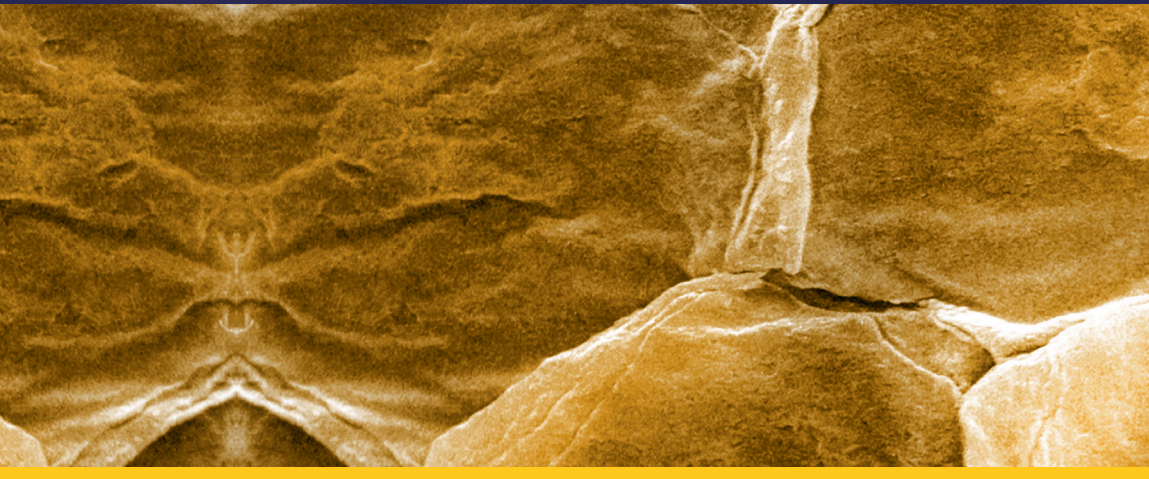
# Rook's Dermatology Handbook



EDITED BY
Christopher E. M. Griffiths | Tanya O. Bleiker
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This edition first published 2022


*Registered Offices*
John Wiley & Sons, Inc., 111 River Street, Hoboken, NJ 07030, USA
John Wiley & Sons Ltd, The Atrium, Southern Gate, Chichester, West Sussex, PO19 8SQ, UK

*Editorial Office*
9600 Garsington Road, Oxford, OX4 2DQ, UK

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*Library of Congress Cataloging-in-Publication Data*

Names: Griffiths, C. (Christopher), editor. | Bleiker, Tanya, 1969- editor. | Creamer, Daniel, editor. | Ingram, John R., editor. | Simpson, Rosalind C., editor.
Title: Rook's dermatology handbook / edited by Christopher E. M. Griffiths, Tanya O. Bleiker, Daniel Creamer, John R. Ingram, Rosalind C. Simpson.
Other titles: Dermatology handbook
Description: Hoboken, NJ : Wiley-Blackwell, 2020. | Includes index.
Identifiers: LCCN 2020024268 (print) | LCCN 2020024269 (ebook) | ISBN 9781119428190 (paperback) | ISBN 9781119428350 (adobe pdf) | ISBN 9781119428374 (epub)
Subjects: MESH: Skin Diseases
Classification: LCC RL74 (print) | LCC RL74 (ebook) | NLM WR 140 | DDC 616.5–dc23
LC record available at https://lccn.loc.gov/2020024268
LC ebook record available at https://lccn.loc.gov/2020024269

Cover Design: Wiley
Cover Images: Skin surface, SEM © Science Photo Library / Getty Images, Inc., Blue Blue blur bokeh spring fresh romantic background © Vijay kumar / Getty Images

Set in 8.5/10.5 pt Utopia by Straive, Pondicherry, India

10 9 8 7 6 5 4 3 2 1

# Contents

# Acknowledgements

This handbook has been compiled from *Rook's Textbook of Dermatology*, Ninth Edition, edited by Christopher Griffiths, Jonathan Barker, Tanya O. Bleiker Robert Chalmers and Daniel Creamer. © 2016 John Wiley & Sons, Ltd. Published 2016 by John Wiley & Sons, Ltd. The Editors thank all of the chapter authors from the Rook parent book for their original contributions. Where necessary, the original material has been rewritten to suit a different readership.

Thanks also to John Ingram's colleagues in Cardiff for supplying additional images: Drs Mabs Chowdhury, Manju Kalavala, Colin Long, Richard Motley, Catherine Roberts, Rachel Abbott and Ru Katugampola, and Professors Andrew Finlay and Vincent Piguet.

# Preface

*Rook's Textbook of Dermatology* is a four volume behemoth of information, arguably THE dermatological reference. First published in 1968 Rook has evolved from the visionary text produced by Arthur Rook, Darrell Wilkinson and John Ebling and is now in its 9th edition. Indubitably this is indispensable as a detailed reference on dermatology but is neither a pocket book for ready access in clinic nor a skin disease "101" for trainees, non-dermatologists and hard pressed consultants. The Rook editors had discussed the relative merits of a "Rook Handbook" for several years and eventually decided, by popular demand, that the time had come for the talking to stop and work to begin on such a book.

*Rook's Dermatology Handbook* is a 1000 page, fully illustrated guide to facilitate the rapid diagnosis of skin diseases and provide ready access to key relevant facts about them. The format comprises epidemiology, pathophysiology, clinical features, differential diagnosis, investigations and management. The basic science is kept to a minimum, there are no photomicrographs of histology and management is top line only. The reader would be expected to turn to more detailed references for in-depth information. We have pared down the text from Rook's textbook, retained many of its high-quality images and introduced new tables and new sections, including dermatological vocabulary and differential diagnosis of common clinical presentations such as blisters, hair loss and erythroderma. Three of the editors of the textbook – Chris Griffiths, Tanya O. Bleiker and Daniel Creamer – have been joined in the venture by two next generation clinicians, John Ingram and Rosalind Simpson. We are delighted with the book but the proof will come from how it performs in the clinic as an aid to the diagnosis, understanding and management of dermatological disease. We are indebted to all of the authors from the Rook 9th edition who freely gave us permission to recycle and synopsise their chapters.

The book would not have seen the light of day without the unstinting support and expertise of Claire Bonnett, Jenny Seward and Nick Morgan of Wiley, and Production team.

**Chris Griffiths**
**Tanya O. Bleiker**
**Daniel Creamer**
**John Ingram**
**Rosalind Simpson**

# Glossary

| | |
|---|---|
| **Alopecia** | Decreased density or thickness of hairs |
| **Artefact** | Induced by exogenous injury, sometimes self-inflicted |
| **Callus** | Reactive hyperkeratosis, usually due to friction and/or pressure, leading to enhanced skin markings |
| **Comedone (open and closed)** | *Open:* dilated hair infundibulum with oxidised (black) keratinous debris ('blackhead')<br>*Closed:* expansion of hair infundibulum by keratinous debris, usually with no connection to skin surface ('whitehead') |
| **Dysaesthesia** | Inappropriate sensations, e.g. paraesthesias |
| **Exanthem** | Acute widespread eruption, usually due to a viral infection or drug reaction |
| **Fissure** | Linear disruption of stratum corneum; may extend into the dermis |
| **Infarct** | Ischaemia of tissue due to arterial occlusion |
| **Induration** | Deep thickening of the skin can result from oedema, inflammation, or infiltration |
| **Keratoderma** | Thickening of the stratum corneum and/or epidermis of the palms and soles, often inherited |
| **Keratosis** | Focal thickening of the epidermis, especially the stratum corneum |
| **Kerion** | Boggy plaque, due to infection, that often contains pustules |
| **Lichenification** | Accentuation of skin markings, often due to rubbing |
| **Poikiloderma** | Simultaneous presence of atrophy, telangiectasia and hypo- and hyperpigmentation |
| **Prurigo** | Papules or nodules due to scratching or picking |
| **Purpura** | Haemorrhage into the skin due to pathological processes, primarily of blood vessels |
| **Stria** | Linear atrophy along tension lines; initially can be red to purple in colour |
| **Telangiectasia** | Permanently dilated capillaries and venules which are visible to the naked eye |

# Abbreviations

| | |
|---|---|
| **ACTH** | adrenocorticotropic hormone |
| **AE** | atopic eczema |
| **AGEP** | acute generalised exanthematous pustulosis |
| **AIDS** | acquired immune deficiency syndrome |
| **AK** | actinic keratoses |
| **ALP** | alkaline phosphatase |
| **ALT** | alanine aminotransferase |
| **ANA** | antinuclear antibody |
| **ANCA** | antineutrophil cytoplasmic antibodies |
| **ASOT** | antistreptolysin O titre |
| **AST** | aspartate aminotransferase |
| **ATP** | adenosine triphosphate |
| **BCC** | basal cell carcinoma |
| **BCG** | bacille Calmette–Guérin |
| **BP** | blood pressure |
| **BSA** | body surface area |
| **CBT** | cognitive behavioural therapy |
| **CMV** | cytomegalovirus |
| **CNS** | central nervous system |
| **CREST** | calcinosis, Raynaud phenomenon, oesophageal dysmotility, sclerodactyly and telangiectasia |
| **CRP** | C-reactive protein |
| **CT** | computerised tomography |
| **CTCL** | cutaneous T-cell lymphoma |
| **CVI** | chronic venous insufficiency |
| **CXR** | chest X-ray |
| **DEJ** | dermal–epidermal junction |
| **DLE** | discoid lupus erythematosus |
| **DLQI** | Dermatology Life Quality Index |
| **DNA** | deoxyribonucleic acid |
| **EBV** | Epstein–Barr virus |
| **EGFR** | epidermal growth factor receptor |
| **ELISA** | enzyme-linked immunosorbent assay |
| **ENA** | extractable nuclear antigen |
| **ESR** | erythrocyte sedimentation rate |
| **FBC** | full blood count |
| **5-FU** | 5-fluorouracil |
| **G6PD** | glucose-6-phosphate dehydrogenase |
| **GvHD** | graft-versus-host disease |
| **H&E** | haematoxylin and eosin |
| **Hb** | haemaglobin |
| **HHV** | human herpesvirus |
| **HIV** | human immunodeficiency virus |
| **HLA** | human leukocyte antigen |
| **HPV** | human papilloma virus |
| **HSV** | herpes simplex virus |
| **IF** | immunofluorescence |
| **IFN** | interferon |
| **IgE** | immunoglobulin E |
| **IL** | interleukin |
| **IMF** | immunofluorescence |
| **IV** | intravenous |
| **KC** | keratinocyte carcinoma |
| **LDH** | lactate dehydrogenase |
| **LE** | lupus erythematosus |
| **LFT** | liver function test |
| **LP** | lichen planus |
| **MHC** | major histocompatibility complex |
| **MM** | Investigations malignant melanoma |
| **MMR** | mumps measles rubella vaccination |
| **MRI** | magnetic resonance imaging |
| **MRSA** | meticillin-resistant Staphylococcus aureus |
| **NSAID** | non-steroidal anti-inflammatory drug |
| **PAS** | periodic acid–Schiff |
| **PASI** | Psoriasis Area Severity Index |
| **PCR** | polymerase chain reaction |
| **PUVA** | psoralen and ultraviolet A |
| **PVL** | Panton–Valentine leukocidin |
| **PXE** | pseudoxanthoma elasticum |
| **RAS** | Recurrent aphous stomatitis |
| **RNA** | ribo nucleic acid |
| **QoL** | quality of life |
| **SCC** | squamous cell carcinoma |
| **Sinus** | Tract leading from a deeper focus to the skin surface |
| **SLE** | systemic lupus erythematosus |
| **SPF** | sun protection factor |
| **TCR** | T-cell receptor |
| **TFT** | thyroid function test |
| **TNF** | tumour necrosis factor |
| **TPMT** | thiopurine methyltransferase |
| **U&E** | urea and electrolytes |
| **UV** | ultraviolet |
| **UVR** | ultraviolet radiation |
| **VZV** | varicella-zoster virus |
| **WCC** | white cell count |
| **WHO** | World Health Organization |

# Introduction 1

Human skin consists of a stratified, cellular epidermis and an underlying dermis of connective tissue, separated by a dermal–epidermal basement membrane (Figure 1.1). Beneath the dermis is a layer of subcutaneous fat, which is separated from the rest of the body by a vestigial layer of striated muscle.

The skin performs a number of functions, including:

- Providing a physiological barrier against the external environment.
- Maintaining fluid balance by restricting water loss through the skin.
- Forming an innate immune defence against bacteria, fungi and viruses through keratinocyte-derived endogenous antibiotics, defensins and cathelicidins. Langerhans cells have a primary role in epidermal immune surveillance.
- Supporting thermoregulation: vasodilatation or vasoconstriction of the blood vessels in the deep and superficial plexuses helps to regulate body temperature. Eccrine sweat glands, found at all skin sites, also play a role in heat control.
- Providing insulation and trauma protection: subcutaneous fat limits excessive heat loss and shields internal structures from physical trauma.

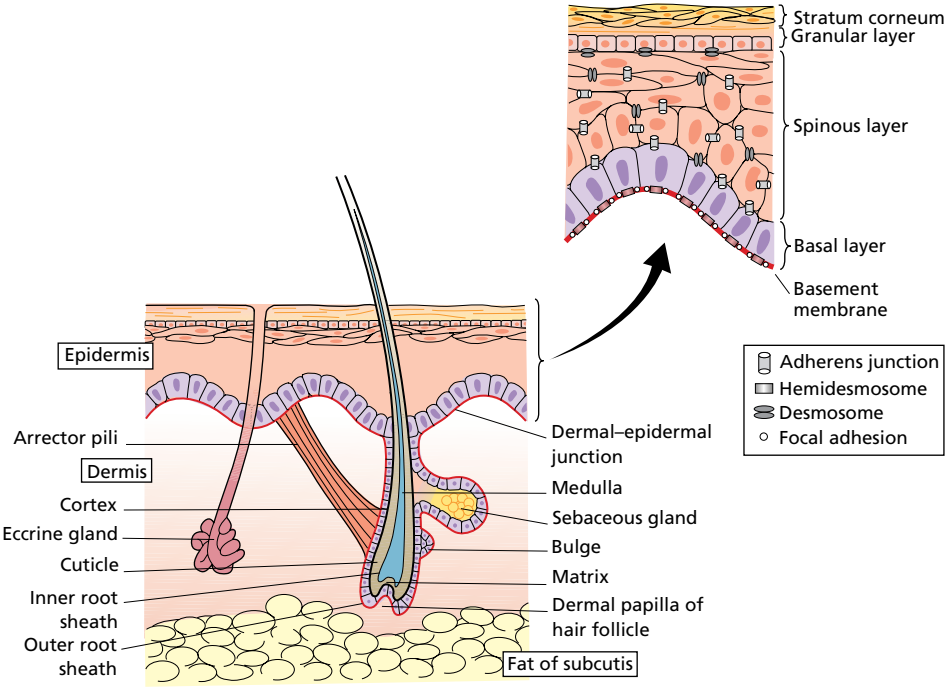



**Figure 1.1** The skin and its appendages.

*Rook's Dermatology Handbook*, First Edition. Edited by Christopher E. M. Griffiths, Tanya O. Bleiker, Daniel Creamer, John R. Ingram and Rosalind C. Simpson.

Fat also has an endocrine function, releasing the hormone leptin, which acts on the hypothalamus to regulate hunger and energy metabolism.
- Vitamin D production.
- Performing a psychosocial function: the appearance of human skin and its associated structures, especially scalp hair, has a major impact on self-image and thus on interpersonal relationships.
- Protection from ultraviolet (UV) radiation through production of melanin from melanocytes. Variation in response to sunlight has historically been divided into six categories according to the Fitzpatrick classification (Table 1.1). It is acknowledged that whilst these 'skin types' describe response to UV exposure, they do not adequately encompass the wide variation of tones seen in skin of colour.

## History taking

Clinical assessment of a patient presenting with a skin disorder follows the standard approach of history-taking and physical examination. Investigations may be needed to supplement information obtained at the consultation.

Although a dermatological diagnosis might be swiftly apparent, it is essential to take a full history before examining the skin. The history of the presenting complaint will yield the story of the symptoms and the clinical features of the dermatosis (Box 1.1). Further questions will give details about any associated clinical problems and the patient's background medical history (Table 1.2). The act of questioning (and listening to the answers) contributes to a consultation's therapeutic function.

**Table 1.1** Fitzpatrick classification of skin types

| Skin type | Skin colour on sun-protected site | Sunburn risk | Tanning ability | Skin cancer risk |
|---|---|---|---|---|
| I | White | ++++ | ± | High |
| II | White | +++ | + | High |
| III | White | ++ | ++ | Moderate |
| IV | Olive | + | +++ | Moderate |
| V | Brown | ± | ++++ | Low |
| VI | Black/dark brown | ± | ++++ | Low |

**Box 1.1 History of the presenting complaint**

**Essential points in the history: rashes**

- Location: Where did the rash start, where did it spread to?
- Temporal: When did it start, does it come and go, if so, how long does it last?
- Exacerbating factors: What makes it worse?
- Alleviating factors: Physical factors, diet, treatment?
- What are the predominant symptoms: itch, pain, disfigurement?
- Occupational factors: Does it get worse at work? Does it improve away from work?
- Open questions: Do you have any thoughts as to what has caused this? What concerns you most about this problem?

**Essential points in the history: lesions**

- Where is the lesion? Is it single or multiple?
- Was there any trauma before it arose?
- Temporal: How long has it taken to develop to this size? Is it still growing or is it resolving?
- Symptoms: Is it tender, painful or itchy? Are there any exacerbating factors? Has it bled?
- Past history: Have you had anything similar before?
- Sun exposure: How much sun exposure have you had, including living/ working abroad and use of sun beds? Any history of blistering sun burns?

**Table 1.2** Background medical history

| Further history | Rationale | Example |
|---|---|---|
| General medical history | Systemic diseases may have cutaneous features | Dermatomyositis and other connective tissue disorders |
| Medication history | Certain dermatoses are induced by drugs | Drug-induced exanthem |
| Allergy history | Certain dermatoses are caused by an allergy to a food or drug or contact allergen | Oral allergy syndrome |
| Family history | Certain dermatoses are inherited | Basal cell carcinoma syndrome (Gorlin syndrome) |
| Occupational history | The trigger for a dermatosis may be found only at the patient's workplace | Allergic contact dermatitis in a hairdresser |
| Leisure history | Certain dermatoses are related to leisure activities | Allergic contact dermatitis to plants in gardening |
| Travel history | Certain dermatoses are more commonly encountered abroad | Leishmaniasis |
| Social history | Certain dermatoses are associated with lifestyle habits | Palmo-plantar pustulosis is associated with smoking |
| Ethnicity | Certain disorders are more prevalent in particular ethnic groups | Sarcoidosis and lupus erythematosus occur more frequently in patients with black skin |
| Quality of life | Effects of dermatosis on work, relationships, activities etc. can be quantified | Dermatology Life Quality Index |

## Clinical examination

As in any medical consultation, examination follows history-taking and the correct assessment of skin signs is only achieved in the context of a patient's symptoms. Effective interpretation of cutaneous clinical features relies on the principle that most skin diseases have characteristic lesions with a predilection for certain body sites. An understanding of these disease-specific patterns is intrinsic to diagnosis in dermatology, an assertion which is especially true in the appraisal of a rash.

The patient should always be examined in a good light, preferably daylight, and with magnification of lesions if necessary. A mobile light on a flexible stand can be helpful in illuminating areas that are in the shade from overhead lights, such as the mouth and the flexures. Ideally, the entire skin should be examined in every patient, including the scalp and nails. Full skin examination may also reveal suspicious skin lesions that the patient was not aware of, for example lesions on the back.

### Examination of a lesion

When assessing a solitary skin lesion there are a number of features relating to its morphology which direct the physician to a diagnosis. All skin lesions can be assigned to one of the descriptive entities defined in Table 1.3 (illustrated in Figure 1.2). Recognition of the lesion type is the basis of clinical examination in dermatology. Thereafter a more detailed appreciation of the lesion's properties will enhance the assessment. Use of the 5**S**s is helpful in describing, and thus identifying, a lesion: **S**ite, **S**ize, **S**ymmetry, **S**hape and **S**urface.

**Table 1.3** Descriptive terms for cutaneous lesions (adapted from Nast et al. 2016)

| Term | Definition | Example |
|---|---|---|
| Bulla (Figure 2a) | A circumscribed lesion >1 cm in diameter that contains liquid (clear, serous or haemorrhagic) | Bullous pemphigoid |
| Macule (Figure 2b) | A flat, circumscribed, non-palpable lesion that differs in colour from the surrounding skin | Junctional naevus |
| Nodule (Figure 2c) | An elevated, solid, palpable lesion >1 cm usually located primarily in the dermis and/or subcutis | Squamous cell carcinoma |
| Papule (Figure 2d) | An elevated, solid, palpable lesion that is ≤1 cm in diameter | Intradermal naevus |
| Patch (Figure 2e) | A flat circumscribed area of discoloration, >1 cm | Vitiligo |
| Plaque (Figure 2f) | A circumscribed, palpable lesion >1 cm in diameter; most plaques are elevated | Psoriatic plaque |
| Pustule (Figure 2g) | A circumscribed lesion that contains pus | Palmoplantar pustulosis |
| Vesicle | A circumscribed lesion ≤1 cm in diameter that contains liquid (not pus) | Herpes simplex |
| Weal | A transient elevation of the skin due to dermal oedema | Urticaria |
| Scale (Figure 2h) | A visible accumulation of keratin, forming a flat plate or flake | Psoriasis |
| Crust | Dried serum, blood or pus on the surface of the skin | Impetigo |
| Erosion | Loss of either a portion of the epidermis or the entire epidermis | Pemphigus vulgaris |
| Excoriation | A loss of the epidermis and a portion of the dermis due to scratching or an exogenous injury | Scratching from any cause |
| Ulcer | Full-thickness loss of the epidermis plus at least a portion of the dermis | Venous leg ulcer |

Source: Adapted from A. Nast et al. The 2016 International League of Dermatological Societies' revised glossary for the description of cutaneous lesions. British Journal of Dermatology, 2016, 174, pp. 1351–1358. John Wiley & Sons Ltd on behalf of the British Association of Dermatologists.

## Examination of a rash

In the initial assessment of a rash the type of primary lesion, from which the dermatosis is constituted, needs to be identified. Thereafter the configuration of lesional skin on the skin's surface will point to the diagnosis, a deductive process termed pattern recognition. The description of a rash should comment on the morphology of individual lesions, including colour and shape (Table 1.4), as well as information on body sites of involvement and distribution pattern (Table 1.5) (illustrated in Figure 1.3). Palpation of lesional skin imparts additional information about texture, skin thickness, tenderness and temperature.

## Medical photographs

Medical photography is a useful tool to record the current state of a dermatosis and to permit serial comparisons over time to assess change. Patient consent and secure image storage are important considerations.

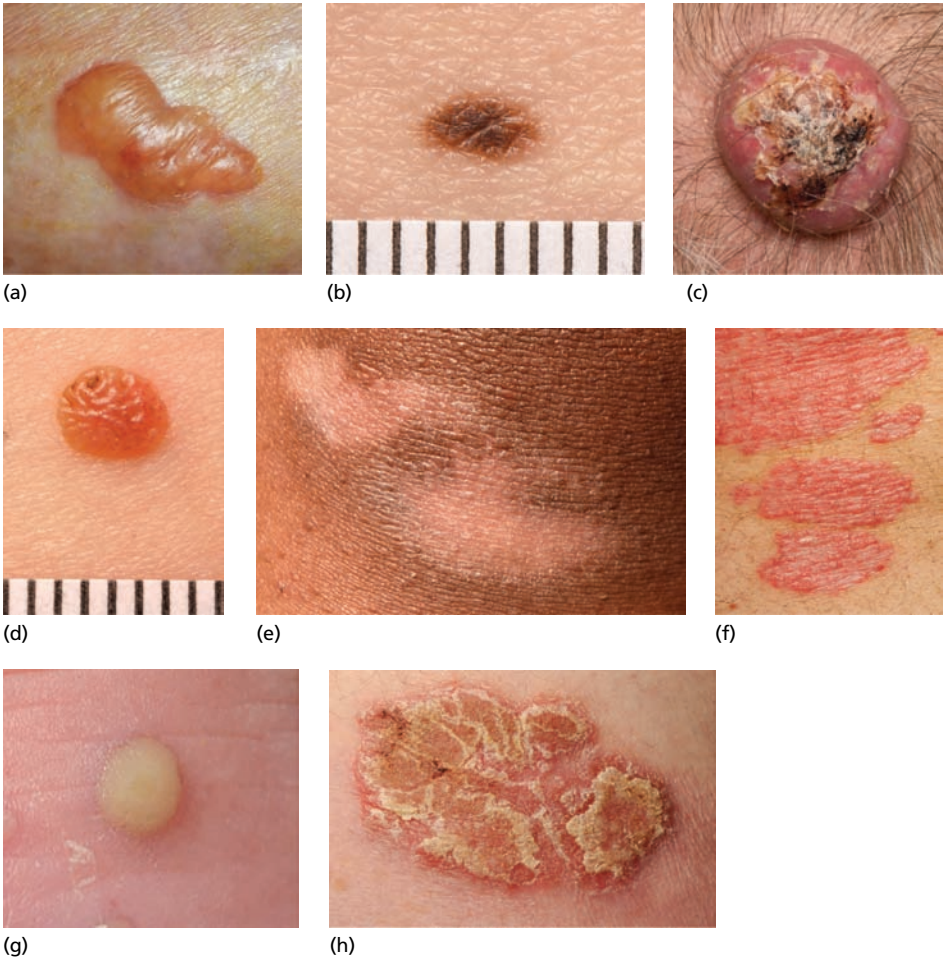



**Figure 1.2** Types of cutaneous lesion: (a) bulla: bullous pemphigoid; (b) macule: junctional naevus; (c) nodule: squamous cell carcinoma; (d) papule: intradermal naevus; (e) patch: vitiligo; (f) plaque: psoriasis; (g) pustule: palmoplantar pustulosis; (h) scale: psoriasis. (Source: Reproduced with permission of Cardiff and Vale University Health Board.)

## Bedside tests

### *Dermoscopy*

### (Syn. Dermatoscopy)

A dermatoscope (Syn. Dermoscope) provides polarised light and magnification to aid examination of the skin. The dermatoscope lens is applied to the skin surface with a film of oil on the lesion to enhance examination of subcorneal structures. Analysis of the colours and appearances of structural elements, such as the pigment network, is especially useful in the diagnosis of pigmented lesions. The images may be viewed directly, photographed or recorded digitally for subsequent or sequential analysis. Dermatoscopes can also be useful in distinguishing haemangiomas, angiokeratomas, pigmented basal cell carcinomas and seborrhoeic keratoses. Additional uses include the identification of scabies mites and other parasitic infections. Trichoscopy is use of a dermatoscope for hair and scalp lesions, and aids diagnostic accuracy in scalp disorders.

**Table 1.4** Shapes of cutaneous lesions (adapted from Nast et al. 2016)

| Term | Definition | Example |
|---|---|---|
| Acuminate | Elevated lesion with a sharp point | Cutaneous horn |
| Annular (Figure 3a) | Shape of a ring (clear centrally) | Tinea corporis |
| Arciform, arcuate | A segment of a ring; arch-like | Erythema annulare centrifugum |
| Digitate | Finger-shaped | Digitate dermatosis, a form of parapsoriasis |
| Discoid; nummular (Figure 3b) | Circular or coin-shaped | Nummular eczema |
| Linear | Lesional skin forming a band or line | Lichen striatus |
| Papillomatous | Lesion with multiple surface projections | Epidermal naevus |
| Pedunculated | Papule or nodule attached by a thinner stalk | Skin tag |
| Polymorphic | Variable sizes and shapes as well as types of lesions | Acne vulgaris |
| Polycyclic | Coalescence of several rings | Subacute cutaneous lupus erythematosus |
| Reticulate (Figure 3e) | Net-like or lacy pattern | Mucosal lichen planus |
| Serpiginous (Figure 3c) | Wavy pattern, reminiscent of a snake | Cutaneous larva migrans |
| Targetoid | Lesion composed of concentric rings | Erythema multiforme |
| Umbilicated | Lesion with a small surface depression | Molluscum contagiosum |
| Verruciform | Lesion with multiple projections resembling a wart | Viral wart |

Source: Adapted from A. Nast et al. The 2016 International League of Dermatological Societies' revised glossary for the description of cutaneous lesions. British Journal of Dermatology, 2016, 174, pp. 1351–1358. John Wiley & Sons Ltd on behalf of the British Association of Dermatologists.

A dermatoscope can also be used in the assessment of nail fold capillaries in connective tissue diseases (e.g. dermatomyositis).

### *Skin swabs (bacterial/viral)*

In a suspected bacterial infection skin swabs for bacteriology should be sent to confirm the organism and provide antibiotic sensitivities to guide antibiotic selection.

Detection of viral skin infection, for example herpes simplex, requires a specific viral swab for viral culture. Increasingly polymerase chain reaction (PCR) amplification of viral DNA/RNA can provide a diagnosis within hours.

### *Mycological sample collection*

**Skin.** Scraping samples of surface scale from an active margin are taken with a disposable scalpel blade or banana-shaped scalpel. The scrapings should be transported in folded paper, which keeps the specimen dry, thus preventing overgrowth of bacterial contaminants.

**Hairs.** If tinea capitis is suspected, the hairs should be plucked with the roots intact; cut hairs are unsuitable. Brush samples from the scalp are excellent for culture, but with this technique microscopy is not possible.

**Table 1.5** Distribution patterns of cutaneous lesions (adapted from Nast et al. 2016)

| Term | Definition | Example |
|---|---|---|
| Acral | Lesions involving distal extremities (e.g. ears, nose, fingers and toes) | Acrocyanosis |
| Asymmetrical | Distribution pattern which lacks symmetry along an axis (e.g. the midline) | Lichen striatus |
| Blaschkoid; along Blaschko lines | Lesions occurring on embryonic growth lines (Blaschko lines) | Incontinentia pigmenti |
| Dermatomal (zosteriform) | Lesions confined to one or more dermatome (a segment of skin innervated by a single spinal nerve) | Shingles (herpes zoster) |
| Disseminated | Lesions distributed randomly over most of the body surface area | Viral exanthem |
| Exposed skin | Areas exposed to external agents (e.g. airborne allergens, irritants, sunlight) | Airborne allergic contact dermatitis |
| Extensor sites | Areas overlying muscles and tendons involved in extension (e.g. dorsal forearm, elbow, posterior upper arm) | Psoriasis |
| Flexural sites | Areas overlying muscle and tendons involved in flexion of joints (e.g. antecubital fossa) | Atopic dermatitis |
| Follicular | Lesions located within or around hair follicles | Keratosis pilaris |
| Generalised/ widespread | Distributed over most of the body surface area (see above) | Viral exanthem |
| Intertriginous | Present in major body folds (axillae, submammary folds, inguinal creases, natal cleft) | Flexural psoriasis |
| Kobnerised (displaying Kobner phenomenon) | Lesions arranged in a distribution which reflects physical stimuli (e.g. scratching, sunburn) | Lichen planus |
| Palmo-plantar | Involving palmar and plantar skin | Palmo-plantar pustulosis |
| Periorificial (e.g. perioral, periorbital) | Involving the skin around orifices | Peri-oral dermatitis |
| Seborrhoeic | Involving areas with the highest density of sebaceous glands (e.g. scalp, face, upper trunk) | Seborrhoeic dermatitis |
| Sporotrichoid (Figure 3d) | Lesions occurring along lymphatic vessels, usually of arm or leg | *Mycobacterium marinum* infection |
| Symmetrical | Lesions occurring with symmetry along an axis, commonly the midline | Psoriasis |

Source: Adapted from A. Nast et al. The 2016 International League of Dermatological Societies' revised glossary for the description of cutaneous lesions. British Journal of Dermatology, 2016, 174, pp. 1351–1358. John Wiley & Sons Ltd on behalf of the British Association of Dermatologists.

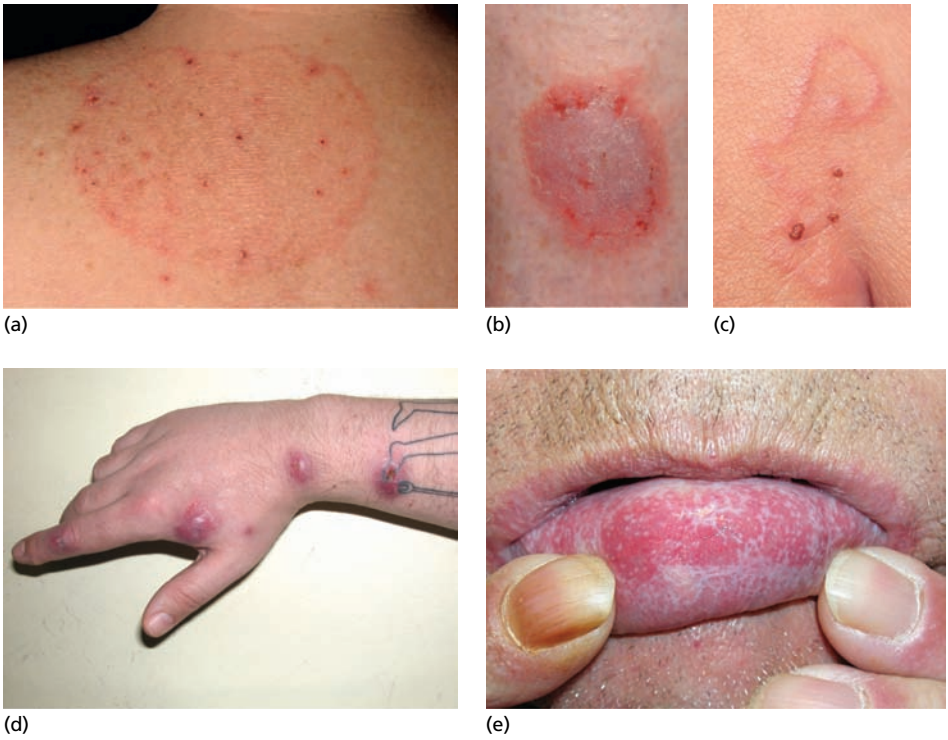



**Figure 1.3** Shapes and distribution patterns of skin lesions: (a) annular: tinea cruris; (b) discoid (round): nummular eczema; (c) serpiginous: cutaneous larva migrans; (d) sporotrichoid: Mycobacterium marinum infection; (e) reticulate: lichen planus on the lower lip. (Source: (a), (b) and (c) reproduced with permission of Cardiff and Vale University Health Board.)

**Nails.** Isolation of the pathogen from nail material is more difficult than in other samples. The full thickness of the nail should be sampled. Debris from under the nail is a fruitful source of material.

### *Wood's light*

This is a source of UV light from which visible light has been excluded by a Wood's (nickel oxide) filter. Variations in epidermal pigmentation are more apparent under Wood's light than under visible light, whereas variations in dermal pigment are less apparent. For example, Wood's light accentuates the epidermal depigmentation of vitiligo, whereas the pallor from localised dermal vasoconstriction in naevus anaemicus disappears under Wood's lamp. Some organisms produce chemicals that fluoresce under Wood's lamp, including *Corynebacterium minutissimum*, the bacterium responsible for erythrasma (Figure 1.4). Wood's light examination is a useful tool in the diagnosis of superficial mycoses, particularly infections due to *Microsporum* species which fluoresce green (Table 1.6).

## Specific investigations

### *Biopsy*

A biopsy of lesional skin provides essential information on the dermatopathology of almost all skin disorders. Sections from a paraffin-embedded biopsy specimen are usually stained with haematoxylin and eosin (H&E) for standard histopathological reporting. Special stains can be used to detect the presence of microorganisms (e.g. dermatophytes), the distribution of particular components of the skin (e.g. elastin) and the deposition of pathological substances (e.g. amyloid). Antibody deposition in the skin in immunobullous diseases is assessed

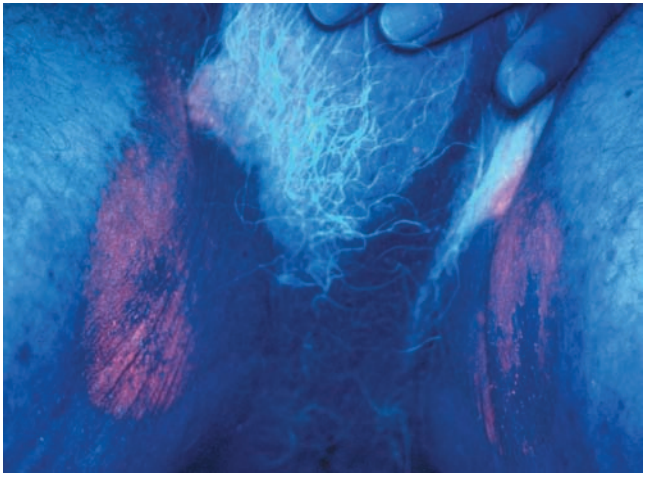


**Figure 1.4** Wood's light illumination of erythrasma of the groins. The fluorescence in erythrasma is coral pink.

**Table 1.6** Colour under Wood's light linked to clinical examples (adapted from Nast et al. 2016)

| Colour under Wood's light | Clinical example(s) |
|---|---|
| Blue-green to yellow-green | Tinea capitis due to *Microsporum* spp. |
| Coral pink | Erythrasma |
| Red | Urine in some forms of porphyria |
| White | Well-developed lesions of vitiligo |
| Yellow to yellow-green | Pityriasis (tinea) versicolor |

Source: Adapted from A. Nast et al. The 2016 International League of Dermatological Societies' revised glossary for the description of cutaneous lesions. British Journal of Dermatology, 2016, 174, pp. 1351–1358. John Wiley & Sons Ltd on behalf of the British Association of Dermatologists.

by direct immunofluorescence. Skin biopsies are processed specifically for this purpose; the immunofluorescence laboratory technique is performed on frozen sections.

Several different types of biopsy can be performed under local anaesthetic. Punch biopsies provide a small full thickness sample of skin, shave biopsies provide information on superficial skin layers and incisional biopsies may be used to sample a full-thickness section of a larger skin lesion or rash.

### *Patch tests*

Patch tests are typically used to detect contact allergy of the delayed hypersensitivity type. Multiple chemicals are applied to the patient's back to assess for an eczematous reaction. Patch tests are usually read at 2 days and 4 days (see Chapter 69). A patch test technique can be used to detect contact urticaria when the results are read at 15–30 min.

### *Prick tests*

Prick testing investigates immediate type I hypersensitivity reactions. A small quantity of the test solution is placed on the skin and a prick is made through it with a sharp needle. The size of the weal and flare is measured after 15 min and compared with an adjacent control solution.

# 2 Introduction to dermatological therapeutics

Treatment modalities for skin disease comprise:

- Topical treatment
- Dressings (not discussed further in this book)
- Local injection
- Systemic agents (Chapter 82)
- Phototherapy
- Surgical removal of tissue
- Physical destruction of tissue such as with cryotherapy, cautery/diathermy, hyfrecation, and laser.

## Topical treatment

There are different 'vehicles' (Box 2.1) that can be used to apply topical medication or emollients to the skin. As a rule, acutely inflamed skin is best treated with bland preparations that are least likely to irritate. Moist or exudative eruptions are conventionally treated with lotions or creams, whilst dry skin responds well to ointments.

### Prescribing topical treatment

The following should be considered when making a prescription for a topical treatment:

*Prescription requirements*: In general, a prescription of topical agent should comprise drug name, vehicle (cream or ointment), quantity to be dispensed, frequency, site of application and duration of treatment.

*Frequency*: Emollients should be applied frequently enough to maintain their physical effect, which may mean several applications per day. Active preparations are usually applied once or twice daily. Twice-daily application of topical corticosteroids is only marginally more effective than once-daily application.

**Box 2.1 Different types of vehicle**

*Ointments*: Semi-solid vehicles composed of lipid, such as white soft paraffin BP (petrolatum). Contain fewer preservatives than other vehicles. Occlusive and emollient properties.

*Creams*: Semi-solid emulsions containing both lipid and water. Emollient, lubricant and mildly occlusive.

*Pastes*: Semi-solid preparations containing a high proportion of finely powdered material such as zinc oxide or starch. Occlusive, protective and hydrating.

*Lotions*: Liquid formulations, usually simple suspensions or solutions of medication in water, alcohol or other liquids. Suitable for treating the scalp and other hairy areas of skin.

*Gels*: Thickened lotions. Suitable for treating the scalp and other hairy areas of skin.

*Powders*: Occasionally used to deliver drugs such as antifungal agents applied to the feet.

*Paints*: Liquid preparations which are usually applied with a brush to the skin or mucous membranes.

*Dressings*: Impregnated dressings, e.g. bandages containing ichthammol or zinc oxide, or tapes containing topical steroid.

*Rook's Dermatology Handbook*, First Edition. Edited by Christopher E. M. Griffiths, Tanya O. Bleiker, Daniel Creamer, John R. Ingram and Rosalind C. Simpson.

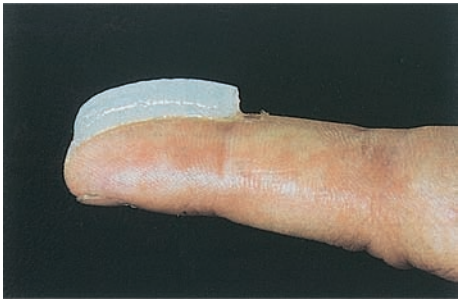


**Figure 2.1** The fingertip unit: from the distal crease of the forefinger to the ventral aspect of the fingertip

*Quantity*: The quantity of active topical agent (such as topical corticosteroids) needed for effective treatment should be explained to the patient. 'Fingertip units' are a useful guide for topical corticosteroid application (see Figure 2.1 and Table 2.1). Emollients should be applied more liberally.

*Timing of application*: Leave a suitable amount of time between emollient and active agent. This avoids dilution of the active medication and prevents spread over areas of skin where it is not required.

*Potential hazards*: Localised irritant or allergic reactions are the most frequent adverse effects (see Chapter 69). All topically applied drugs are absorbed to some degree, but systemic side effects are relatively rare. Absorption varies considerably depending on the region of skin being treated (absorption greatest from the genital area and least from the soles and palms). Occlusion greatly enhances drug penetration. Inflammation of the skin significantly increases drug absorption, especially in erythrodermic patients. Bath oils tend to make the bath slippery; paraffin-based ointments are flammable, which is a particular risk in smokers.

Table 2.2 lists frequently used topical treatments, but is not intended to provide an exhaustive list.

## Topical corticosteroids

Topical corticosteroids (TCS) are the mainstay of treatment in eczematous dermatoses and are used either regularly or occasionally in the management of most inflammatory skin diseases. TCS vary in potency from mild to very potent (Table 2.3). Classification of potency is important to predict response and possible adverse effects. Penetration of TCS is increased by occlusion using polythene film, dressings, gloves or bandages. This improves beneficial effects but also increases the potential for adverse effects.

### *Side effects*

Significant side effects are rare, especially with short term use. The most common side effects are localised to application sites: skin atrophy, striae, erythema, telangiectasia and purpura; atrophic changes can become irreversible with long-term use of potent preparations. Areas most vulnerable to atrophy are those where the skin is already relatively thin, e.g. flexures and face.

Other local side effects are development of contact allergy, exacerbation of infection and if used on the face acneiform eruptions (see Chapter 40). It is advisable to avoid the use of topical corticosteroids in the presence of active viral infection, including herpes simplex, viral warts or molluscum contagiosum.

It is recommended that patients should use no more than 50 g of a superpotent steroid or 100 g of a potent steroid preparation per week and that prolonged usage at this high rate should be avoided to minimise the risk of systemic absorption leading to Cushing syndrome and hypothalamic-pituitary-adrenal axis suppression.

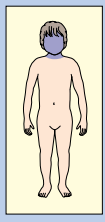
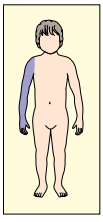
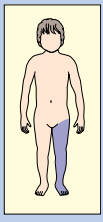
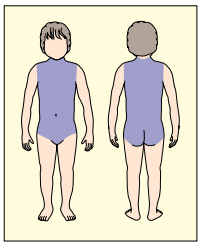
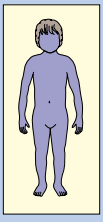
Rebound worsening of disease may occur when topical corticosteroids are withdrawn, particularly in psoriasis. This is most likely after withdrawal of potent or very potent corticosteroids.

'Steroid phobia' describes the fear of using topical corticosteroids which is out of proportion to the likelihood of side effects developing.

## Topical calcineurin inhibitors

Topical calcineurin inhibitors (TCIs) have been developed for topical treatment of atopic eczema and have numerous additional applications. TCIs (e.g. tacrolimus and pimecrolimus) exhibit their anti-inflammatory effect by inhibition of calcineurin, which suppresses lymphocyte activation. They do not induce cutaneous atrophy. Theoretically, the local immunosuppression related to these

**Table 2.1** Fingertip units required for a single treatment of various regions in children and adults (the unit is measured using an adult finger)

| Age | Face and neck | One upper limb | One lower limb | Trunk (including buttocks) | Whole body |
|---|---|---|---|---|---|
| 3–6 months | 1 | 1 | 1.5 | 2.5 | 8.5 |
| 1–2 years | 1.5 | 1.5 | 2 | 5 | 13.5 |
| 3–5 years | 1.5 | 2 | 3 | 6.5 | 18 |
| 6–10 years | 2 | 2.5 | 4.5 | 8.5 | 24.5 |
| Adult | 2.5 | 4.5 | 7.6 | 13.5 | 40 |

Source: Finlay AY, Edwards PH, Harding KG. 'Fingertip Unit' in dermatology. Lancet, 1989, 11, 155 and Long CC, Mills CM, Finlay AY. A practical guide to topical therapy in children. Br J Dermatol 1998, 138, 293–296.

**Table 2.2** Different types of topical treatments and their main uses

| Type of agent | Common example(s) | Indication |
|---|---|---|
| Antimicrobial agents | Alcohols: isopropyl alcohol, ethanol and *n*-propanol<br>Benzalkonium chloride<br>Chlorhexidine, iodine<br>Antibiotics | Alcohols can be used for skin cleansing<br>Present in antiseptic creams<br>Used as a skin cleanser prior to surgery<br>Topical antibiotics are frequently used in the treatment of superficial infections, acne vulgaris and rosacea |
| Antifungal agents | Allylamines (e.g. terbinafine), imidazoles (e.g. clotrimazole), morpholines (e.g. amorolfine) and polyenes (e.g. nystatin) | Treatment of mild dermatophyte and yeast infections |
| Antiparasitic agents | Pyrethroids (e.g. permethrin), malathion, dimeticone, Ivermectin | Treatment of lice infestations and scabies |
| Antiperspirants | Aluminium chloride | Hyperhidrosis of the axillae, palms and soles |
| Antiviral agents | Aciclovir, podophyllin, cidofovir | Treatment of herpes simplex virus types I and II, treatment of genital warts |
| Astringents | Aqueous solutions of potassium permanganate, aluminium acetate, and silver nitrate | Used to reduce exudation by precipitation of protein. These also have antiseptic properties. |
| Calcineurin inhibitors | Tacrolimus, pimecrolimus | Licensed for treatment of atopic eczema, especially in facial and flexural areas<br>Also used in multiple other inflammatory dermatoses |
| Corticosteroids | Topical: see Table 2.3<br>Intralesional, e.g. triamcinolone | Topical: mainstay of treatment in eczematous dermatoses and other inflammatory dermatoses<br>Intralesional: recalcitrant dermatoses, e.g. alopecia areata, keloid scars, lichen simplex, nodular prurigo |
| Cytotoxic and antineoplastic agents | 5-fluorouracil, diclofenac, ingenol mebutate, imiquimod | Actinic keratosis, Bowen disease, superficial BCC, viral warts (refer to individual drug regarding indication) |
| Depigmenting agents | Hydroquinone, azelaic acid | Melasma |
| Emollients | White soft paraffin | Used to protect, lubricate and moisturise dry skin<br>Also use instead of soap ('soap substitute') on inflamed skin |
| Keratolytic agents<br>Miscellaneous agents | Salicylic acid, urea<br>Brimonidine<br>Capsaicin<br>Dithranol<br>Nicotinamide/nicotinic acid | To treat hyperkeratosis<br>Rosacea<br>Neuralgia, nodular prurigo, other localised intractable itch<br>Psoriasis<br>Acne vulgaris |

(*Continued*)

**Table 2.2** (Continued)

| Type of agent | Common example(s) | Indication |
|---|---|---|
| Retinoids | Retinoic acid (tretinoin), isotretinoin, adapalene Bexarotene | Acne<br>Early plaque stage mycosis fungoides |
| Sensitising agents | Dinitrocholorobenzene, diphencyprone | Treatment of alopecia areata and warts |
| Soothing agents | Menthol, calamine | To help soothe itching and discomfort |
| Special dermatological formulations ('specials') | Examples:<br>Coal tar solution BP 5% w/w in betamethasone valerate 0.025% w/w ointment 100 g<br>Salicylic acid 5% w/w/propylene glycol 47.5% w/w in Dermovate® cream 100 g<br>Reflectant (Dundee) sunscreens (available in coffee, coral pink, beige) 50 g | For moderate-severe psoriasis of trunk and limbs when other treatments such as vitamin D analogues have been ineffective<br>For use on palmoplantar skin for hyperkeratotic eczema, palmopustular pustulosis and psoriasis not responding to Clobetasol propionate and emollients alone<br>To treat photosensitivity disorders where the patient is sensitive to visible light, e.g. solar urticaria and porphyrias |
| Tars | Coal tar | Psoriasis |
| Vitamin D analogues | Calcipotriol, calcitriol, maxacalcitol, tacalcitol | Psoriasis |

**Table 2.3** Potency of some common topical corticosteroids as per *British National Formulary*

| Topical corticosteroid potency | Examples |
|---|---|
| Very potent | Clobetasol propionate<br>Diflucortone valerate 0.3% |
| Potent | Beclometasone dipropionate 0.025%<br>Betamethasone valerate 0.1%<br>Fluocinolone acetonide 0.025%<br>Hydrocortisone 17-butyrate<br>Mometasone furoate 0.1%<br>Fluticasone propionate |
| Moderate | Betamethasone valerate 0.025%<br>Clobetasone butyrate<br>Fludroxycortide 0.0125%<br>Fluocinolone acetonide 0.00625%<br>Alclometasone dipropionate 0.05% |
| Mild | Hydrocortisone 1%<br>Hydrocortisone 2.5%<br>Fluocinolone acetonide 0.0025% |