Keywords: Impetigo/Antibiotics/Children/Infection control

●This article has been double-blind peer reviewed

Although a common and usually self-limiting skin condition, impetigo needs to be treated effectively to prevent recurrence and the spread of infection

Impetigo: treatment and management

In this article...

- Causes of impetigo
- How the infection is transmitted
- How impetigo should be diagnosed and managed

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Abstract Lawton S (2014) Impetigo: treatment and management. *Nursing Times;* 110: 18-20.

Impetigo is the third most common skin disease in children. It is highly infectious and can be transmitted through direct and indirect contact. This article discusses the types of impetigo, its cause, diagnosis and management, and highlights additional guidance and resources that can support practice.

Impetigo is a highly contagious superficial bacterial skin infection frequently seen in children. It occurs annually in around 2.8% of children aged up to four years old and 1.6% of those aged 5-15 years (National Institute for Health and Care Excellence, 2013). The third most common skin disease seen in children after eczema and viral warts (Sladden and Johnston, 2004), it is usually transmitted by direct contact.

The condition can be classified as:

- Primary – there is a direct bacterial invasion of normal skin that has minor breaks;
- Secondary – the infection is secondary to an underlying skin disease such as eczema or scabies (Koning et al, 2012), or a result of trauma from burns, bites or lacerations (Fitzpatrick et al, 2001).

Although children are infected most often through contact with other infected children, fomites (objects or materials likely to carry infection, such as clothes, towels, utensils and furniture) can also spread impetigo. It is also more common in the summer months, and in areas with poor hygiene and crowded living conditions (Cole and Gazewood, 2007).

Types of impetigo

There are two forms of impetigo:

- Non-bullous (impetigo contagiosa or crusted impetigo) – this is the more common form, accounting for three-quarters of cases;
- Bullous impetigo (NICE, 2013; Blenkinsopp et al, 2004).

Both can be present at the same time.

Non-bullous impetigo

Lesions present as vesicles (small fluid-filled blisters) or pustules. These commonly present around the mouth and nose, but can affect other areas of the face and the extremities. The lesions rapidly burst and develop into gold-crusted plaques, typically 2cm in diameter, which have been said to resemble "glued-on cornflakes".

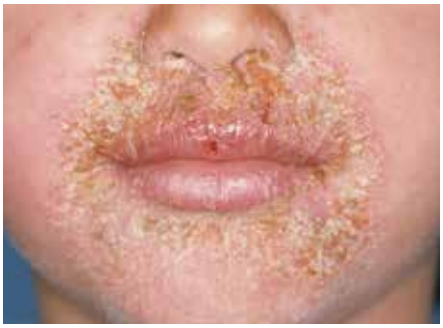
Satellite lesions may occur due to autoinoculation. Non-bullous impetigo is usually asymptomatic although there may be some itching. Systemic symptoms (such as fever) are uncommon unless the infection is widespread (NICE, 2013).

Bullous impetigo

Bullous impetigo is characterised by flaccid, fluid-filled vesicles and blisters (bullae) that are 1-2cm in diameter. These rupture leaving raw skin and form thin, flat, brown-to-golden crusts. The lesions are multiple, painful and spread rapidly; patients may also experience systemic symptoms (weakness, fever and diarrhoea), and regional lymphadenopathy (swelling of lymph nodes). The face is less commonly affected; sites involved tend to be the axilla, neck folds and nappy area (NICE, 2013).

5 key points

1. Impetigo is the third most common skin disease seen in children
2. The infection can be transmitted through direct contact or indirectly through contact with fomites
3. Impetigo is usually caused by *Staphylococcus aureus*
4. Patients and their families must be given evidence-based advice to reassure them and to prevent recurrence
5. If treatment is not effective within seven days, treatment and adherence should be reviewed



Burst lesions develop into gold-crusted plaques

Alamy

TABLE 1. CONDITIONS THAT MIMIC IMPETIGO

Skin infections and infestations	● Cellulitis ● Erysipelas ● Ecthyma ● Candidiasis ● Dermatophytosis ● Herpes simplex virus ● Varicella (chicken pox and shingles) ● Scabies
Non-infective skin diseases	● Atopic eczema ● Contact dermatitis ● Insect bites ● Other skin disorders, such as burns and scalds, drug reactions, Stevens-Johnson syndrome and toxic epidermal necrolysis
Rare conditions	● Discoid lupus erythematosus ● Pemphigus foliaceus ● Bullous pemphigoid ● Sweet's syndrome

Source: National Institute for Health and Care Excellence (2013)

Cause

Staphylococcus aureus is the main bacteria that causes non-bullous impetigo; *Streptococcus pyogenes* (group A beta-haemolytic streptococcus) causes a smaller number cases, either alone or in combination with *S aureus*. Bullous impetigo is always caused by *S aureus* (Koning et al, 2012; Cole and Gazewood, 2007).

Diagnosis

Impetigo is diagnosed by identifying clinical features and history, and by ruling out other conditions that mimic it (Table 1). Assessment should consider:

- Any pre-existing skin disease;
- Trauma to the skin;
- Onset of lesions and site;
- Localised lesions or generalised with spread;
- Appearance of lesions;
- Symptoms, such as itchiness, soreness and pain;
- Symptoms of systemic illness;
- Family history – other family members with symptoms or with impetigo;
- Hygiene routines and the sharing of beds and towels;
- Whether impetigo has been treated and, if so, with what and for how long, including prescribed and over-the-counter preparations (Burr, 2003).

Skin swabs are not necessary to diagnose impetigo but are taken to identify the type of bacteria causing the infection and for sensitivity if the infection is:

- Extensive or severe;
- Recurrent (consider nasal swab for staphylococcal carriage);
- Suspected to be a community outbreak;
- Suspected to be caused by meticillin-resistant *S aureus* (MRSA) – the patient has been in contact with a person diagnosed with MRSA (NICE, 2013).

If herpes simplex is suspected, a viral culture should be taken. Further investigations may be needed if there is still doubt over the diagnosis or systemic symptoms (Blenkinsopp et al, 2004; Burr, 2003).

Management

Hygiene measures are crucial to prevent impetigo from spreading so it is important that patients and families receive advice and treatment based on current evidence (Box 1).

Treatment

Non-bullous impetigo should be treated with topical or oral antibiotics and the underlying cause addressed if appropriate. If the impetigo is localised it should be treated with topical fusidic acid 3-4 times a day for seven days (eMC, 2013). Before application, lesion crusts should be removed by soaking in soapy water – providing this does not cause discomfort. This allows the antibiotic to come into direct contact with the bacteria rather than being wasted on inert, dry, exfoliating skin (Watkins, 2005).

Topical mupirocin, retapamulin and antiseptics are not recommended as first-line treatments (Box 2); there is a lack of evidence that topical antiseptics are effective and they can cause skin reactions. Alcohol-based antiseptics can also exacerbate skin dryness and fissures (Watkins, 2005). If the impetigo is bullous, extensive or severe with systemic symptoms, oral antibiotics should be the first-line treatment (Table 2) (NICE, 2013).

Treatment outcomes and follow-up

Most controlled trials have shown positive results from topical and oral antibiotics after one week, so follow-up is unnecessary unless there is no significant improvement seven days after starting treatment – or sooner if the condition deteriorates (Koning et al, 2012). If this happens, the diagnosis, underlying cause and adherence to treatment and hygiene measures should be reviewed. A swab should be taken and oral antibiotics considered if topical fusidic acid was used and the impetigo has spread; if it has not spread, consider using topical retapamulin for five days. If an oral antibiotic was used, this can be extended for a further week until the swab results are available.

BOX 1. PATIENT ADVICE

Reassure the patient or family that impetigo usually heals, is a self-limiting condition that does not usually scar and rarely has serious complications. Advise that hygiene measures are important to help healing and stop the infection spreading to other parts of the body and to other people:

- Wash the affected areas with soapy water
- Wash hands after touching a patch of impetigo and after applying antibiotic cream (and ask other people to do the same)
- Avoid scratching the affected areas and keep fingernails clean and cut short
- Avoid sharing towels, flannels, clothing and bath water until the infection has cleared
- Use a clean towel each time the affected area is dried
- Change towels, pillowcases and sheets and launder after the first day of treatment – either at 60°C (140°F) or at 40°C (104°F) with the addition of a bleach-based laundry product
- Change and launder clothing daily for the first few days
- Stay away from school or work until the lesions are dry and scabbed over or, if the lesions are still crusted or weeping, for 48 hours after antibiotic treatment has started. If there is no improvement after seven days, seek further medical advice.

Source: National Institute for Health and Care Excellence (2013), British Association of Dermatologists (2011)

BOX 2. TOPICAL ANTIBIOTICS

There is good evidence from a Cochrane systematic review that topical antibiotics are effective in treating localised non-bullous impetigo (Koning et al, 2012). Their use for longer than two weeks should be discouraged because of the risk of contact sensitisation and development of antibiotic resistance (Yang and Keam, 2008).

- **Fusidic acid** – recommended as first-line treatment. Effective against *Staphylococcus aureus* and *Streptococcus pyogenes* and licensed for the treatment of impetigo; shown in a Cochrane systematic review to be as effective as mupirocin and retapamulin (Koning et al, 2012)
- **Mupirocin** – should be reserved for the treatment of impetigo known to be caused by meticillin-resistant *S aureus* (MRSA), due to concerns over bacterial resistance
- **Retapamulin** – a newer topical antibiotic that has been shown to be as effective as fusidic acid (Koning et al, 2012) but, due to the significant cost difference, should be used as second-line treatment

Source: National Institute for Health and Care Excellence (2013)
For further information visit: www.medicines.org.uk/emc/

Switching from one oral antibiotic to another is unlikely to be beneficial; there is the possibility that the infection is caused by MRSA, which the skin swab will confirm or exclude. In cases of recurrent impetigo, nasal swabs should be taken from the patient and their immediate family to detect staphylococcal carriage. If *S aureus* is detected, advise on hygiene measures and eliminate the bacteria from the nasal carriage with mupirocin or chlorhexidine plus neomycin.

Referral

Referral is rarely necessary unless the diagnosis is uncertain or the impetigo is extensive with systemic symptoms, unresponsive to optimal treatment or recurring. Referral should then be made to a dermatologist or paediatrician and microbiology teams.

Prognosis

Complications of non-bullous impetigo are rare but local and systemic spread of infection can occur that may result in cellulitis, lymphangitis or septicaemia. Non-infectious complications of *S pyogenes* infection include guttate psoriasis, scarlet fever and glomerulonephritis (an inflammation of the kidney that can lead to kidney failure) (Koning et al, 2012). Exotoxins produced by some strains of *S aureus* may rarely result in staphylococcal toxic shock syndrome or scalded skin syndrome (DermNetNZ, 2013).

Conclusion

Impetigo can be successfully treated with evidence-based interventions. However, if the infection is recurring, health professionals should offer hygiene and lifestyle advice and assess the underlying cause, including taking nasal swabs from the patient's immediate family. Box 3 lists sources of further information. **NT**

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TABLE 2. ORAL ANTIBIOTICS

Drug	Dosage	Notes
Flucloxacillin	4 per day for 7 days	Recommended as a first-line treatment because it is known to be effective against Gram-positive organisms, including beta lactamase-producing *Staphylococcus aureus*
Clarithromycin	2 per day for 7 days	An alternative if the patient is allergic to penicillin, and recommended as the macrolide antibiotic of choice. Generally considered to cause fewer adverse effects than erythromycin and to have greater adherence as it only requires twice-daily dosing
Erythromycin	4 per day for 7 days	Another alternative if the patient is allergic to penicillin. A macrolide antibiotic with a broad spectrum of activity, including most staphylococcal and streptococcal species. Recommended as an alternative to clarithromycin due to lower cost

Source: National Institute for Health and Care Excellence (2013); Health Protection Agency and British Infection Association (2013)
For further information visit: www.medicines.org.uk/emc/ and tinyurl.com/PHE-PrimaryCareGuidance

BOX 3. RESOURCES

British Association of Dermatologists
www.bad.org.uk
British Dermatological Nursing Group
www.bdng.org.uk
Centre of Evidence-based Dermatology
www.nottingham.ac.uk/research/groups/cebd
Cochrane Skin Group
http://skin.cochrane.org
DermNet NZ
www.dermnetnz.org
Electronic Medicines Compendium
www.medicines.org.uk
Health Protection Agency (Public Health England)
www.hpa.org.uk
NICE Clinical Knowledge Summaries
http://cks.nice.org.uk
Nottingham Support Group for Carers of Children with Eczema
www.nottinghameczema.org.uk