

MARSI

MEDICAL ADHESIVE-RELATED SKIN INJURY

Everything you
need to know
about but were
afraid to ask

EXPLAINED

Published by:

Wounds UK
108 Cannon Street
London EC4N 6EU, UK
Tel: +44 (0)20 3735 8244
www.wounds-uk.com

WOUNDS | UK

© Wounds UK, 2023

This document has been developed by Wounds UK and supported by CliniMed.

CliniMed[®]

The views expressed are those of the authors and do not necessarily reflect those of CliniMed Ltd.

How to cite this document:

Wounds UK (2023) *MARSI Explained*. Available to download from: www.wounds-uk.com

Glossary

BARRIER FILM: Product that creates a protective layer between the patient's skin and medical adhesive, preventing contact with exudate, urine and faeces. They are recommended for application before using medical adhesives, especially for patients who are vulnerable to skin damage

DRESSING ADHESION: Adhesion (sticking) of dressing materials to the periwound skin

FULL THICKNESS TISSUE LOSS: Severe damage involving the separation of the epidermis and dermis from underlying skin structures

MARSI: Medical adhesive-related skin injury; skin trauma caused by the repeated removal of dressings, tapes and other medical adhesive devices; for more information on causes of MARSI, see page 3

MEDICAL ADHESIVE REMOVERS: Products used to safely and effectively remove medical adhesives from the skin without causing harm or irritation

PARTIAL THICKNESS TISSUE LOSS: Superficial damage involving the separation of the epidermis from dermis




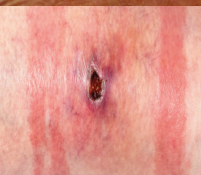


What is a MARSi?

(MEDICAL ADHESIVE-RELATED SKIN INJURY)

A medical adhesive-related skin injury (MARSi) refers to skin damage caused by the use of products containing a medical adhesive – e.g. tapes, dressings, electrodes, medication patches and wound closure strips (Fumarola et al, 2020; [Table 1]).

MARSis can occur at any age and clinical setting (de Faria et al, 2022) but are especially prevalent in ‘at-risk’ patients, those with fragile skin and when proper application and removal techniques of adhesive dressings/devices are not followed.

Table 1: Causes of MARSis (Fumarola et al, 2020)

Causes	Type	Action	Result	Example
1. Mechanical forces	1a. Skin stripping	<ul style="list-style-type: none"> Single and/or repeated application/removal of medical adhesive Shear, friction and/or blunt force 	<ul style="list-style-type: none"> Superficial removal of one or more layers of epidermal cells Skin may appear shiny and lighter than surrounding areas 	
	1b. Skin tears	<ul style="list-style-type: none"> Single and/or repeated application/removal of medical adhesive Shear, friction and/or blunt force 	<ul style="list-style-type: none"> Separation of skin layers from epidermis to dermis Can be partial-thickness or full-thickness 	
	1c. Tension blisters	<ul style="list-style-type: none"> Excessively stretched or tightened adhesive Swelling underneath a correctly applied product 	<ul style="list-style-type: none"> Blistering 	
2. Dermatitis	2a. Non-allergic irritant contact dermatitis	<ul style="list-style-type: none"> Presence of a chemical or physical irritant that may be exacerbated by occlusion or length of time in contact with skin 	<ul style="list-style-type: none"> Localised inflammation Skin may appear ‘red’ and swollen Vesicles may form 	
	2b. Allergic dermatitis	<ul style="list-style-type: none"> Presence of an allergen in the medical adhesive that comes into contact with skin 	<ul style="list-style-type: none"> Local/systemic inflammatory response Skin may appear ‘red’, inflamed, blistered and itchy 	
3. Other	3a. Folliculitis	<ul style="list-style-type: none"> Irritation of the hair follicle by adhesive pulling on hair 	<ul style="list-style-type: none"> Local infection, rash, raised bump and pustules 	

© Fiona Downie 2023

© Jacquie Fletcher 2023

Understanding MARSI and risk factors

Anyone who requires the use of medical adhesives that are repeatedly applied and removed can be affected by a MARSI. However, it is important that clinicians recognise 'at risk' groups including (de Faria et al, 2022):

- Extremes of age (neonates/premature infants and older people)
- Patients with stomas
- Patients with PICC lines, central lines, IV cannulas and PEG tubes
- Patients with dermatological conditions (e.g. eczema, dermatitis, chronic exudative ulcers and epidermolysis bullosa).

MARSIs are known to have a significant effect on a patient's quality of life (McNichol and Bianchi, 2016) resulting in:

- Increased pain, trauma, skin injury and risk of wound healing complications (e.g. infection, chronicity and/or scarring)
- Increased hospital length of stay and costs to the healthcare provider
- Increased anxiety
- Negative impact on patient wellbeing
- Negative impact on patient engagement with treatment.

There are intrinsic and extrinsic risk factors that can increase the likelihood of developing a MARSI:

Intrinsic risk factors:

- Malnutrition and dehydration
- Oedema (swelling)
- Increased frailty
- Dry skin — due to harsh skin cleansers, excessive bathing, low humidity, etc.

Extrinsic risk factors:

- Inappropriate selection of product
- Improper application and removal of product
- Repeated application and removal of product
- Prolonged exposure to moisture
- Certain medications (e.g. anti-inflammatory agents, anticoagulants, chemotherapeutic agents and long-term corticosteroid use).

A holistic skin assessment **and** risk assessment should be carried out and documented before each application and removal of an adhesive, such as a dressing or medical device (Fumarola et al, 2020). The holistic risk assessment should include the following checklist:

Holistic risk assessment checklist

- Patient medical history and history of the wound or stoma
- Allergy/sensitivity assessment, including any known/suspected allergies or sensitivities to adhesive materials (Bernatchez and Bichel, 2023)
- Reassess – is the device effective and/or still necessary, if not replace or remove
- Visual inspection of the skin:
 - Feel the patient's skin to measure turgor or elasticity
 - Observe for local signs of irritation/damage where adhesive will be or has been applied.
- Pain assessment — use validated scales to quantify pain (World Union of Wound Healing Societies, 2004), such as the numeric rating scale. It is important to be aware that certain patients, such as the young or those with cognitive impairments, may not be able to report pain accurately.

Prevention of MARSIs in practice

Continuous use of adhesive dressings or devices with improper application or removal techniques can cause irritation and damage to the skin. Fortunately, MARSIs are largely preventable if proper prevention strategies are followed. By implementing the following four steps, you can minimise and prevent MARSIs (McNichol and Bianchi, 2016).

STEP 1

Skin preparation prior to adhesive application

- Assess the individual's skin and surrounding area for irritation or damage
- Clean the skin thoroughly and ensure it is completely dry. If necessary, clip or trim any excess hair (Fumarola et al, 2020)
- Consider applying a skin protectant product (e.g. barrier film) under medical adhesive.

STEP 2

Select appropriate adhesive

- Consider the patient's skin type, wound condition, anatomical location, lifestyle, environment and health status (Fumarola et al, 2020)
- Check the patient is not allergic to any of the ingredients used in the products that will be applied to their skin
- Avoid using adhesives with excessive adhesion that surpasses the patient's needs and the specific application
- Consider using dressings that minimise trauma upon removal.

STEP 3

Apply adhesive dressing/device correctly

- Ensure area is fully dry before applying adhesive dressing/device
- Apply in the correct orientation that doesn't restrict patient movement
- Do **not** apply tension or stretch the dressing
- Use firm but gentle pressure to smooth the adhesive product, ensuring there are no gaps or wrinkles
- Always refer to the manufacturer's instructions.

STEP 4

Remove adhesive correctly

- To reduce pain, skin stripping and peri-wound trauma, consider using a sterile medical adhesive remover such as Appee!® Sterile (CliniMed Ltd.) to soften and loosen adhesive bonds and edges
- Loosen edges first and take the time to remove adhesive in the direction of hair growth, close to the surface of the skin and slowly (**'low and slow'**)
- Support exposed skin with other hand (Fumarola et al, 2020).

Using Appeel® Sterile range in practice

Best practice guidance recommends the use of sterile silicone medical adhesive removers, such as Appeel Sterile, particularly for patients who are significantly at risk of infection. When Appeel Sterile comes into contact with the adhesive of the appliance, it temporarily changes the surface energy of the skin, disrupting the adhesive properties between the skin and device and loosening the bond without compromising the surrounding area. This facilitates the quick and easy removal of dressings and other adhesive appliances, while simultaneously reducing discomfort and preventing MARSIs.



Appeel Sterile Liquid Sachet

- Single use only
- **Indications:** Removal of large medical adhesive products where pain, periwound trauma and infection may be a concern
- **Example:** Around the abdominal and spinal area



Appeel Sterile Wipe

- Single use only
- **Indications:** Removal of small medical adhesive products without damaging the skin
- **Example:** Around nasogastric or endotracheal tubes



Appeel Sterile Foam Applicator

- Single use only
- **Indications:** Removal of small medical adhesive products where precise application is required
- **Example:** Around intravenous cannula, central lines and delicate skin areas — e.g. for use in infants and/or on the face



Appeel Sterile Spray

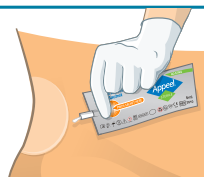
- Single patient; multiple use - e.g. in the community
- **Indications:** Removal of dressings in difficult-to-reach/see areas. The spray provides 360-degree coverage and can be applied from any angle without causing any cold sensation
- **Example:** Sensitive or sore skin including diabetic foot wounds on the heel

Appeel Sterile is

- Sterile — use on both intact and injured skin
- Easy to use
- Fast drying

and aids in the removal of:

- Adhesive dressings
- Adhesives securing devices such as central lines, nasogastric tubes, intravenous and subcutaneous cannulae



MARSI prevention pathway

When adhesives are ready to be removed, follow the MARSI prevention pathway to ensure that the correct product and removal technique is used:

Perform a skin assessment at each dressing change and consider patient's risk factors for MARSI

If patient is high-risk, consider the use of a sterile medical adhesive remover e.g. Appeel Sterile

Ensure you still use the correct dressing removal technique: **Low and slow**

Is the dressing or adhesive appliance to be removed large?

Use **Appeel® Sterile Liquid Sachet (5ml)**



Is the dressing or adhesive appliance to be removed small?

Use **Appeel® Sterile Wipes** (not on fragile skin)



Is the dressing or adhesive appliance large and requiring multiple dressing changes?

Use **Appeel® Sterile Spray (100ml)**



Is precision required (e.g. face/delicate area, or infant)?

Use **Appeel® Sterile Foam Applicator**



Tips for assessment and prevention of MARSI

- ✓ **Identify risk factors:** consider patient's age, underlying medical conditions, skin health and any existing skin injuries or changes
- ✓ **Examine adhesive usage:** review type and frequency of adhesive dressing or device used and whether continuous use is necessary
- ✓ **Consider skin preparation:** if needed, use skin protectants like a barrier film
- ✓ **Select and apply appropriate adhesive dressing/device:** choose adhesives or devices that match the patient's skin type, wound condition and anatomical location
- ✓ **Remove adhesive correctly:** if needed, use a sterile medical adhesive remover
- ✓ **Monitor and re-evaluate:** continuously assess the skin's condition, response to adhesives and any signs of irritation or damage
- ✓ **Provide education:** educate patients, caregivers and healthcare professionals about MARSI prevention and proper application and removal techniques.

References

- Bernatchez SF, Bichel J (2023) *Adv Wound Care (New Rochelle)* 12(4): 187-204
- de Faria MF et al (2022) *Int J Nurs Stud Adv* 4: 100078
- Fumarola S, Allaway R, Callaghan R et al (2020) *Journal of Wound Care* 29 (3c): S1-S24.
- McNichol L, Bianchi J (2016) *Wounds UK* 12(4): 1-4
- World Union of Wound Healing Societies (2004) *Wounds International*

