

Impetigo (School Sores) — Causes and Treatment

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Impetigo is defined as infectious maculopapular skin eruption. It can be caused by staphylococcus organisms or anaerobic bacteria. The condition is usually self-limited, but topical antibiotics are indicated to fasten the healing process. Patients with staphylococcal scalded skin syndrome can develop fever, fatigue, localized or diffuse bullous impetigo, and cellulitis. The condition is caused by the exfoliation toxins produced by staphylococcus aureus and needs penicillinase resistant antibiotics such as oxacillin.



Definition of Impetigo and Related Disorders

Impetigo is an **infectious condition** that is characterized by the **bacterial infection of the skin**. Impetigo can form **bullous or nonbullous lesions**. The crusts in nonbullous impetigo are honey-colored and located on the face and upper or lower extremities. Bullous impetigo, as the name implies, involves the formation of bullous skin eruptions.

Staphylococcal scalded skin syndrome (SSSS) is one form of impetigo of newborns. The condition is defined as the **acute exfoliation of the skin** that is associated with **acute cellulitis**. The condition can be **mild** and presents with few blisters localized to the site of the infection **or severe** and involves the whole body.

Epidemiology of Impetigo

Impetigo is the **most common skin infection** that is encountered by the family physician. Approximately, more than 11 million skin infections are caused by staphylococcus aureus infection alone per year in the United States. The most commonly affected age group is **children aged two to five years**. The most common cause of impetigo is a **secondary bacterial infection of a mosquito bite**.

On the other hand, **SSSS** is more common in **neonates and young children**. Adults can develop SSSS as well, but these **adults** are usually critically ill and can have other comorbidities such as **renal failure** and **immunosuppression**. The mortality of localized SSSS is estimated to be 1%, while the mortality of SSSS associated with sepsis can go as high as 60%.

Pathophysiology of Impetigo

Certain bacteria such as **staphylococcus pyogenes** and **staphylococcus aureus** can colonize the **nasal cavity** and the **axilla** or **perineal areas**. These bacteria are considered as possible pathogens because, once the skin breaks, i.e. by an insect bite, they can spread and cause infection.



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Therefore, **skin injury** and **trauma** are key risk factors for the condition. **Poor hygiene**, **hot weather**, **diabetes**, and **malnutrition** are also possible risk factors for impetigo. **Anaerobic bacterial infection** can also be implicated in the etiology of impetigo.

Staphylococcal scalded skin syndrome results from a reaction to the **exfoliative toxin** which is produced in approximately 5% of the cases of staphylococcus aureus infection. The toxins produced by the bacteria are responsible for the **separation of the epidermis from the granular cell layer** and the **formation of bullae**.

The condition can be **localized or generalized** to the whole body. The toxins produced in SSSS are believed to spread through the **hematogenous route** in contrast to simple bullous impetigo where the toxins remain localized to the skin.

Clinical Presentation of Impetigo

Impetigo can be classified into **two types**: bullous and nonbullous. The **nonbullous type** is the **most common** form of impetigo and is responsible for **70% of the cases**. Impetigo can be preceded by trauma, insect bites, scabies or herpetic skin lesion. A previous history of diabetes or other systemic conditions predisposes the patient to impetigo.

The nonbullous form presents with a **maculopapular skin rash** that includes **small vesicles**. These vesicles are known to **rupture** and form **pruritic skin erosions** and **honey-colored crust**. The condition is characterized by **spontaneous healing without scarring**.

On the other hand, patients with **bullous impetigo** present with **large and fragile bullae** that can rupture. These bullae contain a **yellow-colored fluid**. The cause of these bullae is the local reaction to the **exfoliative toxins** produced by staphylococcus aureus. The condition is different from SSSS because, in simple bullous impetigo, the toxins do not spread by the hematogenous route.

Patients with **severe impetigo** can develop a **fever**. **Diarrhea** and **tiredness** can complicate the picture in severe impetigo.

Patients with **SSSS** develop **fever, irritability** and **skin tenderness**. The **skin** is **edematous** and **warm to touch** in addition to the formation of **multiple bullae**. Despite the severity of the picture in SSSS, most patients are not severely ill or septic.

Diagnostic Work-up for Impetigo

The diagnosis of both types of impetigo is merely a clinical one. In a few cases, confusion might arise between impetigo and other skin blistering diseases. Usually, laboratory investigations are preserved for patients who do not respond to **antibacterial therapy**.

Pus or bullous fluid culture can yield the responsible pathogen in a significant number of cases. Serologic testing for streptococcal antibodies is not useful in impetigo.

Patients might develop **septicemia**. Those ill patients can have **leukocytosis**. Impetigo near the joints can spread to the joint space and cause **septic arthritis**. **Osteomyelitis**, caused by the hematogenous or direct spread of bacteria from the skin site to the bone, can also complicate the picture.

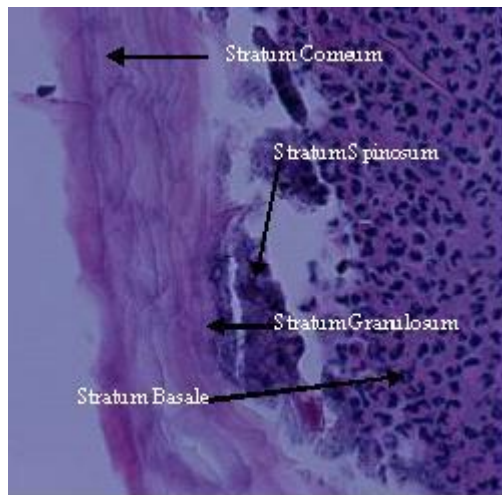


Image: "H&E of Bullous Impetigo." by Romanoanthony28 - Own work. License: [CC0 1.0](https://creativecommons.org/licenses/by/4.0/)

X-rays can confirm the diagnosis. **Magnetic resonance imaging** is indicated in **complicated cases** to assess signs of osteomyelitis which involve the soft-tissues in addition to the bone.

Erythrocyte sedimentation rate and **white blood cells** may be **elevated in SSSS**. Patients who are **severely dehydrated or septic** should also undergo **renal function testing** to exclude possible acute renal injury or electrolyte disturbances. A **biopsy of the infected areas** in SSSS shows the separation of the epidermis at the granular cellular layer.

SSSS can evolve into **toxic epidermal necrolysis**. This condition carries a **significant risk of sepsis and mortality**. A biopsy examination can help differentiate between SSSS and toxic epidermal necrolysis.

In **SSSS**, there is **no significant inflammatory cellular infiltrates** in the skin. On the other hand, patients with **toxic epidermal necrolysis** usually have **lymphocytic infiltrates** in addition to the **deeper separation of the epidermis** at the basement membrane instead of the granular cellular layer.

Treatment of Impetigo

Patients with **simple nonbullous impetigo** benefit from **topical antibiotics**. Fusidic acid, mupirocin, and retapamulin are all considered as good options for the treatment of impetigo.

Patients with **large bullae**, or those who do not respond to topical antibiotic treatment, should receive **oral antibiotics**. Amoxicillin/clavulanate, cephalexin, and clindamycin have been all used as systemic oral antibiotics for the treatment of bullous impetigo. The choice of the antibiotic should be based on the doctor's judgment and any **previous history of allergies** because the efficacy of the different classes of antibiotics was shown to be the same.

Therefore, the current recommendation is to use topical antibiotics whenever possible for impetigo and oral antibiotics in patients who do not respond to topical treatment or when topical treatment is not practical. **Patients should not receive erythromycin because the resistance among the causative organisms is high.** Topical disinfectants and antibacterial soaps are not useful in impetigo.

Patients with **SSSS** are **dehydrated** and have **high fever**; therefore, **antipyretic therapy** in addition to **fluid replacement therapy** is indicated. Patients who are confirmed to have SSSS should undergo an **extensive physical examination** to identify the **main focus of the infection**.

Because SSSS is caused by staphylococcus aureus, **antibiotics against staph infections** are indicated. Patients should receive **nafcillin** or **oxacillin** because these antibiotics are resistant to penicillinase which is an enzyme produced by staphylococcus aureus and is responsible for penicillin resistance.

Patients who are suspected to have **methicillin-resistant-staphylococcus-aureus SSSS** should receive either **vancomycin** or **linezolid**.

Patients with SSSS have **severe skin eruptions** and, in some cases, **careful skin-wound care** should be provided in a **specialized burns unit**.

References

[Impetigo: diagnosis and treatment](#) via nih.gov

[Staphylococcal Scalded Skin Syndrome](#) via medscape.com

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