Patient Safety —The Role of Medical Adhesives

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Disclosure Statement

Janet M. Davis
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Objectives

At the end of this program, clinicians will be able to:

• Identify patients **at risk** for Medical Adhesive-Related Skin Injuries (MARSIs)

• **Choose** medical adhesives based on patient characteristics and adhesive technology

• Identify the common causes of **impaired skin integrity** under medical adhesives

• Articulate **interventions** to ensure patient safety and maintain skin integrity when using medical adhesives
Adhesive Use is a Patient Safety Concern

Allergic Dermatitis  Folliculitis  Irritant Contact Dermatitis  Maceration

Skin Stripping  Skin Tear  Tension Injury or Blister
Attitudes Among Care Providers

• This is just what happens with adhesives!
• Remove adhesives quickly
• Remove adhesives slowly
• Adhesives are a necessary evil and skin injury the “cost of doing business”
• Nothing can be done
Twenty-three (23) multidisciplinary Key Opinion Leaders with specialized expertise were invited to establish consensus statements regarding the assessment, prevention and treatment of Medical Adhesive-Related Skin Injury (MARSII).
Skin injury is occurring more often than you think

Adhesive injury is the most common source of skin breakdown in infants in the NICU.

A medical adhesive is a product used to approximate wound edges or to affix an external device (i.e., tape, dressing, catheter, electrode, pouch or patch) to the skin.”
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.

Types of Skin Trauma: Skin Stripping

What is it?
• Mechanical injury caused by adhesives
• Epidermis detaches from itself or dermis
• Can involve few or many or all layers of epidermal cells
• Skin-adhesive attachment > skin-skin attachment

What is the cause?
• Too aggressive tape
• Frequent re-taping same area
• Use of tackifier on fragile skin
• Incorrect removal technique

Shiny skin is a classic “look” of skin stripping
Types of Skin Trauma: Skin Stripping

How to prevent/treat?

• Use gentler tape — silicone if possible
• Apply alcohol-free skin barrier film
• Tape on intact skin
• Consider a taping platform
• Use self-adherent non-adhesive wrap

Shiny skin is a classic “look” of skin stripping
Types of Skin Trauma: Tension Blisters

What is it?
- Mechanical injury caused by shear force from strapping tape over wound or swelling occurring under non-stretchy tape
- Epidermis pulls apart
- Skin-adhesive attachment > skin-skin-attachment

What is the cause?
- Strapping tape over skin; strapping does not increase adhesion. Tape resists stretch and returns to its original shape.
- Edema, hematoma formation or distention occurring under an unyielding, non-stretch tape

Blisters at edge of tape is classic “look” of tension blisters
Types of Skin Trauma: Tension Blisters

How to prevent/treat?

• Use tape with stretch if swelling, movement anticipated
• Stretch tape over gauze only, not skin
• Use an alcohol free skin barrier film on fragile skin or when re-taping
• If distention is observed, loosen and reposition or replace tape
Types of Skin Trauma: Irritant Contact Dermatitis

What is it?
• Irritation: redness, swelling, blistering usually in area exposed to adhesive
• Can look similar to allergic dermatitis

What is the cause?
• Chemical irritants or skin preps trapped between adhesive and skin
• Common caused when skin preps are not allowed to dry before tape is applied
Types of Skin Trauma: Irritant Contact Dermatitis

How to prevent/treat?

• Assure skin is clean and dry before applying tape
• Protect with alcohol-free skin barrier film and allow to dry completely before applying tape
• If possible, avoid using tackifiers
Types of Skin Trauma: Allergic Dermatitis

What is it?

• Cell-mediated immunological response to a particular component of tape adhesive or backing
• Erythema, edema, itching, wheals, vesicles
• Similar appearance to non-allergic dermatitis

What is the cause?

• A true allergic reaction occurs in sensitized individuals who come in contact with a substance to which they have previously been sensitized
Types of Skin Trauma: Allergic Dermatitis

How to prevent/treat?

• Consider consultation with a dermatologist or allergist to confirm
• Avoid the allergen. If reaction is caused by an acrylate tape, consider using silicone tape
• Contact manufacturer for assistance
Risk Factors
Key Risk Factors for MARSI

- Underlying illness
- Extremes of age
- Immuno-suppression
- Skin changes as with sun exposure
- Treatment of medical conditions
How do medical adhesives cause skin injury?

Skin injury results when the **skin to adhesive attachment** is stronger than the **skin to skin attachment**.
What are the preventable causes of MARSI?

Inadequate/improper

• Skin preparation
• Adhesive product selection

• Adhesive product application
• Adhesive product removal
Understanding Medical Tape Technology
Medical Adhesive Tape/Dressing/Device Composition

Combination of adhesive technology and backing technology determines tape performance

Who knew?
Medical Adhesives — Not just tape, but same principles
Adhesives Used in Medical Tape

- Natural Rubber Latex Adhesives Introduced in the 1900s
- Acrylate Adhesives Introduced in the 1960s
- Silicone Adhesives Introduced in the 1990s
Three Primary Differences Between Silicone and Acrylate Adhesives
Silicone vs. Acrylates

Adhesive profile over time

Surface Tension

Skin cell removal visualization

Silicone adhesive
Acrylate adhesive
Backings used in medical tapes
Preventing and Reducing MARSI

Based on Consensus Panel Recommendations
Selection

Part of the body
• Contoured vs. flat
• Potential for skin to stretch: edema, distention, movement

Skin condition
• Dry vs. moist or oily
• Intact vs. “at-risk” vs. damaged
• Age-related

Length of wear
• Short time
• Longer wear time
Ask: What level of securement is needed?

**Strong Adhesion**
- Heavy Tubing e.g., ET, NGT
- Sports Taping

**Multi-Purpose**
- Immobilizing Body Parts
- Securing Medical Devices

**Gentle To Skin**
- Anchoring Dressings
- Lightweight Tubes/Device

Critical Securement and Heavy Tubing

Light Tubing, Low to Medium Adhesion
Preparation

- Remove excess hair
- Be sure skin is clean and dry
- Apply protective alcohol-free barrier film
- Use gentlest tape that can do the job
- Alcohol-free barrier film optional with silicone tape
- Avoid routine use of tackifiers

“Allow preps to dry completely”
Application

• Apply sufficient pressure to activate pressure-sensitive adhesives
• Cover adequate surface area
• Obtain full contact between the tape and skin or tubing so moisture cannot penetrate and loosen the tape

Application Tips:
• Clip hair, if needed
• Minimize touching adhesive
• Allow preps to dry
• Apply to clean, dry skin
• Do not stretch or strap over skin

Consensus Statement 12, 13, 17
Application

Use sufficient pressure  Cover adequate surface area  Obtain full contact

Consensus Statements 17
Stretch

How to apply soft cloth tape to secure a surgical dressing

Consensus Statement 12, 13

Stretch of tape

Proper Tape Application

Incision

Vertical Incision (Head to Toe)

Transverse Incision (Hip to Hip)
Removal

L-O-W and S-L-O-W
Removal

Stretch method

Tape method
Consensus Statements

Infection Prevention

21. Store and use adhesive-containing products in a manner that prevents contamination.

22. Single-patient-use adhesive products are preferred.
Single Patient Use Rolls

Single patient use rolls can help balance infection prevention goals and managing costs by reducing waste.

Consensus Statements 21, 22

“Dedicate non-disposable items that cannot be cleaned and disinfected (e.g. adhesive tape) between patients for use only on the patient”

Tips to Take with You

Selection

• Based on clinical need and patient characteristics
• Use tape with stretch when needed
• Consider silicone adhesive for at-risk skin
Tips to Take with You

Preparation

• Skin is clean and dry
• Use alcohol-free protective barrier/skin prep
• Allow preps to dry completely
Tips to Take with You

Application and Removal

- Cover adequate surface area
- Obtain full contact
- Apply sufficient pressure
- Remove low and slow
Tips to Take with You

MARSI Prevention

• Build MARSI surveillance into Pressure Ulcer P&I surveys
• Educate your organization

Tape affects the experience of every patient every day. Use your knowledge to make their experience better and share what you have learned with your colleagues.
Tape with Care

Your patient’s skin depends on it.
Thank you for your attention!

For more information: