Even with the best care, some patients will experience injury due to medical adhesives. 3M offers a full range of solutions for skin integrity and wound management.

To learn more about how 3M can help you and your facility prevent and treat MARSI, contact your 3M Critical & Chronic Care Solutions representative or call our Customer Service team on 0845 873 4076

www.3M.co.uk/healthcare

References

1 Wysocki AB. Anatomy and Physiology of Skin and Soft Tissue. In: Bryant, RA and Nix DP eds. *Acute and Chronic Wounds: Current Management Concepts*. 4th ed. St Louis, MO: Elsevier Mosby; 2012: 40-62

2 Roth RR and James WD. Microbial ecology of the Skin. *Annu. Rev. Microbiol.* 1988; 42: 441–464

3 NICE Medical technology guidance Published: 22 July 2015, nice.org.uk/guidance/mtg25

4 George M. Role of skin protectant in reducing the local complications in PICC lines. Poster presentation at the 2013 meeting of the infusion Nursing Society

5 Link D and Cutler C. In search of a better central line dressing in the autologous bone marrow reinfusion patient. 1998. 3M White Paper

6 Campbell K et al. A clinical evaluation of 3M™ Cavilon™ No Sting Barrier Film. *Ostomy Wound Management*. 2000; 46(1):24–30

7 Grove GL. et al. Comparison of the skin protection properties of various film forming skin protectants. Poster presentation at the Wound, Ostomy, and Continence Nurses Society Annual Conference. 1993

8 3M Data on file 2013; CLIN-MISC-US-05-202211

9 3M Data on file 2012; CLIN-MISC-US-05-201292

10 3M Data on file 2009; I2MS 11230

11 Rowley S, Clare S (2011) ANTT: a standard approach to aseptic technique. *Nursing Times* 107(36)

12 3M Data on file 2011; CLIN-MISC-US-05-169008

13 3M Data on file 2004; I2MS 10029

14 3M Data on file 2004; I2MS 10030

15 3M Data on file 2004; I2MS 10031

16 Skin impairment associated with vascular access devices and semi-permeable transparent dressings, Hitchcock J., et al, Imperial College Healthcare NHS Trust. Poster Presentation, NIVAS, 2015

17 3M Internal Data. Barrier properties of surgical tapes – Durapore and Microfoam. Study 05-010041. 2005

18 Grove, GL et al. Adhesive tape trauma evaluation of two gentle tapes in healthy human subjects. Poster presentation, WOCN, New Orleans. June 2011

19 CUST-CVE-05-146472. Customer Validation Evaluation of 3M Kind Removal Silicone Tape. February 2011

20 3M Internal Data. Investigators Report. LIMS 09698. 2003

21 3M Internal Data. LIMS07972. 1999

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3M Science. Applied to Life.™

3M Science. Applied to Life.™

Understanding and preventing MARSI

Medical Adhesive-Related Skin Injuries

3M's application of science can help you to prevent MARSI

A leader in medical adhesives

At 3M we collaborate and apply science in powerful ways to improve lives daily. We have a history of developing the 'right' kind of adhesive for almost any medical application, including the category of gentle-to-skin medical tape. 3M™ Micropore™ Surgical Tape is trusted by millions of healthcare professionals around the world.

Our culture of collaboration, investment in research and development and expertise in adhesive technology has enabled us to develop the tapes, dressings, skin closures and professional skin care products you depend upon to enhance patient care.

3M scientists around the world continue to innovate, creating proven solutions which help prevent and treat critical and chronic conditions across the continuum of care.

Protecting patient comfort and safety

3M convened a panel of 23 recognised key opinion leaders to establish consensus statements to serve as guidelines for proper assessment, prevention, product selection and usage, and treatment of skin injuries.* Out of this conference came the term MARSI (Medical Adhesive-Related Skin Injuries).

MARSI is a prevalent and serious complication that occurs across all care settings and among all age groups, yet such injuries are generally accepted as an inevitable part of patient care. MARSI is under reported because it is not currently categorised as an adverse event. Therefore the prevalence and financial impact of MARSI is unknown. A study in the U.S. in 2008 suggested that the annual cost to U.S. hospitals to treat tape-related skin injuries exceeded $11 million.**

With increased awareness, education and implementation of these guidelines, you can improve the patient experience, help reduce health care costs and improve outcomes.

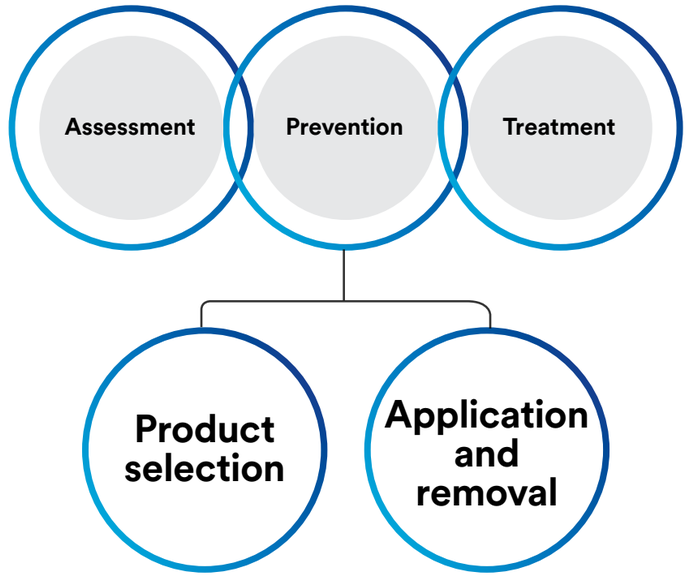
'Be aware of, and reduce as far as possible, any potential for harm associated with your practice'.

The Nursing and Midwifery Council Code, effective from 31 March 2015

Visit go.3M.com/MARSI/Consensus to download a copy of the complete *Medical Adhesive and Patient Safety: State of the Science* – Consensus Statements for the Assessment, Prevention, and Treatment of Adhesive-Related Skin Injuries.

Visit 3M Health Academy at **3mlearning.co.uk** for a range of relevant e-learning modules.

Icon indicates information featured in the Consensus



What is MARSI?

A Medical Adhesive-Related Skin Injury is an occurrence in which erythema and/or other manifestation of cutaneous abnormality (including, but not limited to, vesicle, bulla, erosion, or tear) persists 30 minutes or more after removal of the adhesive.

*The Consensus Summit was made possible by an unrestricted educational grant from 3M.
**Gannon, et al. Clinical Symposium on Advances in Skin & Wound Care. 2008.

Identifying MARSI

Skin stripping

Removal of one or more layers of the stratum corneum following removal of medical adhesive; stripped skin may appear shiny

Tension injury or blister

Separation of the epidermis from the dermis as a result of distension of skin under an unyielding adhesive; blisters often develop at the edge of the adhesive

Folliculitis

Inflammatory reaction in hair follicle caused by shaving or entrapment of bacteria; appears as small, inflamed elevations of skin surrounding hair follicle

Skin tear

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

Types of MARSI

Maceration

Softening and breakdown of the skin resulting from prolonged exposure to moisture; increases susceptibility to damage; skin appears wrinkled and white/grey in colour

Allergic contact dermatitis

Rarer immunologic response to adhesive or backing; typically appears as an area of erythematous, vesicular, pruritic dermatitis; may persist for up to a week after allergen removed

Irritant contact dermatitis

Reaction ranging from erythema and scaling to necrotic burns from non-immunologic damage caused by irritant chemicals in contact with the skin; may appear reddened and swollen

Various intrinsic and extrinsic factors influence risk of skin injury: age-related physiologic factors, race/ethnicity, underlying medical conditions, malnutrition and dehydration, drying of the skin, prolonged exposure to moisture, certain medications, radiation therapy, photo damage and previous use of adhesive products.

Assessment

As with all aspects of health care, the foundation for preventing and treating MARSI begins with proper patient assessment.

MARSI can occur anywhere adhesives are used

Protocols for assessing and documenting pressure ulcers and skin tears have led to significant reduction in the incidence and prevalence of these types of skin damage.

While most facilities currently do not assess or track the risks of Medical Adhesive-Related Skin Injuries, documentation and tracking tools can be adapted to include criteria for MARSI.

Common occurrences of MARSI

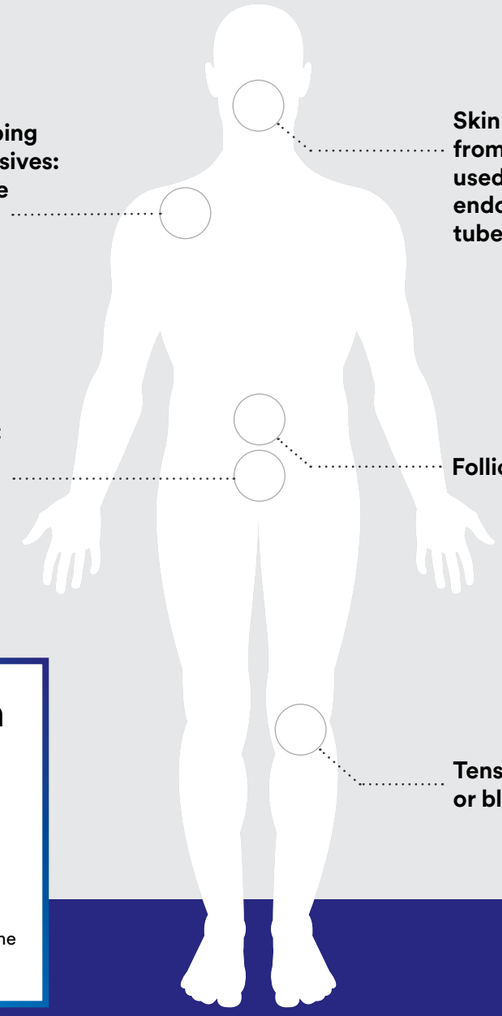
Skin stripping from adhesives: central line dressings

Skin stripping from tape used to secure endotracheal tubes

Maceration from adhesives: Negative Pressure Wound Therapy (NPWT), tapes, dressings, ostomy pouches

Folliculitis

Tension injury or blister



Documentation tip

When assessing your patients, it's important to document the specific type of MARSI that occurs: skin stripping, tension blister, skin tear, irritant contact dermatitis, allergic dermatitis, maceration or folliculitis. Avoid the term 'tape burn.'

Prevention

MARSI often occurs through improper application or removal of medical adhesives, causing undue pain and anxiety, compromising skin integrity, and increasing the risk of infection – all of which negatively impact patient quality of life. You can help prevent MARSI by following these basic steps:

1. **Select the appropriate tape**
2. **Properly prepare the skin**
3. **Apply the tape using the appropriate techniques**
4. **Remove the tape using the appropriate techniques**

The chart below identifies common and preventable causes of MARSI and suggests corrections and considerations for proper application and removal.

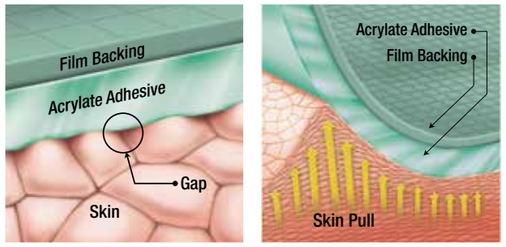
Cause	Corrections	Considerations
Improper tape selection: tape is not matched to clinical need (e.g. too aggressive, does not stretch, etc.)	Select tape based on the clinical need/ indication	▸ Refer to Adhesive Product Selection chart on pages 8 and 9
Skin is not adequately prepared: hair is not removed; skin is soiled, wet/moist or residue is left on the skin; preps are not allowed to dry; adhesion promoters (tackifiers) are indiscriminately used	Proper skin preparation prior to tape application	▸ Clip/trim hair ▸ Clean and dry the skin to remove soil and residue ▸ 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
Tape is applied incorrectly: tape is stretched or applied with tension; applied in wrong direction	Proper application technique	▸ Tape strip should be long enough to extend at least 1.25cm (2.5cm is preferred) beyond the dressing or device ▸ Orient tape to allow stretch (i.e. in the direction of expected swelling or movement) ▸ Apply tape without stretch or tension: replace acrylate tape or reposition silicone tape if swelling/distention occurs ▸ Apply gentle firm pressure after application, stroking the tape in place
Tape is removed incorrectly: tape is removed rapidly or pulled vertically; underlying skin is not supported during removal	Proper removal technique	▸ Remove tape slowly keeping tape horizontal and close to skin ▸ Remove in the direction of hair growth ▸ Support exposed skin at the peel line as tape is removed

The science of securing to skin: two tape adhesive choices offer the flexibility you need

Acrylate adhesives continue to be the most common adhesive used for patient care. However, silicone adhesives are increasing in use because they are more gentle to skin.

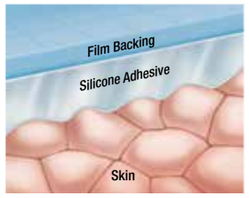
Acrylate tape adhesive

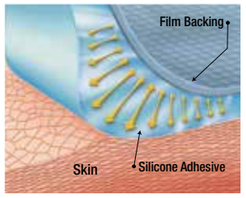
Acrylate adhesive initially adheres to the skin cells closest to the top, leaving some gaps in adherence. Over time the adhesive fills the gaps and strengthens as it forms a tighter bond with the skin, making it ideal for situations where increased securement or longer wear are needed.



Silicone tape adhesive

Silicone adhesive has a lower surface tension, allowing the silicone to conform quickly to the skin's natural profile. The adhesive strength is more consistent over time, maintaining the same level of adhesion from application through to removal. This makes silicone adhesive the preferred choice for those patients with at-risk or fragile skin or when more frequent dressing changes are required.





Skin damage is a local complication that can lead to increased risk of colonisation and infection[1,2]

Why Cavilon no sting barrier film is the ideal solution to protect skin around the infusion catheter site

- Contains a unique blend of not one, but two polymers. The additional polymer allows the film to flex with the skin and maintain a continuous protective coating[9]
- Chlorhexidine gluconate and povidone iodine compatible.[10] To ensure effectiveness of antimicrobial preps, only barrier films with proven compatibility should be used
- Sterile with unique 'peel down' packaging for aseptic delivery. Accepted standards of practice[11] call for sterile technique and supplies
- Fast-drying and non-sticky – for ease of use and patient comfort[12]
- Alcohol-free and non-stinging – comfortable for use on damaged skin[13]
- Non-cytotoxic[14] and hypoallergenic[15]

It is reported that optimal skin integrity in association with the securement of vascular access devices (VADs) is often overlooked, with the emphasis being on the prevention of infection at the insertion site and catheter-related blood stream infections (CRBSIs). There is very limited literature regarding skin integrity associated with VADs and in particular peripherally inserted central catheters (PICC).[16]

Did You Know?

Treatment cost for a CRBSI is estimated to be £9,900 per infection[3]

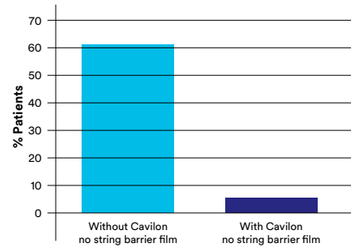
Skin safety starts here: 3M™ Cavilon™ No Sting Barrier Film

- Forms a breathable transparent protective coating between the skin and the adhesive of the securement dressing device or tape*
- Proven to protect skin from Medical Adhesive-Related Skin Injury (MARSI)[4,5,6,7]
- When the dressing is changed, Cavilon no sting barrier film is removed instead of skin cell layers[8]

Did You Know?

A recent study evaluated skin condition in patients with peripherally inserted central catheters (PICC). A significant decrease in local skin complications with use of Cavilon no sting barrier film was demonstrated.[4]

% Patients with skin complications at second dressing change (PICC lines)[4]**



*3M Internal Data. Excellent protection from adhesive stripping / tape trauma. Study 12MS-10028.
**Rash/redness, peeling, maceration, adhesive transfer.

Adhesive product selection

You can give your patients the best possible care by selecting products based on the performance characteristics required for each application to help minimise the risks of MARSI.

Considerations for selecting medical adhesive products

What are you trying to secure?

Securement	Recommended tape
Critical tubing and devices	 **3M™ Durapore™ Surgical Tape** ► Silk-like fabric tape features strong, reliable adhesion ► Conforms well to contoured areas ► Durable fabric resists stretching ► Easy to tear
Routine dressing changes	 **3M™ Medipore™ H Soft Cloth Surgical Tape** ► Porous, soft cloth fabric allows skin to breathe, helping maintain skin integrity ► Stretches across and diagonally to accommodate swelling, distension and movement ► Easy-tear perforated rolls for convenience  **3M™ Transpore™ White Surgical Tape** ► Gentle to skin ► Easy, straight bi-directional tear ► Breathable to maintain skin integrity ► Reliably secures dressings and devices  **3M™ Micropore™ Surgical Tape** ► Gentle, trusted for over 50 years ► Highly breathable ► Reliably secures dressings

Where will the tape be applied?

Area	Recommended tape
Contoured areas Areas subject to movement, stress or distension	 **3M™ Medipore™ H Soft Cloth Surgical Tape** ► Porous, soft cloth fabric allows skin to breathe, helping maintain skin integrity ► Stretches across and diagonally to accommodate swelling, distension and movement ► Easy-tear perforated rolls for convenience  **3M™ Microfoam™ Surgical Tape** ► Highly conformable elastic foam tape stretches in all directions to accommodate swelling and promote comfort[17] ► Gentle, secure adhesion to contoured sites

What is the condition of the patient's skin?

Skin type	Recommended tape
At-risk or fragile skin	 **3M™ Kind Removal Silicone Tape** ► Gentle tape adheres well, yet removes without disrupting fragile skin layers[18] ► Reliable and consistent securement[19] ► Easy to reposition ► Easy to tear
Dry	 **3M™ Transpore™ White Surgical Tape** ► Gentle to skin ► Easy, straight bi-directional tear ► Breathable to maintain skin integrity ► Reliably secures dressings and devices[20]
Moist	 **3M™ Micropore™ Surgical Tape** ► Gentle, trusted for over 50 years ► Highly breathable ► Reliably secures dressings[21]

What type of wound am I treating?

Wound type	Recommended dressing
Non exuding	 **3M™ Tegaderm™ Film Dressing** ► Easy to use frame delivery system for quick, precise and easy application ► Conformable dressing which flexes and stretches with skin to promote longer wear time ► Transparency of the dressing provides complete visibility and on-going monitoring of wound ► Protects skin and bony prominences from abrasion and allows patient to move easily ► Impermeable to liquids, bacteria and viruses* ► Waterproof barrier which allows patients to bathe or shower without removing dressing ► Pressure sensitive adhesive holds strongly and releases gently
Exuding	 **3M™ Tegaderm™ +Pad Dressings** ► Absorbent non-adherent pad will not stick to the wound bed therefore reducing pain on removal ► Easy to use frame delivery system for quick, precise and easy application ► Conformable dressing which flexes and stretches with skin to promote longer wear time ► Transparency of the dressing provides complete visibility and on-going monitoring of wound ► Protects skin and bony prominences from abrasion and allows patient to move easily ► Impermeable to liquids, bacteria and viruses* ► Waterproof barrier which allows patients to bathe or shower without removing dressing ► Pressure sensitive adhesive holds strongly and releases gently

*Laboratory tests have proved Tegaderm transparent film dressings provide a barrier against HIV-1 and HBV while the dressings remain intact without leakage.

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 Medical Adhesive-Related Skin Injuries (MARSI) and increase consistency of care across your facility. See specific product manufacturer's labeling for any additional or contra-indications directions related to preparation, application and removal.

For product specific application and removal instructions, please visit **www.3M.co.uk/healthcare**

Prepare the skin

Clip/trim hair

Clean and dry the skin to remove soil and residue

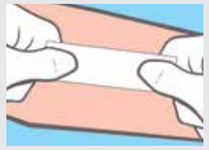
Apply 3M™ Cavilon™ No Sting Barrier Film, to protect at-risk skin

Allow barrier film to dry completely before applying tape

Avoid routine use of tackifiers

3M™ Kind Removal Silicone Tape can be repositioned without compromising adhesion.

Apply the tape



Apply tape to skin without stretching or tension

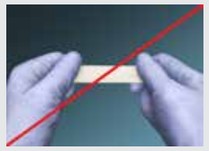
Apply firm pressure to activate the adhesive and gain full contact with the skin

Application tips

Minimise touching of 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



Tape should not be pulled or stretched when applied

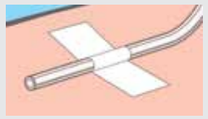
If swelling does occur, loosen and replace tape. 3M™ Kind Removal Silicone Tape can be repositioned without compromising adhesion.

When securing dressings, tape should extend at least 1.25cm (2.5cm is preferred) beyond the edge of the dressing to hold the dressing in place.

Special applications

Securing tubing: omega technique

Optimal technique for securement and to reduce potential pressure under tubing



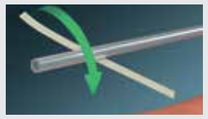
Centre tape over tubing: encircle tubing with tape

Where tape meets, pinch the two adhesive sides together

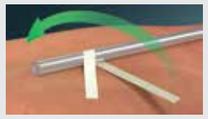
Secure remainder of tape to skin

Securing tubing: chevron technique

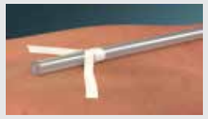
Optional technique to help keep tubing securely in place; works best with thin tape strips or conformable tapes



Centre tape with adhesive side up, under tubing



Cross one section of tape over tubing and secure to skin



Repeat with other side of tape

Remove the tape

Proper tape removal is critical in reducing the incidence of MARSI

Loosen edge of tape

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

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)

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 MARSI

As tape is removed, continue to support the skin at the peel line