

A Vulnerability in the Body Armor

Medical Materials & Technologies

Are you a fan of the Middle Ages?

Alfred the Great, Edward the Black Prince and Baibars the Mamluk are prominent warriors from that time, and they often went into battle wearing powerful armor for protection. Just like armor shields the warriors, skin shields us. It's our armor and it protects our body. Sometimes, our armor undergoes an attack. A common culprit? MARS1.

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MARSI: Medical Adhesive-Related Skin Injury

MARSI ranges in severity – from mild to very severe. Severe cases can cause pain and heighten the risk of infection, which may prolong the healing process.

Identifying MARSI

Types of 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.



Maceration

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



Irritant contact dermatitis

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



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.




Why does MARSI occur?

MARSI may occur during adhesive removal – when the bond between the skin and adhesive is stronger than the bond between skin layers. The top layers of skin cells separate from the lower layers of skin upon adhesive removal. The physiology of MARSI is only partially understood, but we do know that many intrinsic and extrinsic factors can influence occurrence.

Assessing User Risk Factors	Intrinsic	<ul style="list-style-type: none">• Age (infant, elderly)• Existing dermatologic condition• Ethnicity/race• Underlying medical condition
	Extrinsic	<ul style="list-style-type: none">• Dry skin• Repeat taping• Tape/device removal• Prolonged exposure to moisture

Is it possible to reduce the risk of MARSI?

The simple answer is YES. There are a variety of ways to help reduce the risk of MARSI, including the following three steps.

 Step 1: Assess	User age, medical history and skin conditions
 Step 2: Select	Choose the right adhesive product for the application
 Step 3: Use	Appropriate adhesive application and removal techniques

Step 1: Assess

Understand patient skin type. Take note of age, skin condition, ethnicity, hair, environment.

Second, consider wear time. Selecting tapes for the right application can help optimize for the intended use.

Third, consider backing. Skin needs to breathe, so if your device is intended for long-term wear, use a nonwoven or perforated backing.

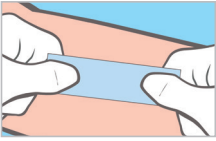
Step 2: Select

Selecting the right adhesive for your application depends on a few factors. First, consider use. For example, if applying an adhesive over a joint – choose a tape that flexes to mimic movement.

Finally, consider the ambient conditions present at the site. Exposure to moisture, perspiration, exudate or body fluids will affect tape and adhesive selection.

✔ Step 3: Use

Proper skin preparation, adhesive application and removal are critical in reducing the risk of MARSIs.

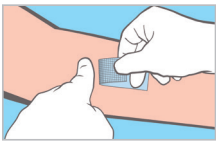


1. Application technique is important. **Make sure the skin is clean and dry.** Remove excess amounts of hair if needed by clipping not shaving the area.

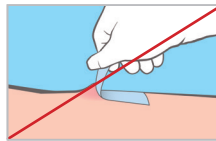
Apply tape/device to the skin without stretching or tension.



2. **Apply firm pressure to the back of the tape to gain secure contact with the skin.** Try to avoid touching the adhesive with your fingers except at the edges as this may reduce the adhesive strength. Avoid wrinkles and gaps in the tape as this can allow moisture to get in between the tape and the skin, possibly causing the tape to lift.



3. **Removal Technique: Remember “Low and Slow”.** If possible, always remove an adhesive tape in the direction of hair growth, keeping the tape parallel with the skin surface while pulling it back over itself.



4. Avoid pulling a tape off perpendicular to the skin surface. This will pull at the epidermis and possibly result in an increased risk of MARSIs.

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To learn more about techniques to help reduce the risk of MARSIs, visit 3M.com/MedTech and 3M.com/MARSIs

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