Understanding & guarding against

MARSI
Medical Adhesive-Related Skin Injuries

Protect your patients.
Patient care begins with skin.

Skin is the body’s largest organ. It protects us from the environment and disease, helps us regulate body temperature, collects essential vitamin D from the sun and provides us with our sense of touch.

With the maintenance and restoration of skin integrity being regarded as an indicator for quality patient care, skin care is an integral part of the nursing practice in every care setting. We understand that helping you keep patients comfortable while protecting the skin from the unnecessary injury and pain associated with Medical Adhesive-Related Skin Injuries (MARSI) is of utmost importance. As your ally in care, we're providing a wide range of medical tapes and skin-friendly products to maintain and protect the integrity and health of this vital organ.
What are Medical Adhesive-Related Skin Injuries or MARSI?

MARSI is the red, irritated skin that may occur on your patients when medical adhesives are removed. It can affect skin integrity, cause pain, increase risk of infection and delay healing, all of which reduce a patient’s quality of life.² It can be a complication that occurs across all care settings and age groups and can sometimes be serious enough to require additional treatment.

What causes MARSI?

There is no simple answer. MARSI occurs during a convergence of factors, including:

- The current condition of the patient’s health and skin, including allergies, age and several other factors.

- Lack of product choice. Sometimes there aren’t as many tape options to work with as clinicians would like.

- Lack of product education and usage guidelines to understand why one product is preferable over the other.

- Tape application technique. How tape is applied can set the stage for maintaining skin health.

- Tape removal technique. Correct removal is critical and often there is no training available.

Various factors can influence the risk of skin injury, such as age-related issues, the presence of dermatological conditions or other underlying medical conditions including malnutrition, dehydration, prolonged exposure to moisture, certain medications, radiation therapy, photodamage and previous use of adhesive products.³

Impact of MARSI.

Despite the fact that MARSI continues across care specialties, the prevalence of MARSI is largely unknown. MARSI has a significant negative impact on patient safety and experience.
Those most at risk.

While any patient who comes in contact with medical adhesives can potentially experience MARSI, certain groups of people are more vulnerable. Identifying these higher-risk patients is a key component of risk reduction.

**Elderly patients.** Skin changes inherent to the aging process, such as thinning of the skin, increase the risk of skin injury in older adults. Other changes include loss of dermal matrix and subcutaneous tissue; epidermal thinning; reduced cohesion between the dermal and epidermal layers; reduced vascularity, elasticity, tensile strength; and loss of moisture.³

**Infants.** Neonatal skin is 40% to 60% thinner than adult skin, largely due to the presence of fewer epidermal cell layers in the stratum corneum.⁴ Such delicate skin must be treated with extra care. The most common MARSI seen in neonatal patients is skin stripping. Chronically hospitalised infants may also experience irritant contact dermatitis due to a variety of adhesive products.⁵
• **Orthopedic surgery patients.** Skin injuries are more prominent in this setting in part because of the use of large amounts of tape to hold large compression bandages securely, and the risk of tape damage is compounded by joint movement, skin friction and the presence of tissue oedema, which creates a strapping effect.\(^6\)

Other higher-risk patients include:

• Those with chronic skin conditions such as eczema, dermatitis, chronic ulcers and epidermolysis bullosa.
• Those with underlying medical conditions, such as diabetes, infection, renal insufficiency, immunosuppression, venous insufficiency or hypertension.
• Oncology patients.
• Steroid-dependent patients.
• Dialysis patients.
• ICU patients.
• Patients undergoing radiation treatments.
• Patients suffering from malnutrition and/or dehydration.
Identifying MARSI.

MARSI can take several forms. It results when adhesive attachment to the skin is stronger than the patient’s own skin cell-to-cell attachment. Removing or repositioning tape can cause epidermal layers to separate. In mild cases, there may be no visible trauma, but in other cases irritation and injury can be more obvious.
Skin Stripping
Removal of one or more layers of the stratum corneum following removal of adhesive tape or dressing; lesions are frequently shallow and irregular in shape and the skin may appear shiny; open lesions may be accompanied by erythema and blister formation.7,9

Tension Injury or Blister
Injury (separation of the epidermis from the dermis) caused by shear force as a result of distension of skin under an unyielding adhesive tape or dressing, inappropriate strapping of tape or dressing during application or when a joint or other area of movement is covered with an unyielding tape.8,10,11

Folliculitis
Inflammatory reaction in hair follicle caused by shaving or entrapment of bacteria; appears as small inflamed elevations of skin surrounding the hair follicle; may be nonsuppurative (papules) or contain pus (pustules).

Maceration
Changes in the skin resulting from moisture being trapped against the skin for a prolonged period; skin appears wrinkled and white/grey in color; softening of the skin results in increased permeability and susceptibility to damage from friction and irritants.

Skin Tear
Wound caused by shear, friction and/or blunt force resulting in separation of skin layers; can be partial- or full-thickness.4

Allergic Contact Dermatitis
Cell-mediated immunologic response to a component of tape adhesive or backing; typically appears as an area of erythematous vesicular, pruritic dermatitis corresponding to the area of exposure and/or beyond; persists for up to a week.3,5,12

Irritant Contact Dermatitis
Non-allergic contact dermatitis occurring as a result of a chemical irritant; a well-defined affected area correlates with the area of exposure; may appear reddened and swollen and vesicles may be present; typically of shorter duration.3,5
Steps to reduce the risk of MARSI.

Reducing the risk of MARSI is paramount to good patient care. By learning more about risk reduction strategies, you can play an important role in reducing incidents.

**Assessment**

When using medical adhesives, the skin should be assessed on a daily basis for evidence of damage. This is especially important for those patients who are at higher risk for MARSI. Try to have good lighting and check the skin for color, texture, uniformity of appearance and integrity.

Additionally, be sure to gather a history of patients’ allergies and sensitivities to minimise the risk of MARSI due to allergic reactions. It has been found that 3% to 50% of patients with atopic or contact eczema, allergy, or asthma in their medical history experienced a skin reaction from adhesive materials during a preoperative skin test. Based on established knowledge, these patients are believed to be likely to experience a reaction to the same adhesive material if it were to be used in a wound area.19
Minimise Risk
Identification of patients at high risk for MARSI is a key component of risk reduction. Extra precautions may be necessary, such as using a more gentle tape, e.g., 3M™ Kind Removal Silicone Tape and barrier products such as 3M™ Cavilon™ No Sting Barrier Film.

Product Selection and Application
Right tape. Right application. Select the most appropriate adhesive product based on its intended purpose. Consider where it will be attached on the body. For example, facial skin may be more sensitive than skin on the leg or arm. Think about adhesive gentleness, breathability, stretch, conformability and flexibility. 3M has a comprehensive line of tapes, from soft cloth and foam to our innovative silicone tape, which is very gentle to skin.

Tape Application
Correct tape application sets the stage for avoiding MARSI. 3M has detailed guidelines and tips for applying tape in many situations.

Correct Removal
Correct tape removal is also critical in reducing the incidence of MARSI. Awareness of, and training on, the latest techniques for applying and removing medical adhesive products can help to minimise the risk of MARSI and increase the consistency of care across your facility.

Treatment
The same general principles used to manage other wounds should be employed when treating MARSI.

For more information regarding steps to reduce the risk of MARSI, go to 3M.com.au/MARSII and download the consensus statement, Medical Adhesives and Patient Safety: State of the Science.
The science of securing to skin: Two adhesive choices offer the flexibility you need.

The science of adhesives is one of the cornerstones of 3M’s business. In fact, we invented the category of gentle-to-the-skin medical tapes more than 50 years ago, and we continue to improve our products to help meet your needs and create better patient outcomes.

**Acrylate Adhesive**

![Acrylate Adhesive](image)

Acrylate adhesives continue to be the most common adhesive used for patient care. These initially adhere to the skin cells closest to the top, leaving some gaps in adherence. Over time the adhesive fills the gaps and strengthens as it forms a tighter bond with the skin, making it ideal for situations where increased securement or longer wear is needed.

**Silicone Adhesive**

![Silicone Adhesive](image)

Silicone adhesive is very gentle and conforms to the uneven surfaces of the skin immediately and remains constant throughout wear time. Unlike acrylate adhesives, silicone adhesives have lower surface tension, making them the preferred choice for those patients with at-risk or fragile skin or when more frequent dressing changes are required.
Protection From Other Adhesives
When working with adhesives that aren’t silicone-based, you may want added protection for your patients. 3M™ Cavilon™ No Sting Barrier Film forms a protective barrier between skin and the adhesive of the securement, dressing, device or tapes to help reduce the risk of skin trauma before it occurs.

Proven Comfort — An Example of Silicone Adhesives
Meet our 3M™ Kind Removal Silicone Tape. This tape provides reliable securement, kind removal and gentle care without compromise. Research confirms that upon removal, 3M™ Kind Removal Silicone Tape causes minimal epidermal cell stripping and less pulling of hair. Patients will feel the difference the moment it goes on and comes off.*
The right tape for the right situation.

Not all medical tapes are the same. After all, certain situations call for specific adhesive requirements, and clinicians appreciate having a wide variety of reliable, consistent 3M tapes at hand.

You can give your patients the best possible care and help minimise the risks of MARSII by selecting products that match both your needs and your patient’s.

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<th>PRODUCT</th>
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<th>Tapes for at-risk skin</th>
<th>Tapes for critical securement</th>
<th>Tapes for specialty applications</th>
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3M™ Kind Removal Silicone Tape
- Gentle tape adheres well, yet removes without disrupting fragile skin layers
- Reliable and consistent securement
- Easy to reposition without compromising adhesion
- Easy to tear
A tape for everyday use, at-risk or fragile skin and specialty application needs.

3M™ Medipore™ H Soft Cloth Surgical Tape
- Porous, soft cloth fabric allows skin to breathe, helps maintain skin integrity
- Stretches across and diagonally to accommodate swelling, distension and movement
- Easy-tear perforated rolls for convenience
A tape for routine dressing changes, contoured areas, areas subject to movement, stress or distension.

3M™ Transpore™ White Surgical Tape
- Gentle to skin
- Easy, straight bi-directional tear
- Breathable, to maintain skin integrity
- Reliably secures dressings and devices
A tape for everyday use and at-risk or dry skin needs.

3M™ Microfoam™ Surgical Tape
- Highly conformable elastic foam tape stretches in all directions to accommodate swelling and promote comfort
- Gentle, secure adhesion to contoured sites
A tape for specialty application needs and areas subject to movement, stress or distension.

3M™ Micropore™ Surgical Tape
- Gentle, #1 trusted brand for over 50 years
- Highly breathable
- Reliably secures dressings and devices
A tape for routine dressing changes and moist skin conditions.

3M™ Durapore™ Surgical Tape
- Silk-like fabric tape features strong, reliable adhesion
- Conforms well to contoured areas
- Durable fabric resists stretching
- Easy to tear
A tape for critical tubing and devices.
Correct application and removal.

Awareness of, and training on, the latest techniques for applying and removing medical adhesive products can help to minimise the risks of MARSI and increase consistency of care across your facility. See specific product manufacturer’s labeling for any additional or contrary directions related to preparation, application and removal.

Prepare the Skin

- Clip/trim hair.
- Clean and dry the skin to remove soil and/or residue from medical grade adhesive remover, moisturiser or lotion.

Apply the Tape

- Apply 3M™ Cavilon™ No Sting Barrier Film, to protect at-risk skin.
- Allow barrier film to dry completely before applying tape.
- Avoid routine use of tackifiers.

- Apply tape to skin without stretching or tension.
- Apply firm pressure to activate the adhesive and gain full contact with the skin.

Application Tips

- Tape should not be pulled or stretched when applied.
- Minimise touching adhesive surface to retain adhesive levels.
- Avoid gaps and wrinkles that can allow moisture to get between the tape and the skin, tubing or dressing.
- Do not encircle a limb completely with tape.
- If swelling occurs, loosen and replace tape. 3M™ Kind Removal Silicone Tape can be repositioned without compromising adhesion.
- When securing dressings, tape should extend a minimum of one-half inch (one inch is preferred) beyond the edge of the dressing to hold the dressing in place.
Remove the Tape
Correct tape removal is critical in reducing the incidence of MARSIs.

- Loosen edge of tape.
- Stabilise the skin with one finger at the peel line.
- Remove tape “low and slow” in the direction of hair growth, keeping it close to (parallel with) the skin surface while pulling it back over itself.
- Pulling tape at a vertical angle (perpendicular) to the skin will pull at the epidermis, increasing the risk of MARSIs.
- As tape is removed, continue to support the skin at the peel line.

Tip: To start the edge, press a small separate piece of tape onto a corner of the piece to be removed. This serves as a handle for lifting the edge of the tape.

Tip: For tape that is strongly adhered to skin or hair, consider using a medical grade adhesive remover or moisturiser to soften the adhesive along the peel line (peel edge).

Special applications.

Securing Tubing: Omega Technique
Optimal technique for securement and to reduce potential pressure under tubing.

1. Center tape over tubing: encircle tubing with tape.
2. Where tape meets, pinch the two adhesive sides together.
3. Secure remainder of tape to skin.

Securing Tubing: Chevron Technique
Optional technique to help keep tubing securely in place; works best with thin tape strips or conformable tapes.

1. Center tape with adhesive side up, under tubing.
2. Cross one section of tape over tubing and secure to skin.
3. Repeat with other side of tape.
Protecting patient comfort and safety.

The earliest medical tapes were far from ideal. They blocked perspiration, irritated the skin and were painful to remove. Clinicians were looking for a non-irritating, breathable tape for long-term use. In response to this need, a team of 3M scientists began their quest for a better medical tape. 3M has now been developing and improving medical adhesives for over 50 years.

3M convened a panel of 23 recognised key opinion leaders to establish consensus statements to serve as guidelines for correct assessment, prevention, product selection and usage and treatment of skin injuries.*

To download the Consensus Statement from this summit, go to www.3m.com.au/MARSI

To learn more about how 3M can help you and your facility reduce the risk and treat MARSI, contact your 3M Critical & Chronic Care Solutions representative or call the 3M Health Care Customer Helpline at Australia 1300 363 878 or New Zealand 0800 80 81 82

References:

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