Chapter 25

Therapy-related issues: musculoskeletal diseases

Rheumatoid arthritis *548*
Gout *556*

Rheumatoid arthritis

Rheumatoid arthritis (RA) is an autoimmune disease which causes joints lined with synovium to become inflamed, swollen, stiff, and painful, and leads to joint erosion. It is a multisystem disorder which can affect many organs including the eyes, lungs, heart, and blood vessels. The aim of treatment is to decrease pain and inflammation, prevent joint damage, and ultimately induce remission of disease.

Disease-modifying anti-rheumatic drugs (DMARDs) (Table 25.1)

- DMARDs should be started early, ideally within 3 months of the onset of persistent symptoms.
- Use a combination of at least two, usually including methotrexate.
- If a single DMARD is used, increase the dose rapidly to a therapeutic level.
- Unless contraindicated, use analgesics and NSAIDs as needed to relieve pain.
- When the disease is controlled, DMARDs can be cautiously reduced.

Common characteristics of DMARDs

- May take up to 3 months for full therapeutic effect. Therefore short-term glucocorticoids may be required in this period (IA, IM, or oral).
- Can cause adverse effects. Safety monitoring is required (see Table 25.1).
- Live vaccines should be avoided, but annual influenza and pneumococcal vaccines are recommended.
- Caution with exposure to chickenpox/shingles.

Biological therapies (Table 25.2)

Biological therapies offer major new options in the treatment of rheumatoid arthritis and their role is rapidly evolving. In England and Wales the use of these therapies is determined by NICE guidance.

- Biological therapies are associated with increased risk of serious infection and their use is contraindicated in patients with current infections.
- Screen patients for mycobacterial infections before biological therapies are initiated—if necessary give anti-TB prophylaxis.
- Can exacerbate heart failure—assess patients prior to initiation.
- Caution is required in patients with demyelinating diseases as anti-TNF therapies have been associated with demyelinating syndromes in a few cases.

Ankylosing spondylitis

Ankylosing spondylitis is an inflammatory disease affecting the spine and causing back pain, stiffness, and joint fixation. The large peripheral joints can also be affected.

- Conventional treatment is with physiotherapy and NSAIDs only.
- Methotrexate, and occasionally sulfasalazine, are used for peripheral disease.
- Anti-TNF therapies may be used for patients who have persistent active disease that has not responded to conventional therapy (Table 25.2).

Psoriatic arthritis

Psoriatic arthritis is a chronic inflammatory arthropathy of variable and unpredictable course associated with psoriasis of the skin or nails.

- Traditional standard therapy is with NSAIDs and corticosteroid injections.
- Methotrexate, leflunomide, and sulfasalazine are the DMARDs of choice (only leflunomide is specifically licensed). The risks of hepatotoxicity are slightly greater than for the same drugs used in RA and monitoring is essential.
- Patients with poor response may be changed to alternative DMARDs (e.g. ciclosporin).
- Etanercept, adalimumab, or infliximab may be used (in accordance with NICE guidelines) in patients with active and progressive psoriatic arthritis not responsive to adequate trials of at least two DMARDS either individually or in combination.

Vasculitis

The vasculitides comprise a group of diseases featuring inflammation and necrosis of blood vessels. They include temporal arteritis, Wegener's granulomatosis, Churg–Strauss syndrome, and vasculitis secondary to RA, systemic lupus erythematosus, or Sjögren's syndrome. Treatment depends on the extent and severity of disease.

Treatment of acute phase of the disease

- Cyclophosphamide may be given at a dose of 10–15mg/kg IV in pulses every 2–3wks for 3–6 months, or 2mg/kg daily taken orally, with monitoring of white blood cells and neutrophils and reductions in dose or frequency for renal impairment and age.
- Mesna is given in conjunction with cylophosphamide to prevent bladder toxicity. Patients are advised to maintain a fluid intake of ~3L/day on the day of treatment.
- Antiemetics will be needed with cyclophosphamide.
- Corticosteroids may be given prior to the cyclophosphamide as either IV methylprednisolone 10–15mg/kg or high-dose oral prednisolone.
- Co-trimoxazole 480–960mg three times weekly should be given as prophylaxis against *Pneumocystis jirovecii*.
- Patients on high-dose corticosteroids will require bone protection with a bisphosphonate and calcium and vitamin D supplements and may also require a PPI. Fluconazole or nystatin may be required as prophylaxis against oral candidiasis.

Maintainence therapy

After the cyclophosphamide course is complete, azathioprine or methotrexate may be given as maintenance therapy.

Further reading

http://www.nice.org.uk; musculoskeletal section.
http://www.rheumatology.org.uk; guidelines.
http://www.arthritisresearchuk.org

Table 25.1 Disease-modifying anti-rheumatic drugs

DMARD	Dose	Other clinical information	Suggested Monitoring regimen
Methotrexate	7.5–10mg weekly ↑ to 25mg weekly	Folic acid 5mg may be given 3–4 days after the methotrexate, ↑ as necessary, but avoiding the day of methotrexate. Patient information and shared care card should be given as per NPSA alert. NSAIDs may be continued with regular monitoring; however, over-the-counter NSAIDs should be avoided. May be changed to subcutaneous route for maximum bioavailability and improved tolerability. The strength and form of methotrexate must be clearly stated.	FBC, LFTs, U&Es, ESR, and CRP every 2wks for 3 months, then monthly.
Sulfasalazine	500mg daily ↑ by 500mg weekly to 1g twice daily. Maximum 3g daily	May colour urine orange and stain soft contact lenses yellow. May be used in pregnancy (up to 2g/day) and breastfeeding.	FBC, U&Es, LFTs, ESR, and CRP monthly for 3 months, then every 3 months.
Hydroxychloroquine	200–400mg daily	Visual acuity should be monitored annually by an optometrist and patients advised to report any visual disturbances. May be continued in pregancy	Regular blood monitoring is not required.
Leflunomide	10–20mg daily Occasionally 30mg daily	Long elimination half-life. Teratogenic—women planning to have children should discontinue leflunomide for 2 years or have cholestryramine washout procedure. Men should stop leflunomide 3 months before trying to father a child.	FBC, LFTs, U&Es, ESR, CRP, BP, and weight monthly for 6 months, then 2 monthly.

Azathioprine	1mg/kg/day for 4–6wks ↑ to 2–3mg/kg/day	If patient started on allopurinol reduce azathioprine dose to 25% of original dose.	FBC, LFTs, U&Es, CRP,and ESR weekly for 6wks, fortnightly until stable, then monthly.
Ciclosporin	2.5mg/kg/day in 2 divided doses for 6wks. ↑ at 2–4wk intervals to maximum 4mg/kg/day	Bioavailability varies with formulation—prescribe by brand name. Reduce diclofenac dose by 50%. Avoid colchicines, St John's wort, and doses of simvastatin >10mg.	U&Es, FBC, ESR, CRP, BP, and urinalysis fortnightly for 3 months, then monthly. LFTs monthly. Lipids every 6 months.
Mycofenolate	500mg daily ↑ by 500mg weekly to 1–2g daily. Maximum 3g daily	Used to treat vasculitis.	FBC weekly for 6wks, then monthly LFTs, U&Es, ESR, and CRP monthly.
Gold	10mg test dose. 50mg IM weekly until total of 1g, then review.	Given by deep IM injection. Patients should be observed for 30min after injection because of risk of anaphylaxis. Benefit not usually seen until cumulative dose of 500mg given. Stop if no response after 1g	FBC and urinalysis before each injection.CRP, ESR, and U&E at least 3 monthly.
Penicillamine	125mg daily ↑ by 125mg every 4wks to 500mg daily in divided doses. Maximum 1g daily	Stop if no response after 3 months on maximum dose	Urinalysis with blood tests every 2 weeks FBC, U&Es, ESR, CRP, and LFT every 2wks until stable, then monthly.

Table 25.2 Biological therapies

Biological	Dose	Action	Licence in rheumatology	NICE approval
Infliximab	RA—3mg/kg by IV infusion over 2h at 0, 2, and 6wks, then every 8wks with methotrexate. Can ↑ in steps of 1.5mg/kg to 7.5mg/kg AS and PA—5mg/kg at 0, 2 and 6wks, then every 6–8wks. In PA use with methotrexate	TNF-α inhibitor	RA—severe active progressive RA. when response to DMARDs including methotrexate has been inadequate (see NICE Critera) AS—where conventional therapy has been inadequate PA—where response to DMARDs has been inadequate	RA—for patients with inadequate response to 2 DMARDs including methotrexate AS—not recommended PA—when response to 2 DMARDs has been inadequate
Etanercept	RA—25mg twice weekly or 50mg weekly SC in combination with methotrexate unless not tolerated or contraindicated AS and PA—25mg twice weekly or 50mg weekly SC	TNF receptor fusion protein	RA—when response to DMARDs including methotrexate has been inadequate. Severe active progressive RA AS—where conventional therapy has been inadequate PA—where response to DMARDs has been inadequate	RA—for patients with inadequate response to 2 DMARDs including methotrexate AS—Severe active AS when 2 NSAIDs have not been effective PA—when response to 2 DMARDs has been inadequate

Adalimumab	RA—40mg every 2wks SC with methotrexate unless not tolerated or contraindicated AS, PA, PJIA—40mg every 2wks	TNF-α inhibitor	RA—when response to DMARDs including methotrexate has been inadequate. Severe active progressive RA AS—where conventional therapy has been inadequate PA, PJIA—where response to DMARDs has been inadequate	RA—for patients with inadequate response to 2 DMARDs including methotrexate AS—severe active AS when 2 NSAIDs have not been effective PA—when response to 2 DMARDs has been inadequate
Rituximab	RA–1g by IV infusion 30min after 100mg IV methylprednisolone. Followed by a further dose after 2wks. May be repeated after 6 months. In combination with methotrexate	Depletes B lymphocytes	RA (adults) with severe active RA and inadequate response or contraindication to other DMARDs including one or more tumour necrosis inhibitors	RA (adults) with severe active RA and inadequate response or contraindication to other DMARDs including one or more tumour necrosis inhibitors
Certolizumab	RA—400mg SC at 0, 2, and 4wks, then 200mg every 2wks in combination with methotrexate	TNF-α inhibitor	RA—when response to DMARDs including methotrexate was inadequate	RA—for patients with inadequate response to 2 DMARDs including methotrexate. The manufacturers provide the first 12 weeks treatment free of charge

(continued)

Table 25.2 (*Contd.*)

Biological	Dose	Action	Licence in rheumatology	NICE approval
Tocilizumab	RA—8mg/kg (minimum 480mg) by IV infusion over 1h every 4wks. In combination with methotrexate	Inhibits interleukin-6	RA—in patients who have responded inadequately to or are intolerant of DMARDs or TNF antagonists	RA—for patients with moderate or severe active RA that has responded inadequately to one or more anti-TNFs and whose RA has responded inadequately to rituximab or in whom rituximab is contraindicated or not tolerated
Abatacept	RA—<60kg 500mg, 60–100kg 750mg, >100kg 1000mg IV as a 30min infusion at 0, 2, and 4wks, then every 4wks. In combination with methotrexate PJIA—<75kg 10mg/kg, >75kg as adult dosing	Attenuates T-lymphocyte activation	RA—in patients who have responded inadequately to or are intolerant of DMARDs, including at least one TNF inhibitor PJIA—severe PJIA age ≥6 years with insufficient response to DMARDs including at least one TNF inhibitor	RA—for patients with severe active RA with inadequate response to or intolerance of other DMARDs including at least one anti-TNF and who have a contraindication to or intolerance of rituximab or methotrexate
Anakinra	RA—100mg daily SC	Inhibits interleukin1	RA—in combination with methotrexate in patients with inadequate response to methotrexate alone	Not recommended

RA, rheumatoid arthritis; AS, ankylosing spondylitis; PA, psoriatic arthritis; PJIA, polyarticular juvenile idiopathic arthritis.

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Gout

Treatment of an acute attack of gout

- NSAIDs at maximum dose for 1–2 weeks, unless contraindicated. For patients at increased risk of peptic ulceration gastroprotection can be added or a COX-2 inhibitor used (e.g. etoricoxib 120mg daily). Aspirin or salicylates at analgesic doses should not be used because of reduced uric acid excretion, but low-dose aspirin may be continued.
- Colchicine may be used as an alternative or in addition to an NSAID. Give 500micrograms every 4–6h until pain relief is achieved, a total dose of 6mg is reached, or side effects become limiting (commonly sickness and diarrhoea) Note interactions with ciclosporin and erythromycin.
- If NSAIDs are contraindicated or ineffective or if gout is refractory, corticosteroids may be needed. Intra-articular corticosteroid injections may be useful if only one joint is affected. Systemic corticosteroids may be needed for polyarticular disease.
- Allopurinol and uricosurics should not be started during an acute attack or for 2–3 weeks after the attack has resolved. However, they should be continued in patients who are already taking them.
- Simple analgesics may be used in addition if necessary.
- Diuretics should be stopped if prescribed for hypertension. If an alternative antihypertensive is required, losartan should be considered as it has modest uricosuric effects. Diuretics for heart failure should be continued.

Lifestyle changes

- During an acute attack the joint should be rested. Ice packs and splinting may be of benefit.
- If obese, a weight reduction programme should be adopted, but high-protein low-carbohydrate diets should be avoided. Once the acute attack has subsided, moderate exercise should be encouraged.
- Alcohol should be restricted to <21 units per week for males and <14 units per week for females, particularly avoiding beer.
- Foods with a high purine content, such as red meat, offal, game, shellfish, and yeast extracts, should be avoided.

Management of chronic or recurrent gout

- Allopurinol should be started at 50–100mg daily and increased by 100mg every 2–4wks until symptom control is achieved, serum urate <0.3 or 0.36mmol/L, or the maximum dose of 900mg daily in divided doses is reached. Allopurinol lowers urate levels by inhibiting xanthine oxidase. It is metabolized principally to oxipurinol which has a $t_{1/2}$ of 13–30h and can accumulate in renal impairment. Therefore reduced dosing is required. Withdraw immediately if a rash develops. Note interactions with azathioprine, mercaptopurine, and coumarins.
- A uricosuric may be used in patients with normal renal function and no history of renal stones if allopurinol is not tolerated. Sulfinpyrazone 100–200mg daily may be used, increasing over 2–3 weeks to 600mg daily. Probenecid 1–2g daily is available (in the UK) on a named patient basis.

- Febuxostat is a selective inhibitor of xanthine oxidase which may be used in patients who are intolerant of allopurinol or for whom allopurinol is contraindicated. It is started at 80mg daily and may be increased to 120mg daily after 2–4 weeks if serum urate >0.36mmol/L.
- Colchicine 0.5mg twice daily or low-dose NSAIDs should be given at the same time as allopurinol to prevent an acute attack and continued for 1 month after normal serum urate is achieved.
- Fenofibrate should be considered for patients with hyperlipidaemia, as this has a uricosuric effect.

Further reading

British Society for Rheumatology and British Health Professionals in Rheumatology (2007). *Guidelines for the Management of Gout*: http://www.rheumatology.org.uk

Zhang W *et al.* (2006). Eular evidence-based recommendations for gout. Part II: Management, report of a taskforce of the Eular Standing Committee for International Clinical Studies Including Therapeutics (ESCISIT). *Annals of the Rheumatic Diseases* **65** :1312–24.

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Chapter 26

Therapy-related issues: skin

Wound care *560*
Eczema *566*
Psoriasis *572*

Wound care

The skin is the largest organ of the body and has the primary function of protecting underlying tissues and organs. Breaching this barrier exposes the underlying tissues and organs to:

- mechanical damage
- dehydration
- microbial invasion
- temperature variations.

The ideal wound dressing replicates the skin's protective qualities, in addition to promoting wound healing.

Factors affecting the healing process

For a wound to heal the following factors are required.

- Moist environment, but not excessively wet.
- Warmth.
- Oxygen.
- Nutrition.
- (Relatively) free from contamination with microbes or foreign bodies, including slough and necrotic tissue.

A wound dressing should provide all these factors.

Some patients experience delayed wound healing and can develop chronic wounds (e.g. leg ulcers) despite good wound care. This might be caused by patient-related factors which inhibit wound healing, and these must be addressed as far as possible (Table 26.1).

Classification of wounds

Various wound classifications exist. For the purposes of wound care, the following descriptions are the most useful because they correspond to dressing choice. Note that some wounds may show more than one of the following features.

- Epithelializing or granulating—a clean red or pink wound, usually shallow with minimal exudates.
- Sloughy—yellow slough covers part or all of the wound. This might be a dry or wet wound. Note that visible bone or tendon appears yellow.
- Necrotic—dead tissue creates a black, dry, leathery eschar.
- Infected—yellow or greenish in colour, with possible surrounding cellulitis of unbroken skin. The wound might have an offensive smell.
- Exuding—all the features listed so far (except necrotic) might produce exudates to varying degrees. High levels of exudates can lead to maceration of surrounding skin.
- Cavity—the wound might form a deep or shallow cavity. Sinuses are narrow cavities which can extend to some depth, including tracking to bone or between two wounds.
- Malodorous—fungating tumours and infected and necrotic wounds can all have an offensive smell.

These classifications broadly represent the stages of wound healing. Thus, as the wound heals, the type of dressing appropriate to the wound can change. Slough and necrotic tissue are effectively foreign bodies that inhibit wound healing. After these have been removed, the underlying tissue should be granulating. Patients should be warned that as debridement occurs the wound might appear to become bigger before it starts to heal. Occasionally pain associated with the wound can ↑ as the wound heals because damaged nerve endings also heal.

It is important to review wound care on a regular basis. Frequency of reviews (and dressing changes) depends on the severity and nature of the wound. An infected or highly exuding wound might require daily dressing changes, but a granulating wound might only require re-dressing every few days. It is important to avoid renewing a dressing unnecessarily becuase this can expose the wound to cooling, dehydration, or mechanical damage. It is good clinical practice to prepare a wound care chart (Table 26.2). This ensures that all staff are informed about the nature of the wound, which dressings are being used, and the frequency of dressing changes/review. Including photographs of the wound enables progress (or deterioration) to be monitored.

Table 26.1 Patient factors that inhibit wound healing

- Poor perfusion, e.g. peripheral vascular disease
- Older age (usually linked to poor nutrition or other disease)
- Concurrent disease, e.g. diabetes, cancer or anaemia
- Drugs, e.g. steroids, cytotoxics or NSAIDs
- Smoking
- Immobility

Table 26.2 Wound care plan

Patient's name: _____	**Date:** _____
Photograph/diagram (number each wound and use numbering scheme when describing wounds):	**Description of wound(s)**
Dressings (number, as above):	**Frequency of dressing changes:**
Other information (e.g. analgesia required with dressing changes):	
Review date: _____	
Signature: _____	

Selection of wound dressing

There is no universal wound dressing and different types of dressing suit different wounds. The ideal dressing satisfies all the requirements described in Table 26.3 according to the environment in which it is being used. Dressings are divided into the following two categories.

- Primary dressings—applied directly to the wound surface.
- Secondary dressings—placed over the primary dressings to hold them in place and/or provide additional padding or protection.

It is less important for secondary dressings to satisfy the ideal requirements.

Each time a dressing is changed, it exposes the wound to contamination, dehydration, and cooling. Thus, ideally, the frequency of primary dressing changes should be kept to a minimum. Secondary dressings can be changed more frequently, without disturbing the primary dressing.

Wound care has advanced greatly since the introduction of 'interactive' dressings. These dressings provide active wound management, usually by interacting with the wound surface (e.g. alginates form a gel on contact with exudates) rather than simply acting as a barrier. Selection of the correct dressing is important both to ensure that the wound is healed as efficiently as possible and to ensure cost-effective use because interactive dressings are usually more expensive than non-interactive dressings (Table 26.4).

Table 26.3 Characteristics of the ideal wound dressing

- Maintain moist environment
- Manage excessive exudates
- Allow oxygenation
- Provide a barrier to micro-organisms
- Maintain a warm environment (~37°C)
- Not shed particles or fibres
- ↓ or eliminate odour
- Cost-effective
- Acceptable to the patient

Table 26.4 Matching the dressing to the wound

Dressing type	Examples	Suitable for:	Comment
Alginate	ActivHeal® alginate Sorbsan® Sorbsan® Plus Kaltostat®	Exuding, sloughy Ribbon or rope—cavity or sinus	'Plus' versions have a highly absorbent backing, suitable for highly exuding wounds
Foams	ActivHeal® Foam Lyofoam® Allevyn®	Exuding or highly exuding wounds	Avoid adhesive versions on fragile skin
Films and membranes	Opsite® Tegapore®	Shallow, granulating	
Hydrocolloid	ActivHeal® hydrocolloid Granuflex® Comfeel® Tegasorb®	Sloughy, light to medium exudates	Not suitable for infected wounds or if frequent dressing changes required Avoid on fragile skin
Hydrofibres	Aquacel®	Sloughy, medium to high exudates Ribbon—cavity or sinus	
Hydrogels	ActivHeal® hydrogel Intrasite® Granugel®	Dry, sloughy	Always requires secondary dressing
Low-adherent	Melolin® NA® NA Ultra®	Dry, lightly exuding, granulating	Even 'non-adherent' versions can stick to wound, causing trauma on removal
Odour-absorbing	Clinisorb® Carbopad® VC	Malodorous	Apply over primary dressings
Padding	Gamgee®	Highly exuding	Secondary dressing only
Paraffin gauze	Jelonet®	Granulating	

Use of topical antimicrobials

These agents are not usually recommended because of the risk of development of resistance and high incidence of local sensitivity reactions (which could ultimately lead to systemic allergic reactions). There is little evidence that topical antimicrobials work, and infection should be treated systemically.

The following preparations are recommended for particular situations.

- Povidone iodine preparations, as either impregnated dressings (Inadine®) or solutions (Betadine® aqueous) can be used on wounds infected with bacteria, fungi, or protozoa. These should be stopped as soon as the infection is under control as povidone iodine has been shown to inhibit wound healing.
- Silver, either as silver sulfadiazine cream (Flamazine®) or as silver-impregnated dressings (AquacelAg®), is active against Gram-negative infection (e.g. *Pseudomonas infection* in burns) and MRSA. These preparations are often used inappropriately for any 'infected' wound. Use should be restricted because they are expensive and excessive use of the cream can cause irreversible black skin staining (argyria) because of deposition of silver into the skin.
- Metronidazole gel is used to inhibit anaerobic bacteria which cause the malodour associated with fungating tumours or necrotic wounds. Liberal application of metronidazole suppresses bacterial growth and thus ↓ odour. The surrounding skin should be protected from the gel to avoid maceration. Excessive use could (theoretically) lead to the emergence of metronidazole resistance. Where metronidazole gel is unavailable (e.g. in developing countries), the tablets can be crushed to a fine powder and sprinkled over the wound or mixed with an aqueous gel (e.g. KY® jelly) before application.

Other special wound care agents

Chlorinated desloughing agents

These agents, such as Eusol® and Chlorasol®, are no longer recommended. Although effective for debriding sloughy wounds, they are potential irritants and can delay healing because of cell toxicity and ↓ capillary blood flow. With more modern desloughing dressings available, the disadvantages of these agents outweigh the benefits.

Sugar paste and honey dressings

These can be used on sloughy, infected, and/or malodorous wounds. The antibacterial effect of the sugar or honey ↓ odour. Bacterial growth is inhibited because of the ↑ osmotic pressure in the wound, and honey (especially manuka honey) has some inherent antimicrobial effect. These dressings debride sloughy wounds and can promote angiogenesis. Pharmaceutical quality honey should be used as it is prepared according to set standards and gamma irradiated to reduce the risk of bacterial contamination. Sugar pastes are made from preservative-free icing or caster sugar. Thin pastes can be used in wounds with small openings, using a syringe to dribble the paste into the wound, and thick pastes are used for larger cavity wounds. The disadvantage of these dressings is that they might require frequent changes—twice daily or more.

Vacuum-assisted closure (VAC)

VAC therapy is a form of wound care where negative pressure is applied to a special porous dressing which is placed in the wound cavity or over a flap or graft. VAC helps to remove excess exudates and mechanically draws the edges of the wound inwards, promoting healing. It is suitable for any chronic open wound or acute and traumatic surgical wounds, and is used in plastic surgery to promote healing of grafts and flaps. VAC therapy should not be used on infected wounds (including those involving osteomyelitis) unless these are being treated with systemic anti-microbials. VAC is unsuitable for fistulae, which connect with body cavities or organs, and malignant or necrotic wounds, and should be used with caution on bleeding wounds.

Larval (maggot) therapy

Larvae of the common greenbottle are used in the management of necrotic or sloughy wounds. To feed, the larvae produce proteolytic substances that degrade dead tissue but have no adverse effect on living tissue.

Larvae are supplied either in a gauze bag—various sizes contain different numbers of larvae—or loose. The former presentation is often more acceptable to patients (and nurses) and can be used on cavity wounds, where it might be difficult to locate and retrieve free larvae.

Larvae should usually be used within 48h of receipt, otherwise they will die because of lack of nutrients, and will generally survive for 3–5 days feeding on the wound. During this time, they ↑ in size, and as long as they are still active and increasing in size, they are still effective.

The gauze bag or individual larvae are applied directly to the wound and covered with a non-adherent dressing, which is soaked in saline to ensure that the larvae are kept moist (but not drowning!). A non-occlusive secondary dressing should be used to cover them to prevent them from drying out and to ensure that they have sufficient O_2 to survive. Most interactive dressings are unsuitable (and unnecessary) for use on a wound being treated with larvae because they might kill them by ↑ osmotic pressure or ↓ O_2 supply. During treatment, the amount of exudate can ↑ and appear greenish in colour, but this is normal. It might be necessary to protect surrounding healthy skin from maceration caused by ↑ exudates by applying a barrier film such as Cavilon®.

Further reading

http://www.worldwidewounds.com: A peer-reviewed online wound care journal, sponsored by industry but with a code of practice to limit bias.

Eczema

Eczema is an inflammatory skin condition. It nearly always causes itching but its appearance can vary, depending on the site, cause, and severity, and whether it is acute or chronic. Signs can include dryness, scaling, erythema, oedema, weeping, crusting, papules, and vesicles. The terms eczema and dermatitis are interchangeable.

- There are a number of different types of eczema (Table 26.5), but the most common is atopic eczema which affects 15–20% of school children and 2–10% of adults.[1]
- Atopic eczema often affects the face and hands in infants, and the face, neck, wrist, and elbow and knee flexures in children.
- Discoid/nummular eczema affects the limbs with round coin-shaped lesions.
- Gravitational eczema affects the lower legs.
- Pompholyx eczema produces itchy vesicles which can form on the fingers, palms, and soles.
- Seborrhoeic eczema often affects the scalp, face, back, presternal area, groin, and armpits.
- Allergic contact dermatitis is usually caused by a delayed hypersensitivity reaction to an allergen, although it can be an immediate reaction. Nickel and latex are common causes, but it should be noted that some medicines and excipients can act as allergens (e.g. neomycin, benzocaine, chlorocresol).
- Irritant contact dermatitis is caused by substances that damage the skin—e.g. acids, alkalis, solvents, and detergents. Once the causative irritant or allergen has been identified, steps should be taken to try and avoid it, or if that is not possible to minimize the risk of exposure.
- Photodermatitis is caused by the interaction between light and chemicals absorbed by the skin.

Emollients

- Emollients should be used to rehydrate the dry skin usually associated with eczema.
- Soap should be avoided as it dries the skin—use an emollient soap substitute instead. Emollient bath oils can be added to bath water to enhance rehydration and ensure that the whole skin is treated.
- Aqueous cream is suitable as a soap substitute, but not as an emollient.[2]
- They can be used on wet skin as a soap substitute or after drying.
- They should be applied liberally and as frequently as possible.
- They should be applied in the direction of hair growth by smoothing rather than rubbing in.
- Ointments are better for dry scaly skin, but are also more greasy and difficult to wash off.

1 Primary Care Dermatology Society and British Association of Dermatologists (2009). *Guidelines for the Management of Atopic Eczema*: http://www.bad.org.uk
2 Tsang M, Guy RH (2010). Effect of aqueous cream on human stratum corneum *in vivo*. *British Journal of Dermatology* **163**: 954–8.

- Creams are better for wet weeping eczema and can help with pruritus because of the cooling effect as the water evaporates.
- Ensure sufficient supplies of emollients—600g/wk for an adult and 250g/wk for a child.
- Numerous generic and proprietary brands are available. It is important to find one that the patient is happy with and confident using.
- Some emollients may contain sensitizers, such as lanolin, or preservatives which can cause allergies and further exacerbate the eczema.
- Use of emollients should be continued even after the eczema has cleared.

Table 26.5 Classification of eczema

Exogenous	Endogenous
Allergic contact dermatitis	Atopic
Irritant contact dermatitis	Discoid/Nummular
Photodermatitis	Gravitational/Stasis/Venous
	Pompholyx
	Seborrhoeic

The fingertip unit

Some patients or their carers may be inclined to undertreat eczema because of fear of medication side effects. Others may overtreat to keep it away. In order to standardize the amount used, the fingertip unit has been devised. It is defined as the amount of cream or ointment that can be applied to the terminal phalanx of an adult index finger and is ~500mg. The fingertip unit should not be used for emollients, which should always be used liberally. Table 26.6 shows the number of fingertip units which should be used to cover various parts of an adult's body. Table 26.7 shows the number of fingertip units which should be used to cover various parts of a child's body at different age ranges.

Corticosteroids

Topical corticosteroids are an effective treatment for eczema and are the first-line treatment for atopic eczema exacerbations.[1] If not used correctly, there is a significant risk that their use will be ineffective or will cause adverse effects. Poor adherence is a major cause of treatment failure in atopic eczema.[2] The risks can be minimized and adherence improved by the following.

- Tailoring potency to the severity of the eczema, using the least potent corticosteroid that effectively controls the disease.
- Explaining how and when to step treatment up or down, including the maximum period of time to treat a flare before potency should be stepped down or healthcare advice should be sought to review the eczema.
- Using weaker corticosteroids on the face, genitals, and flexures.
- Labelling topical corticosteroids with the potency class on the tubes when they are dispensed.[3]
- Treating secondary infections promptly. Oral treatment is often necessary. There is only limited evidence to support corticosteroid/anti-infective combination creams and ointments.
- Applying emollient first and then waiting for at least 30min until the emollient has been absorbed before applying the corticosteroid.
- Applying gently in the direction of hair growth.
- Counselling on using thinly, the fingertip unit, and how much to apply.
- Counselling on how long to apply, how often to apply (no more than twice daily), and where to apply.
- Counselling on adverse effects and what to do if they notice them, but also reassuring the patient or carer that adverse effects are rare when the treatment is used correctly.

1 NICE (2004). Technology Appraisal 81: Frequency of Application of Topical Corticosteroids for Atopic Eczema. http://www.nice.org.uk
2 Beattie PE, Lewis-Jones MS (2003). Parental knowledge of topical therapies in the treatment of childhood atopic dermatitis. *Clinical and Experimental Dermatology* **28**: 559–53.
3 NICE (2007). *Clinical Guideline 57: Atopic Eczema in Children*: http://www.nice.org.uk

Table 26.6 The fingertip unit and how to assess the quantity of topical agents needed to cover a given body surface area in adults*

Area to be treated	No. of fingertip units	Approximate BSA (%)
Scalp	3	6
Face and neck	2.5	5
One hand (front and back) including fingers	1	2
One entire arm including entire hand	4	8
Elbows (large plaque)	1	2
Both soles	1.5	3
One foot (dorsum and sole), including toes	1.5	3
One entire leg including entire foot	8	16
Buttocks	4	8
Knees (large plaque)	1	2
Trunk (anterior)	8	16
Trunk (posterior)	8	16
Genitalia	0.5	1

*Menter A *et al.* (2009). Guidelines of care for the management of psoriasis and psoriatitic arthritis. Section 3: Guidelines of care for the management and treatment of psoriasis with topical therapies. *Journal of the American Academy of Dermatologists* **60**: 643–59.

Table 26.7 The fingertip unit in children*

Age	Face and neck	Arm and hand	Leg and foot	Trunk (front)	Trunk (back) including buttocks
3–6mo	1	1	1.5	1	1.5
1–2 yrs	1.5	1.5	2	2	3
3–5 yrs	1.5	2	3	3	3.5
6–10 yrs	2	2.5	4.5	3.5	5.5

*MeReC (1999). Using topical corticosteroids in general practice. *MeReC Bulletin* **10**: 21–4.

Topical calcineurin inhibitors

Topical tacrolimus and pimecrolimus are licensed for treating atopic eczema only. Their use in the UK is restricted to second-line treatment after corticosteroids have failed or the risks of further adverse effects (e.g. irreversible skin atrophy) are unacceptable. They are not recommended for treating mild atopic eczema.[1] Patients or carers should be given the following advice.

- To use thinly, and how much to apply with reference to the fingertip, unit.
- That it is common to get initial skin irritation at the site being treated (e.g. burning, itching, feeling of warmth), but this usually subsides.
- Emollients should not be used within 2h of applying tacrolimus.
- Excessive exposure to UV light should be avoided.
- The medication may cause intolerance to alcohol (flushing and skin irritation).

Other topical treatments

- Wet wraps are wet bandages applied to the areas affected by eczema. A dry bandage layer is put over the top. The eczema may have been pretreated with emollients and/or topical corticosteroids. Wet wraps cool the eczema, enhance the absorption of the corticosteroid, and act as a barrier to scratching.
- Bandages containing ichthammol (to reduce itching), zinc oxide, or coal tar are used to treat lichenification.
- Potassium permanganate 0.1% solution can be used to treat eczema when it is weeping and wet. Care must be taken because it stains skin, clothes, and baths.
- Ketoconazole shampoo and coal tar shampoos are effective treatments for seborrhoeic eczema.

1 NICE (2007). *Technology Appraisal 82: Tacrolimus and Pimecrolimus for Atopic Eczema:* http://www.nice.org.uk

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Psoriasis

Psoriasis is a chronic inflammatory skin disease characterized by raised erythematous scaly plaques. The vast majority of cases are managed in primary care or the dermatology out-patient setting. It is relatively common, with a prevalence of 1.5% in the UK population.[1]

It is not known why psoriasis develops but there is a strong genetic component. A number of factors are known to trigger or exacerbate it, including drugs, so it is essential to establish a full and accurate drug history. Drugs recognized to worsen psoriasis or precipitate a relapse include:

- lithium
- chloroquine/hydroxychloroquine
- β-blockers
- ACE inhibitors
- terbinafine
- mepacrine
- bupropion
- ethanol
- NSAIDs

There is no known cure for psoriasis; treatments are aimed at suppressing symptoms and inducing remission. Some treatments may be relatively safe but unpleasant or inconvenient to use. Other treatments, although well tolerated, have risks of severe toxicity to the liver, bone marrow, kidney or unborn fetus, and may even increase the risk of malignancy. Thus it is essential to tailor treatment to each individual patient based on their age, sex, occupation, personality, general health, and resources, and their perception and understanding of the disease.[2] The success of treatment depends on patient concordance, and all patients need to be carefully counselled on their treatment to ensure adherence. A list of the treatment options available is shown in Table 26.8.

Emollients

- Emollients have a beneficial effect in psoriasis.[3]
- They are particularly useful in inflammatory psoriasis and palmoplantar plaque psoriasis.
- Apply liberally and frequently to soften and reduce scaling.

See 🕮 pp.566–7, 'Emollients' in 'Eczema', for counselling points.

1 Gelfand JM *et al.* (2005). Prevalence and treatment of psoriasis in the United Kingdom. *Archives of Dermatology* **141**: 1537–41.
2 British Association of Dermatologists & Primary Care Dermatology Society (2009). *Recommendations for the Initial Management of Psoriasis:* http://www.bad.org.uk/Portals/_Bad/Guidelines/Clinical%20Guidelines/BAD-PCDS%20Psoriasis%20reviewed%202010.pdf
3 Menter A *et al.* (2009). Guidelines of care for the management of psoriasis and psoriatitic arthritis. Section 3. Guidelines of care for the management and treatment of psoriasis with topical therapies. *Journal of the American Academy of Dermatology* **60**: 643–59.

Coal tar

- This has been an effective treatment for psoriasis for many years.
- Smelly, messy, and stains skin and clothing.
- Difficult to apply, resulting in reduced concordance.
- Tar-based shampoos are the first-line treatment for scalp psoriasis.

Salicylic acid

- A topical keratolytic agent.
- Used for hyperkeratotic psoriasis of the palms, soles, and scalp where penetration of other topical agents will be prevented by significant scaling leading to treatment failure.

Dithranol

- A very effective treatment for chronic plaque psoriasis.
- Like coal tar, its use has declined in recent years because of the widespread availability of more cosmetically acceptable treatments.
- Burns normal skin and is oxidized to a dye which stains skin and anything else it comes into contact with (e.g. hair, clothes, bed linen, and bathroom fittings).

Table 26.8 Treatment options for psoriasis

Topical therapies	Systemic therapies
Emollients	Psoralen + ultraviolet A radiation
Coal tar	Acitretin
Salicylic acid	Methotrexate
Dithranol	Ciclosporin
Corticosteroids	Biological agents
Vitamin D analogues	
Tazarotene	
Ultraviolet B radiation	

Topical corticosteroids

- Effective treatment for some forms of psoriasis.
- Non-irritant compared with coal tar and dithranol.
- Clean and easy to use.
- Limited by adverse effects which include causing rebound exacerbation of psoriasis on discontinuation and precipitating unstable forms of psoriasis.
- Long-term use can also cause tachyphylaxis.
- Rarely used for widespread chronic plaque psoriasis, but reserved for delicate areas, such as the face, genitals, and flexures, or more resistant areas such as the scalp, palms, and soles.
- Use on the face, genitals, and flexures should be limited to mild potency topical corticosteroids—e.g. hydrocortisone 1%.
- Potent topical corticosteroids can be used initially on the scalp, palms, and soles, with the strength adjusted according to clinical improvement.

The British Association of Dermatologists has made the following recommendations concerning the use of topical corticosteroids in psoriasis.[1]

- No more than 100g moderate or higher potency preparations should be applied per month.
- Attempts should be made to rotate topical corticosteroids with alternative non-corticosteroid preparations.
- Use of potent or very potent preparations should be under dermatological supervision.
- Patients should be counselled on the use of the fingertip unit to ensure that they know how much ointment or cream to apply.
- No topical corticosteroid should be used regularly for more than 4wks without critical review.
- Potent corticosteroids should not be used regularly for more than 7 days.

Vitamin D and its analogues

- Calcipotriol, a vitamin D analogue, is first-line treatment for plaque psoriasis.
- Easy to apply.
- Does not smell or stain.
- Lacks many of the adverse effects of topical corticosteroids.
- Calcipotriol can irritate the skin, particularly in sensitive areas such as the scalp, face, and flexures, but this rarely leads to withdrawal of treatment.
- Calcitriol and the topical vitamin D analogue tacalcitol are both less irritant than calcipotriol.
- Avoid vitamin D and its analogues in patients with calcium metabolism disorders.
- Do not exceed maximum doses cited in the *BNF* or hypercalcaemia can develop.

1 British Association of Dermatologists (2008). *Topical corticosteroids*: ℛ http://www.bad.org.uk/site/1117/Default.aspx

Tazarotene

- A topical retinoid.
- Effective treatment for mild to moderate plaque psoriasis involving up to 10% BSA.
- Local irritation is common, necessitating careful application, avoidance of normal skin, and titration of gel strength.
- Often used in alternation with a topical corticosteroid.
- Patients need counselling on washing hands after use, avoiding contact with sensitive areas, avoiding excessive exposure to UV radiation, and not applying cosmetics or emollients within 1h of application.

Ultraviolet B (UVB) radiation

- An effective treatment of guttate psoriasis or plaque psoriasis that is unresponsive to topical treatment.
- Broadband UVB is less effective than narrowband (311 ± 2nm) therapy.
- Treatment is usually three times weekly, and 10–30 doses are required to achieve clearance.
- Dosage can be based on the minimal erythema dose or skin type.
- Used alone or combined with other treatments (e.g. tar, dithranol, calcipotriol, and oral retinoids) to enhance their effect.
- Increased risk of cutaneous malignancies.

Ultraviolet A radiation and psoralen

- Topical or systemic administration of a psoralen followed by exposure to ultraviolet A radiation (PUVA) is an effective treatment for most forms of psoriasis and is used in some centres.
- There is no licensed psoralen available in the UK.
- Increased risk of cutaneous malignancies.
- It can be combined with acitretin or calcipotriol.

Patients receiving UVB or PUVA treatment should not be prescribed photosensitizing agents such as:

- amiodarone
- nalidixic acid
- ofloxacin
- chlorpromazine
- tacrolimus
- tetracyclines
- voriconazole.

Acitretin

- An oral retinoid.
- Least effective of the systemic therapies when used alone, but it also lacks many of their toxicities.
- Often used in combination with topical therapies or PUVA.
- Commonly causes drying of the skin and lips, which can be countered with regular use of emollient and lip salve.
- Less frequently, it also dries the mucous membranes and conjunctiva.
- Stringent controls are in place when acitretin is used in female patients of child-bearing age because of its teratogenicity which can continue for up to 2 years after cessation of treatment.

Methotrexate

- An effective treatment for severe psoriasis which cannot be controlled with topical therapies alone.
- Most patients are managed adequately with 7.5–15mg methotrexate weekly.
- Can cause haematological, renal and liver, toxicity, which necessitates careful counselling of the patient on adverse effects and frequent monitoring of blood tests.
- Contraindicated in pregnancy.
- Men should be advised to avoid fathering children during therapy and for 3 months afterwards.
- Pharmacists screening prescriptions for methotrexate should ensure that they comply with local or national guidelines.

Ciclosporin

- Licensed in the UK for severe psoriasis when conventional therapy is ineffective or inappropriate.
- Efficacy has been fully demonstrated.
- Dose used is 2.5–5mg/kg/day.
- Blood pressure and renal function should be monitored during treatment.

Cytokine modulators

- Adalimumab, etanercept, infliximab, and ustekinumab are all licensed and approved in the UK by NICE for the treatment of severe plaque psoriasis which has failed to respond to standard systemic treatments.
- Pharmacists have an important role to play in all patients on systemic immunosuppressants by:
  - counselling
  - monitoring
  - identifying important drug interactions
  - preventing prescribing errors.