Dermoscopy is well recognized as being more accurate in the diagnosis of melanoma than the naked eye if undertaken by appropriately trained staff (Kittler et al, 2002; Vesterfaard et al, 2008). This has resulted in dermatoscopes becoming commonplace in skin tumour clinics to aid diagnosis and reduce the number of unnecessarily excised melanocytic lesions (Tromme et al, 2012). However, it is not only clinicians assessing and treating skin tumours who can benefit from dermoscopy; it can be helpful in general dermatology clinics such as in the diagnosis of scabies (Walter et al, 2011), differentiating scalp psoriasis from seborrhoeic dermatitis (Kim et al, 2011), assisting in the diagnosis of alopecia areata (Inui et al, 2008) and help with diagnosis of discoid lupus (Lallas et al, 2012). This article will provide an introduction to dermoscopy and some of the features used in assessment.

What is dermoscopy?
The evolution of dermoscopy as we know it today started in 1663, but it wasn’t until the 1950s that the technique termed ‘dermoscopy’ was used to evaluate pigmented skin lesions. In 1971 Dr MacKie identified the advantages of dermoscopy for the differential diagnosis of benign versus malignant pigmented lesions (MacKie, 1971).

The principle of dermoscopy is based on the understanding that the stratum corneum reflects light, which reduces the ability to see structures under the skin. When a substance such as alcohol gel is applied to the skin, this overcomes the refractive properties. If this is combined with the application of a glass plate to flatten the skin surface and the addition of a bright light and optical magnification, underlying structures can easily be examined and assessed (Braun et al, 2005).

Dermatoscopes are easy-to-use devices, which combine a light source and magnification to enable more detailed examination of skin lesions and structures. There are now three groups of dermoscopy devices available:

- Fluid immersion devices — require gel or oil to be applied to the skin to reduce reflection before the dermatoscope is placed in contact with the area to be examined.
- Cross-polarised devices — use cross-polarised light to reduce surface reflection, therefore they do not require direct contact with the skin.
- Hybrid devices — have the option to use either of the above methods.

There are advantages and disadvantages of each type of dermatoscope depending on the clinical setting, personal preference and the lesion being examined. For example, when examining vascular structures, direct contact (non-polarising) devices should be avoided due to the pressure on the skin possibly causing capillaries to disappear. Chrysalis structures seen in BCC are only visible with the polarising devices and milia-like cysts seen in seborrhoeic keratoses are only clearly visible using non-polarising devices. If examining multiple lesions it is easier to use a polarising device to avoid application of alcohol gel or oil several times.
Practical tips

- Use of 70% isopropyl alcohol gel for contact devices may reduce infection risk.
- Ultrasound gel can be used on nail folds or in peri-ocular regions to reduce irritations.
- Clean the device between patients using alcohol wipes (70% isopropyl alcohol) or as per local infection control guidelines.
- If examining a lesion on a horizontal surface apply the gel/oil to the lesion, but if examining on a vertical surface apply the gel or oil to the faceplate of the device.
- If using a fluid immersion device, apply carefully to the skin in a rolling action to avoid air bubbles.

What are you looking for?

Colour

When looking at melanocytic lesions, the colour of the lesion can provide information on its location within the skin due to the presence of melanin. For example:

- Black lesions and light- to dark-brown lesions are located in the epidermis.
- Grey to grey-blue lesions are in the papillary dermis.
- Steel-blue lesions are found in the reticular dermis.

Other colours seen under dermoscopy are:

- Red — blood vessels
- White — regression and/or scarring

Dermoscopic features

There are recognised terms which should be used when describing the patterns and structures seen using a dermatoscope.

Firstly look at the overall picture of the lesion; this can be described as the global features.

Global features include:

- Reticular (Figure 1)
- Globular (Figure 2)
- Homogenous (Figure 3)
- Starburst (Figure 4)
- Parallel (Figure 5)
- Multicomponent (Figure 6)
- Lacunar (Figure 7)

Once you have identified the global features, look for more specific features within the lesion; these are described as the local features.

Local features include:

- Pigment network (Figure 8)
- Dots and globules (Figure 9)
- Pigment blotches (Figure 10)
- Blue-white structures (Figure 11)
- Streaks (Figure 12)
- Milia-like cysts, comedo-like openings (Figure 13a)
- Cerebriform (fissures and ridges) (Figure 13b)

How to use these features to assist in the diagnosis of melanoma

Diagnosis of melanoma should not be based on dermoscopy alone and...
Homogeneous

Figure 3a. Homogenous pattern with dotted and curvilinear blood vessel in a benign naevus.

Figure 3b. Homogenous pattern in a benign naevus.

Starburst

Figure 4. Starburst pattern in a Spitz naevus.

Parallel

Figure 5. Parallel pattern in a benign naevus.

should include clinical examination and history with patient follow-up.

There have been various algorithms developed over the past 20 years to improve the diagnosis of melanoma using dermoscopy, but these should all be regarded as useful in teaching dermoscopy initially. With experience, individuals tend to analyse the history, clinical presentation and dermoscopy features using non-analytical pattern recognition, which concords with higher diagnostic accuracy.

Examples of the most commonly used algorithms are (turn to p26):
STELARA® 45 mg solution for injection in pre-filled syringe

PRESCRIBING INFORMATION: ACTIVE INGREDIENTS: Ustekinumab. Please refer to Summary of Product Characteristics (SmPC) before prescribing. INDICATIONS: Plaque psoriasis: Treatment of moderate to severe plaque psoriasis in adults who have failed to respond to, or who have a contraindication to, or are intolerant to other systemic therapies including ciclosporin, methotrexate and PUVA. Psoriatic arthritis: Alone or in combination with methotrexate for the treatment of active psoriatic arthritis in adult patients when the response to previous non-biological disease-modifying anti-rheumatic drug (DMARD) therapy has been inadequate. DOSAGE & ADMINISTRATION: Under the guidance and supervision of a physician experienced in diagnosis and treatment of psoriasis or psoriatic arthritis. Subcutaneous injection. Avoid areas with psoriasis. For self-injecting patients ensure appropriate training, follow-up and monitoring during treatment. Plaque psoriasis: adults & elderly: Patients >100 kg, 45 mg at week 0 followed by a 45 mg dose at week 4, then every 12 weeks. Patients <100 kg, 45 mg at week 0 followed by a 90 mg dose at week 4, then every 12 weeks (45 mg was less effective in these patients). Psoriatic arthritis, adults & elderly: 45 mg at week 0 followed by a 45 mg dose at week 4, then every 12 weeks. Alternatively, 90 mg may be used in patients with a body weight >100 kg. Consider adults & elderly: 45 mg at week 0 followed by a 90 mg dose at week 4, then every 12 weeks. Patients >100 kg, 90 mg at week 0 followed by a 90 mg dose at week 4, then every 12 weeks. Patients <100 kg, 45 mg at week 0 followed by a 90 mg dose at week 4, then every 12 weeks. Children <16 years: Not recommended. Renal & Hepatic impairment: Not studied.

CONTRAINDICATIONS: Hypersensitivity to product; clinically important, active infection. SPECIAL WARNINGS & PRECAUTIONS: Infections: Potential to increase risk of infections and reactivate latent infections. Caution in patients with a chronic infection or history of recurrent infection, particularly TB. Patients should be evaluated for tuberculosis prior to initiation of STELARA. Consider anti-tuberculosis therapy prior to initiation of STELARA in patients with past history of latent or active tuberculosis. Patients should seek medical advice if signs or symptoms suggestive of an infection occur. If a serious infection develops, they should be closely monitored and STELARA should not be administered until infection resolves. Malignancies: Potential to increase the risk of malignancy. No studies in patients with a history of malignancy or in patients who develop malignancy while receiving STELARA. Monitor all patients, in particular those older than 60, patients with a medical history of prolonged immunosuppressant therapy or those with a history of PUV therapy for non-melanoma skin cancer. Concomitant immunosuppressive therapy: Caution, including when changing immunosuppressive biologic agents. Immunogenicity: Injections: Serious hypersensitivity reactions (anaphylaxis and angioedema) reported, in some cases several days after treatment. If these occur appropriate therapy should be instituted and STELARA discontinued. Immunotherapy: Not known whether STELARA affects allergy immunotherapy. Laboratory tests: Needle cover contains natural rubber (latex), may cause allergic reactions. SIDE EFFECTS: Common: dental infections, upper respiratory tract infection, nasopharyngitis, dizziness, headache, ophthalmalgia pain, diarrhoea, nausea, pruritus, back pain, myalgia, arthralgia, fatigue, injection site erythema, injection site pain, antibodies to ustekinumab. Other side effects include: cellulitis, serious hypersensitivity reactions (including anaphylaxis, angioedema). Refer to SmPC for other side effects.

FERTILITY: The effect of ustekinumab has not been evaluated. PREGNANCY: Should be avoided. Women of childbearing potential: Use effective contraception during treatment and for at least 15 weeks post-treatment. LACTATION: Limited data in humans. INTERACTIONS: In vitro, STELARA had no effect on CYP450 activities. Vaccinations: Live vaccines should not be given concurrently with STELARA, and should be withheld for at least 15 weeks after last dose of STELARA. STELARA can resume at least 2 weeks after such vaccinations. No data on secondary transmission of infection by live vaccines in patients receiving STELARA. Concomitant immunosuppressive therapy: Psoriasis. The safety and efficacy of STELARA in combination with other immunosuppressants, including biologics or phototherapy have not been evaluated. LEGAL CATEGORY: POM. PRESENTATIONS, PACK SIZES, PRODUCT LICENCE NUMBERS & BASIC NHS COSTS: STELARA 45mg: 1 x 0.5ml pre-filled syringe. EU/1/08/494/003. £2147. JANSSEN-CILAG INTERNATIONAL NV, Turnhoutseweg 30, B-2340 Beerse, Belgium. FURTHER INFORMATION IS AVAILABLE FROM: Janssen-Cilag Ltd, 50 – 100 Holmers End Way, High Wycombe, Buckinghamshire, HP12 9EQ UK. © Janssen-Cilag Ltd 2013. Prescribing information last revised: 09/2013. PIVER: 0913


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Figure 6. Multicomponent.

Figure 7. Lacunar pattern in a haemangioma.

Figure 8. Pigment network in a benign naevus.

Figure 9a. Dots and globules — colour of the dots/globules will indicate depth of pigment or if vascular.

Figure 9b. Globular naeves with multiple dots and globules.
Table 1. Seven-point checklist (classic and revised).

<table>
<thead>
<tr>
<th>Dermoscopic pattern</th>
<th>Classic algorithm score</th>
<th>Revised algorithm score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Atypical network</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Combination of at least 2 types of pigment network asymmetrically distributed</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Blue-white veil</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Atypical vascular pattern</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Linear-irregular vessels, dotted vessels and/or milky-red areas not clearly seen within regression structures</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Irregular dots/globules</td>
<td></td>
<td></td>
</tr>
<tr>
<td>More than three round to oval structures, brown or black in colour; asymmetrically distributed within the lesion</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Irregular streaks</td>
<td></td>
<td></td>
</tr>
<tr>
<td>More than three brown to black, bulbous or finger-like projections asymmetrically distributed at the edge of the lesion and not clearly arising from network structures</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Irregular blotches</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Black, brown and/or grey structureless areas asymmetrically distributed within the lesion</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Regression structures</td>
<td></td>
<td></td>
</tr>
<tr>
<td>White scar-like depigmentation and/or blue pepper-like granules usually corresponding to a clinically flat part of the lesion</td>
<td>1</td>
<td>1</td>
</tr>
</tbody>
</table>

Under the classic seven-point algorithm, excision is recommended if the total score is >3. Under the revised seven-point algorithm, excision is recommended if the total score is >1.

(Argenziano et al, 2011)
The CASH algorithm

**Colours:** light brown, dark brown, black, red, white, blue

**Architectural disorder:** no/mild, moderate, marked

**Symmetry:** planes of asymmetry regarding colours, structures and contour

**Homogeneity:** network, dots/globules, streak/pseudopods, blue-white veil, regression structures, blotches, polymorphous blood vessels

<table>
<thead>
<tr>
<th>Score</th>
<th>Colours</th>
<th>Architectural disorder</th>
<th>Symmetry</th>
<th>Homogeneity</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1 - 6</td>
<td>0 - 2</td>
<td>0 - 2</td>
<td>1 – 7</td>
</tr>
</tbody>
</table>

**Total CASH score >7 = suspicious**

(Henning et al, 2007)

Limitations of dermoscopy in the diagnosis of melanoma

Like any other assessment tool there are limitations to dermoscopy. The main concern raised is in relation to very early melanomas, which may not demonstrate the classic features assessed using the algorithms and in these cases the importance of monitoring change over a period of time is important (Skvara et al, 2005). There are also some tumour types which do not demonstrate the features identified in the algorithms and therefore the importance of a full assessment including tumour history, clinical features as well as dermoscopic examination should not be forgotten; if in doubt, cut it out.

Using dermoscopy in non-pigmented skin disease

There are now many articles reporting the use of dermoscopy in non-pigmented skin disease, including non-pigmented skin tumours, inflammatory and infectious skin disorders.

Dermoscopy can be particularly useful in:
- non-pigmented skin tumours
- inflammatory and/or infectious skin diseases
- nail fold assessment in auto-immune diseases
- predicting and/or monitoring skin reaction to treatment

Dermoscopy, however, cannot replace a full holistic assessment including history, clinical examination and appropriate laboratory tests for these disease groups but can enhance the examination.

Assessing non-pigmented skin disease

Zalaudek et al (2006) suggest a step-wise approach to assessing these diseases, including the use of dermoscopy.

**Step 1 — Number of lesions**

Skin tumours are generally single lesions, whereas infections or inflammatory skin diseases will usually have multiple similar areas. A full body examination should therefore be performed.

**Step 2 — Vascular pattern**

Identify vascular patterns within the lesion.

**Step 3 — Arrangement of the vascular pattern**

How are the vascular patterns arranged...
within the lesion, eg regular, irregular, homogenous, peripheral?

**Step 4 — Additional dermoscopic criteria/features**

What other features can be seen within the lesion?

The colour of the vessels within the lesion can also provide additional information to aid diagnosis, similar to the assessment of pigmented lesions. In pigmented lesions the depth of melanin produces differing colours, whereas in non-pigmented lesions it is the depth of the vessels in the skin which produces different colours:

- Vessels in the deeper dermis appear pink and blurred
- Vessels in the upper dermis appear bright red and focused (Zalaudek et al, 2010)

As can be seen from the table, comma, dotted and linear irregular vessels are generally associated with melanocytic tumours, whereas harpin, glomerular and arborising vessels are more suggestive of non-melanocytic tumours (Zalaudek et al, 2010).

**Dermoscopic features in some common skin diseases**

**Alopecia areata**

Exclamation mark hairs are a well-recognised diagnostic feature of alopecia areata but these are not always easily seen on examination with the naked eye. When using a dermoscope further features are visible that can aid diagnosis, such as black dots, broken hairs, yellow dots and short vellus hairs. Inui et al (2008) found that the number of patients in their study who demonstrated black dots, exclamation mark hairs or broken hairs was relatively low (59.3%). However, the number of patients in the group with yellow dots and/or short vellus hairs was very high (94%), suggesting these features are much better diagnostic features (Figure 14). Bowling (2012) also identifies dystrophic and/or coiled hairs as diagnostic features of alopecia areata.

**Infestations**

**Scabies**

Scabies infestation can cause substantial discomfort for patients, spreading easily between contacts, and still has a certain stigma associated with it. Often history and skin examination alone are enough to provide diagnosis but this can be complicated by secondary infection or late presentation. Diagnosis can really only be confirmed by identifying a mite. Traditionally this was done either by skin scraping or adhesive tape test then the sample was examined under a microscope; however Birke et al (2011) suggest that dermoscopy is significantly more sensitive than both these methods and is more easily used in clinic. The scabies mite can be seen as a pigmented triangle using the dermatoscope and can be shown to the patient, which can re-enforce the diagnosis and encourage compliance with treatment.

**Conclusion**

Dermoscopy can be a useful diagnostic tool for nurses working in all care settings to assist in the assessment of skin tumours and general dermatology conditions. It is essential, however, that they receive appropriate training and are experienced clinicians in all aspects of assessment and diagnosis.

**References**


**Figure 14. Yellow dots and exclamation mark hairs in alopecia areata.**