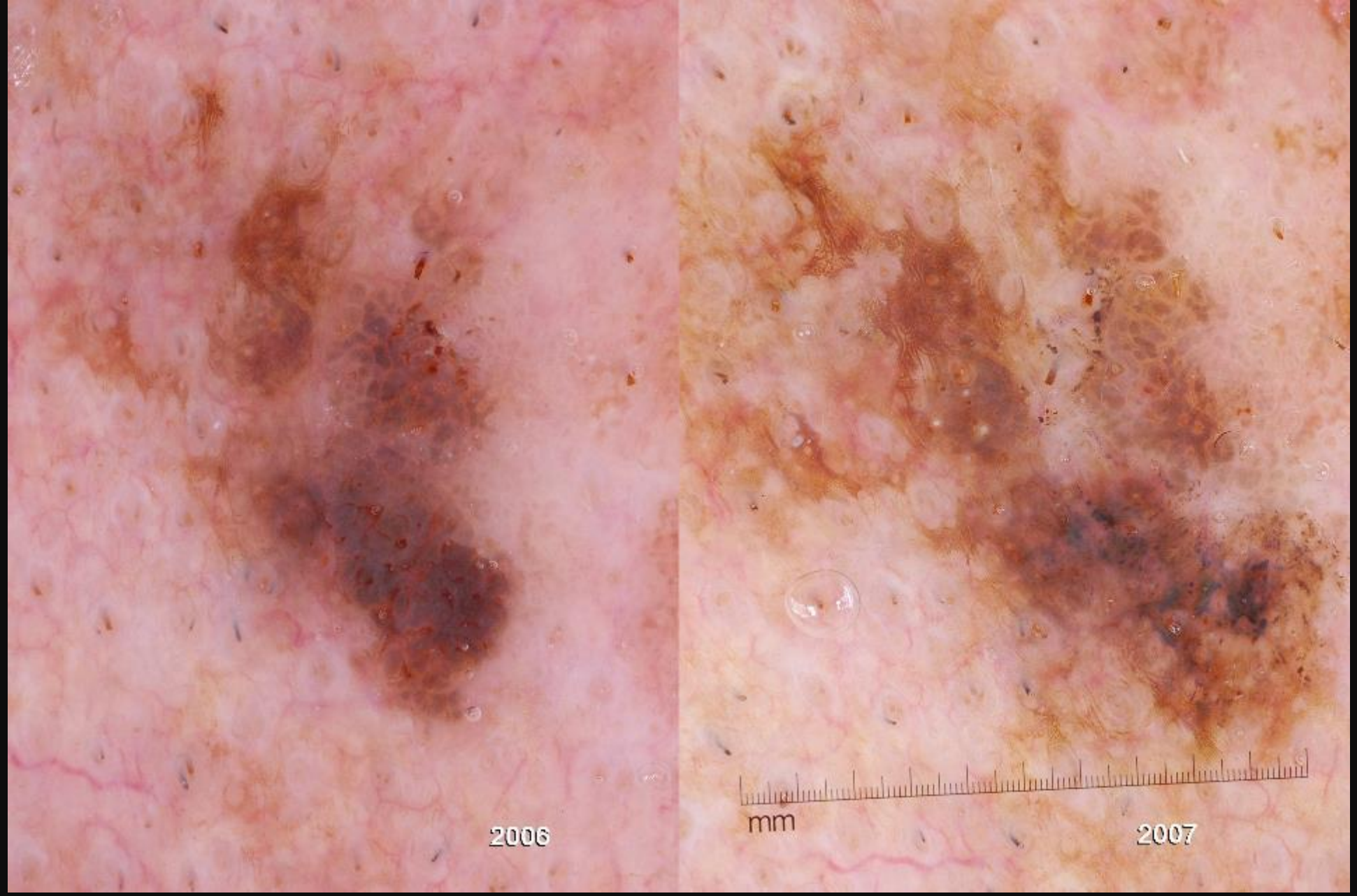
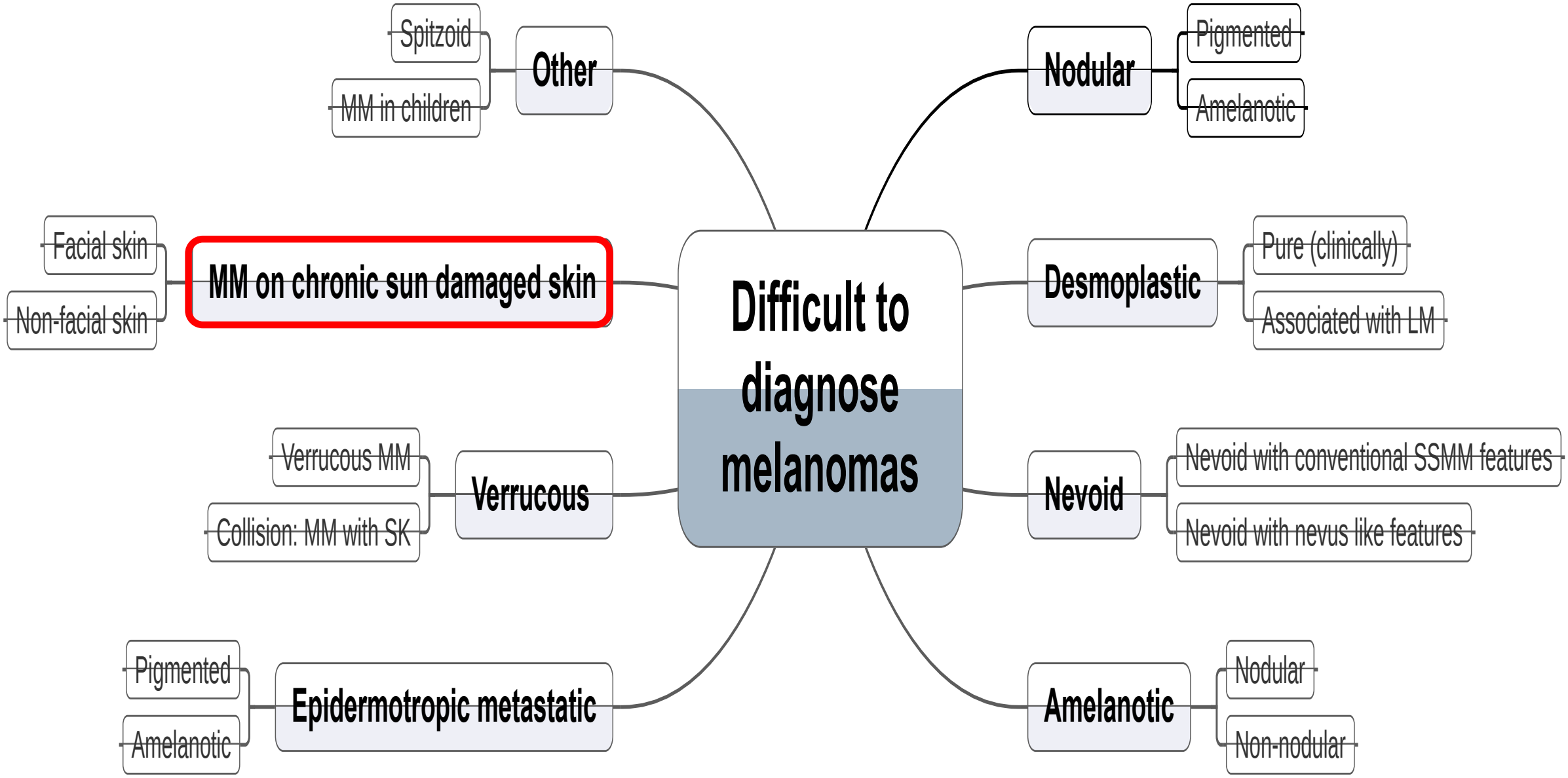

2006
mm
2007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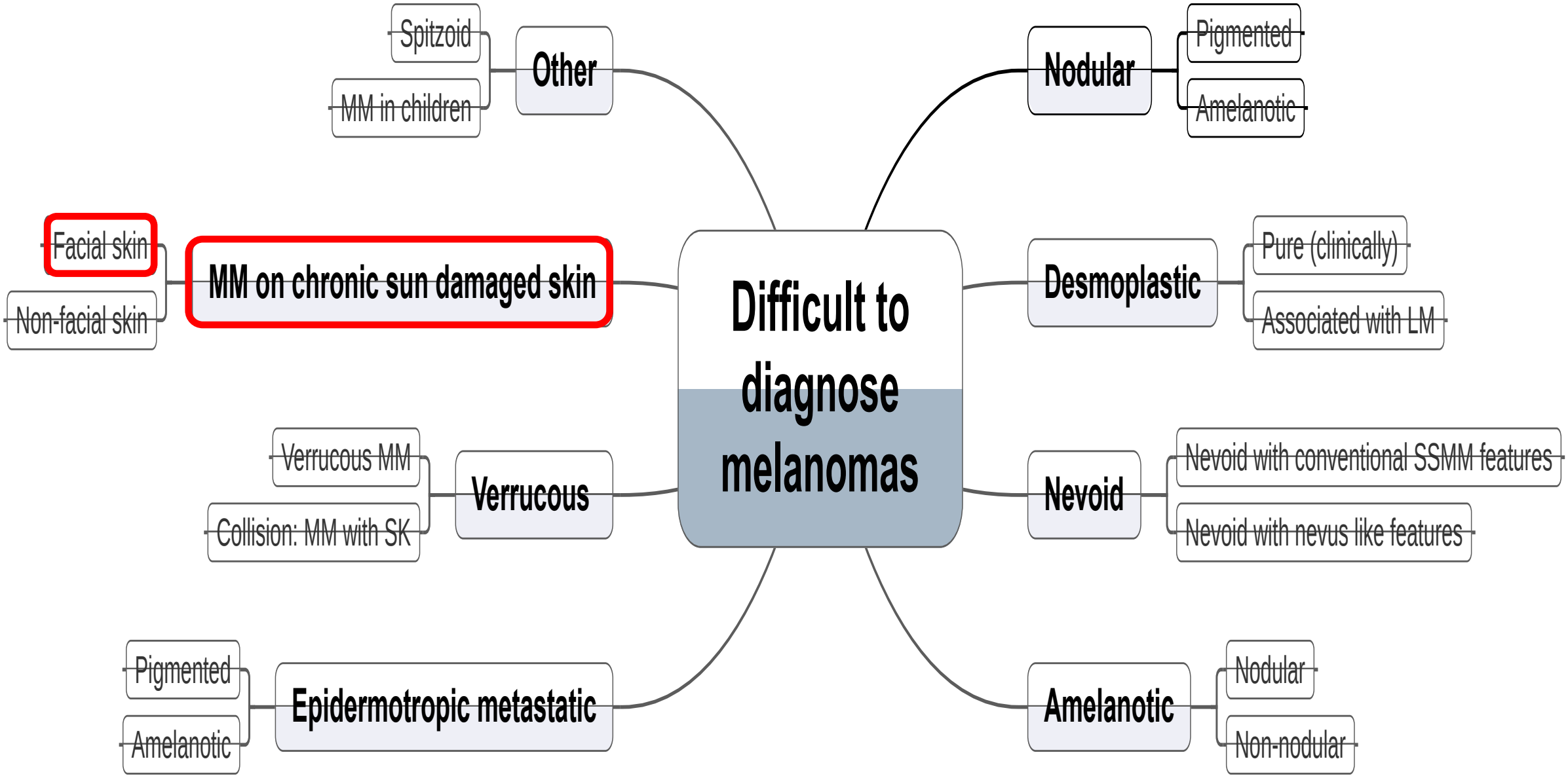
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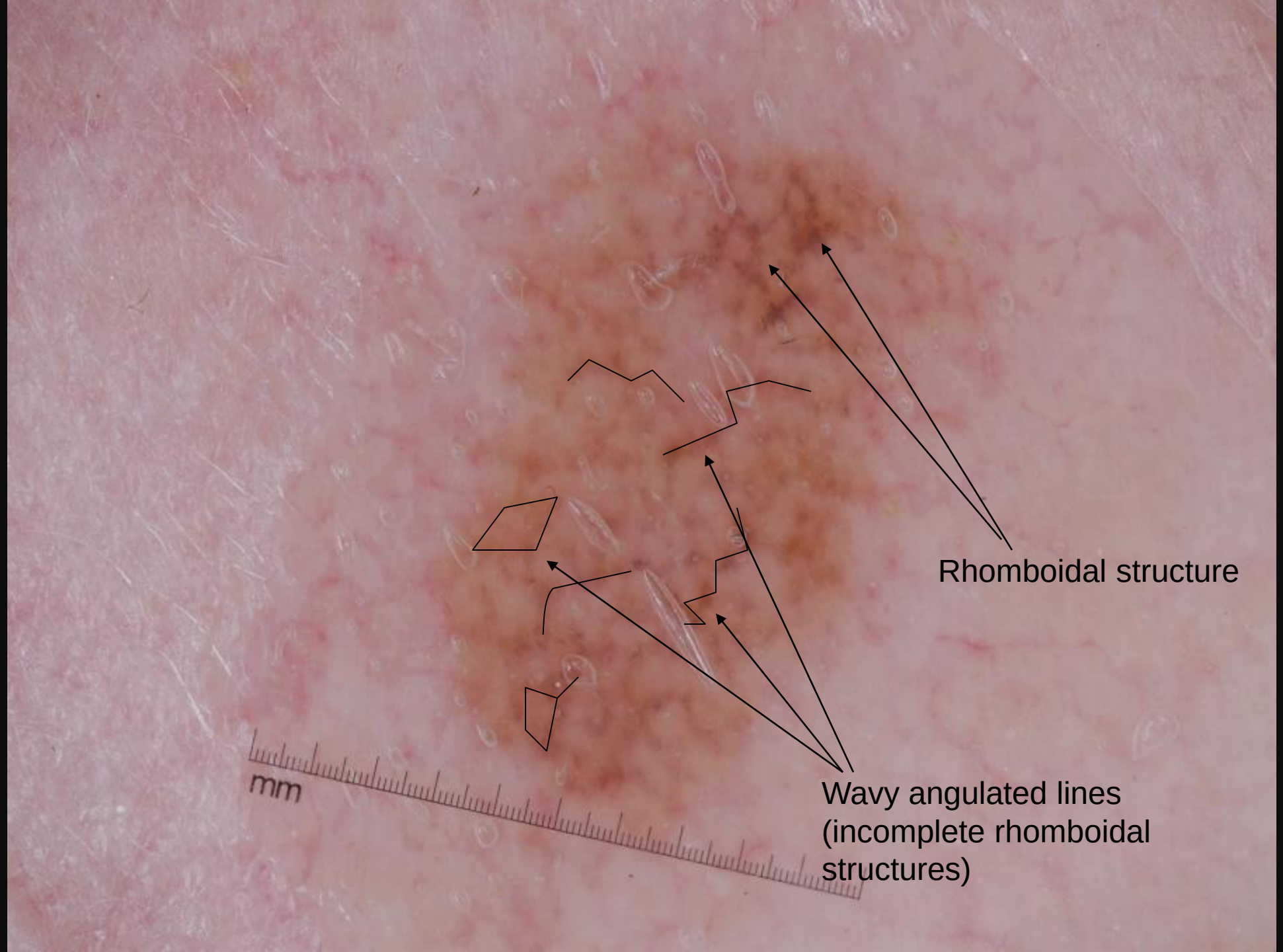
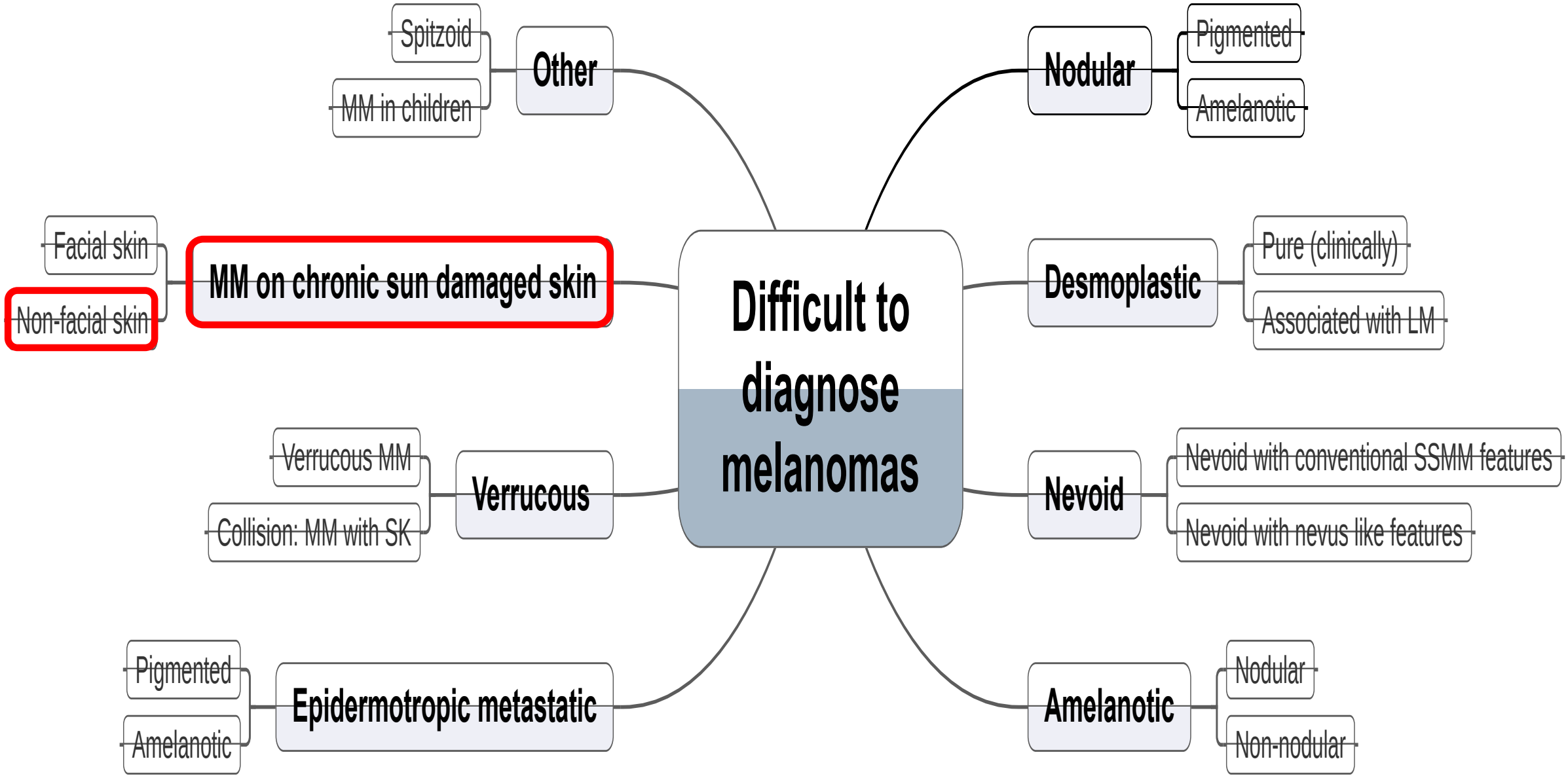

Rhomboidal structure
Wavy angulated lines
(incomplete rhomboidal
structures)
mm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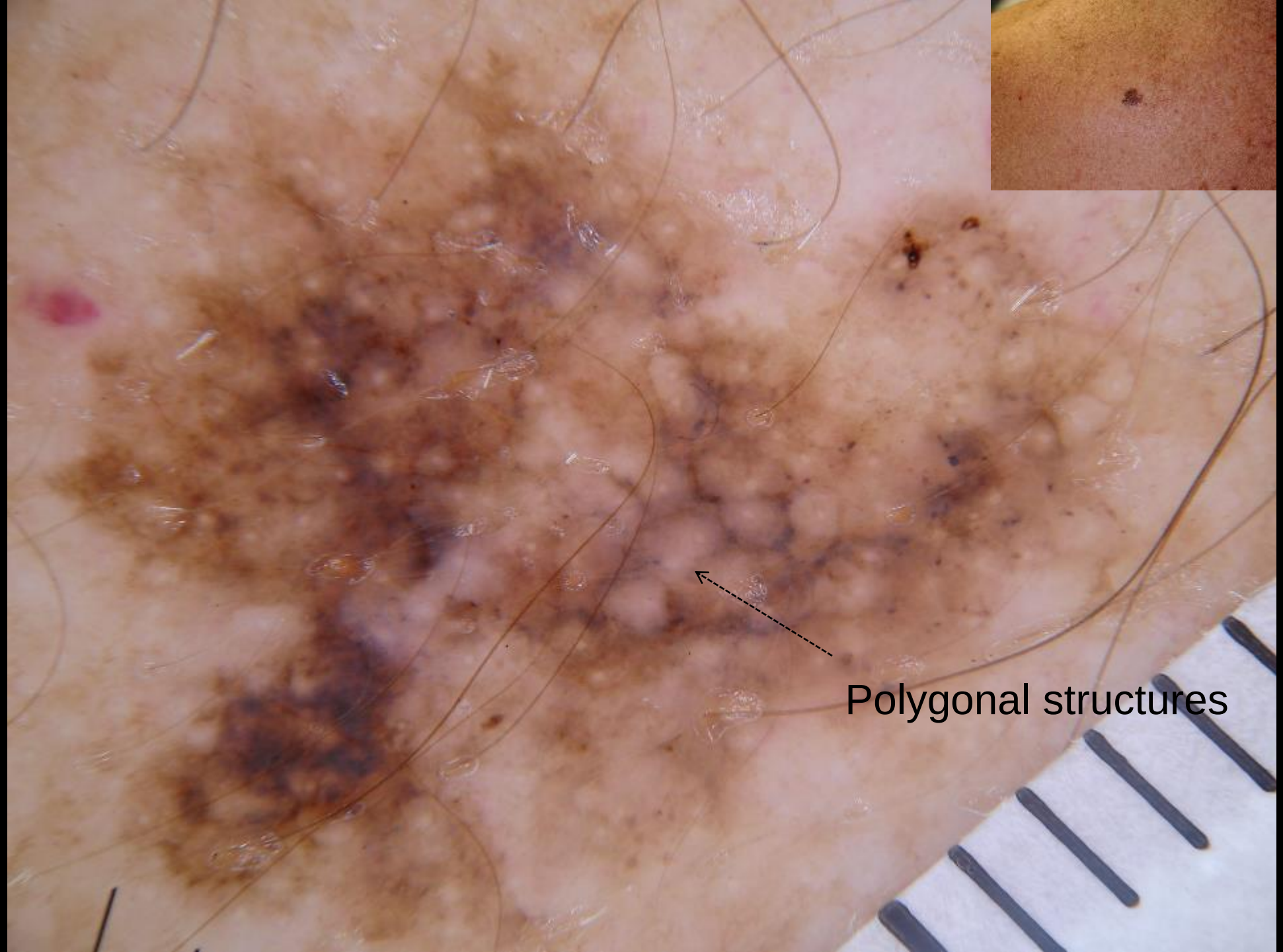
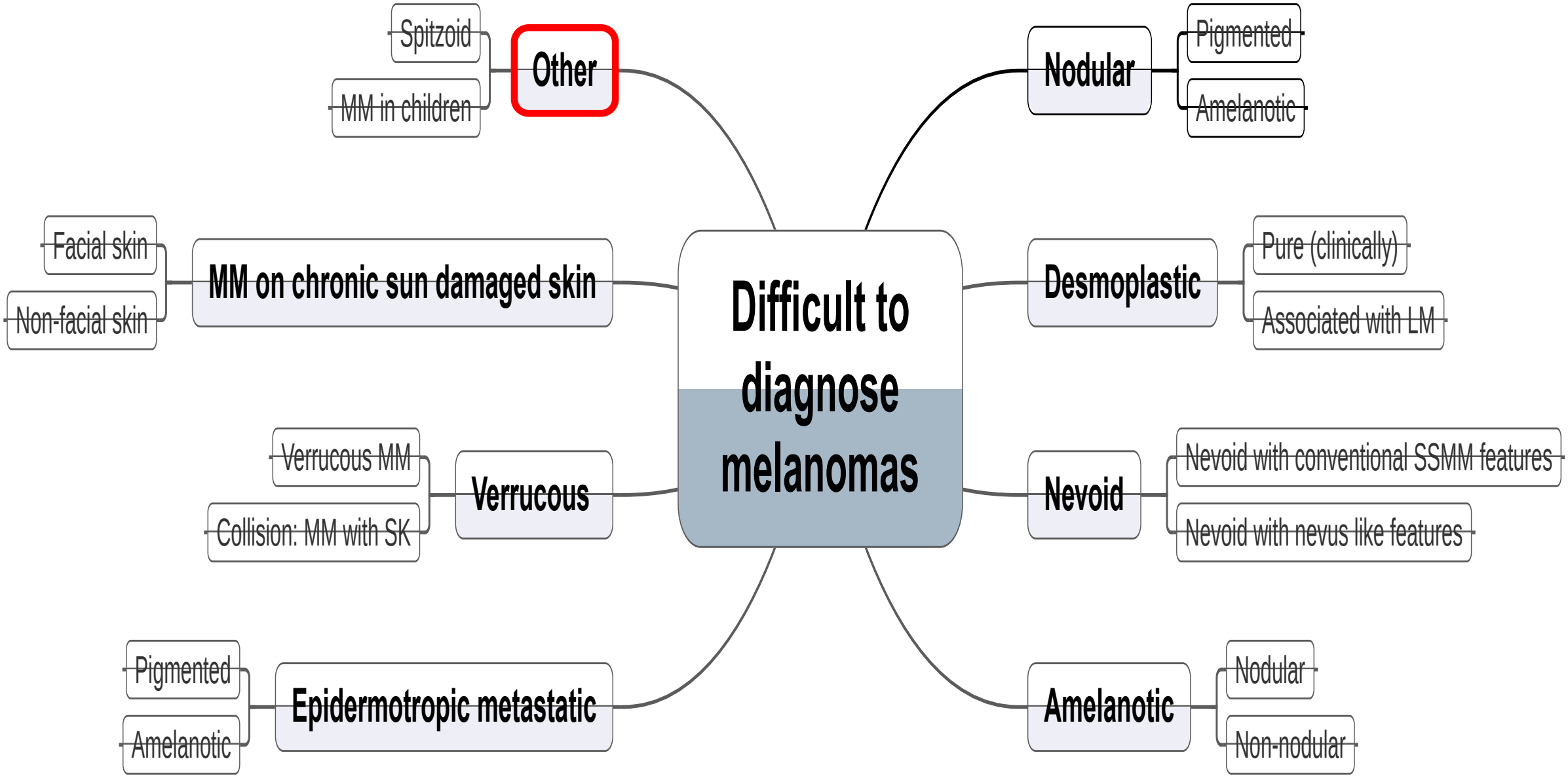

Polygonal structures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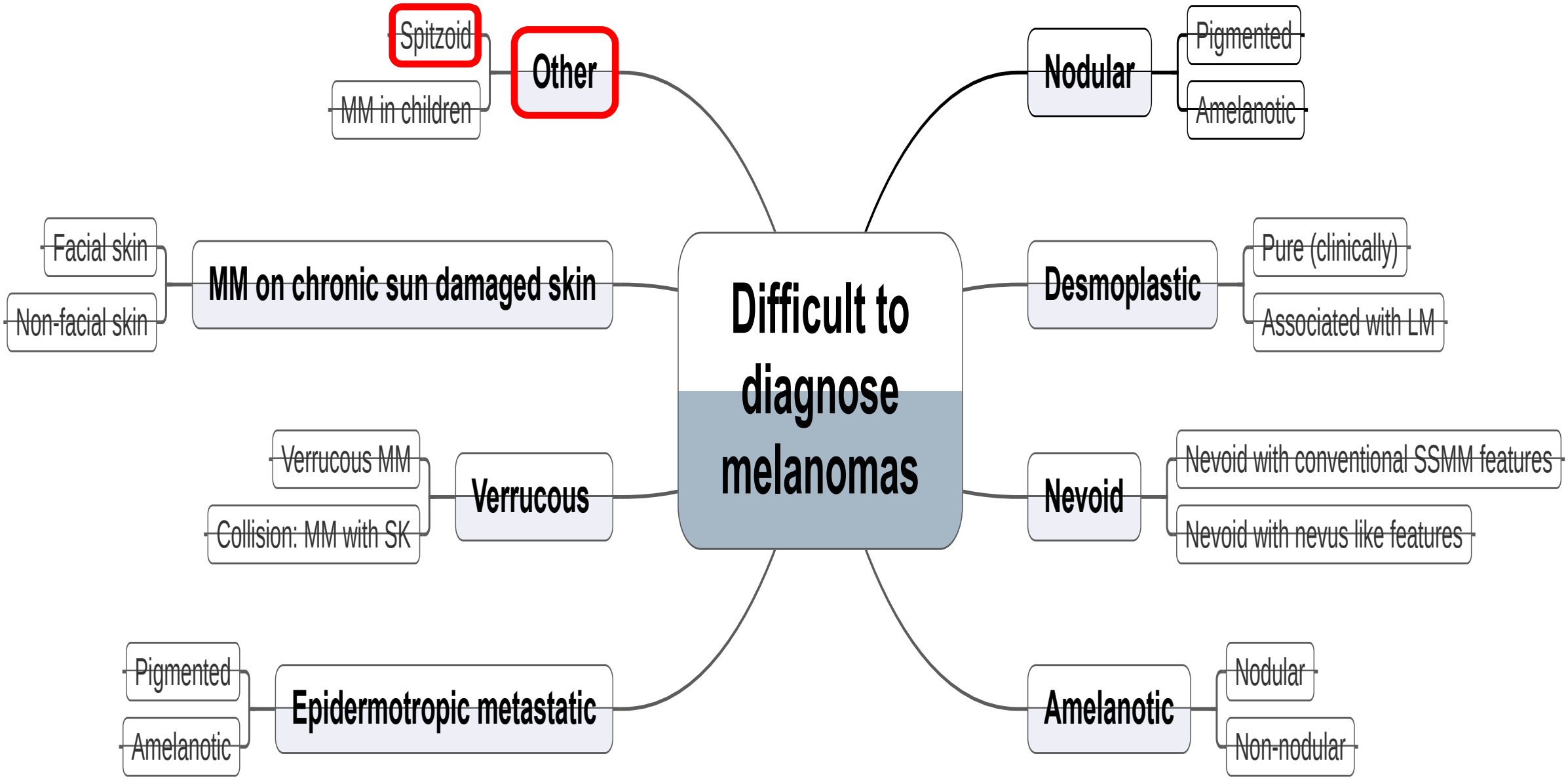
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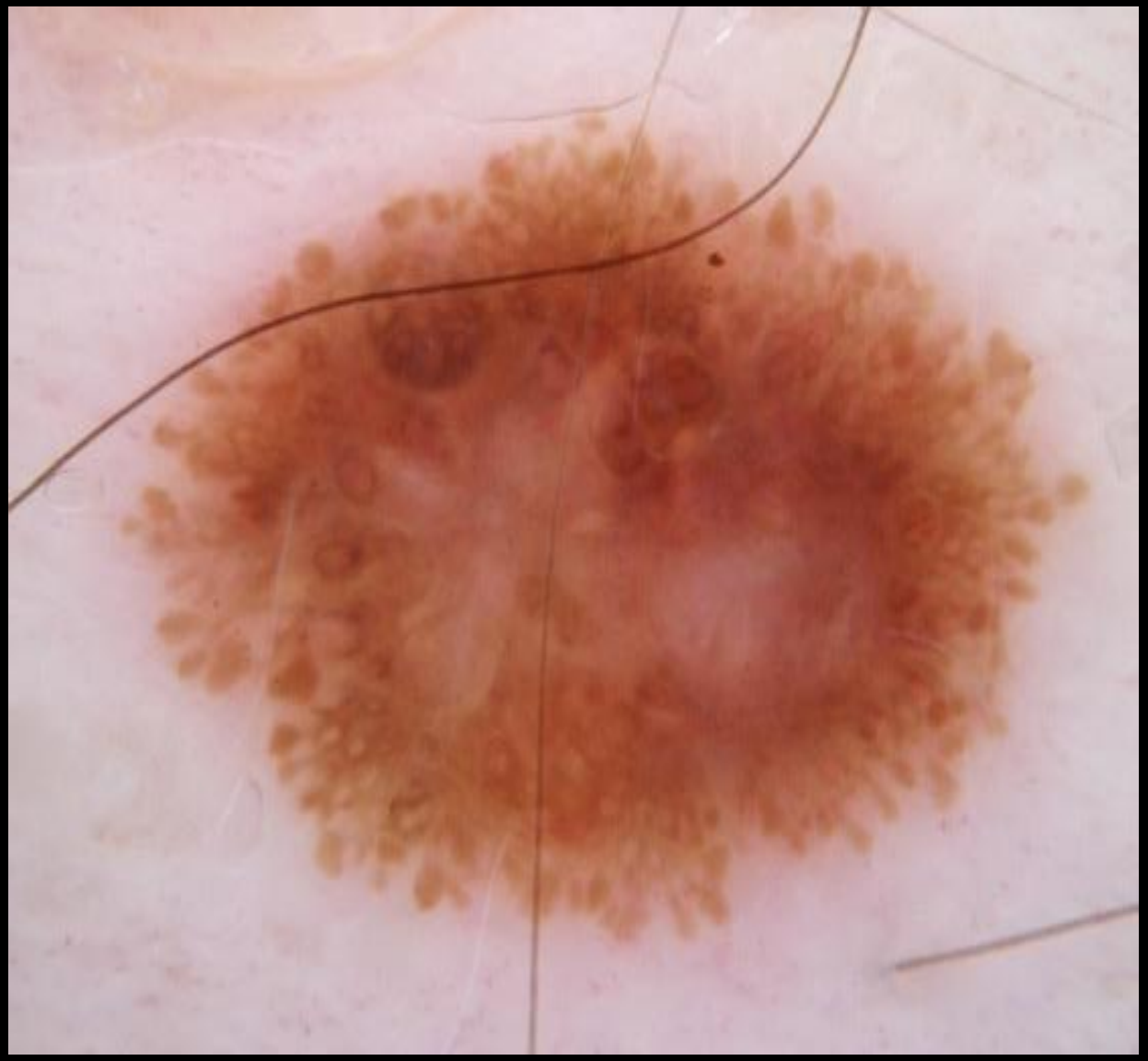
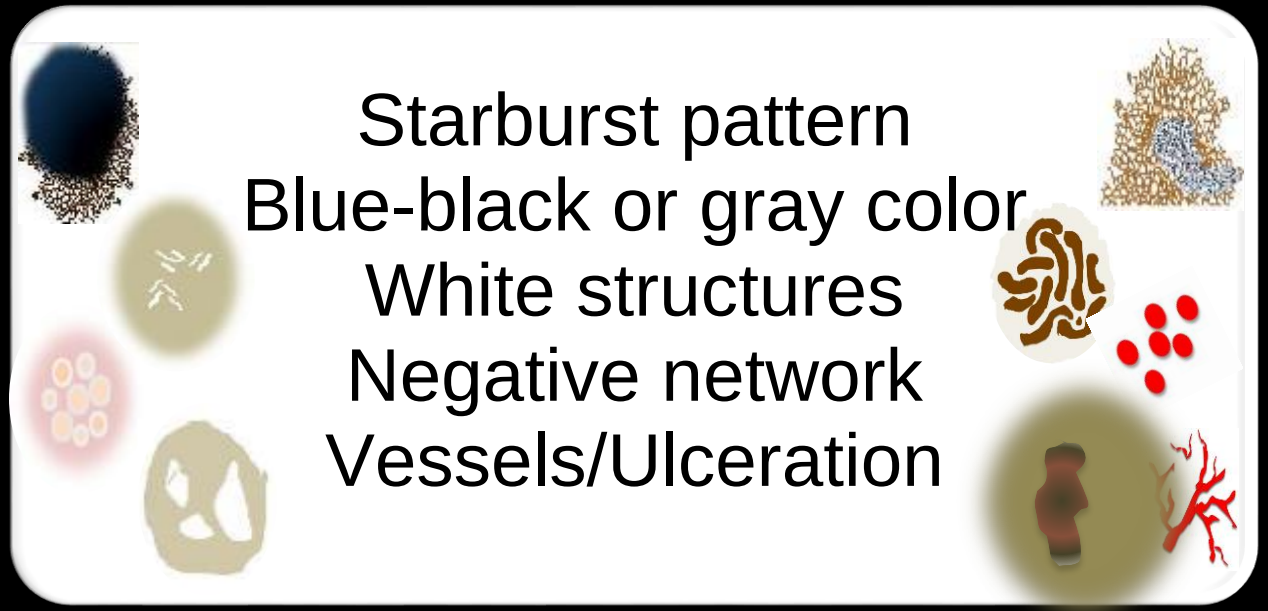
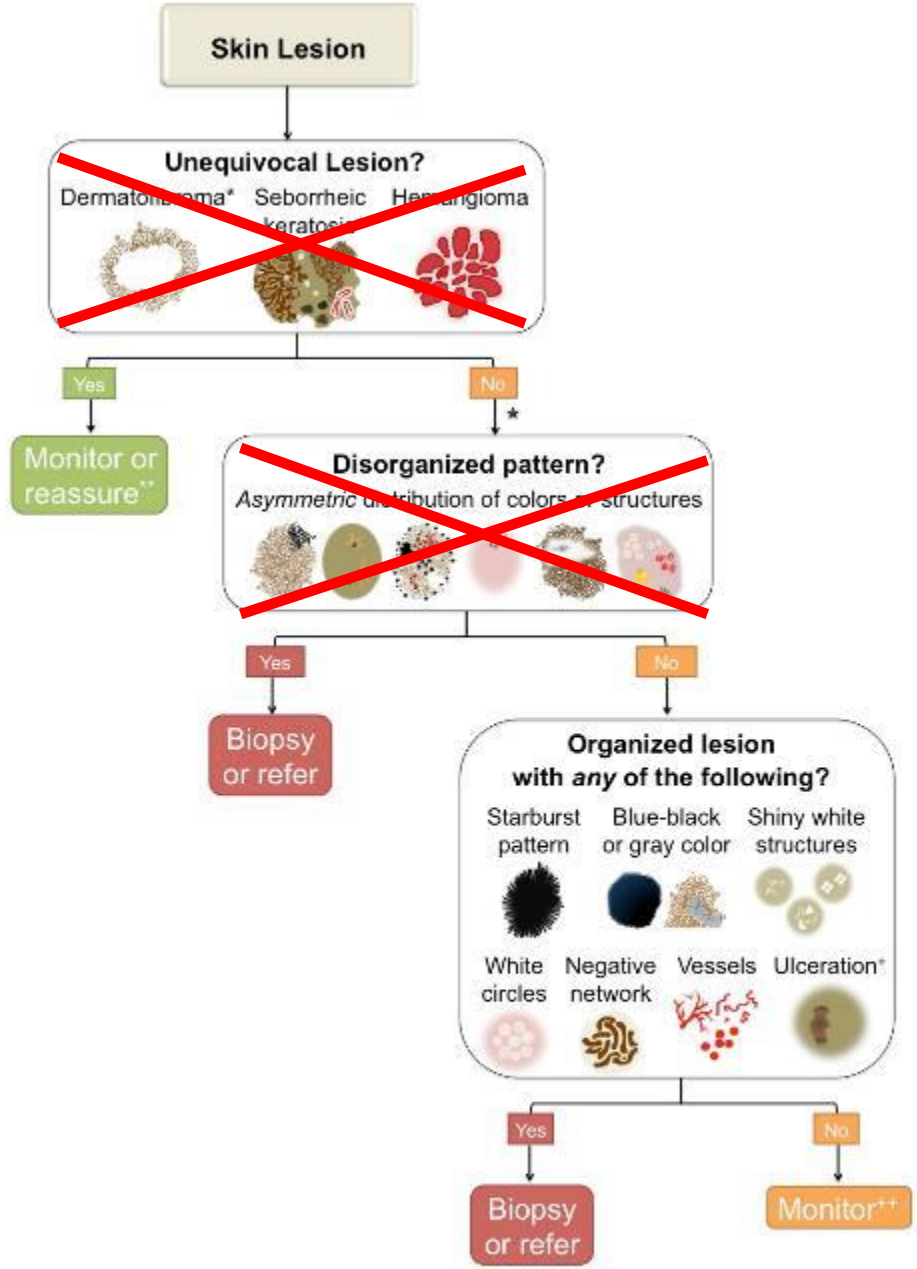
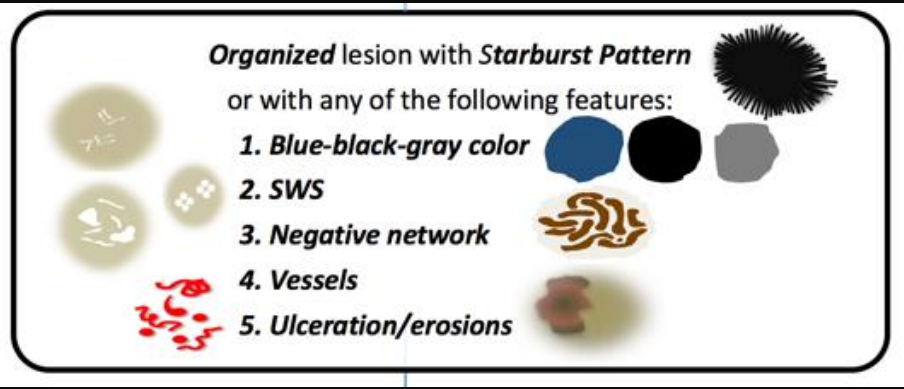


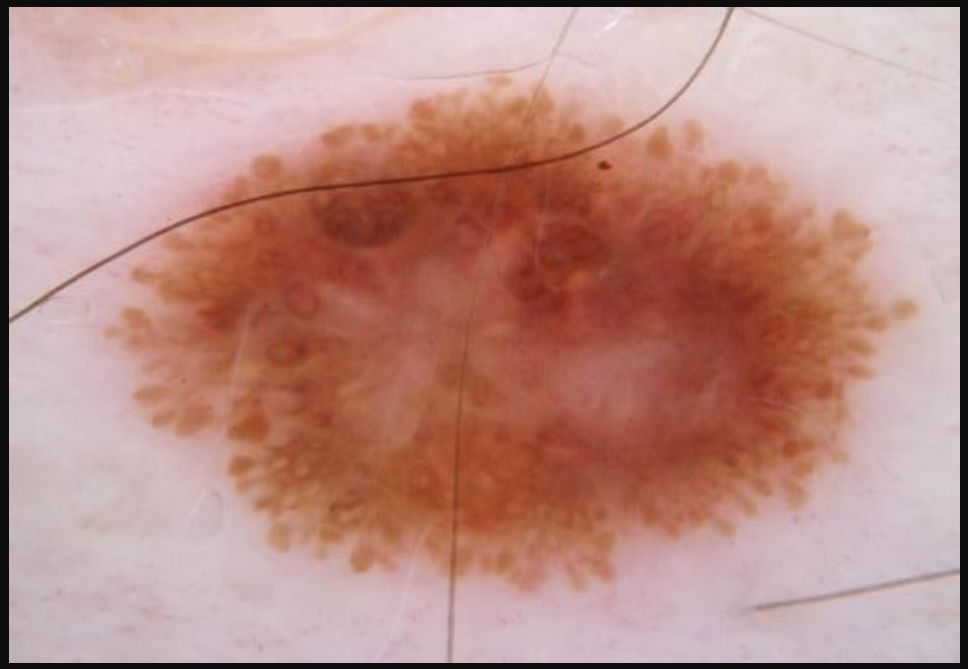
Difficult to diagnose melanomas tend to be symmetric & have one of the following dermoscopic features

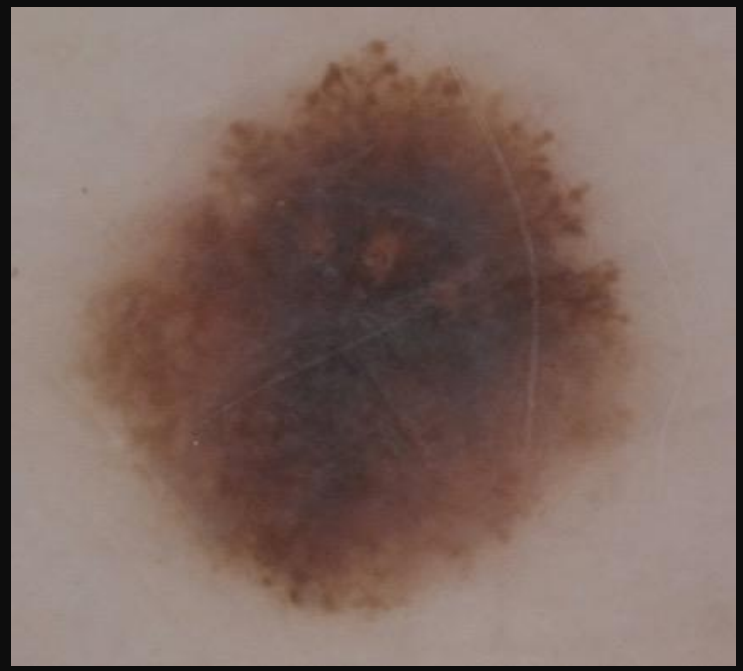


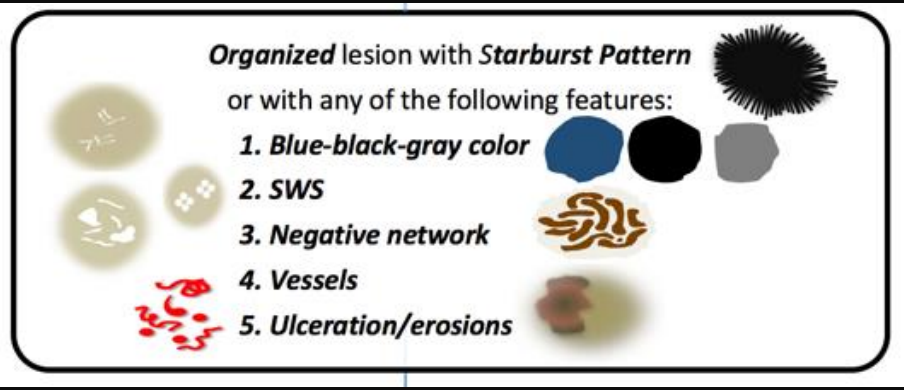

Skin Lesion
Unequivocal Lesion?
Dermatofibroma*
Seborrheic keratosis
Hemangioma
Yes
No
*
Monitor or reassure**
Disorganized pattern?
Asymmetric distribution of colors or structures
Yes
No
Biopsy or refer
Organized lesion with any of the following?
Starburst pattern
Blue-black or gray color
Shiny white structures
White circles
Negative network
Vessels
Ulceration+
Yes
No
Biopsy or refer
Monitor++



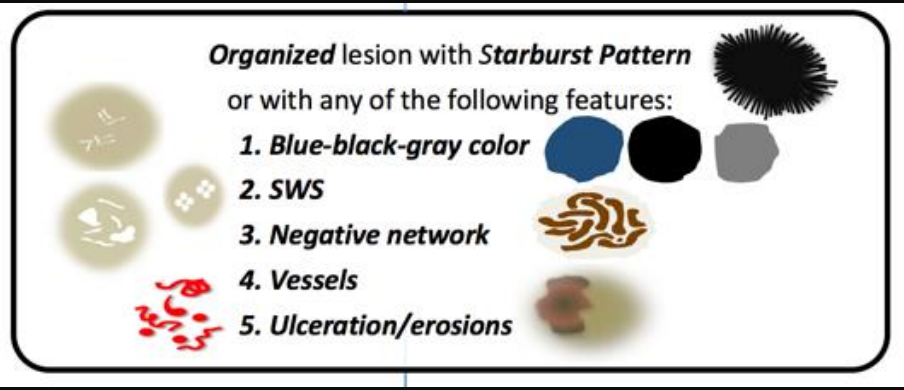
Starburst Pattern



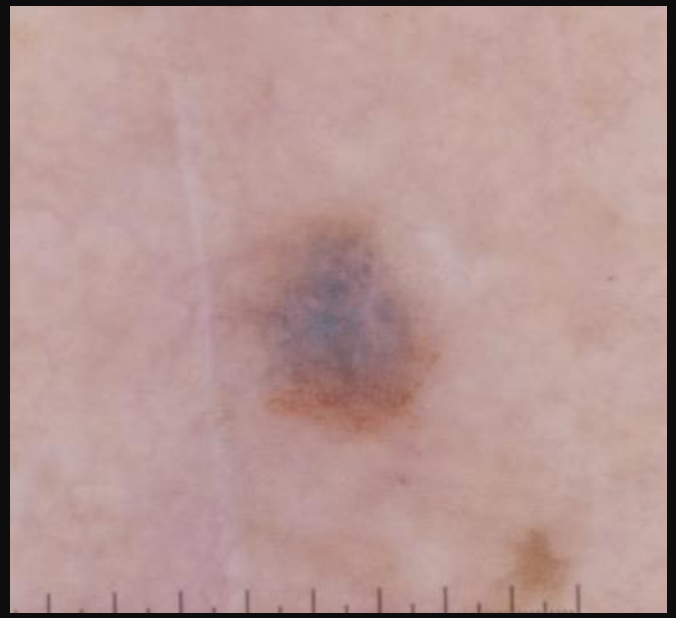


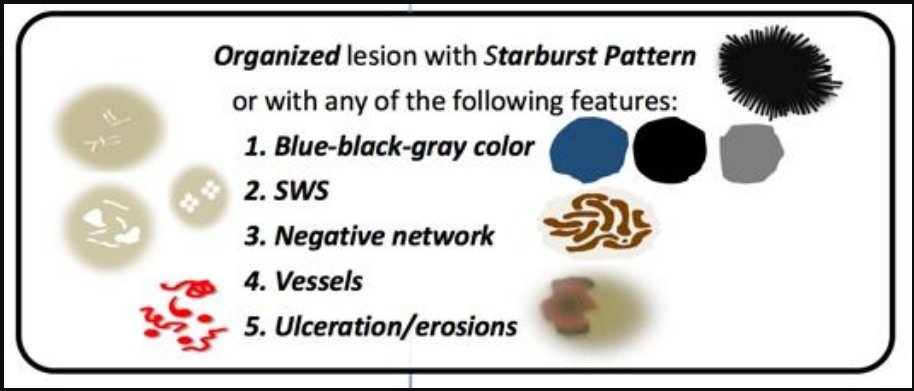

Organized lesion with *Starburst Pattern*
or with any of the following features:
1. Blue-black-gray color
2. SWS
3. Negative network
4. Vessels
5. Ulceration/erosions

Blue, black, &...

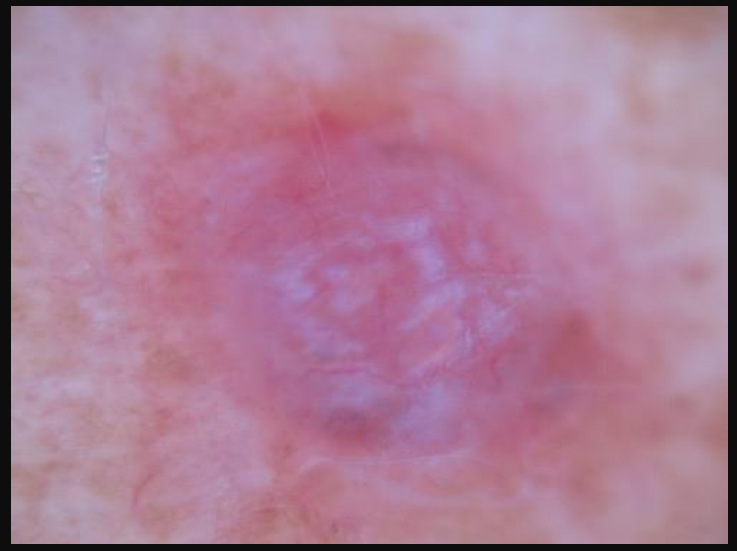

Organized lesion with *Starburst Pattern*
or with any of the following features:
1. *Blue-black-gray color*
2. *SWS*
3. *Negative network*
4. *Vessels*
5. *Ulceration/erosions*

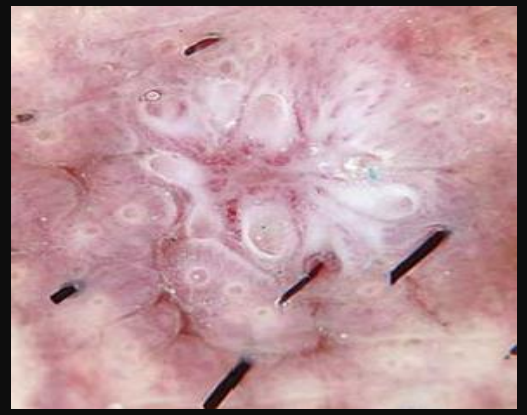
...gray color

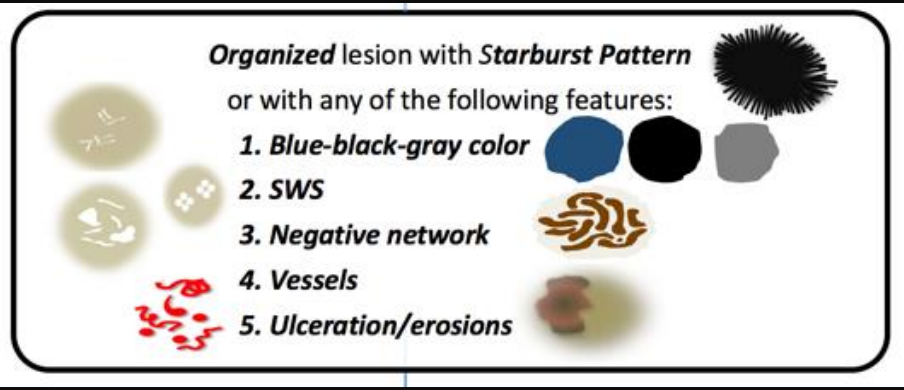




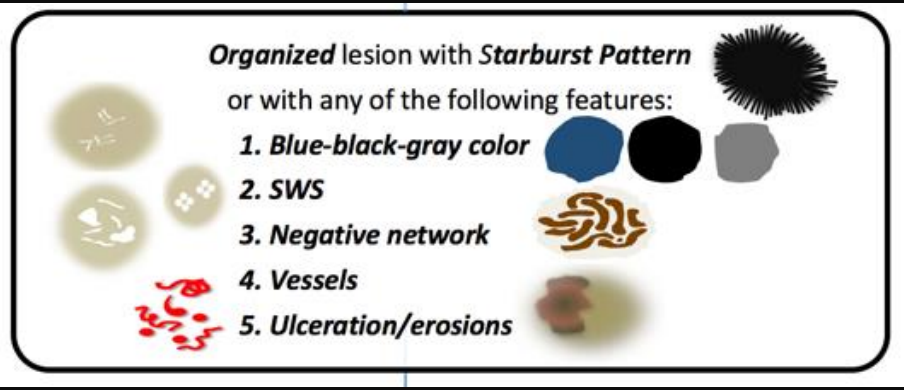
Shiny white structures (PD)
White circles (PD or NPD)







Negative network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or with any of the following features:
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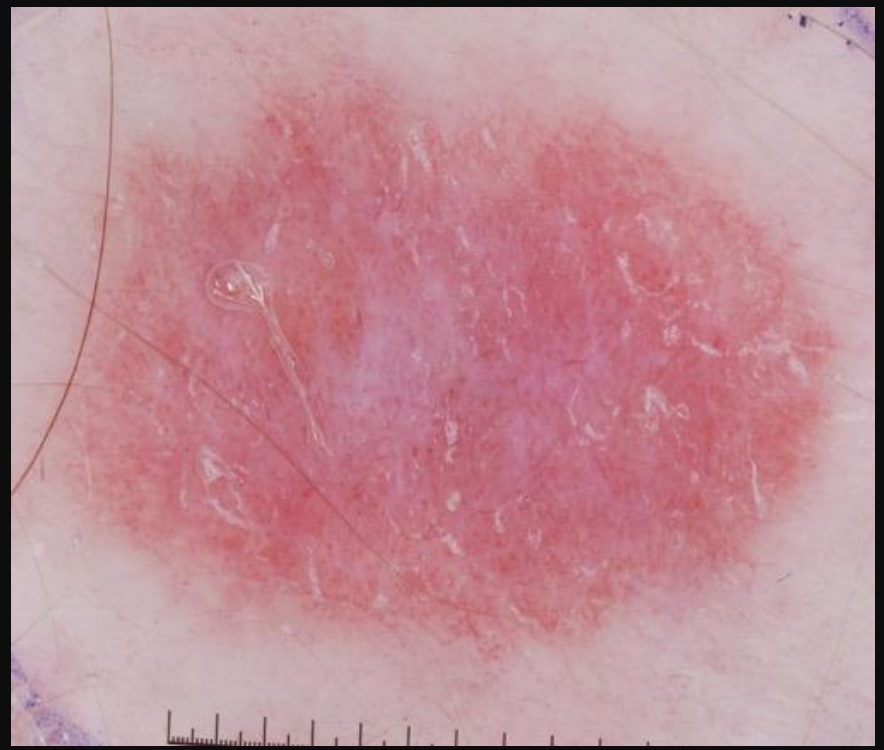
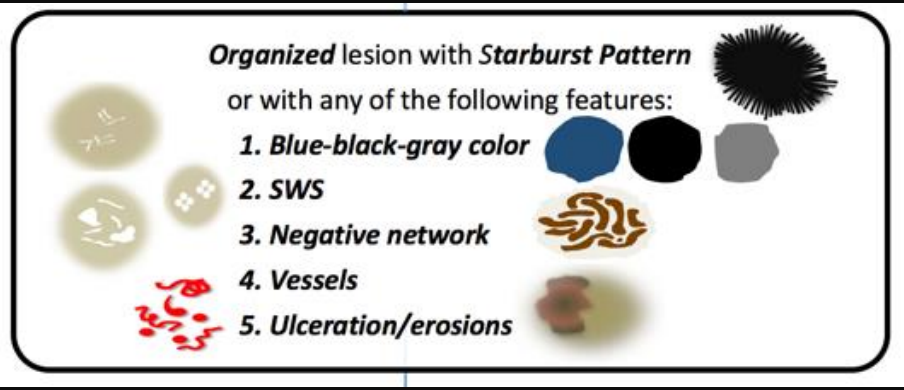
4. Vessels
5. Ulceration/erosions

Vessels

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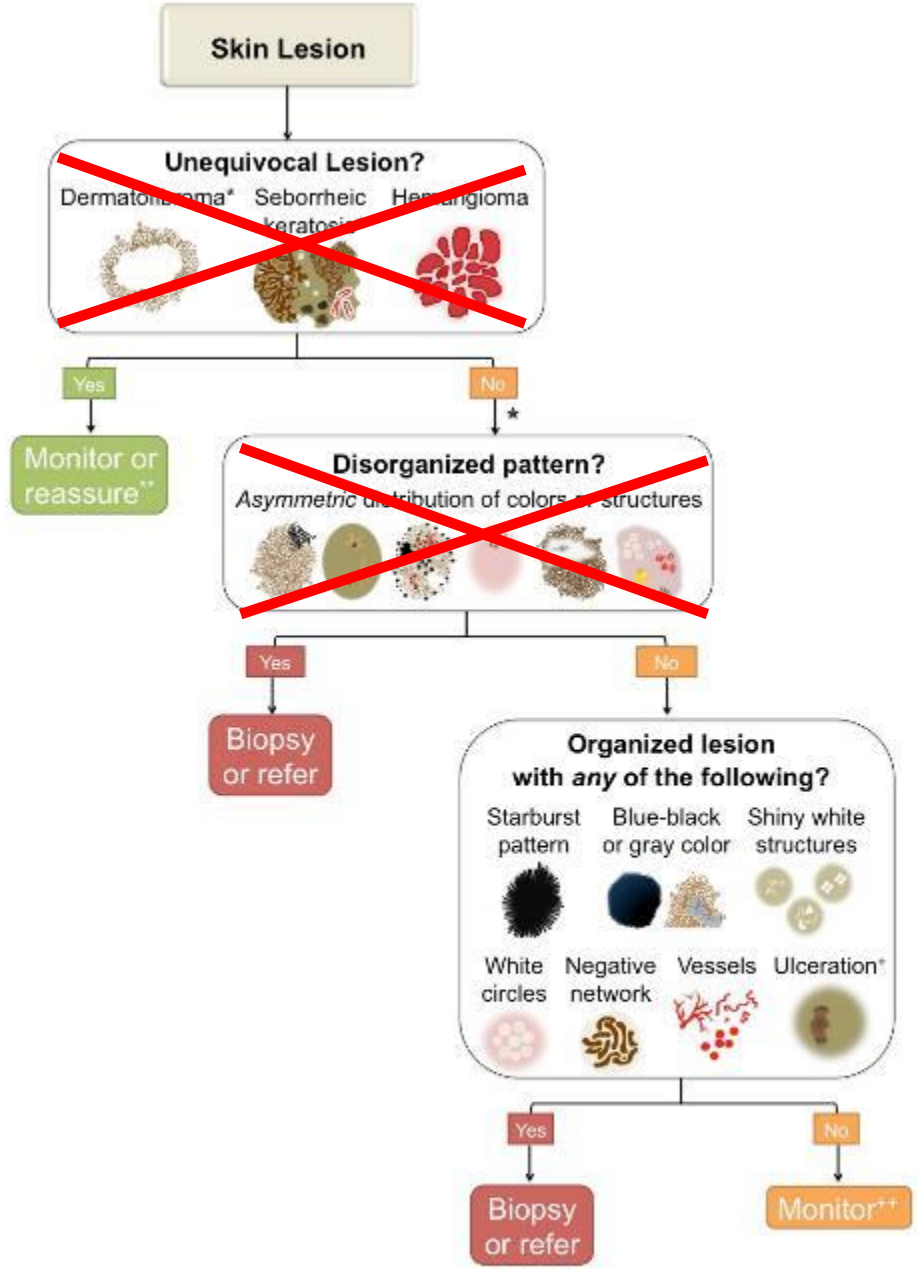
Ulceration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Unequivocal Lesion?
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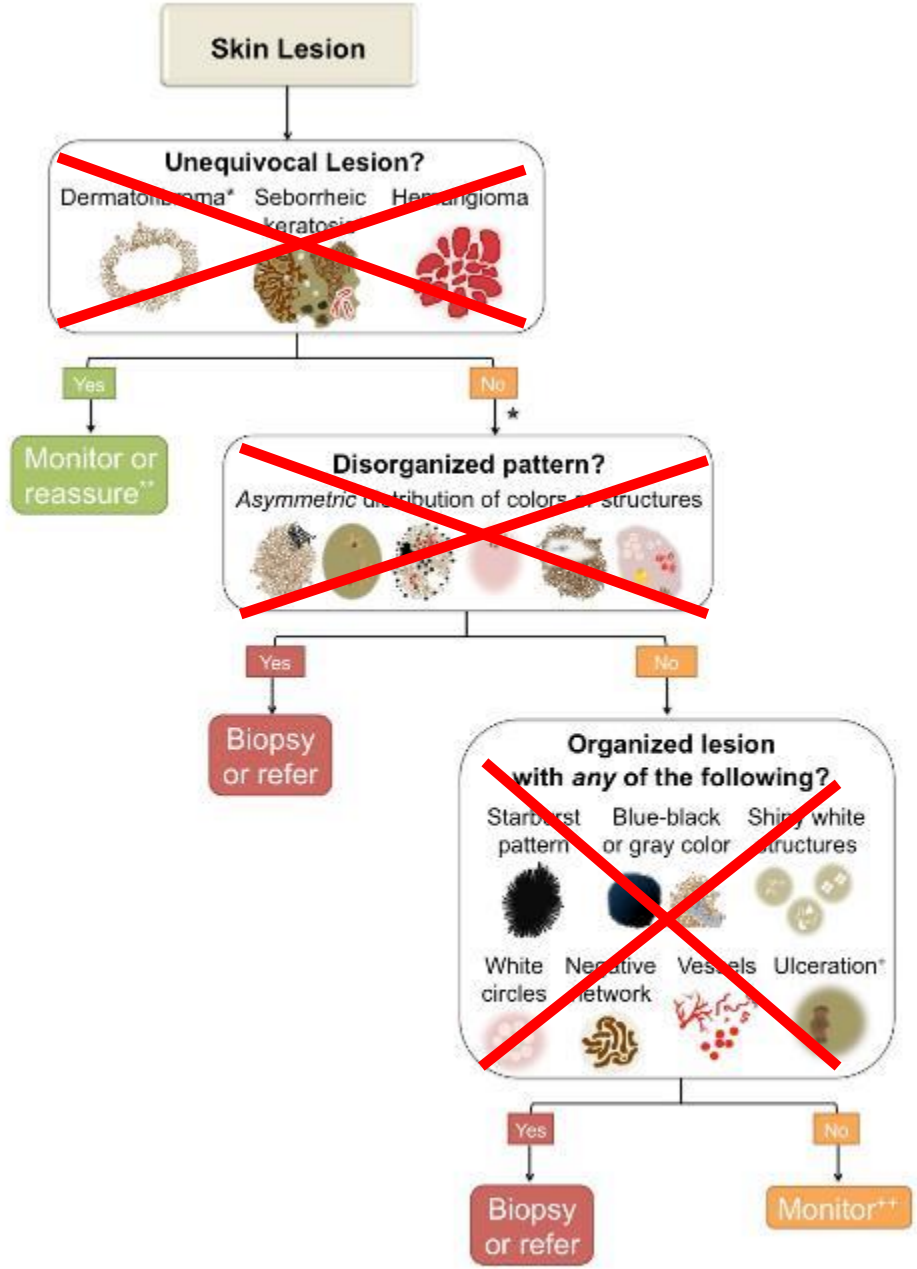
Seborrheic keratosis
Hemangioma
Yes
No
*
Monitor or reassure**
Disorganized pattern?
Asymmetric distribution of colors or structures
Yes
No
Biopsy or refer
Organized lesion with any of the following?
Starburst pattern
Blue-black or gray color
Shiny white structures
White circles
Negative network
Vessels
Ulceration+
Yes
No
Biopsy or refer
Monitor++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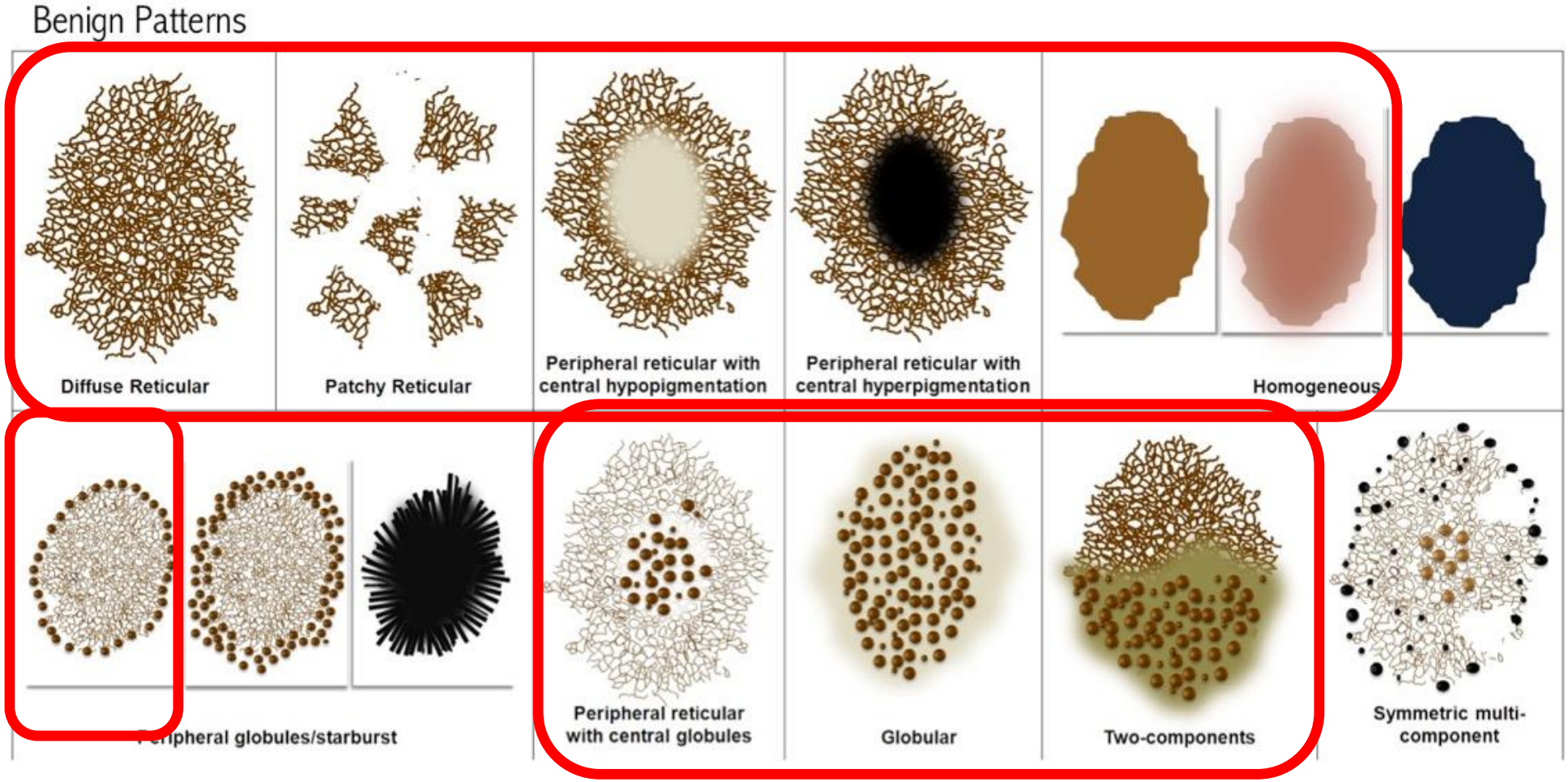
White circles
Negative network
Vessels
Ulceration*
Yes
No
Biopsy or refer
Monitor++

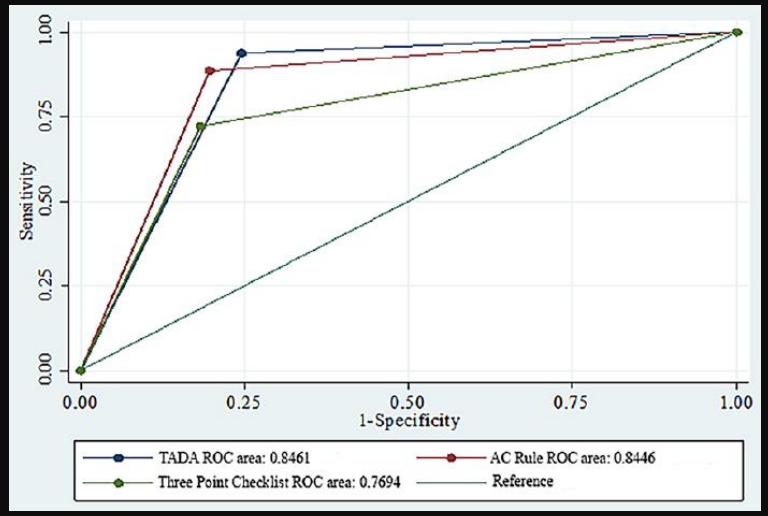
The majority of these “other” lesions are:



Nevi in general should be monitored (self/clinician/app)

How did TADA perform

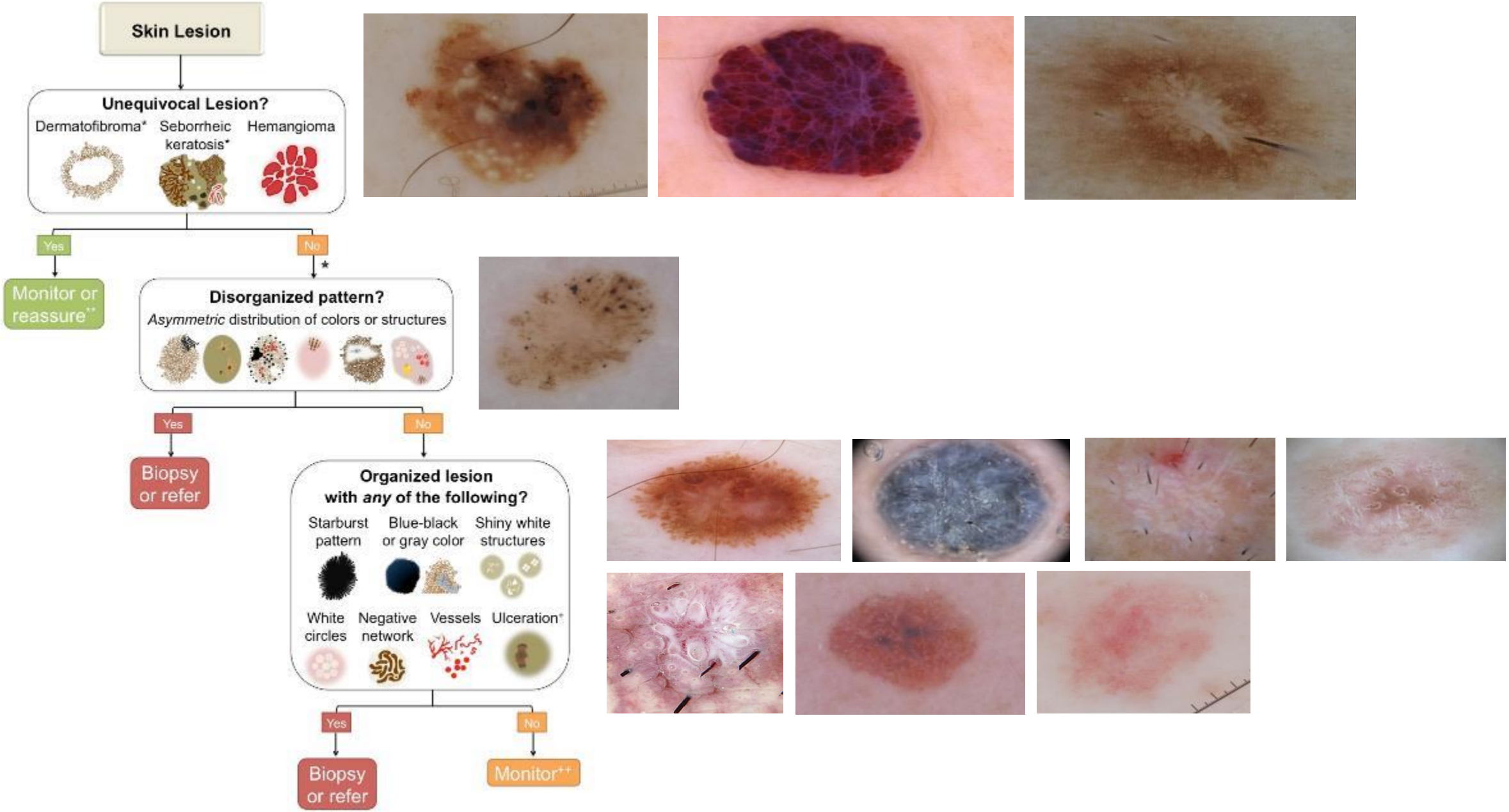
	Overall Sensitivity	Overall Specificity	Malignancies
Three-Point	91.0	71.9	Melanoma, pBCC
Chaos and Clue	90.6	62.7	Melanoma, BCC, pSCC
Blue-Black Rule	78.2	80.5	Melanoma
AC Rule	94.0	62.0	Melanoma
TADA	94.8	72.3	Melanoma, BCC, SCC



TADA results by lesion type and dermoscopic training

Sensitivity				Specificity			
Variable	Coding	Estimate (95% CI)	P-value	Variable	Coding	Estimate (95% CI)	P-value
Overall		94.6 (93.4—95.7)	—	Overall		72.5 (70.1—74.7)	—
Diagnosis	AMM	95.6 (91.5 -99.8)	0.942	Diagnosis	Angioma	76.4 (72.6—80.4)	<0.001
	BCC	95.2 (92.9 -97.6)	0.651		CCA	39.1 (37.0—41.4)	<0.001
	MM	94.4 (92.3 -96.6)	0.251		DF	93.6 (90.0—98.1)	<0.001
	NM	91.6 (88.2 -95.1)	0.020		Nevus	69.4 (67.0—71.9)	—
	SCC	95.7 (93.8 -97.7)	—		SK	82.9 (79.2—86.7)	<0.001
Previous Dermoscopy Training	No	93.6 (91.8—95.5)	—	Previous Dermoscopy Training	No	69.0 (64.6—73.7)	—
	Yes	95.4 (94.8—99.6)	0.14		Yes	73.2 (71.4—84.5)	0.450

Abbreviations: AMM, amelanotic melanoma; BCC, basal cell carcinoma; MM, malignant melanoma; NM, nodular melanoma; SCC, squamous cell carcinoma; CCA, clear cell acanthoma; DF, dermatofibroma; SK, seborrheic keratosis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Shiny white structures
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Vessels
Ulceration*
Yes
No
Biopsy or refer
Monitor++


THE MANY FACES OF
MALIGNANT MELANOMA
Thank you
"Melanoma writes its message on the skin
with its own ink, and it is there for all of us to see.
Unfortunately, some see but do not comprehend."
—Neville Davis, MD