



# A Practical Approach to the Prevention and Management of Intertrigo, or Moisture-associated Skin Damage, due to Perspiration: Expert Consensus on Best Practice

This article provides an at-a-glance overview of a more in-depth article available on the Wound Care Canada website. To view the full article, please go to [www.woundcarecanada.ca/supplements](http://www.woundcarecanada.ca/supplements).

## Consensus panel

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## Introduction

### ***Moisture-associated skin damage (MASD) and intertrigo***

*Moisture is an important risk factor contributing to the development of chronic wounds.<sup>1</sup> Excessive moisture on the skin for a prolonged period of time may result in a spectrum of reversible and preventable skin damage that ranges from erythema to maceration (increased stratum corneum moisture content) and erosion (loss of surface epidermis with an epidermal base). MASD is distinct from damage due to pressure, vascular insufficiency, neuropathy or other factors. This document focuses on intertriginous dermatitis, which is due to perspiration trapped in skin folds plus the effect of friction.*

## Consensus Statements

**Moisture-associated skin damage:** Moisture is a risk factor for the development of chronic wounds that is distinct from other risk factors, including pressure, arterial insufficiency, venous stasis and neuropathy.

**Definition of intertrigo:** Intertrigo, or intertriginous dermatitis, may be defined as inflammation resulting from moisture trapped in skin folds subjected to friction.

**Disease classification of intertrigo:** A disease code for intertrigo could improve diagnosis of the condition and support research efforts.

**Epidemiology of intertrigo:** The true incidence and prevalence of intertrigo is currently unknown.

**Risk factors for intertrigo:** The major documented risk factors for intertrigo include hyperhidrosis; obesity, especially with pendulous breasts; deep skin folds; immobility and diabetes mellitus; all risk factors are aggravated by hot and humid conditions.

**Complications of intertrigo:** Secondary bacterial infection is a common complication of intertrigo that must be treated

effectively to prevent deep and surrounding invasive infection.

**Diagnosis of intertrigo:** The diagnosis of intertrigo is based on the history and characteristic physical findings supplemented with laboratory testing to rule out secondary infection.

**Evidence for intertrigo treatment:** No well-designed clinical trials are available to support therapies commonly used to treat or prevent intertrigo.

**Principles of management of intertrigo:** Prevention and treatment of intertrigo should maximize the intrinsic moisture barrier function of the skin by focusing on at least one of the following goals:

- Minimize skin-on-skin contact and friction.
- Remove irritants from the skin and protect the skin from additional exposure to irritants.
- Wick moisture away from affected and at-risk skin.
- Control or divert the moisture source.
- Prevent secondary infection.

**Prevention of intertrigo:** The following strategies may help prevent intertrigo from developing or recurring:

- Cleanse skin folds gently, dry gently but thoroughly (pat,

do not rub), and educate patients about proper skin-fold hygiene.

- Counsel patients to wear open-toed shoes and loose-fitting, lightweight clothing of natural fabrics or athletic clothing that wicks moisture away from the skin.
- Advise patients to wear proper supportive garments, such as brassieres, to reduce skin-on-skin contact.
- Consider using a moisture-wicking textile with silver within large skin folds to translocate excessive moisture.

**Treatment of intertrigo:** The following approaches may help treat intertrigo:

- Follow recommended preventive strategies to keep skin folds dry and prevent or treat secondary infection.
- Consider using a moisture-wicking textile with silver between affected skin folds.
- Continue treatment until intertriginous dermatitis has been controlled.
- Treat secondary infection with appropriate systemic and topical agents.
- Revisit the diagnosis in cases that do not respond to usual therapy.
- Initiate a prevention program that can include weight loss, a skin-fold hygiene program and early detection and treatment of recurrences.

## Epidemiology

Intertrigo may be found in patients in acute care, rehabilitation, extended-care facilities, hospices and in home care.<sup>2</sup> European studies have found the prevalence of intertrigo to be 17% in a group of nursing home patients and 20% in home care patients.<sup>3</sup> Overall, little evidence quantifies the incidence and prevalence of intertrigo.

## Risk Factors for Intertrigo

No formal risk assessment tool exists for intertriginous dermatitis.<sup>4</sup>

Risk factors for intertrigo are numerous, with the most important including hyperhidrosis, obesity and diabetes mel-

litus.<sup>5</sup> Immunocompromise and increased skin surface bacterial burden may also be risk factors, as may poor hygiene, malnutrition, tight and closed shoes and large, prominent skin folds. A hot and humid climate promotes the development of intertrigo,

## Pathophysiology of Intertrigo

Although much remains to be elucidated about the pathophysiology of intertrigo, exposure to moisture alone is insufficient to produce skin damage.<sup>6</sup> Both moisture and friction in skin folds are required. The clinical course of intertrigo<sup>6</sup> usually starts with erythema and inflammation, with the occurrence of erosions in the presence of moisture due to macerated keratin and wet edema. Some or all of these features may present concurrently or individually.

Intertrigo in the flexural areas due to a combination of factors.<sup>4,7</sup> Contact dermatitis is more commonly irritant than allergic and may be confused with intertrigo. Incontinence-associated dermatitis in skin folds exposed to urine or feces can also be confused with intertrigo. Infections due to fungi, yeasts and bacteria can exist with and without intertrigo, which is characterized by increased local perspiration and moisture.

## Complications of Intertrigo: Secondary Skin Infection

Overhydration of the stratum corneum, due to an inability to evaporate or translocate moisture from a skin fold, can disrupt

*“Every effort must be made to restore a normal environment that will encourage the natural regenerative capacity of the skin.”<sup>7</sup>*

*— TP Kugelman*

## Common Differential Diagnoses of Intertrigo

Common differential diagnoses of intertrigo include inflammatory conditions, such as psoriasis, atopic dermatitis and, less commonly, lichen planus. Atopic individuals may also develop derma-

titis in the flexural areas due to a combination of factors.<sup>4,7</sup> Contact dermatitis is more commonly irritant than allergic and may be confused with intertrigo. Incontinence-associated dermatitis in skin folds exposed to urine or feces can also be confused with intertrigo. Infections due to fungi, yeasts and bacteria can exist with and without intertrigo, which is characterized by increased local perspiration and moisture.

terial, fungal, or yeast infection, the most common complication of intertrigo. The warm, damp environment in skin folds with associated skin damage provides an ideal environment for organisms to proliferate.

### Assessment of Intertrigo

A full history and examination of the entire body surface can help to differentiate intertrigo from conditions that may appear similar.

### History

Clues to the diagnosis of intertrigo may often be found in the patient's medical history.<sup>9</sup> Patients with diabetes or immunosuppression may have a greater incidence of intertrigo. In addition, patients who are obese, bedridden, or incontinent are prone to intertrigo. It is also important to identify previous therapies, such as topical or systemic corticosteroids, as they may affect the appearance of the lesion.

### Physical Examination

To assess a patient with possible intertrigo, it is important to inspect the entire body, including all skin folds, right to their base. Intertrigo appears as mirror-image erythema, inflammation or erosion within skin folds. Other signs and symptoms include itch, burning, pain and odour. Pain with intertrigo may be severe and sometimes requires pain medication. The burning associated with intertrigo may approximate severe

sunburn symptoms and may respond to a combination of pain and antihistamine medication.

### Diagnosis

The diagnosis is often clear-cut and is generally based on the clinical presentation of characteristic intertriginous dermatitis: mirror-image erythema, inflammation or erosion within skin folds.<sup>5</sup> If secondary infection is likely, it is appropriate to perform a culture and sensitivity. Biopsy may be uninformative in uncomplicated intertrigo, but in atypical clinical presentations or lesions without a positive bacterial or fungal laboratory test that are nonresponsive to treatment, biopsy may serve a useful function. Examination under a Wood's light may identify secondary infections, such as erythrasma (coral-red fluorescence) or pseudomonas (green fluorescence). Potassium hydroxide examination may demonstrate hyphae in dermatophyte infections or pseudohyphae in candidiasis.

### Management of Intertrigo

#### Management Principles

A previous expert panel agreed that a preventive or treatment approach for MASD should be based on at least one of the following goals:<sup>6</sup>

1. an interventional skin care program that removes irritants from the skin, maximizes its intrinsic moisture

barrier function and protects the skin from further exposure to irritants

2. use of devices or products that wick moisture away from affected or at-risk skin
3. prevention of secondary cutaneous infection
4. control or diversion of the moisture source"

The panel also agreed that a preventive or treatment regimen should be consistent and include gentle cleansing, moisturization if indicated and application of a protective device or product when additional exposure to moisture was anticipated. Furthermore, measures to reduce or eliminate skin-on-skin contact and friction are important.

### Prevention

No randomized controlled trial evidence-based literature supports strategies to prevent intertrigo, but common-sense approaches are effective.<sup>5</sup> It is important that skin folds be kept as clean and dry as possible to minimize friction. Gentle cleansing with a pH-balanced, rinseless cleanser is recommended. Irritated skin folds should be patted dry, rather than wiped or rubbed.<sup>4</sup> Loose-fitting, lightweight clothing of natural fabrics or athletic clothing that wicks moisture away from the skin are good choices. Open-toed shoes may be beneficial in preventing toe-web intertrigo.<sup>5</sup> However, closed-toe shoes would be recommended for patients with diabetes, and a moisture-wicking textile with silver could be

woven between the toes to help translocate moisture. Proper supportive garments, such as brasieres, can reduce apposition of skin surfaces. In addition, placing moisture-wicking textile with silver within large skin folds to translocate excessive moisture may be helpful.<sup>4</sup> Ensuring that 4 cm of the fabric hangs out of the fold allows translocation of moisture. Patient education should include the importance of showering after exercise and carefully drying skin folds; awareness of the risk of intertrigo associated with sweating, such as in hot and humid weather, should be stressed.

## Treatment

### INEFFECTIVE THERAPIES

A previous expert panel identified several therapies that were ineffective or harmful to prevent or treat intertriginous dermatitis.<sup>4</sup> Powders, such as cornstarch, have no proven benefit and may encourage fungal growth, as cornstarch is a substrate for growth of yeasts.<sup>9</sup> Textiles, such as gauze, various fabrics, or paper towels, placed between skin folds are usually ineffective as they absorb moisture but do not allow it to evaporate, promoting skin damage.<sup>4</sup> Home remedies, such as diluted vinegar and wet tea bags, have never been evaluated in clinical research.

### INTERTRIGO AND MOISTURE-WICKING TEXTILE WITH SILVER

Various standard treatments for intertrigo, such as drying agents, barrier creams, topical antifungals and absorptive

## A Case of Axillary Intertrigo

A 60-year-old woman with a history of right-sided mastectomy presented with denuded and erythematous skin at the right axillary fold (Figure 1). The lesion was very painful, and a foul odour and drainage were present. The condition had been present for two weeks. Nystatin powder had been ineffective in improving the problem. At presentation, the lesion was cleaned gently and patted dry. A piece of moisture-wicking textile with silver was placed within the axillary fold and secured at the shoulder, leaving adequate textile exposed for translocation. The textile was replaced after five days. At seven days, there was significantly less drainage and redness and the denuded skin was almost healed (Figure 2).



**Figures 1 and 2.** Axillary intertrigo before and after seven days with moisture-wicking textile with silver

materials, may be ineffective in some patients. Kennedy-Evans et al. performed a clinical study to determine the efficacy of the moisture-wicking textile with silver instead of standard therapy in patients with refractory intertrigo.<sup>10</sup> Study participants were 21 patients with intertriginous dermatitis from two long-term-care centres. Mean patient age was 53.8 years and mean body mass index was 54.75 kg/m<sup>2</sup>. The intertrigo had been present for a varying number of weeks and in most cases other products had been tried without a response. Skin assessment was performed on Day 1, Day 3 and Day 5 for

itching/burning, maceration, denudement, satellite lesions, erythema and odour (Table 3).

In this study, moisture-wicking textile with silver relieved the patients' symptoms and signs of intertrigo within a five-day period. The moisture-wicking textile with silver is also cost-effective, as it reduces nursing time substantially.

### COMMON-SENSE APPROACHES

Intertrigo treatment relies on common-sense approaches because little evidence supports various commonly used therapies. Most importantly, it is necessary to establish or continue a skin-care regimen that

focuses on keeping the skin folds dry and prevents or treats secondary infection.<sup>4</sup> The moisture-wicking textile with silver has been shown to be effective in treating intertrigo. Treatment of secondary infection may require topical and possibly oral therapy. Treatment should continue until the intertriginous dermatitis has resolved.<sup>1</sup> It is also important to recognize that eroded intertrigo skin is not completely healed until the normal skin thickness is re-established and the barrier function restored. Weight loss is always an appropriate preventive and treatment strategy in obese patients, but it is notoriously difficult to achieve.

## Conclusion

Intertrigo is a common condition associated with MASD, which may be found in a variety of clinical settings, including acute,

## A Case of Inframammary Intertrigo

A 92-year-old female presenting for care of venous stasis ulceration complained of a persistent, painful rash underneath her breasts that had been unresponsive to treatment with a variety of oral and topical therapies. Candida intertrigo was present with erythematous papules, satellite lesions, denudement, weeping and a musty odour. Initial treatment was with an oral prescription antifungal for five days. When this was ineffective, a topical antifungal powder was prescribed twice daily for two weeks. The rash persisted and was then treated with an antifungal cream twice daily for two weeks

At the next visit, the intertrigo was gently cleaned and patted dry. A piece of moisture-wicking textile with silver was then placed beneath each breast, leaving 4 cm exposed for translocation, and secured in place using a sports bra. Substantial improvement was noted by 14 days with complete resolution by 21 days.



**Figures 3 and 4.** Inframammary intertrigo before and after moisture-wicking textile with silver

**Table 3.** Signs and Symptoms in Study Patients

Sign or Symptom	Day 1	Day 3	Day 5
Itching/burning	15	1	0
Maceration	10	1*	1*
Denudement	7	3	1
Satellite lesions	5	1	1
Erythema	21	†	†
Odour	12	†	2*

\* One patient had maceration and odour due to urine soiling of textile that was not removed immediately

† Statistically significant decrease

chronic, long-term and home care. Overall the limited information about intertrigo currently available is a cause for concern. The incidence and prevalence of intertrigo are unknown and little evidence supports the use of commonly used therapies. The information in this consensus document has been synthesized for educational purposes for clinicians and as a stimulus for more research into this common condition. 🖱️

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