

CHAPTER ONE

Algorithms, the Comparative Approach and the Elephant Approach

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This chapter will give a brief overview of the various approaches to diagnosing a lesion as benign or malignant, and it will help increase your skill in determining what constitutes normal or abnormal.

In the past decades, several approaches to skin lesion analysis have been developed.

Pattern analysis

Pattern analysis for dermoscopy began with Hubert Pehamberger's article "In Vivo Epiluminescence microscopy of pigmented skin lesions."¹

Four criteria for diagnosing melanoma

Wilhelm Stolz simplified pattern analysis into four criteria for diagnosing melanoma:² [1]

1. Asymmetry
2. Border's abrupt cutoff
3. Number of colours
4. Number of differential structures

The Menzies Method

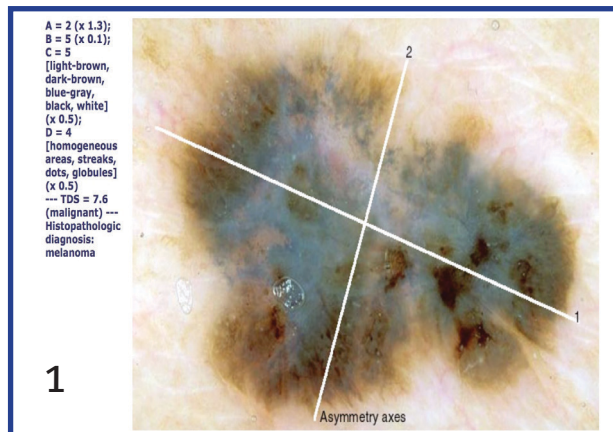
Scott Menzies developed criteria to diagnose melanoma:³

Negative features (that cannot be present)

- Symmetry of pattern
- Presence of a single colour

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) colours
- Multiple blue/grey dots
- Broadened network



Seven-Point Checklist

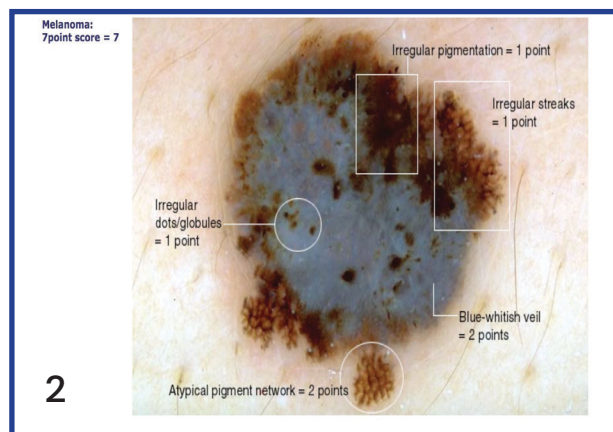
Giuseppe Argenziano developed the Seven-Point Checklist for melanoma diagnosis based on pattern analysis. When a lesion has a significant feature, such as an atypical network, two points are scored. If minor criteria are present, one point is scored. If three or more points are scored, melanoma is diagnosed.⁴ [2]

Three-Point Checklist

Peter Soyer simplified the method even further into a Three-Point Checklist.⁵

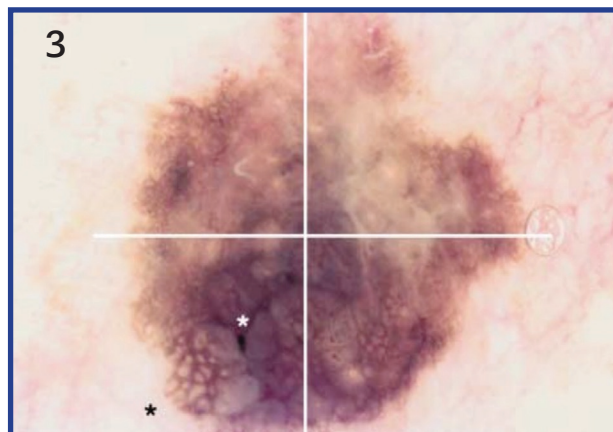
1. Asymmetry
2. Atypical network
3. Blue-white structures

Image [3] shows a melanoma that satisfies the Three-Point Checklist.



The Elephant Approach

In 2014, the Elephant Approach was developed.⁶ It is based on the idea that, if you look at the whole picture, you will immediately see the malignant lesion (= “elephant”). When using the Elephant Approach on the lesion shown in Image [4], you can see it looks suspicious.

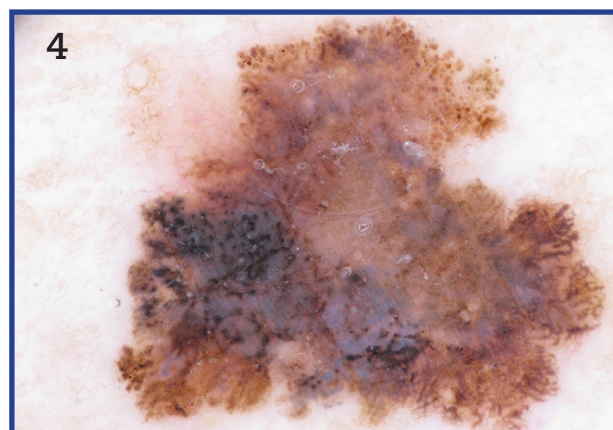


Three clues to melanoma

There are three ways to recognise a melanoma:

Blink

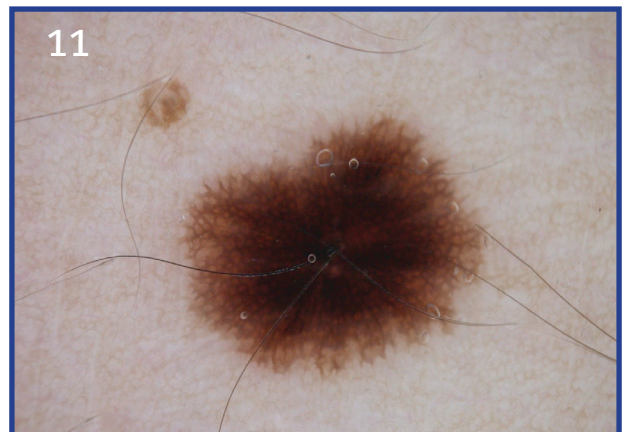
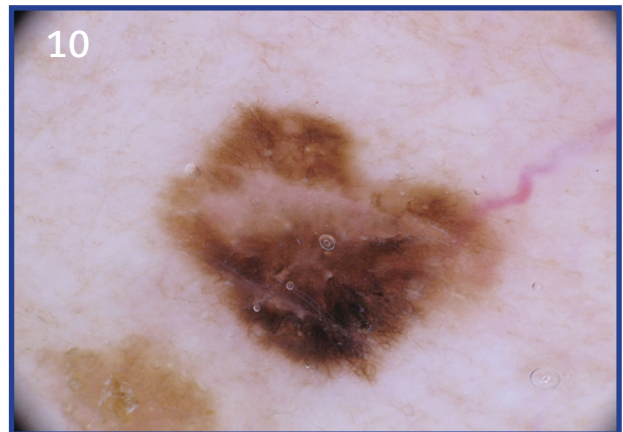
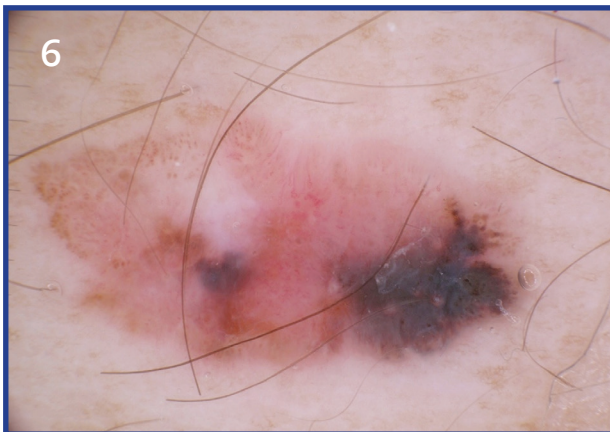
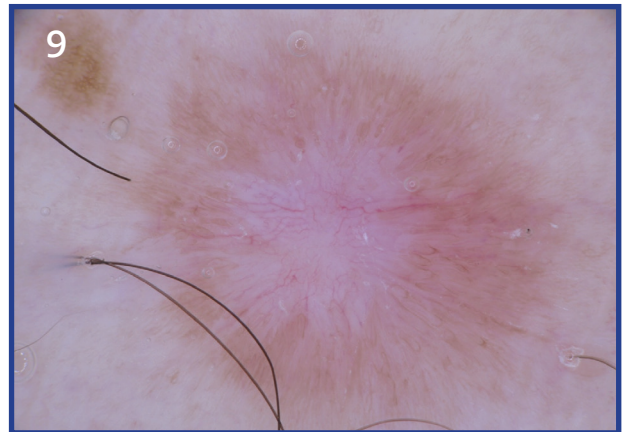
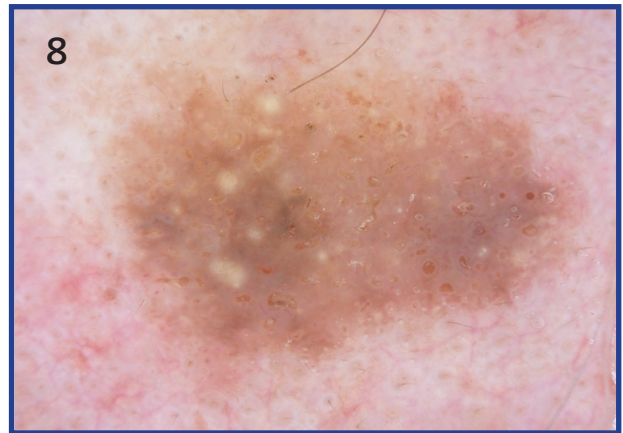
The brain has the ability to recognise something in a millisecond. Do the blink test by looking at an image for one second and determine whether it is a benign lesion or if it requires further analysis. You need to “train” your brain to do this.



You can quickly determine that this is a benign lesion because it is symmetrical in structure and colour. [5]

This is a melanoma. [6] You can immediately see that it is asymmetrical in structure and colour. Image [7] shows a benign lesion and Image [8] shows a benign seborrheic keratosis.

Image [9] shows a dermatofibroma while Image [10] shows a melanoma. In Image [11], you can see a benign naevus which is completely symmetrical.



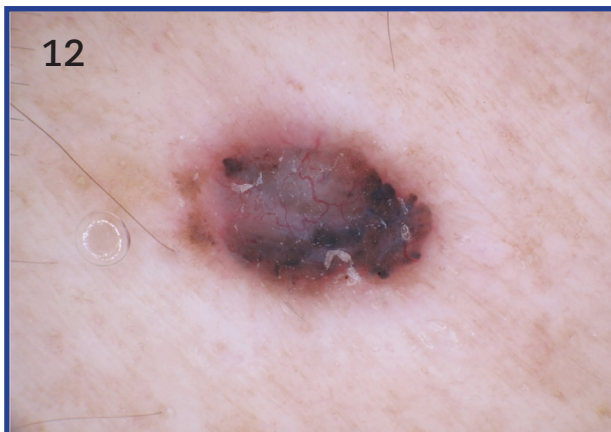


Image [12] shows a malignant lesion. You can see the arborising vessels in the middle. This is a basal cell carcinoma.

Here you can see a haemangioma. It is symmetrical and full of blue-red lacunes. [13]

Think

When the “blink” approach does not work, you must use the analytical approach – the “think” approach. This means that you must consider the seven criteria for diagnosing a melanoma.



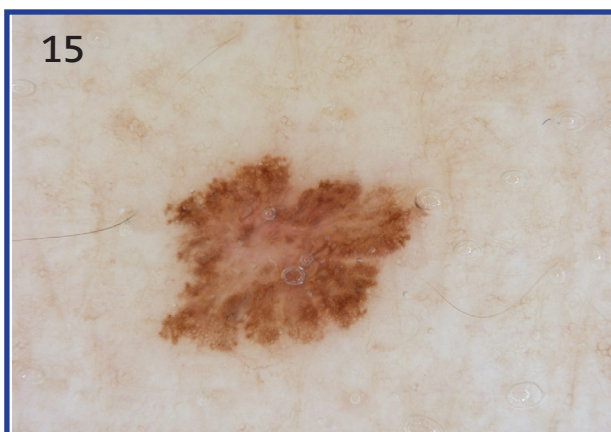
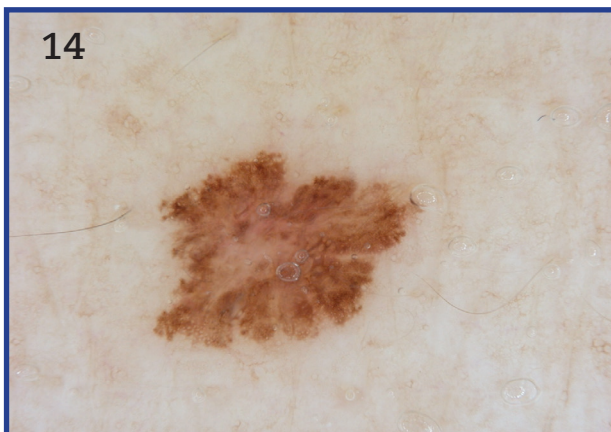
In a millisecond, you might be unsure as to whether this lesion is benign, thus proving that sometimes the blink method is not sufficient. [14]

In Image [15], you must ask yourself: Is there an atypical network? Is there a regressive area? Sometimes, even the think approach is not enough and you must compare.

Compare

When you are uncertain about a lesion, look at the other lesions on the patient.

The comparison approach can be used with the lesion in Image [16] by quickly looking at the patient's other lesions and locating the lesion that is different from the others.

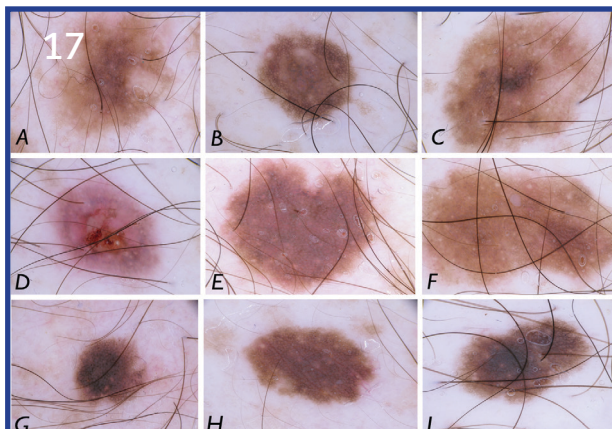
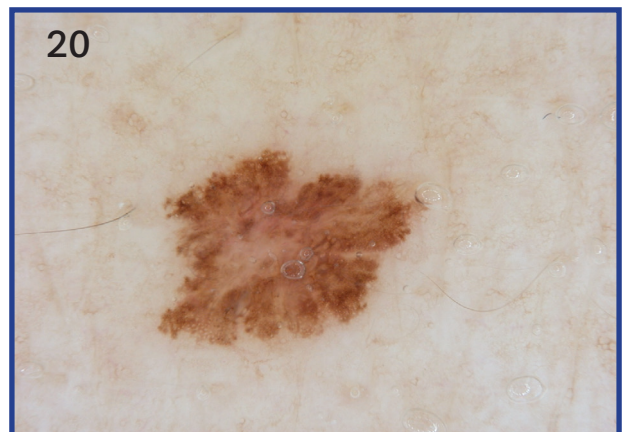
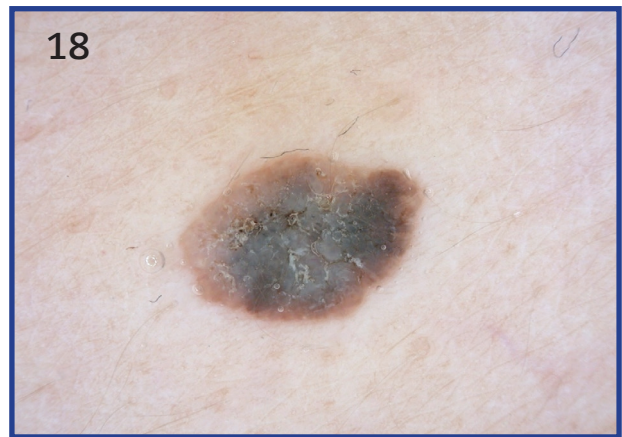


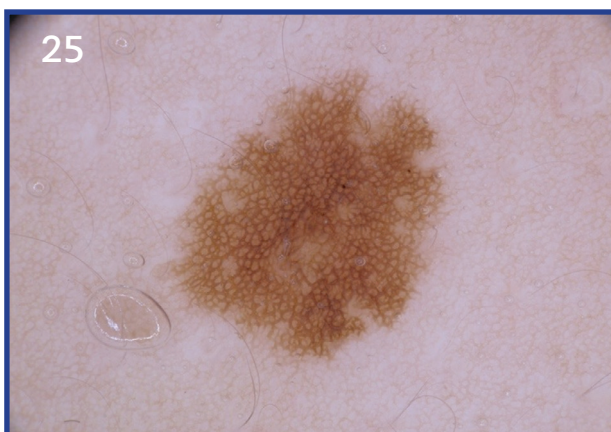
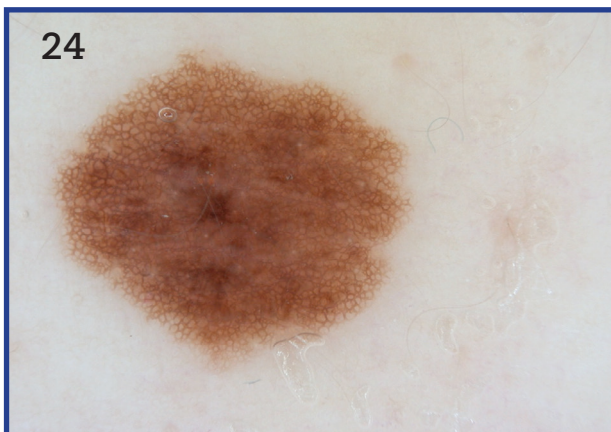
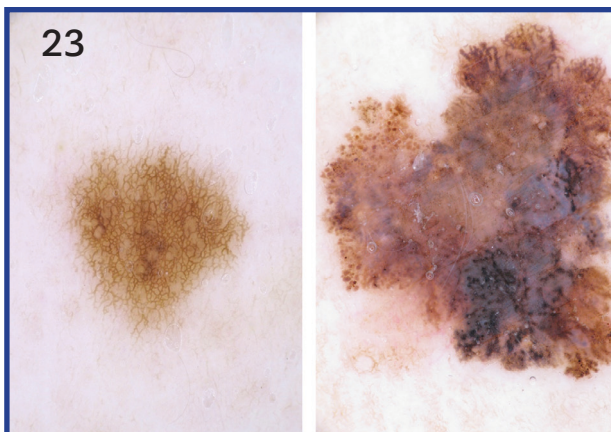
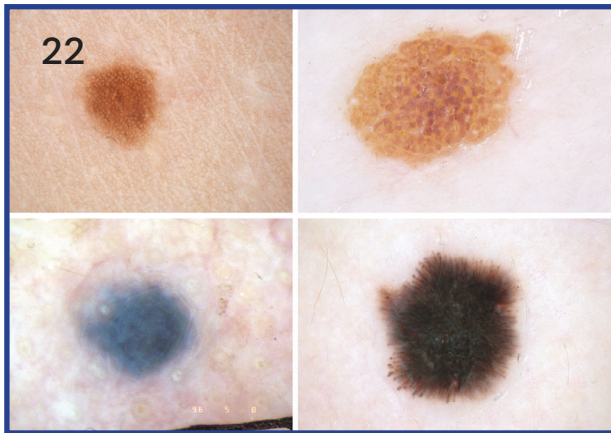
You can see in this comparison that lesion D looks different from all other lesions. It is a melanoma. [17]

Though this lesion might appear to be a seborrheic keratosis, use the comparison approach to be completely certain. [18]

You can see in Image [19] that many of the lesions have the same blue colour, the same milia-like cysts, and the same comedo-like openings. You can therefore conclude that the lesion in question is likely a seborrheic keratosis.

The patient with this lesion did not have many others for comparison. When this occurs, you should excise it. When this lesion was cut out, it was found to be a melanoma in situ. [20-21]





The Elephant Approach in practice

The examples in this chapter will mainly look at pigmented lesions and help you apply the Elephant Approach in practice. (Squamous cell carcinomas should also be considered even though they are non-pigmented lesions.) A different chapter is used in the analysis of non-pigmented lesions.

There are four main types of benign lesions:

1. Naevus [22]
 - Reticular (usually acquired)
 - Globular (usually congenital)
 - Blue
 - Spitz
2. Seborrheic keratosis
3. Vascular lesion
4. Dermatofibroma

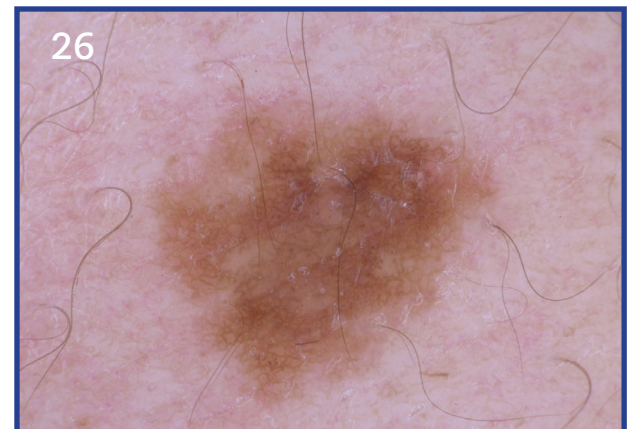
There are two important malignant lesions:

1. Melanoma
2. Basal cell carcinoma

Benign or malignant?

The lesion on the left is a benign naevus. [23] The lesion on the right is a melanoma. The main differences between the two are regularity/irregularity in colour and structure.

Images [24-26] show benign lesions whereas Image [27] shows a melanoma with irregular colours and structures.



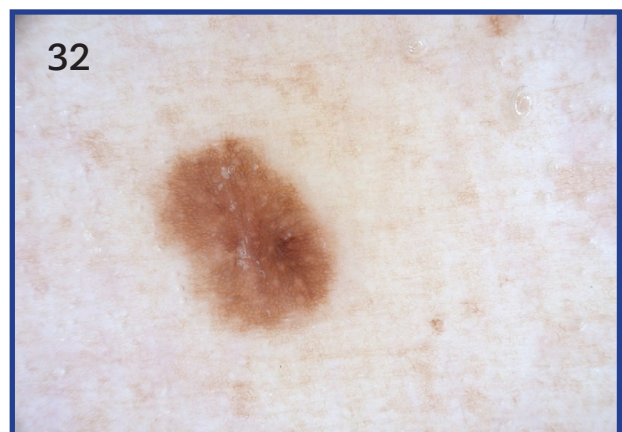
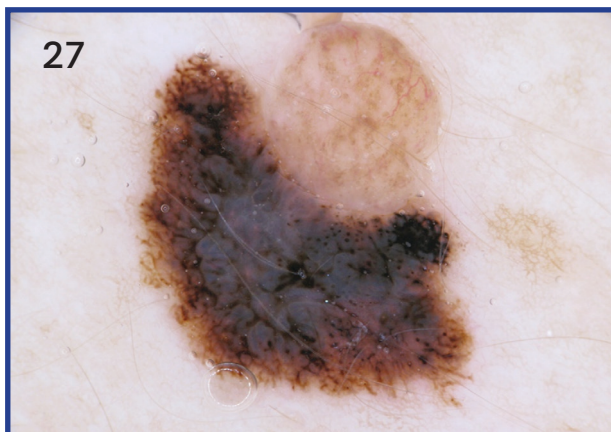
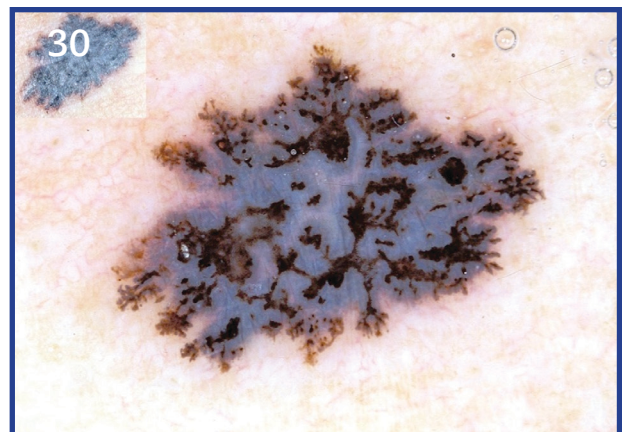
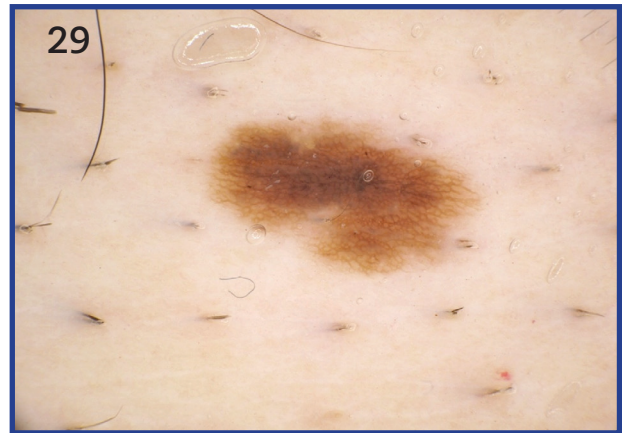
This is a naevus [28] because of its pigmented, regular, thin network. In a melanoma, the network is irregular and thick.

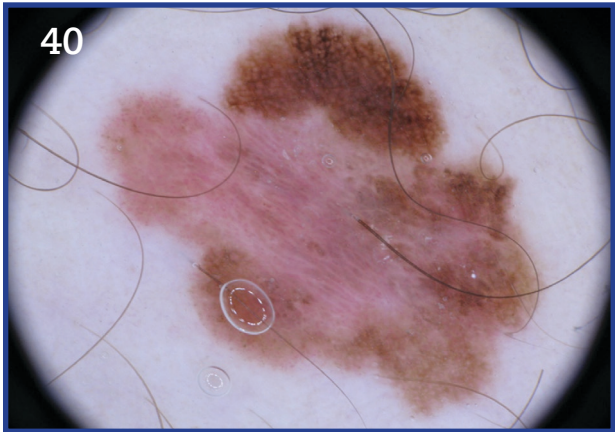
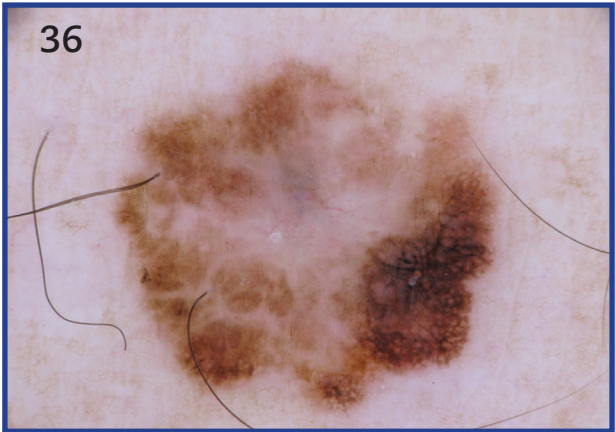
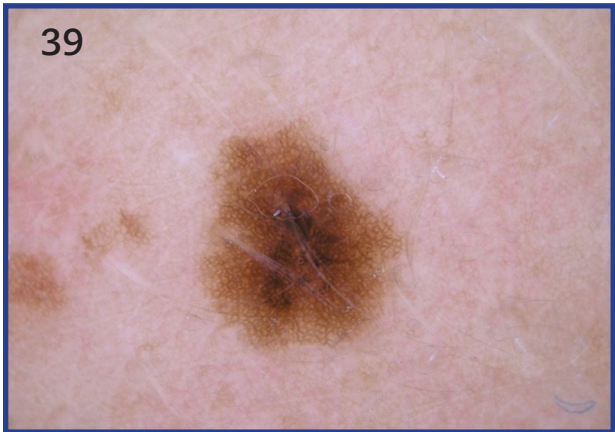
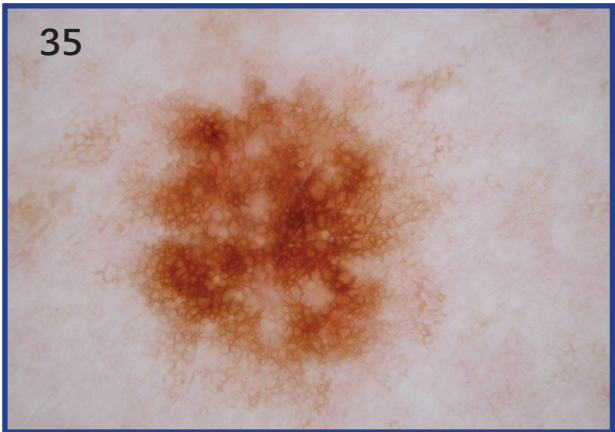
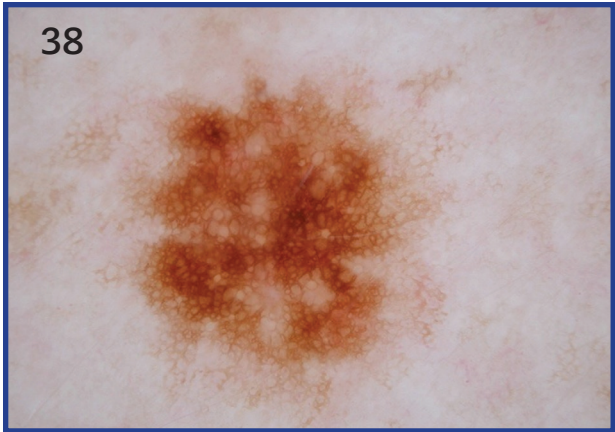
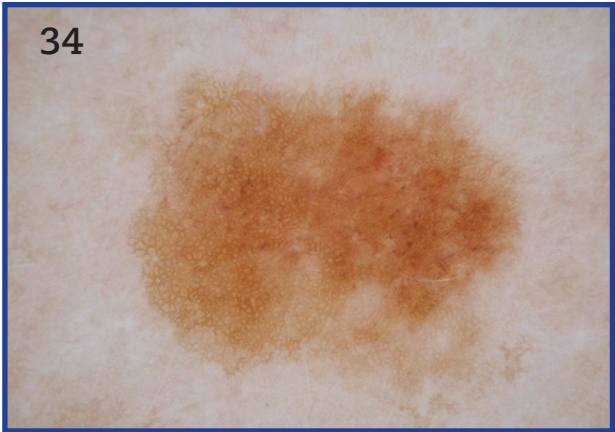
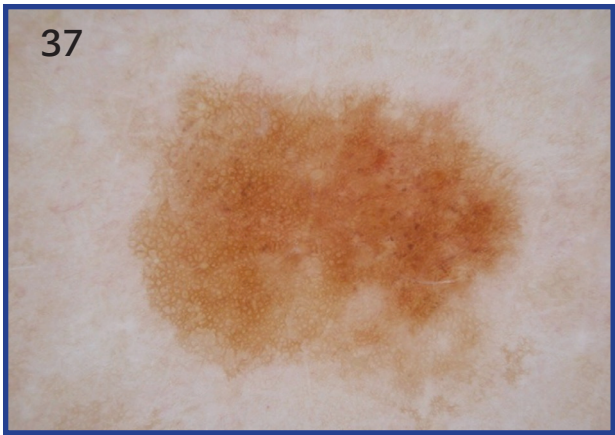
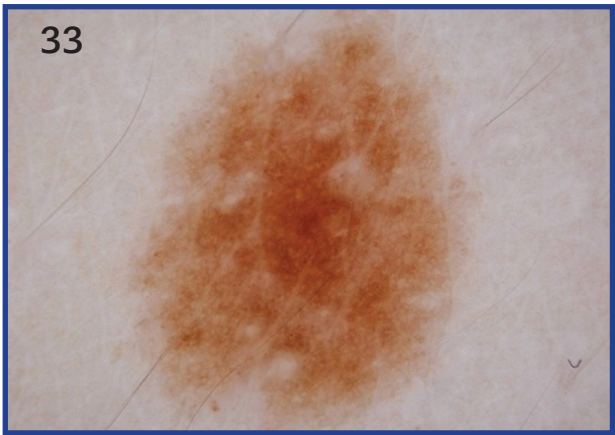
This is another naevus. You can see the regularity of the network. [29]

This is a melanoma. [30] There are a variety of colours and structures. Usually (though there are some exceptions), the combination of blue and black indicates malignancy. The presence of pigmented streaks along the periphery is also an indication of malignancy.

Images [31-34] show naevi which are regular in pattern and colour.

This lesion has some irregularity, but it still falls within the normal range of benign. [35]





In Image [36], you see a melanoma. The network is very irregular and there is a regressive area in the centre. Whitish pigmentation, especially when it occurs alongside blue and blue-grey colouration, indicates regression. (white = fibrosis, blue = melanophages)

The lesions shown in Images [37-38] are benign.

Even though the lesion in Image [39] has more pigmentation, it is still symmetrical so it is benign.

Image [40] shows a melanoma. You can see the regression in the middle and the network along the top.

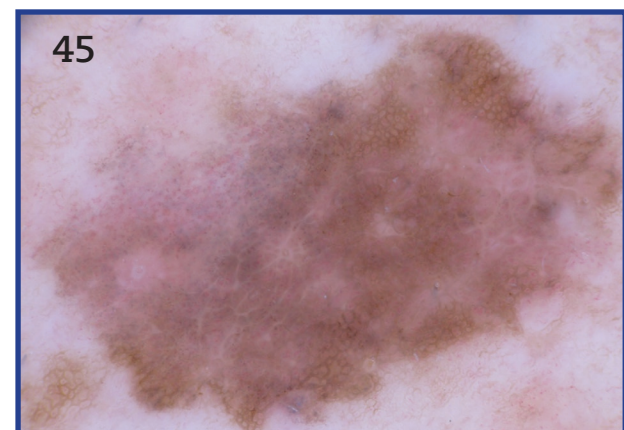
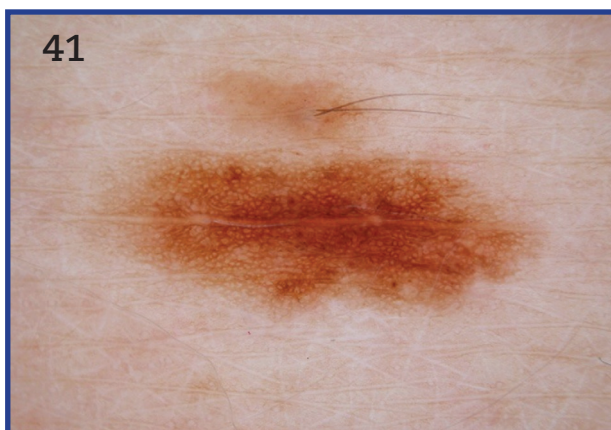
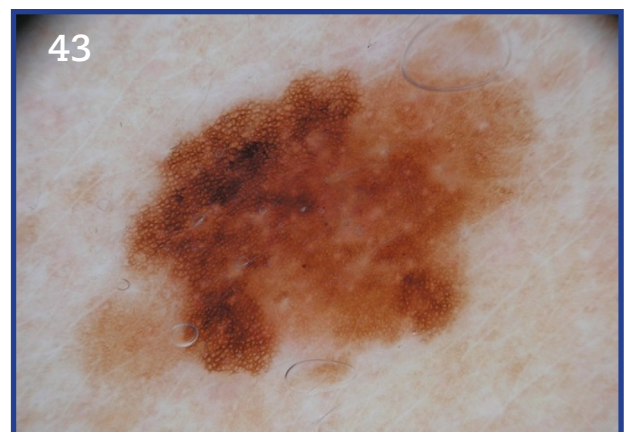
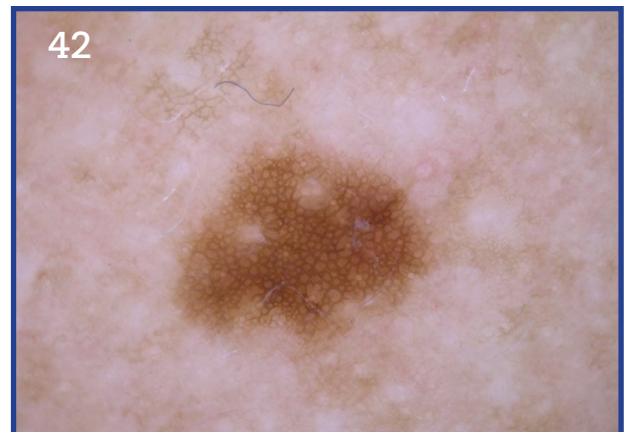
Images [41-42] show naevi.

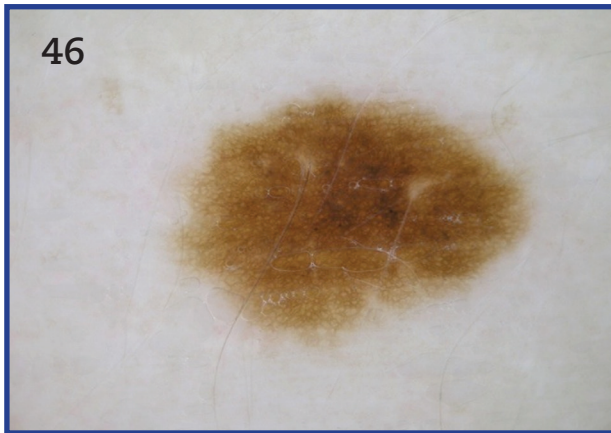
This is an example of the threshold between normal and abnormal. There is too much irregularity in this lesion. It is a melanoma in situ. [43]

This lesion is benign. [44] It is sometimes difficult, however, to decide between regression and hypopigmentation. In this lesion, the white colour is not a scar-like colour. It is caused by a loss of pigment, which indicates hypopigmentation.

Here you see a melanoma. [45] You can see the irregular colours and network as well as the regression.

The lesions in Images [46-48] are naevi.

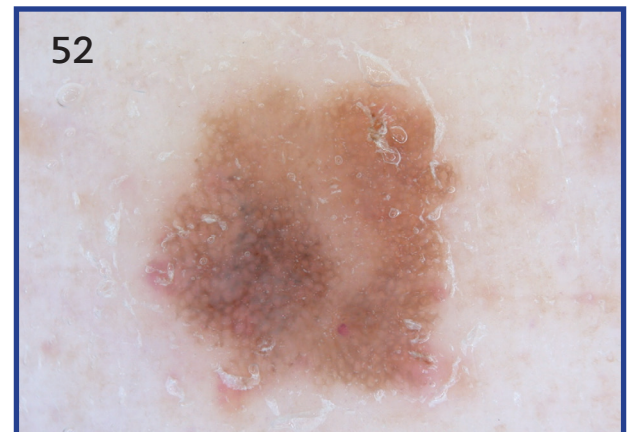
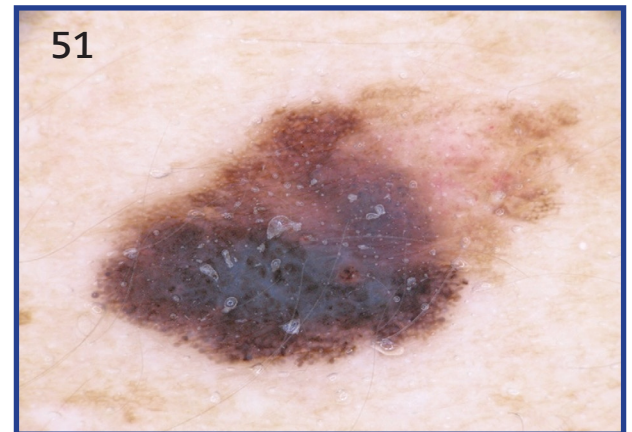
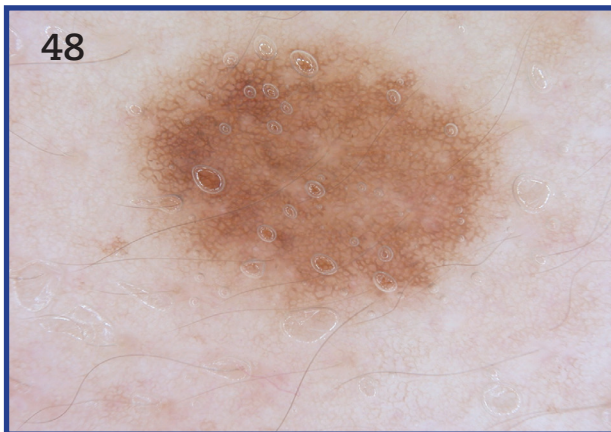
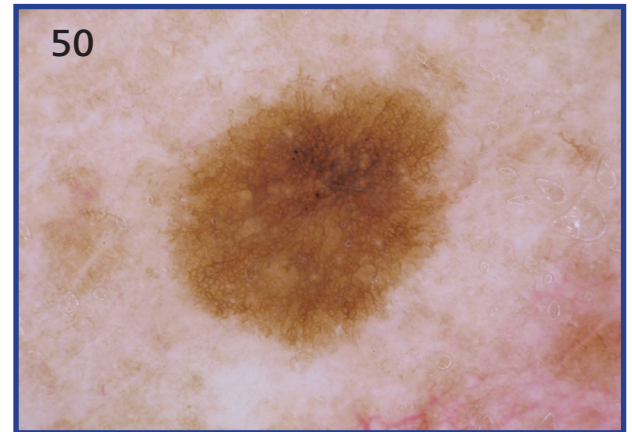
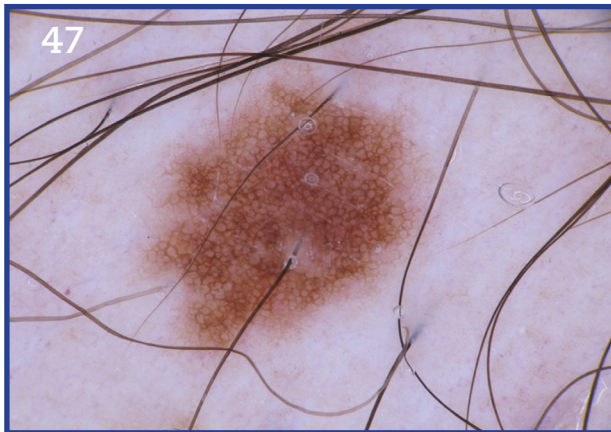




This is a benign lesion [49] and this is a naevus [50]. Though there is a small amount of irregularity, it is still within the normal range.

Here you see a melanoma. [51] There is a variety of blue and black colour.

The irregularity in this lesion falls outside the normal range. [52] You can see the grey/brown network on the left and the brown network on the right. This is a melanoma in situ.



This lesion requires a comparison of the patient's other lesions. [53] If it is different from the rest, you should excise it.

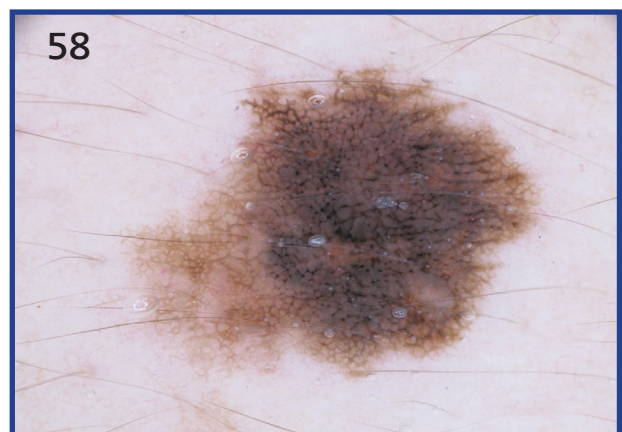
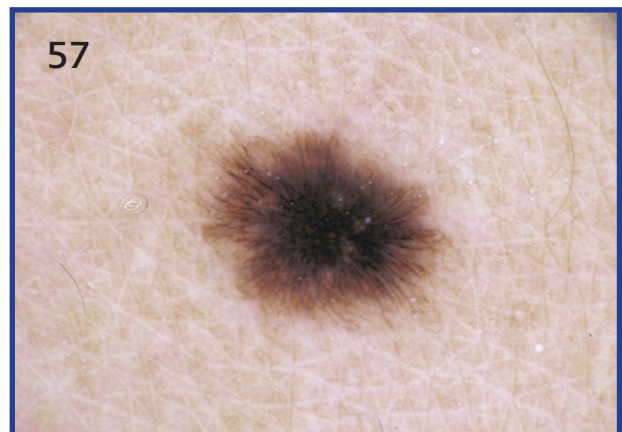
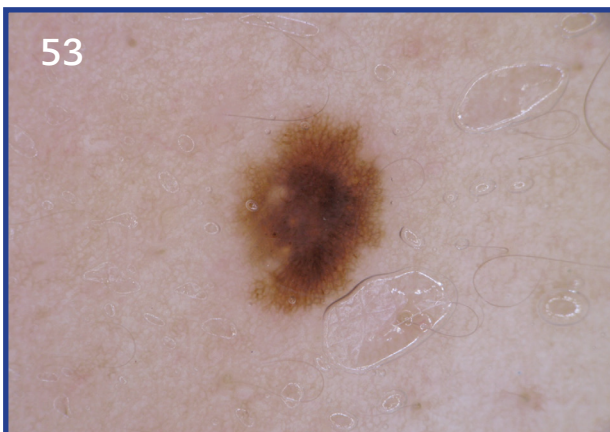
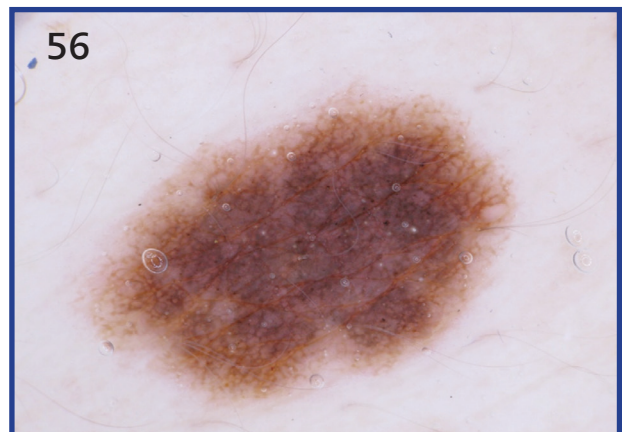
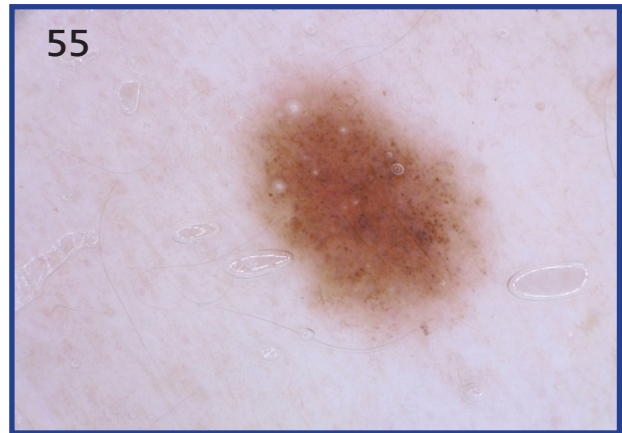
Image [54] shows a melanoma in situ. There is more black colouration on the left than on the right and there are streaks along the periphery. This indicates that the melanoma is growing.

Here you can see a naevus. [55] It is fairly regular, though there is no network. You can also see the globules, which are common in young patients. The globules are nests of melanocytes.

This lesion is benign. [56] This is a naevus. [57]

Here you can see a melanoma. [58] The network on the left is smaller than on the right, which you can see is thick, brown and grey.

The lesion in Image [59] is benign. This type of naevus is typically found on a fair-skinned patient.



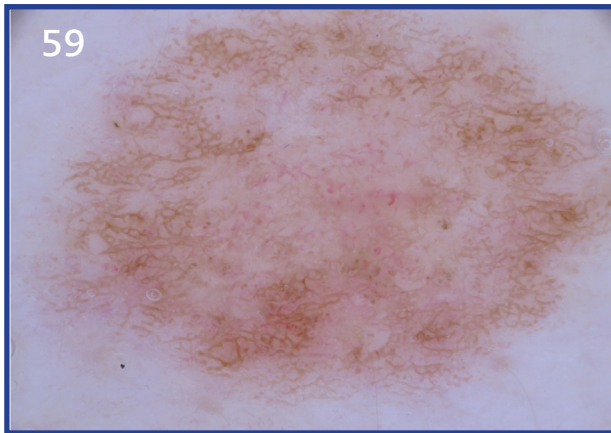
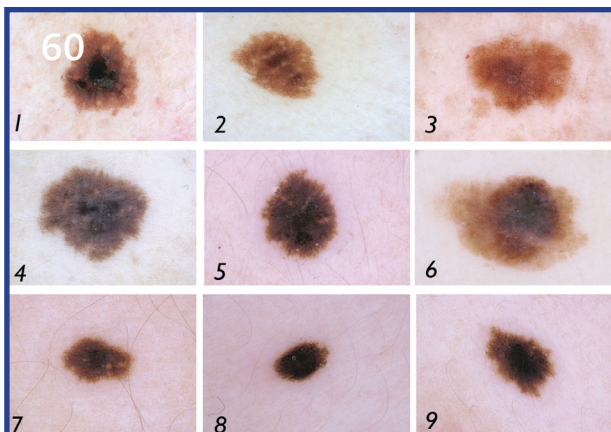


Image [60] shows the darkly pigmented naevi on a darker-skinned patient. The comparison approach was used to determine that Number 6 was different from the other lesions. It is a melanoma.

Image [61] shows a melanoma in situ. The network is too irregular to fall within the normal range.

This is a melanoma. [62] This lesion satisfies the two most important criteria in diagnosing a melanoma: regression and atypical network.



This is a benign lesion. [63-64]

The lesion in Image [65] is also benign. Although there is some irregularity on the left, it still falls within the normal range.

Image [66] shows a melanoma in situ. The irregularity in this lesion does not fall within the normal range. There are a variety of colours, the network is irregular, and there are streaks around 6:00.

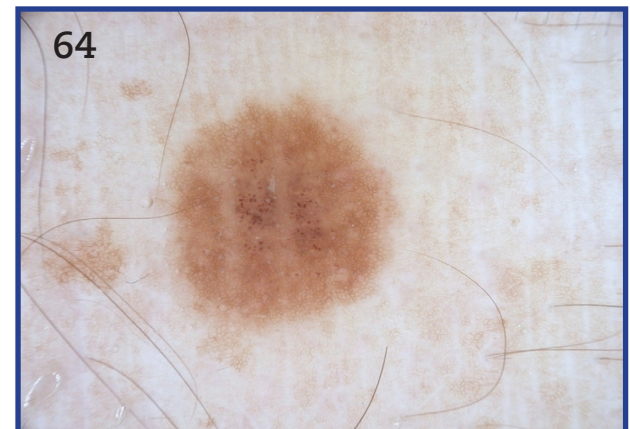
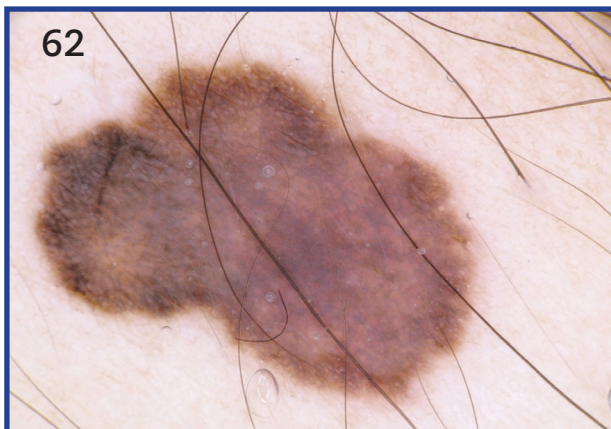
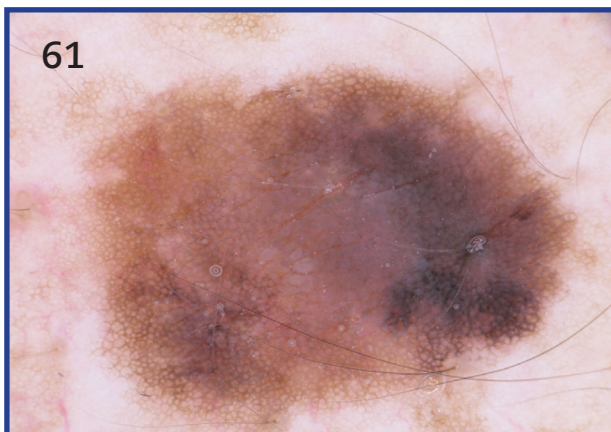
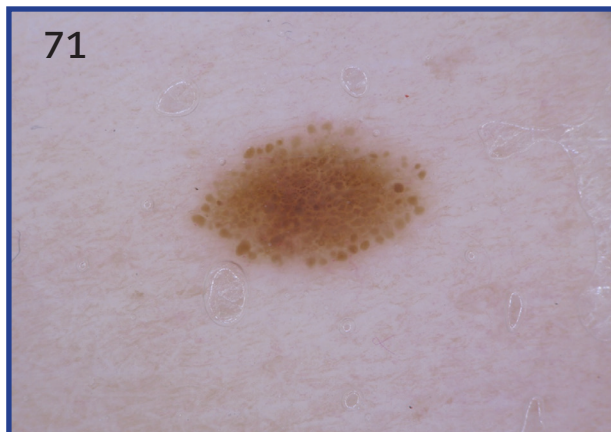
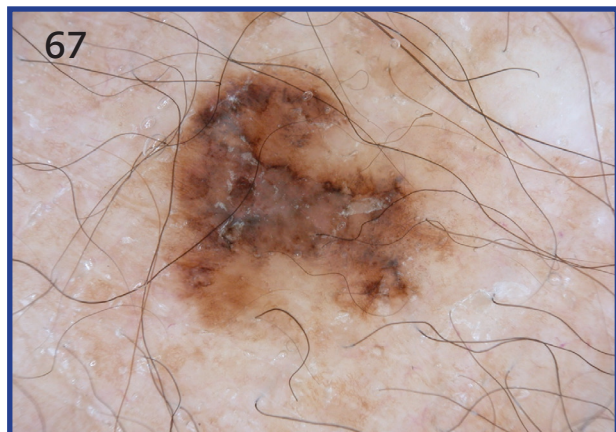
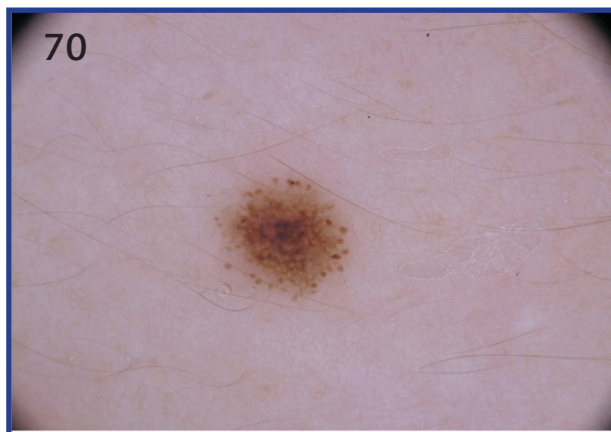
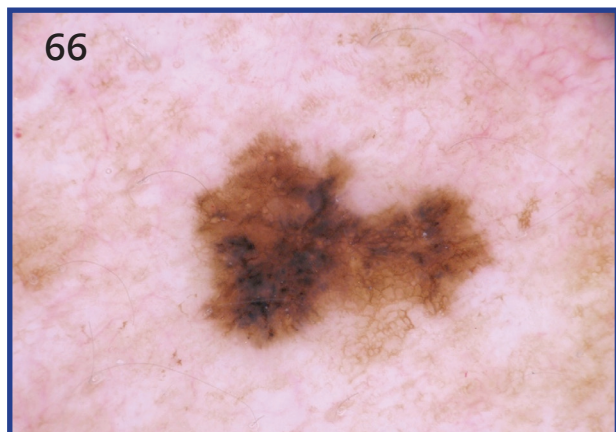
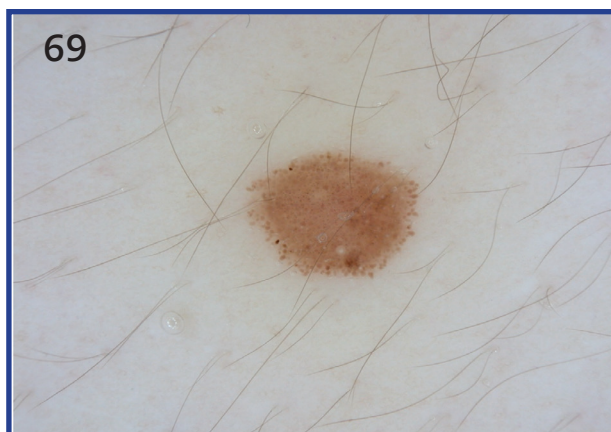
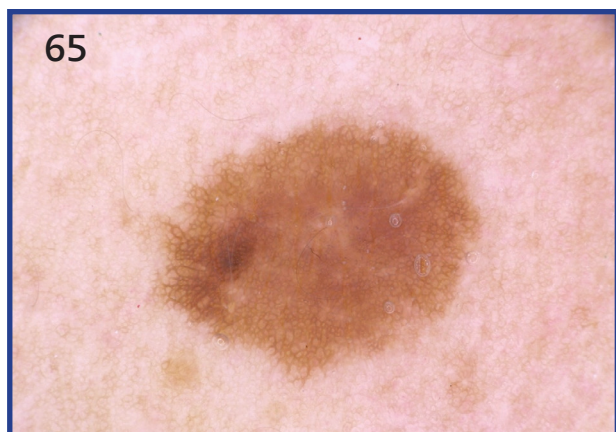
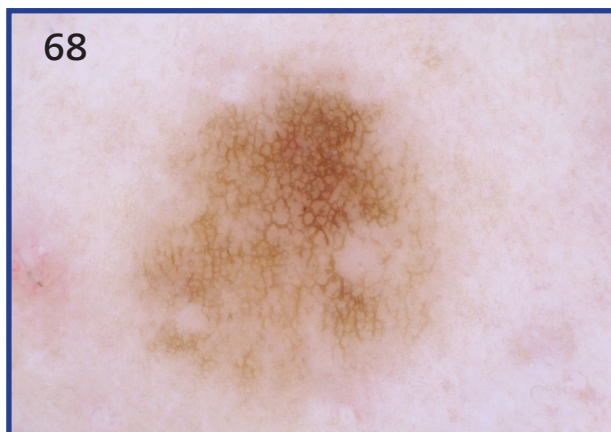


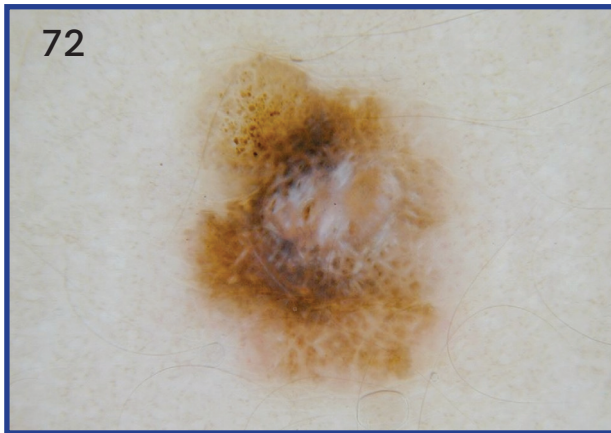
Image [67] shows a melanoma.

This lesion is benign [68], as is this one [69]. Though it has multiple brown globules, they are regularly distributed. This type of lesion is common in young adults and children.

Images [70-71] show benign lesions.

This is a melanoma because the globules are asymmetrical, there is a blue-whitish veil in the middle, and the colours are irregular. [72]





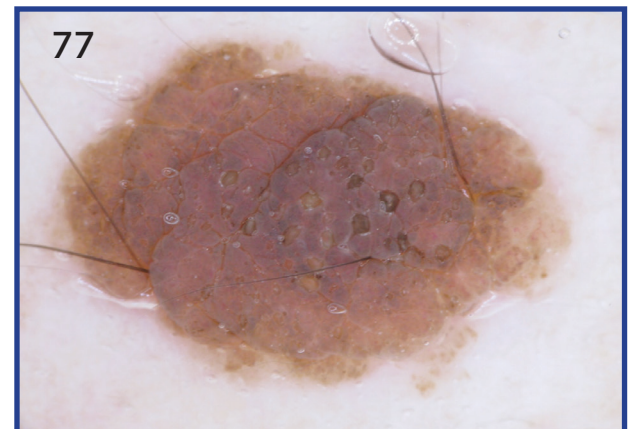
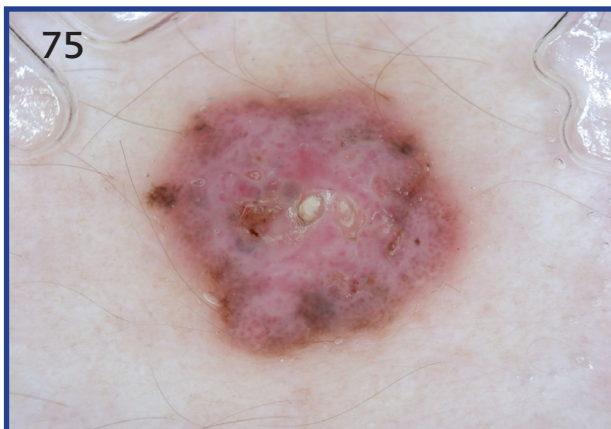
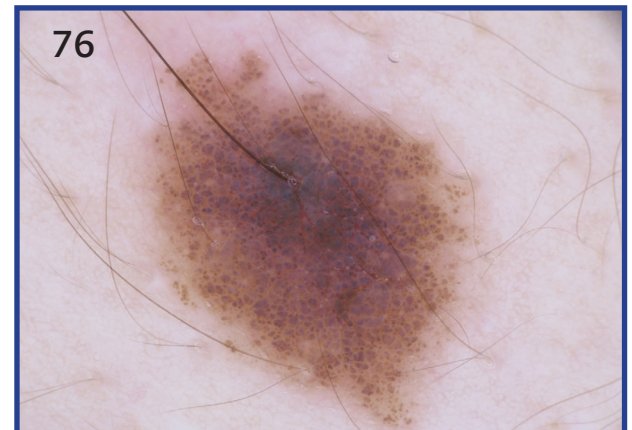
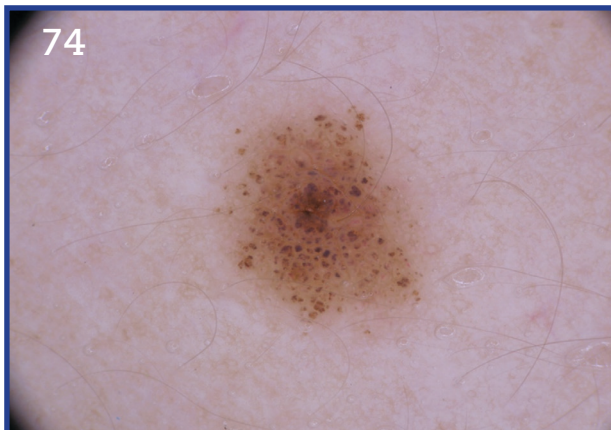
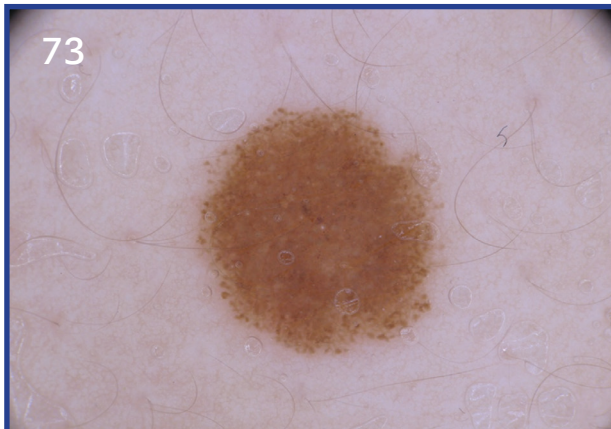
The lesion in Image [73] is benign. The globules are regularly distributed along the periphery.

The lesion in Image [74] is also benign. Even though the globules are varying shades of brown to grey, they are evenly distributed.

This is a melanoma. [75] There are varying colours, especially red, and there are a lot of vessels and irregular globules.

This lesion is a benign, globular naevus. [76] Usually, if it is a globular naevus, it is also a congenital naevus. The brown globules along the periphery correspond to the dermo-epidermal junction and the grey corresponds to the papillary dermis.

Image [77] shows a papillomatous lesion – a dermal naevus. The presence of a terminal hair also means it is likely congenital.



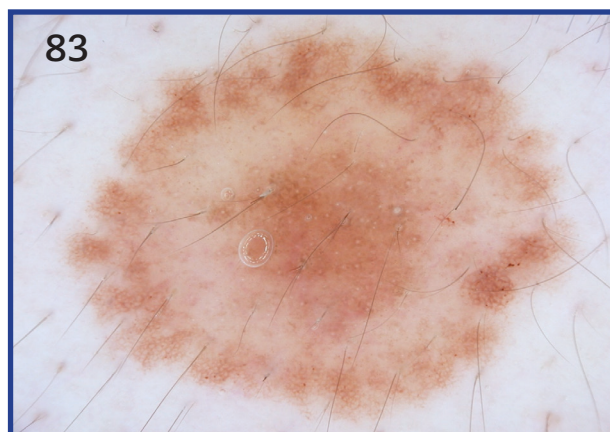
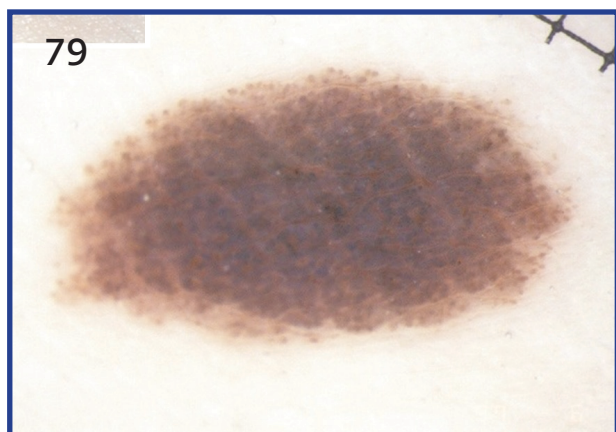
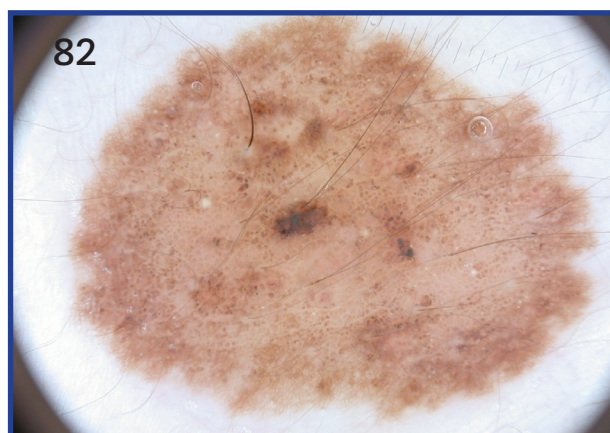
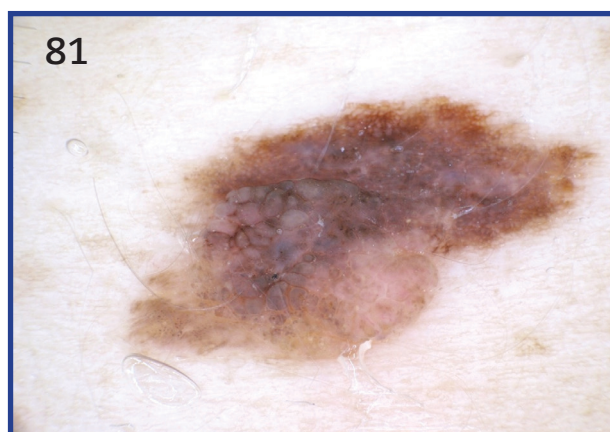
This is a benign naevus with grey to black colouration in the middle and globules along the periphery. [78]

Images [79-80] show a congenital naevus with the greyish structures in the middle. These nests of melanocytes in the papillary dermis are called “cobblestones”. The brown globules are nests of melanocytes at the dermo-epidermal junction.

Image [81] is a melanoma that arose from a dermal naevus. There is asymmetry in its colour, shape and structures, and there is a blue-white veil.

This lesion looks benign based on the mostly regular globules and terminal hairs. You could follow up with this patient because there are some grey areas. [82]

Image [83] shows a fried egg naevus because of the pattern of brownish pigment in the middle, a structureless area and hypopigmentation surrounding the middle. It is a benign congenital naevus.



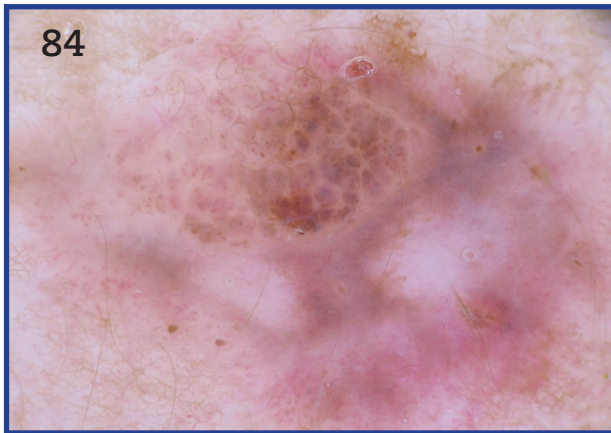
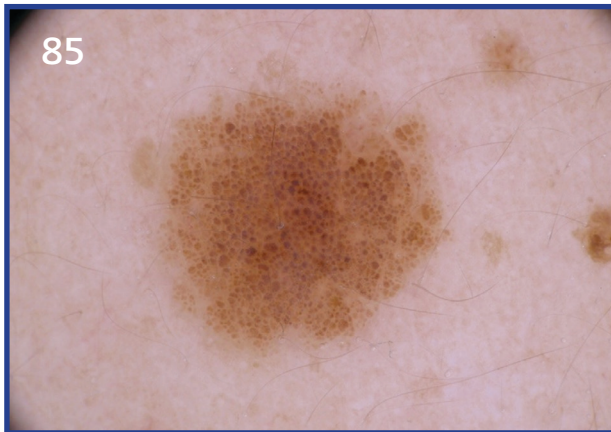


Image [84] shows a melanoma arising from a dermal naevus. There are papillary structures along the top, but the rest of the lesion has red colouration, polymorphic vessels, white areas indicative of regression (fibrosis) and grey colouration, which correspond to melanophages.

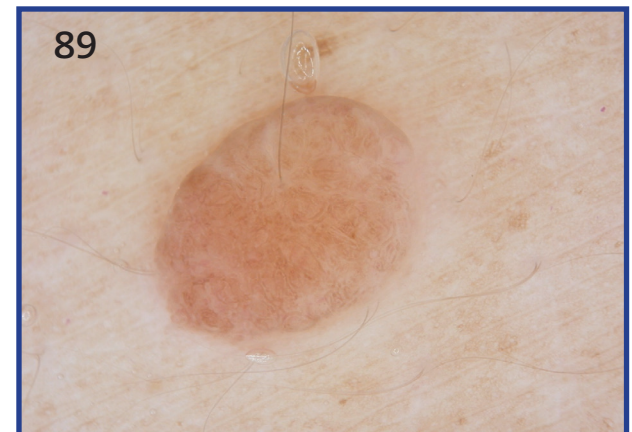
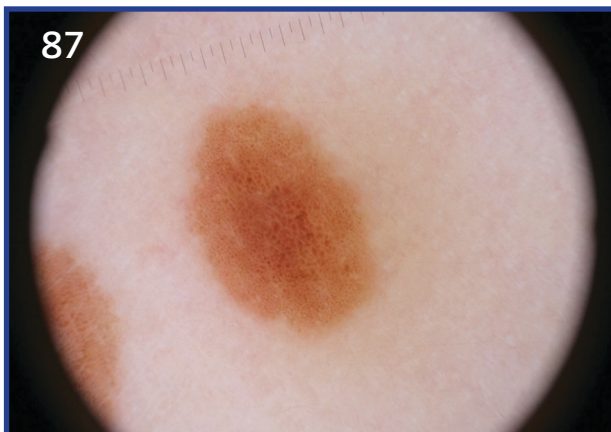
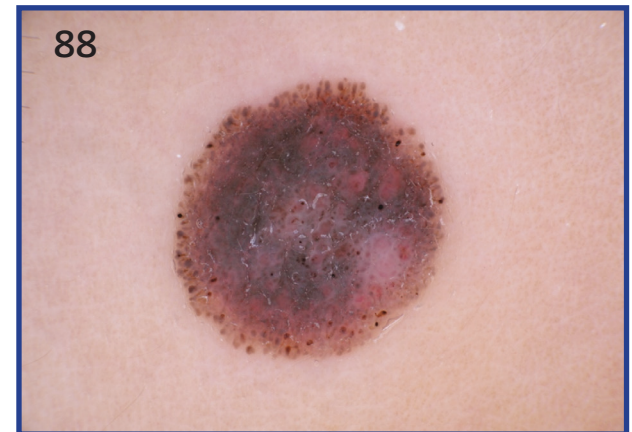
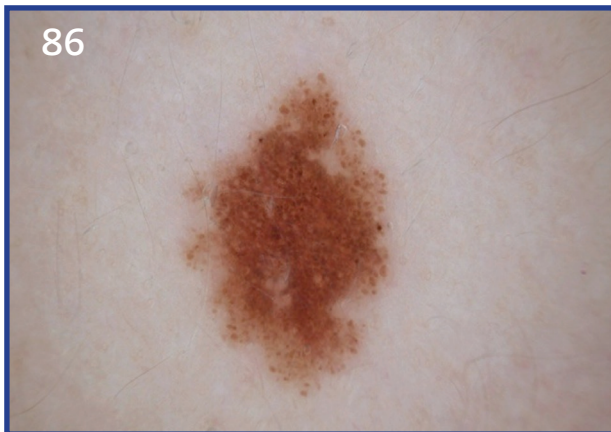
This lesion is a globular, benign naevus. [85]
You can see the regular nests of melanocytes.



The lesion in Image [86] is in the normal range because the globules are mostly regularly distributed along the periphery. This is a benign naevus. [87]

On first glance, this lesion appears symmetrical. [88] But with a dermoscope, you will see that the colours and structures are asymmetrical. There is more white on the right. This is a Spitzoid-looking lesion, and it must be excised to determine if it is a melanoma.

This lesion is most likely a dermal naevus because it is elevated along the periphery, which almost always indicates a dermal naevus. [89]



The lesion in Image [90] is a dermal naevus. There are globules along the periphery and the lesion is elevated and demarcated.

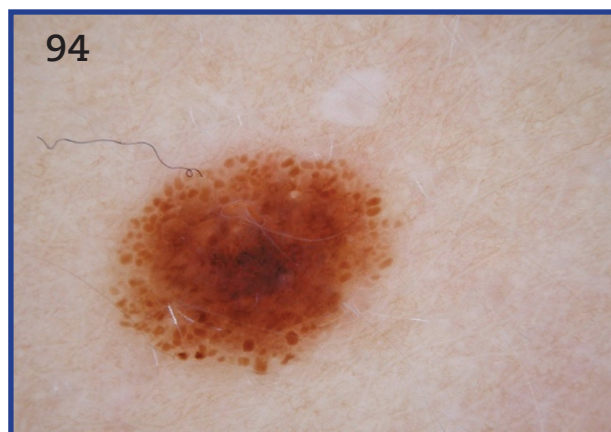
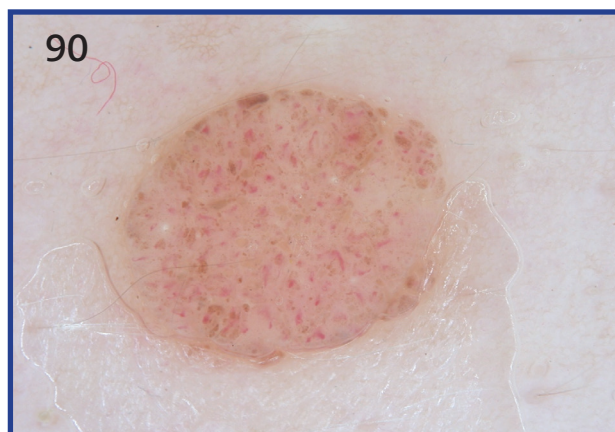
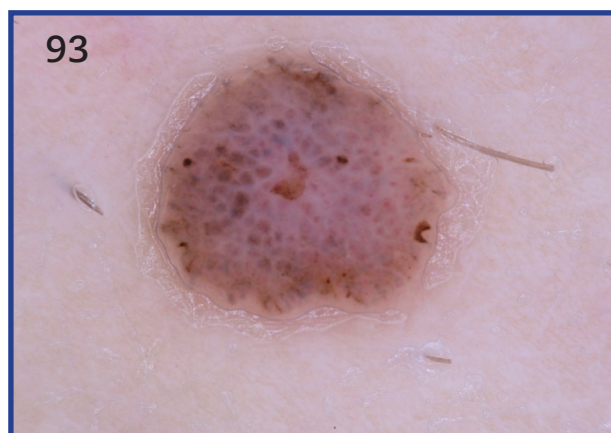
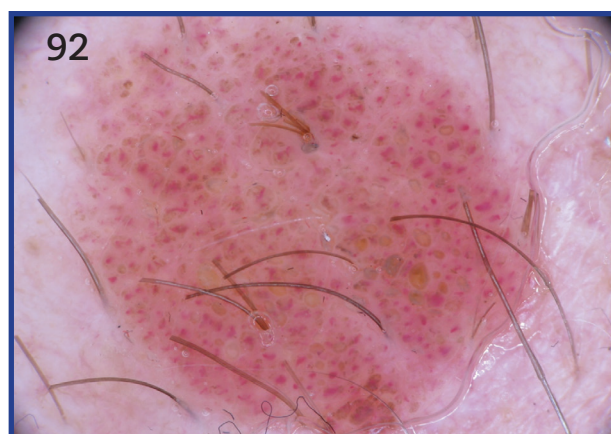
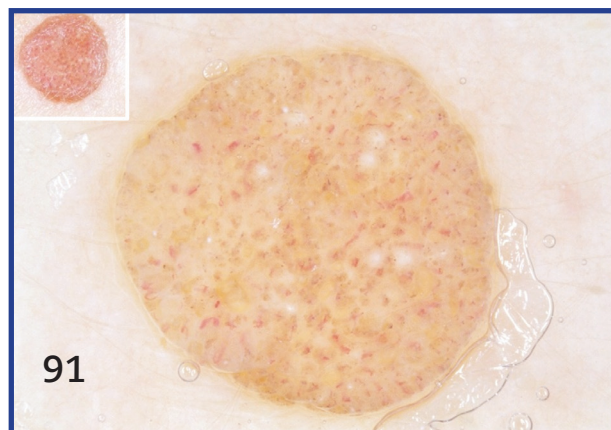
In this particular lesion, the vessels are clearer because of hypopigmentation. These vessels are called “comma-like vessels” because of their shape. You can also see red dots, which are not only common in dermal naevi, but also in melanomas and Spitz naevi. These dots are thick in dermal naevi, which is how they appear here.

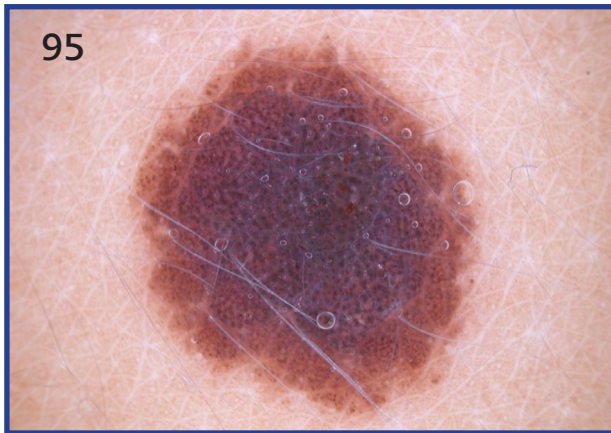
Here is another dermal naevus. [91] It is regular in shape, structures and colours, and it has thick vessels.

This is a benign dermal naevus because of its regularity, the comma-shaped vessels, the thick, dotted vessels, and the terminal hairs. [92]

Despite the symmetry of shape in this lesion, there are many structures and colours that are asymmetrical. [93] This means that it could be a melanoma and should be excised. It was, however, a Spitz naevus.

The benign naevus in Image [94] falls within the normal range even though it has some dark brown globules.



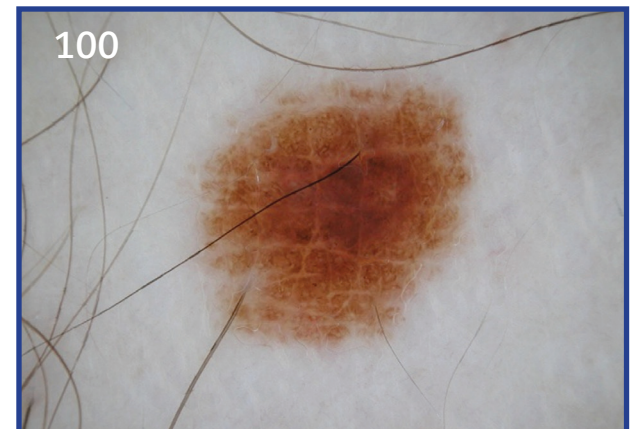
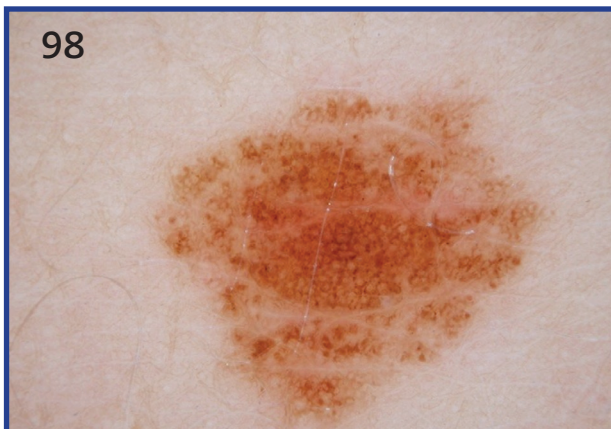
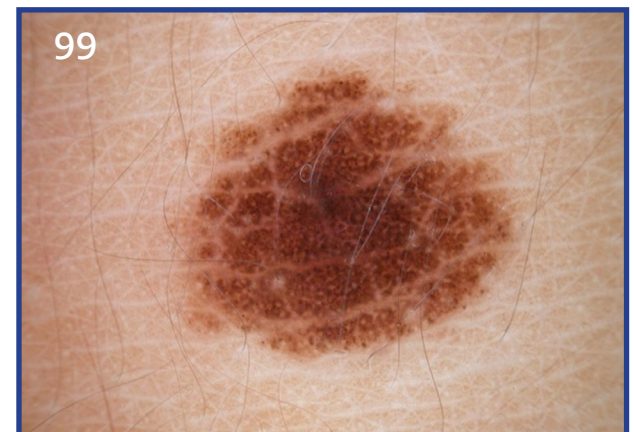
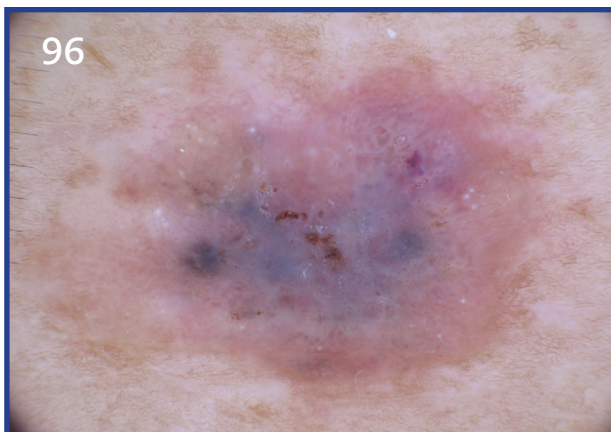


This is a congenital naevus because it is symmetrical with grey colouration in the middle and brown globules along the periphery. [95]

This lesion is a melanoma. [96] You can see the blue-white veil, the red, and the blue-black colouration.

The lesions in Images [97-99] are all benign.

This is a benign congenital naevus. [100] It has a structureless centre and it is symmetrical in structure and colour.

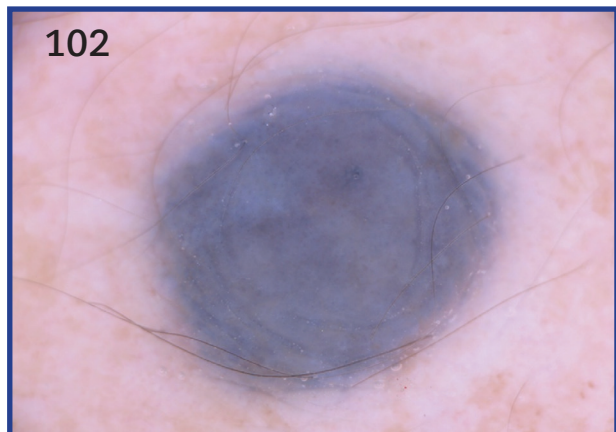
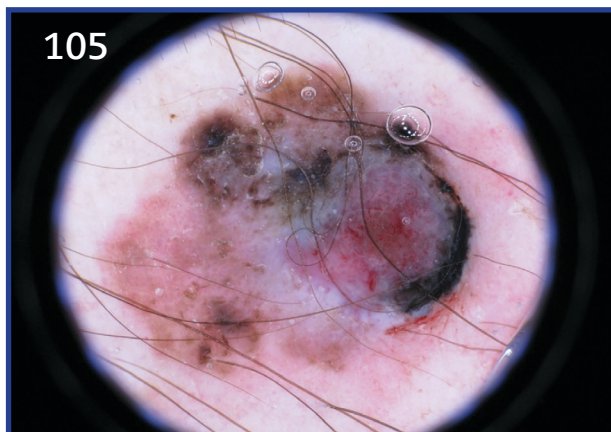
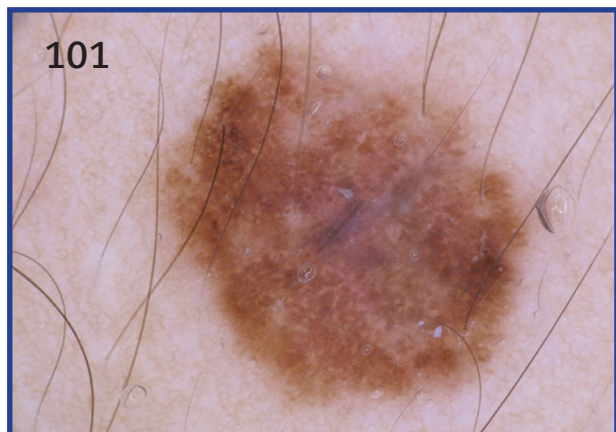
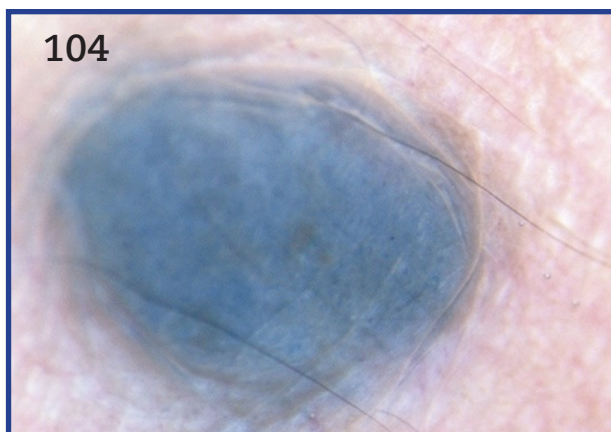
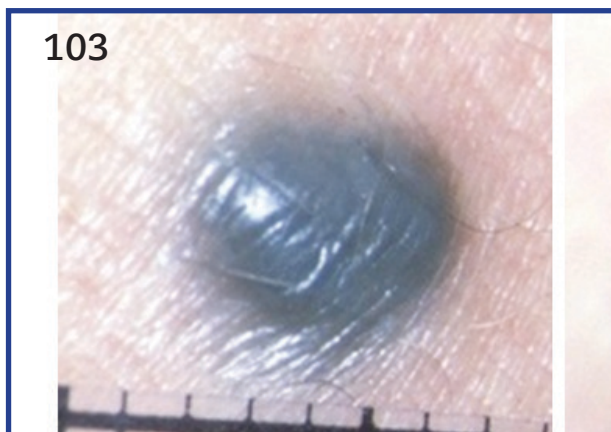


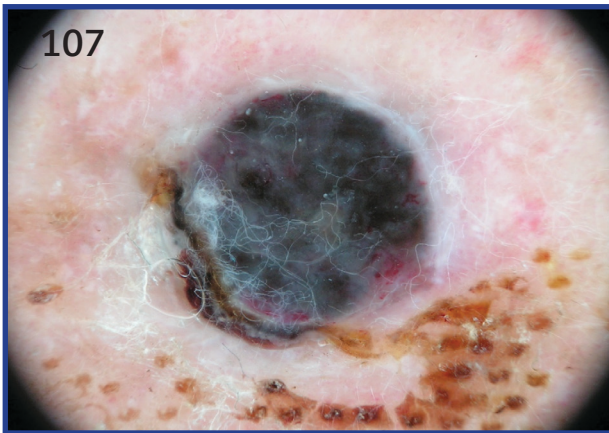
The lesion in Image [101] should be excised because it is not completely symmetrical, and it has a lot of structures and colours with a blue-white veil in the middle.

Images [102] and [103-104] show blue naevi. You can see they are symmetrical, structureless, and completely blue. This type of naevi is the third most common naevus after reticular and globular.

In this melanoma, you can see the blue, black, grey, brown, and red colouration. [105]

This is a blue naevus with shades of blue but still within the normal range. [106]





The nodular melanoma in Image [107] should be excised.

This lesion was found on a patient's scalp. [108] It is light blue in the middle, which is caused by fibrosis, and dark blue along the periphery.

This is a blue naevus with some brown colouration, which is acceptable. [109] However, the lesion in Image [110] is not normal because of the blue and black colouration.

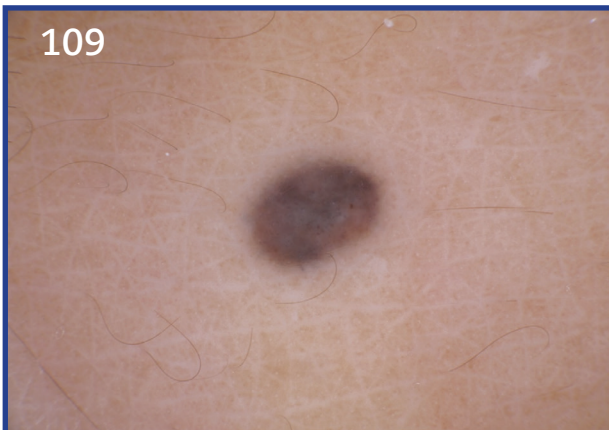


This is a pigmented Spitz naevus, also known as a "Reed naevus". [111] It has a starburst appearance and is most likely benign.

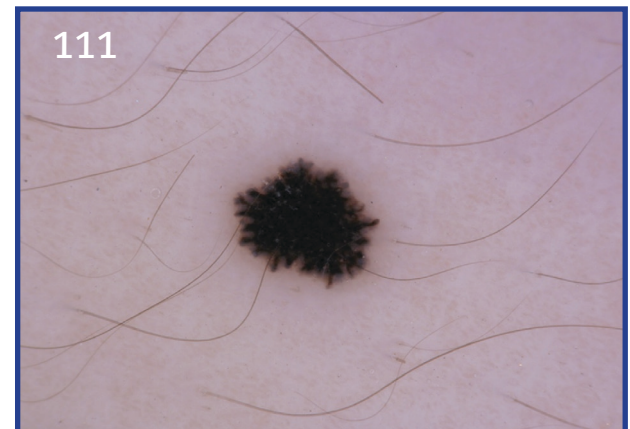
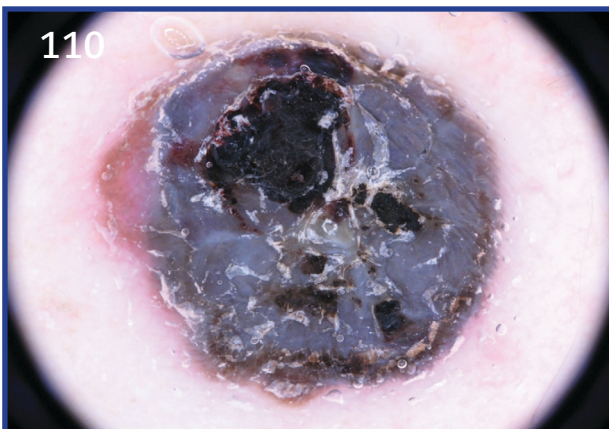
Spitz naevi are the fourth type of naevus commonly seen in practice and are usually heavily and symmetrically pigmented with clearly defined streaks along the periphery that are also present across the entire lesion.

Do not excise Spitz naevi in pre-pubescent children. Even a follow-up before puberty is an overabundance of caution.

After puberty, the probability that the Spitz naevus is instead a melanoma increases with age.



For example, if the patient is 20 years old, the lesion is likely to be a Spitz naevus. If the patient is 55 or 65 years old, there is an increased risk that it is a melanoma and it should be excised. This particular lesion was on a small child. [111]



This Spitz naevus was also found on a small child. [112-113]

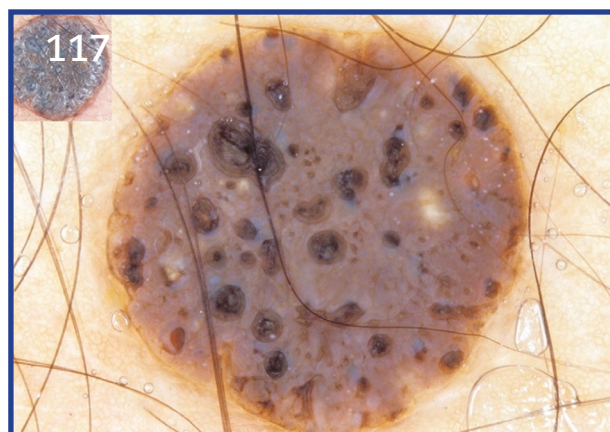
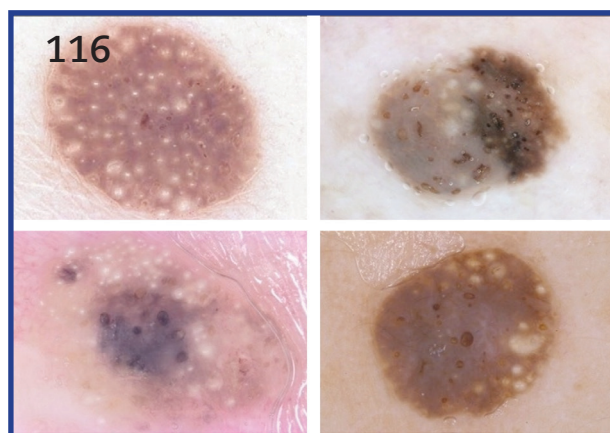
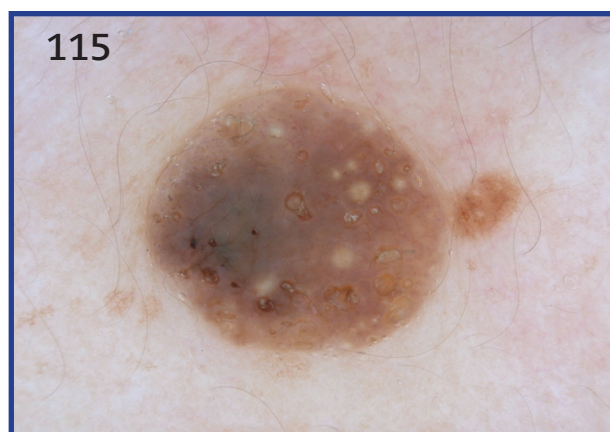
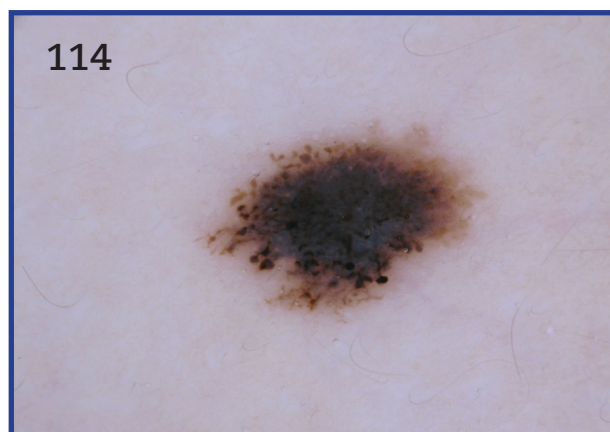
Although this lesion also appears to be a Spitz naevus, you can see that the colours are asymmetrical and it should be excised. [114]

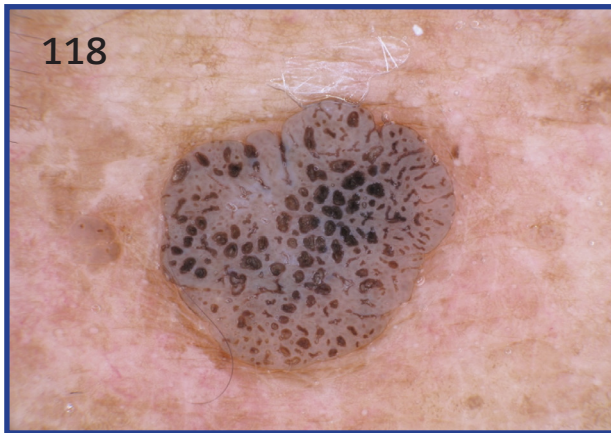
Seborrheic keratosis or basal cell carcinoma?

This is a seborrheic keratosis because of the whitish clots and comedo-like openings. [115]

These are four examples of seborrheic keratosis with distinct milia-like cysts, which are very common. [116]

Image [117] shows a seborrheic keratosis with many comedo-like openings. You can also see the demarcation along the periphery, which is a clue to this type of lesion.



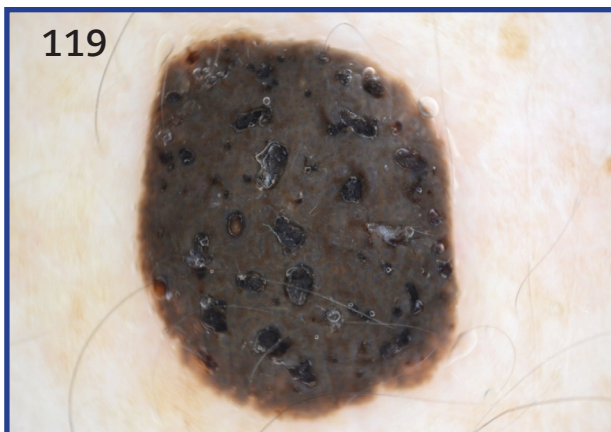


This lesion is a seborrheic keratosis with brain-like structures at 2:00 or 3:00. [118]

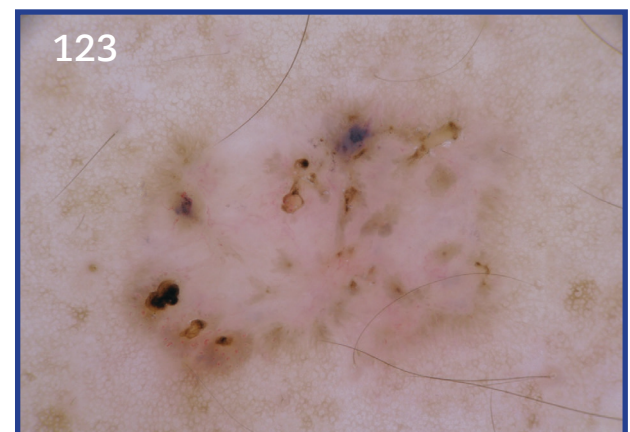
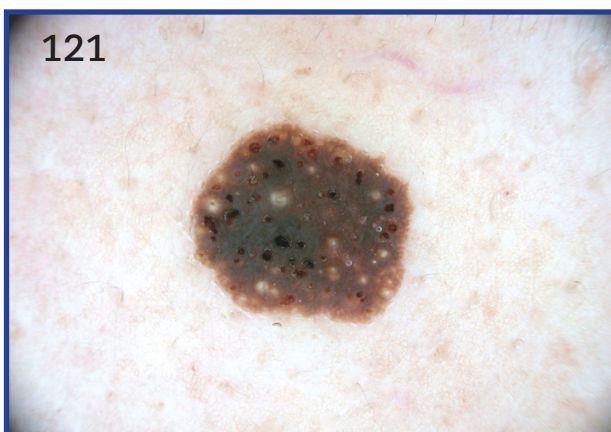
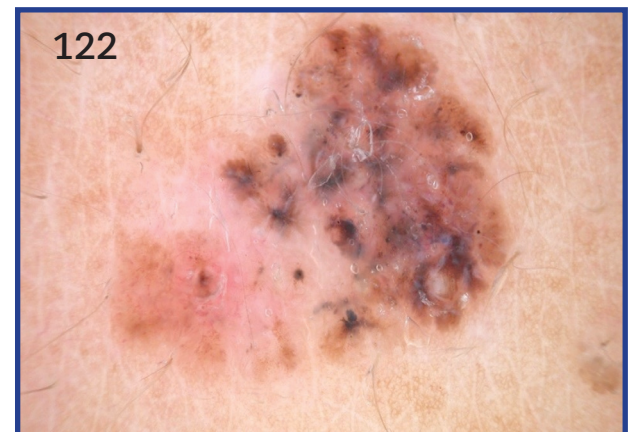
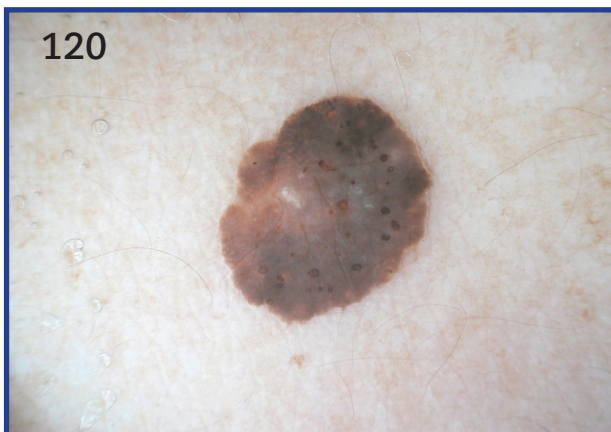
Image [119] also shows a seborrheic keratosis. You can see the comedo-like openings and the demarcated, round, black/brown structures.

Here is another example of a seborrheic keratosis. [120-121]

This lesion is a basal cell carcinoma. [122] You can see the many colours and the grey/brown areas of pigmentation.



The lesion in Image [123] is also a basal cell carcinoma. The black areas are crusted blood, which typically indicate BCC.



This lesion is also a basal cell carcinoma. [124]

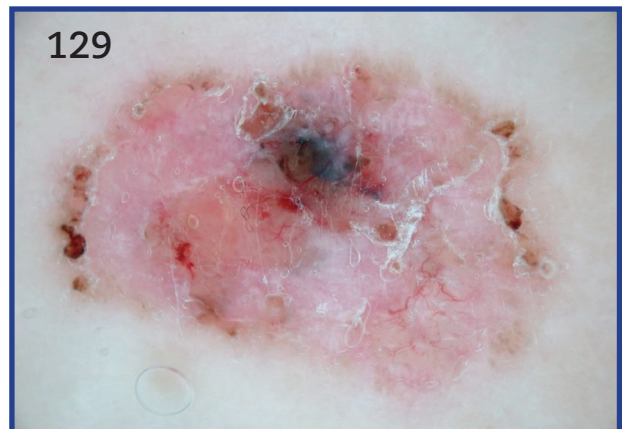
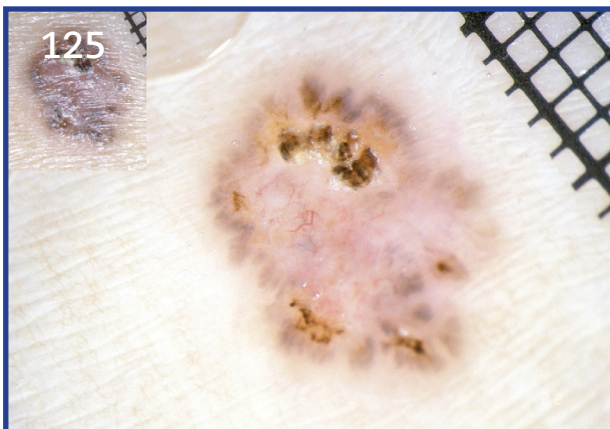
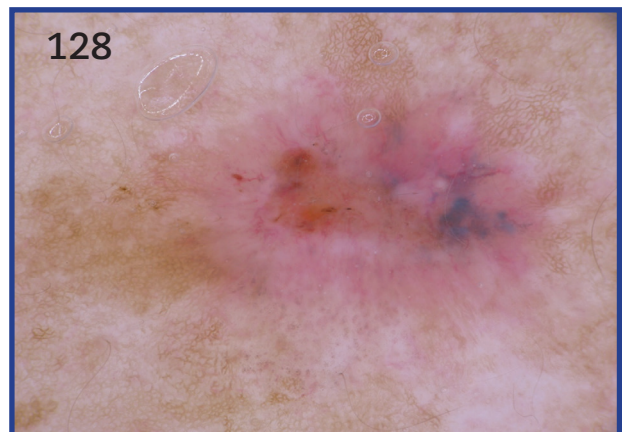
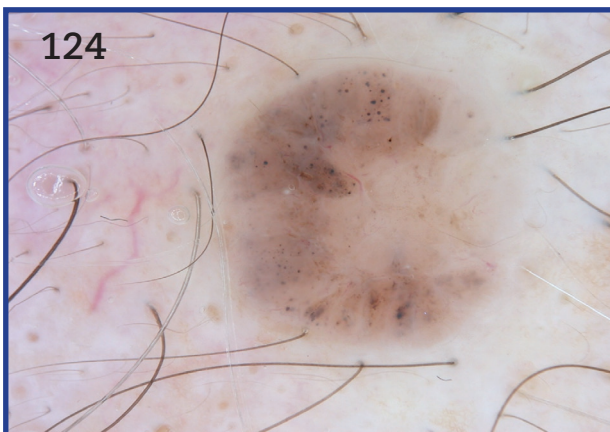
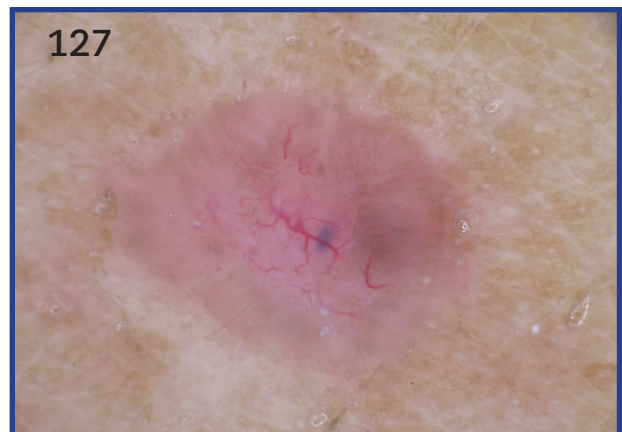
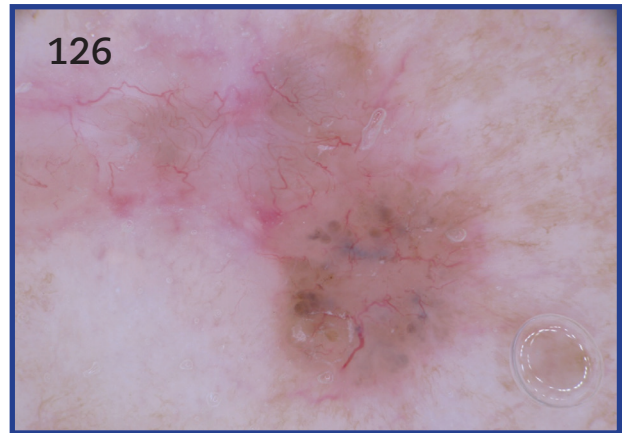
In this basal cell carcinoma, you can see the leaf-like areas along the periphery, which are grey areas of pigmentation. There are blood crusts that correspond to erosions, which are a clue to BCC. You can also see the arborising vessels. [125]

This is another basal cell carcinoma with arborising vessels and areas of pigmentation. [126]

The basal cell carcinoma in Image [127] has arborising vessels and an oval-shaped blue pigmented area.

The lesion in Image [128] is also a basal cell carcinoma.

Although this lesion looks like a melanoma, the presence of blood crusts, arborising vessels and blue pigmentation indicates basal cell carcinoma. [129]

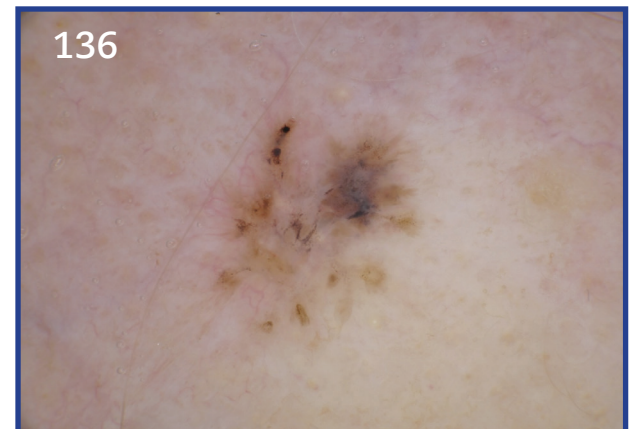
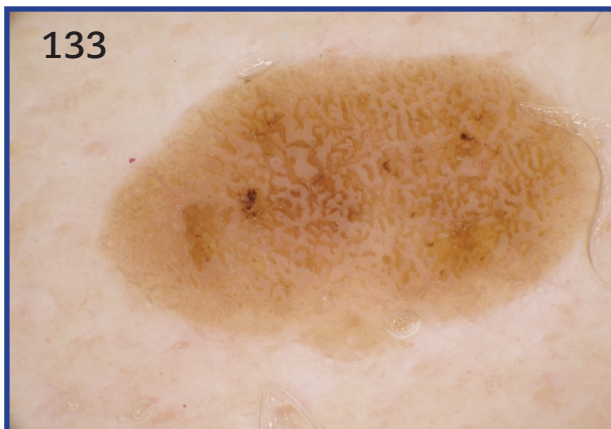
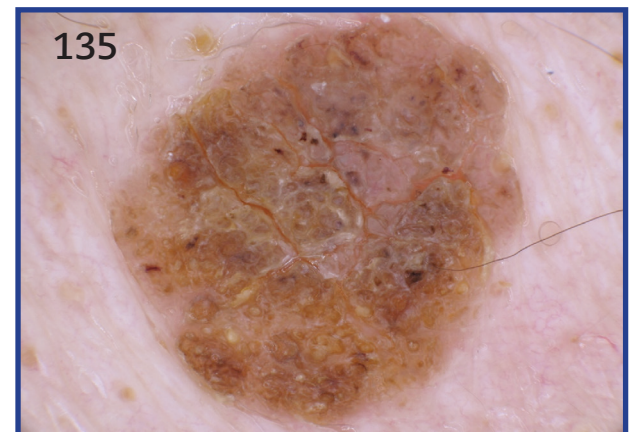
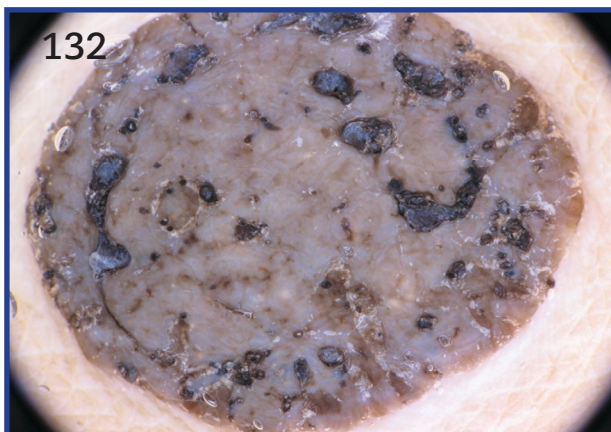
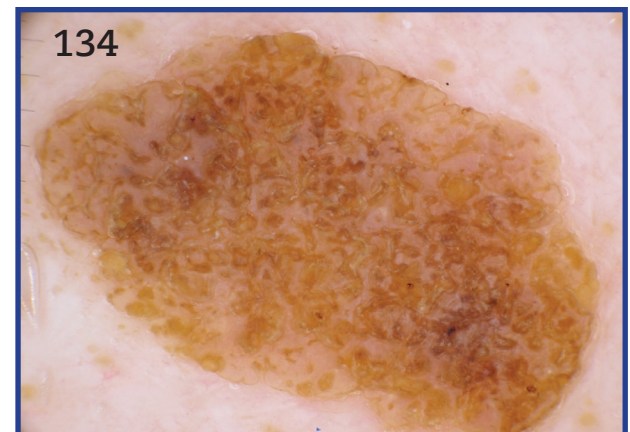
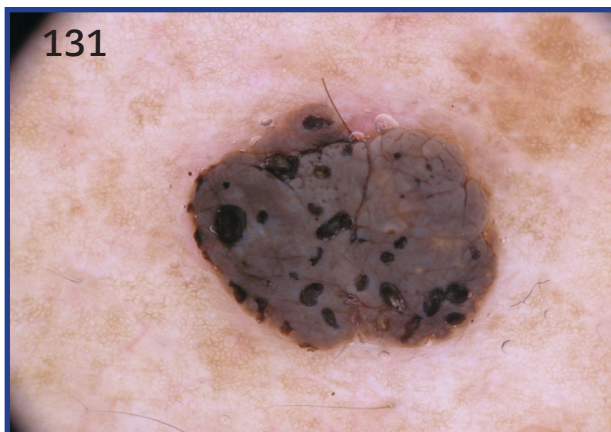




Images [130-132] show seborrheic keratoses. Normally, the presence of blue and black together indicates melanoma, but here, the colours are actually indicative of comedo-like openings.

These lesions are also seborrheic keratoses. [133-135]

This lesion is a basal cell carcinoma with a leaf-like area along the periphery, grey colouration and areas of pigmentation. [136]

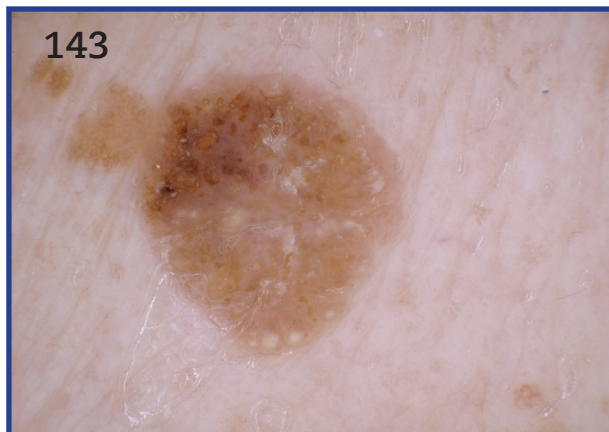
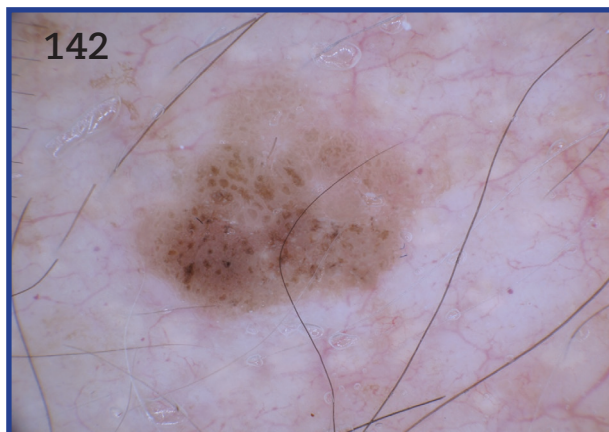
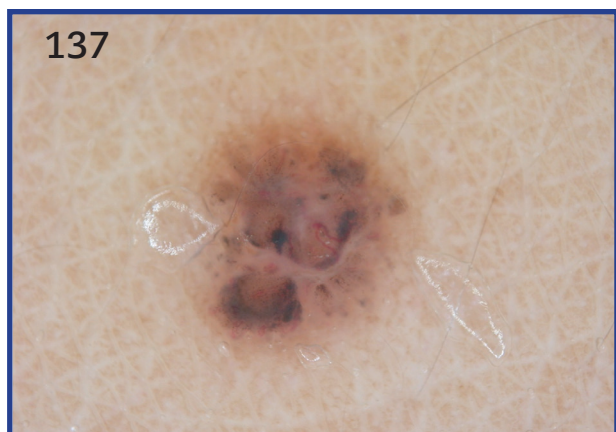


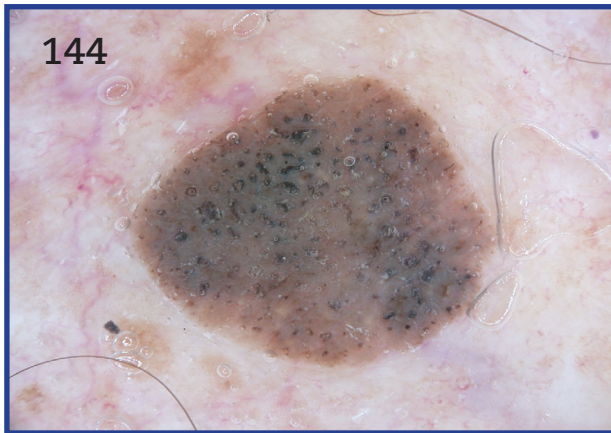
This is also a pigmented basal cell carcinoma. [137]

Image [138] shows a basal cell carcinoma with spoke wheel areas, which look like flowers. In Image [139], you can see another basal cell carcinoma with spoke wheels.

This lesion is a basal cell carcinoma with leaf-like areas along the periphery. [140]

Images [141-143] show seborrheic keratoses.

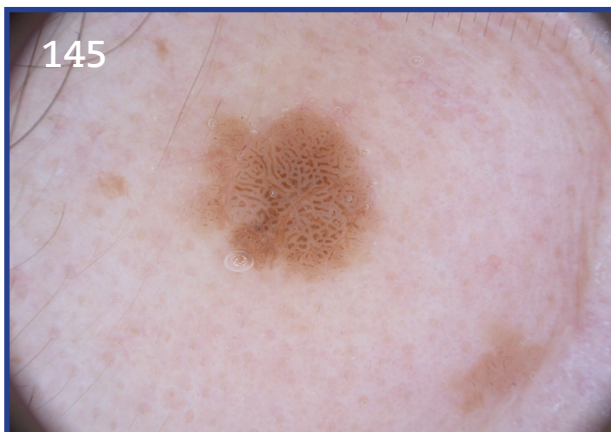




The lesion in Image [144] is a seborrheic keratosis with milia-like openings and sharp demarcation.

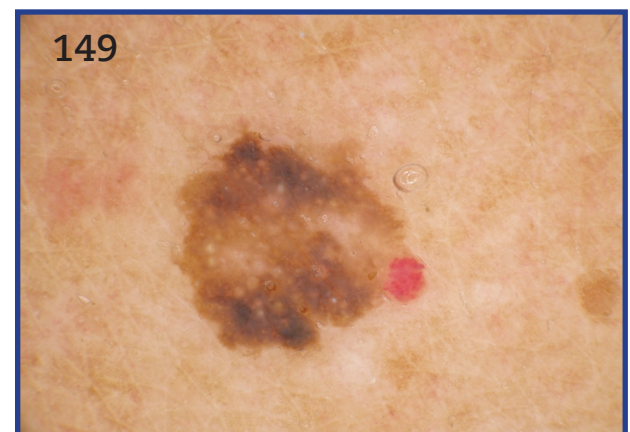
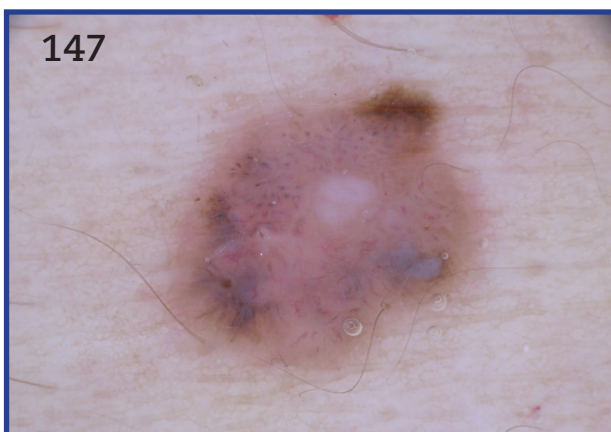
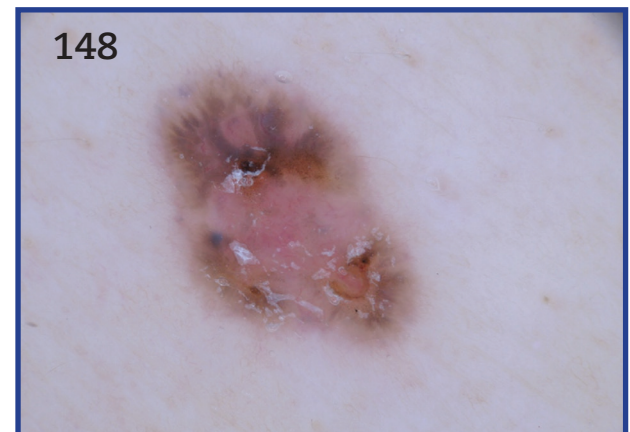
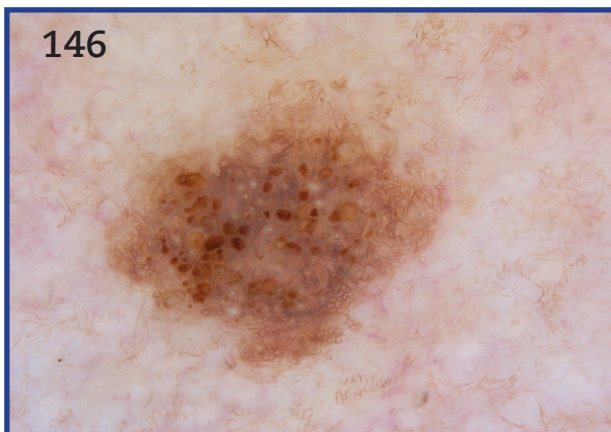
Here, you see a seborrheic keratosis with brain-like structures. [145]

Image [146] shows an early seborrheic keratosis. This is indicated by the many comedo-like openings along the periphery. It is not unusual to see both reticulation and comedones in a seborrheic keratosis.



Images [147-148] are examples of basal cell carcinomas.

This is another seborrheic keratosis. [149] The dot of red colour in this lesion is a cherry angioma.



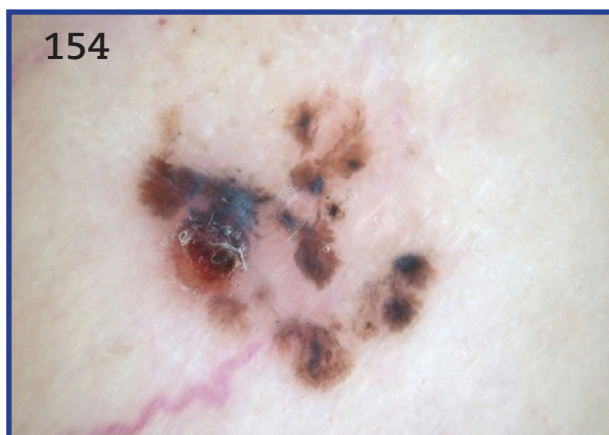
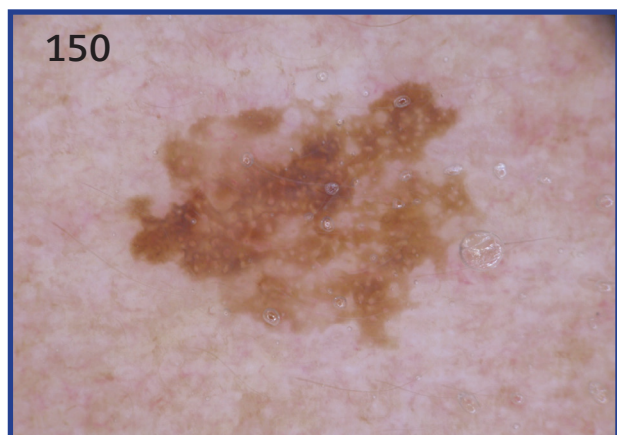
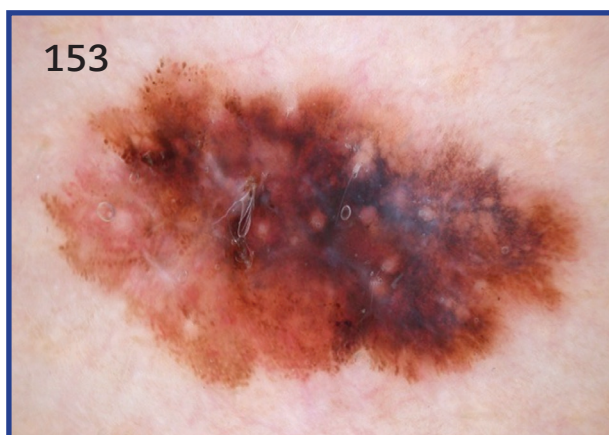
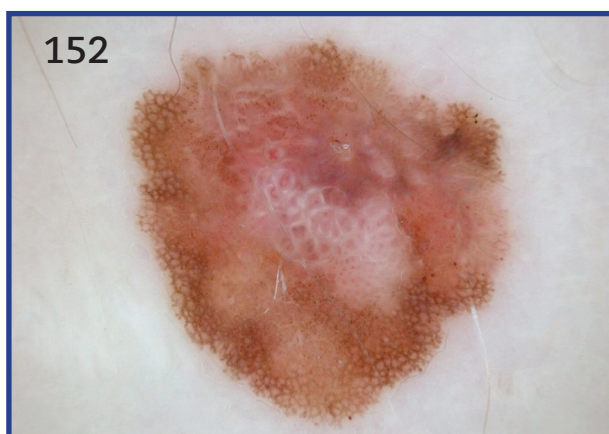
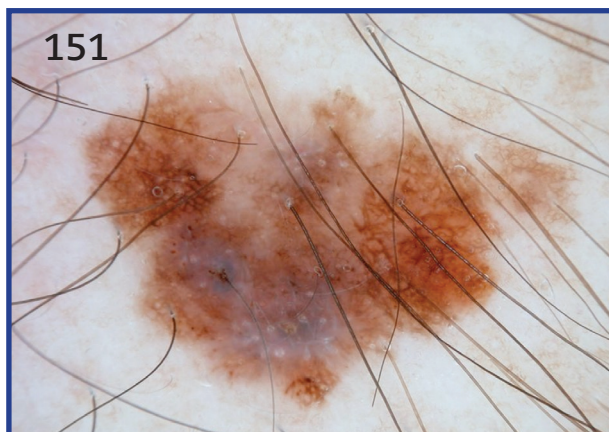
In this reticular seborrheic keratosis, you can see the moth-eaten border, which is very common in this type of lesion. [150]

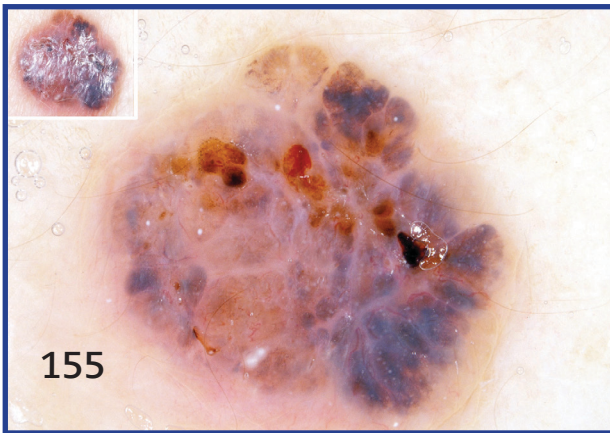
Melanoma or basal cell carcinoma?

Images [151-152] show melanomas. You can see the atypical network and the blue-white veil.

This lesion is a melanoma because of the brown colouration, globules, pigmented streaks and regression areas. [153]

Image [154] shows a pigmented basal cell carcinoma. You can see the areas of pigmentation along the periphery and the erosion.



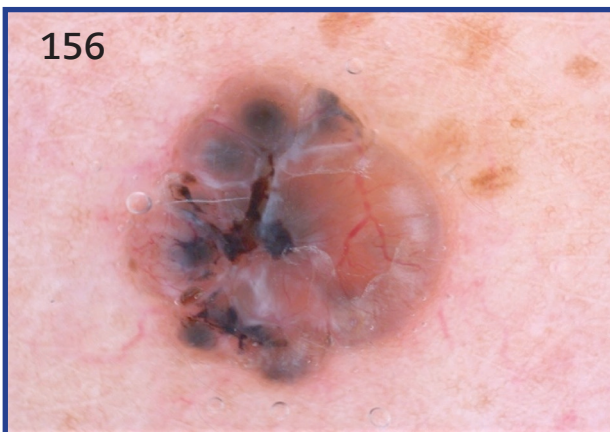


This is a basal cell carcinoma. [155] This lesion has a bluish pigment. [156]

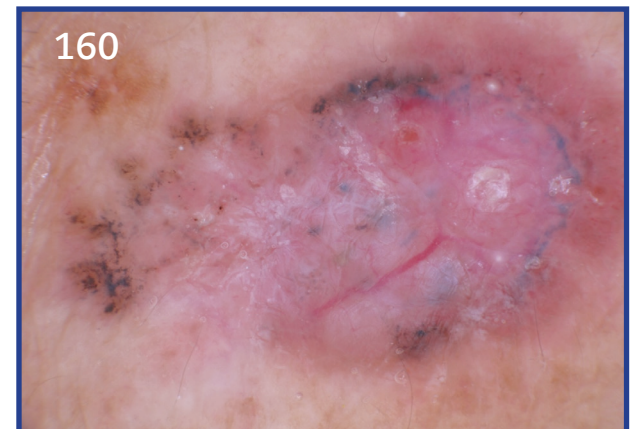
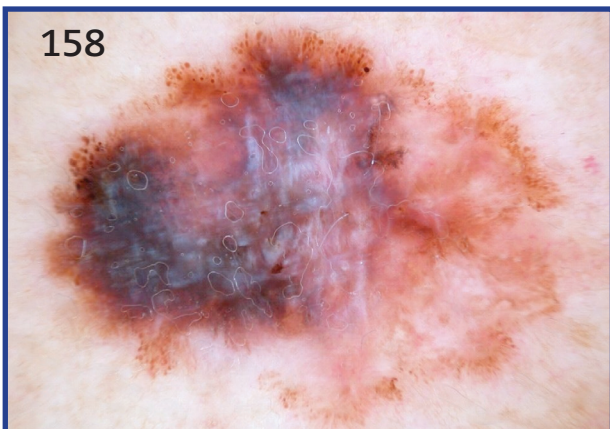
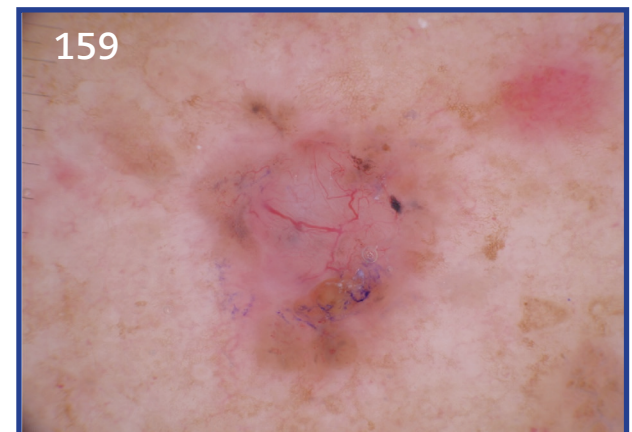
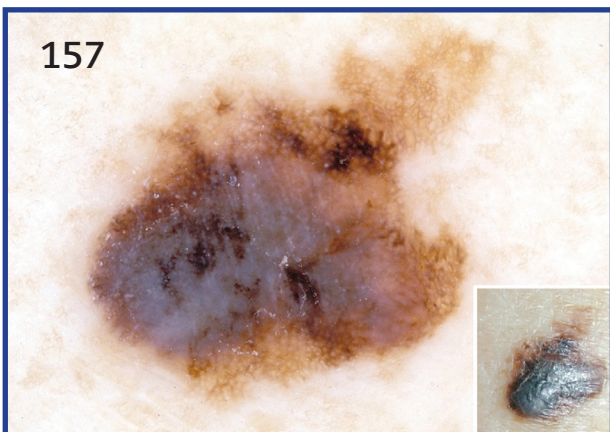
This is likely a melanoma with its atypical network, black colouration and blue veil. [157]

Image [158] also shows a melanoma.

Here is a basal cell carcinoma that is not heavily pigmented. [159] You can see the arborising vessels.



This is a pigmented basal cell carcinoma [160] and Image [161] shows a basal cell carcinoma with arborising vessels and small areas of blue.



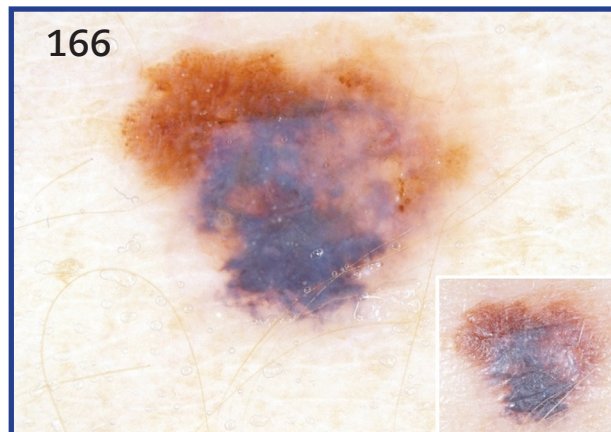
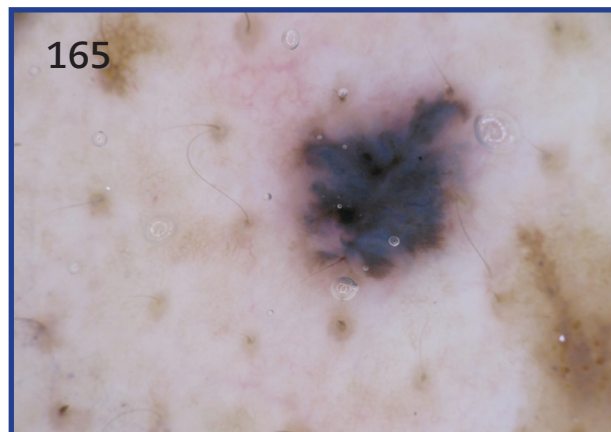
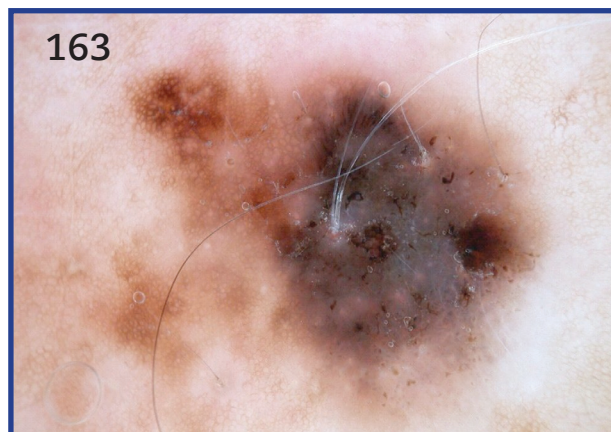
The lesion in Image [162] is a melanoma.

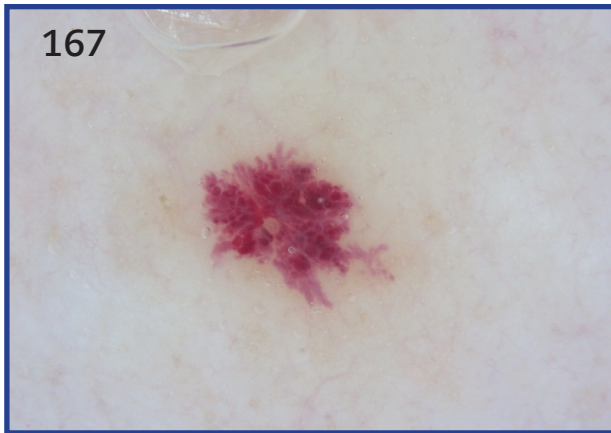
This is also a melanoma with a blue-white veil and black colouration. [163]

This lesion is a basal cell carcinoma because of the areas of bluish pigmentation. [164]

Image [165] shows another basal cell carcinoma.

This is a melanoma with brown structures on the top left side. [166] There are brown globules along the periphery and a blue-white veil in the middle and bottom.





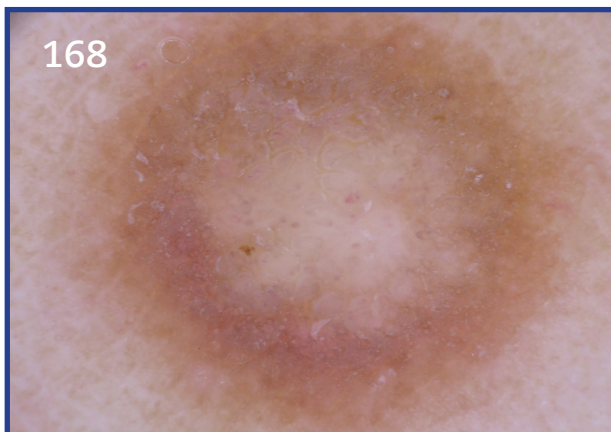
Haemangiomas and dermatofibromas

The last two benign lesions to review are haemangiomas and dermatofibromas.

Haemangioma

Haemangiomas are characterised by red colour and often blue and/or black as well. The blue/black combination in a haemangioma is an exception to the rule that this colour combination indicates malignancy.

In this example, you can see the red demarcated lacunas, which are very common. [167]



Dermatofibroma

The typical morphology of dermatofibromas includes hypopigmentation, a white area in the middle called the “central white scar”, and a very tiny network along the periphery. [168]

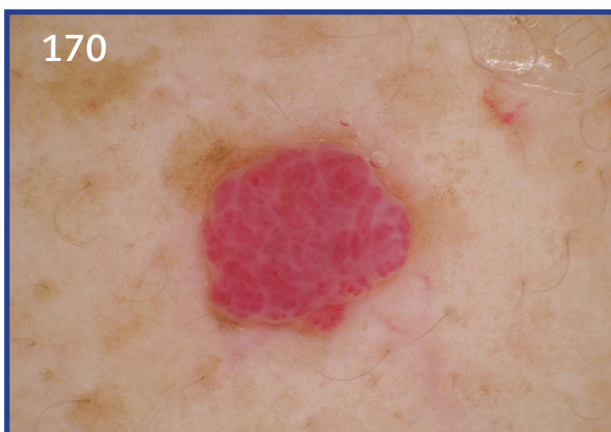
The following images will help you learn to differentiate between these two benign lesions.

Image [169] shows a haemangioma.



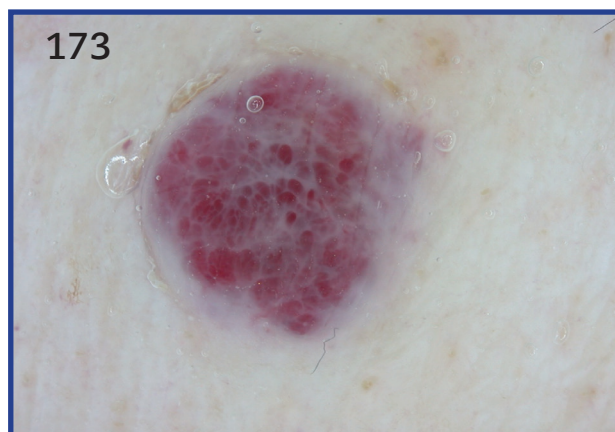
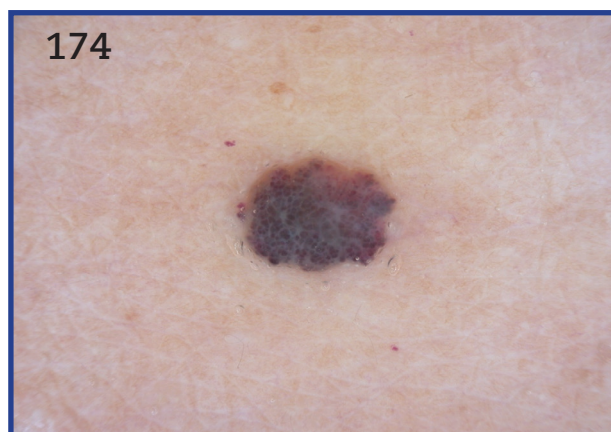
This is a cherry angioma with aggregated red lacunes and sharp demarcation. [170]

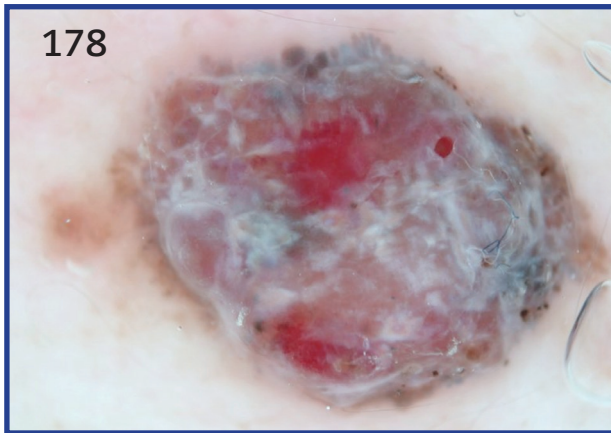
This lesion is an angioma [171] and in Image [172] we have a cherry angioma in Image.



In Images [173-176], you can see examples of haemangiomas.

Image [177] shows another haemangioma with a lot of blue-white veil, but you can still see the blue to red demarcated lacunes along the periphery.





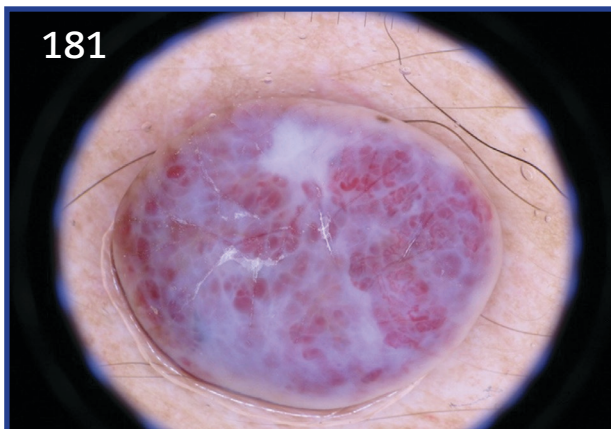
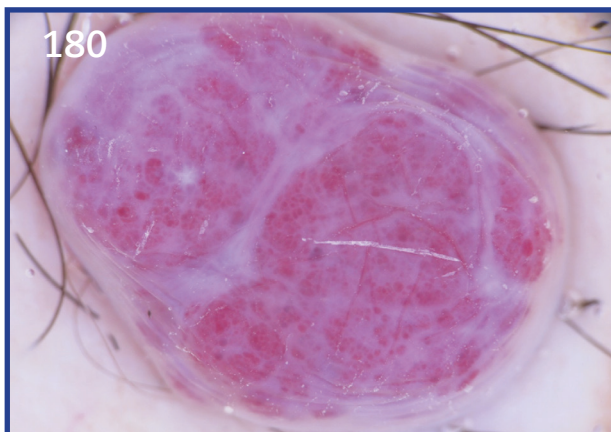
In Image [178], you can see a nodular melanoma. Though it may at first seem like a haemangioma, you can see that the red areas are not well demarcated. There are also black dots along the periphery in addition to the blue-white veil.

This lesion is a haemangioma. [179-180] and this is a haemangioma with fibrotic areas. [181]

Image [182] shows a haemangioma with larger lacunes, but you can still see the sharp demarcation.



Image [183] shows an angiokeratoma, a type of haemangioma. The black areas are thrombosed, and the sharp demarcation is a clue that this is an angiokeratoma.

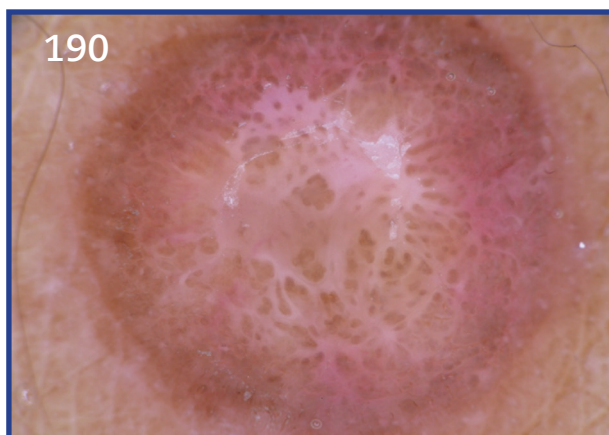
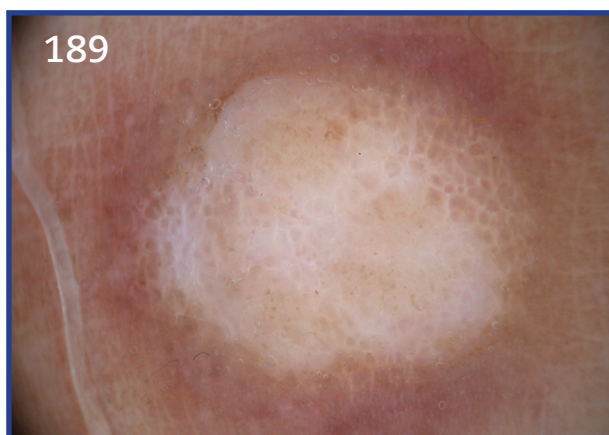
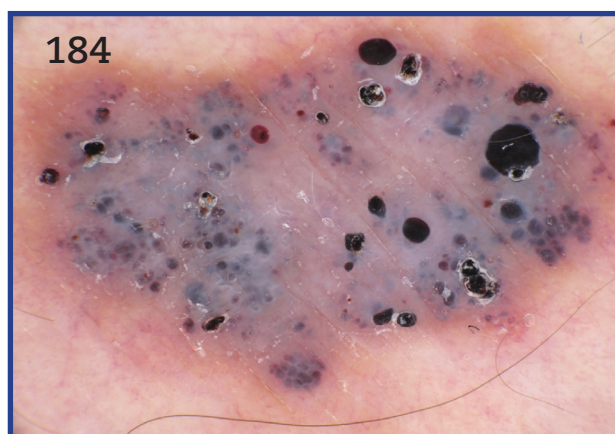


Here is another angiokeratoma. [184] You can see the demarcated, black large lacunes.

Images [185-186] show angiokeratomas.

Image [187] shows a dermatofibroma. You can see the white, scar-like middle and the tiny network along the periphery.

Images [188-190] are further examples of dermatofibromas.



Key messages

- Numerous algorithms exist to support the use of dermoscopy in the diagnosis of skin lesions.
- Algorithms have developed over time and seek to organise and simplify our understanding of dermoscopic findings.
- Pattern analysis, Seven-Point Checklist, Three-Point Checklist, Two-Step Method, and the Elephant Approach all exist to support clinicians.
- Different algorithms are valuable in different settings for clinicians with different experience and expertise.
- Each algorithm relies on recognising a range of criteria that include asymmetry, disorganisation of the lesion, and several more specific features.

References

1. Pehamberger H, Steiner A, Wolff K. In vivo epiluminescence microscopy of pigmented skin lesions. I. Pattern analysis of pigmented skin lesions. *J Am Acad Dermatol*. 1987;17(4):571-583.
2. Nachbar F, Stolz W, Merkle T, Cognetta A, Vogt T, Landthaler M, Bilek P, Braun-Falco O, Plewig G. The ABCD rule of dermoscopy: High prospective value in the diagnosis of doubtful melanocytic skin lesions. *J Am Acad Dermatol*. 1994;30(4):551-559.
3. Menzies SW1, Ingvar C, Crotty KA, McCarthy WH. Frequency and morphologic characteristics of invasive melanomas lacking specific surface microscopic features. *Arch Dermatol*. 1996;132:1178-82.
4. Argenziano G, Fabbrocini G, Carli P, De Giorgi V, Sammarco E, Delfino M. Epiluminescence microscopy for the diagnosis of doubtful melanocytic skin lesions: Comparison of the ABCD rule of dermoscopy and a new 7-point checklist based on pattern analysis. *Arch Dermatol*. 1998;134(12):1563-70.
5. Soyer P, Argenziano G, Zalaudek I, Corona R, Sera F, Talamini R, Barbato F, Baroni A, Cicale L, De Stefani A, Farro P, Rossiello L, Ruocco E, Chimenti S. Three-point checklist of dermoscopy: A new screening method for early detection of melanoma. *Dermatology*. 2004;208(1):27-31.
6. Tschandl P, Kittler H, Schmid K, Zalaudek I, Argenziano G. Teaching dermoscopy of pigmented skin tumours to novices: comparison of analytic vs. heuristic approach. *J Eur Acad Dermatol Venereol*. 2015;29(6):1198-204.