

Dislocazioni accidentali dei cateteri esterni

Come stabilizzare i cateteri neonatali senza
causare lesioni cutanee

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Terapia Intensiva Neonatale, Benevento

Bologna, 14 Maggio 2024



36. VASCULAR ACCESS DEVICE SECUREMENT



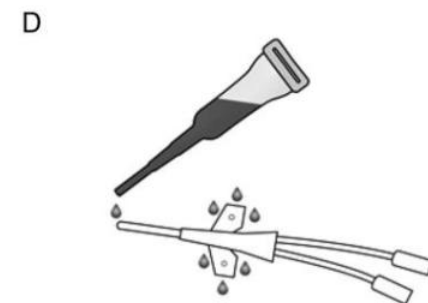
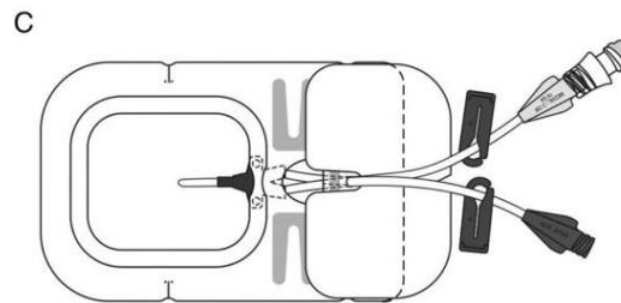
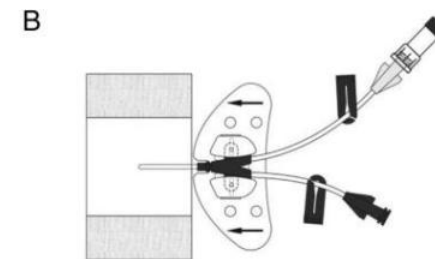
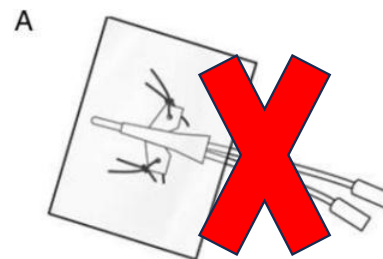
9TH EDITION

REVISED 2024

CASI – Catheter associated skin injury

MARSI – Medical adhesive related skin injury

- N. Be aware of the risk of catheter-associated skin injury.
1. Assess skin when the securement device is changed; anticipate potential risk for skin injury due to age, joint movement, and presence of edema.^{39,46,60,61} (III)



Qualità delle cure erogate e lesioni cutanee

L'integrità della cute rappresenta uno standard di qualità dell'assistenza infermieristica erogata ed è riconosciuto come uno degli indicatori di outcome dell'assistenza infermieristica stessa.



FIGURE 1. Medical adhesive-related skin injury and chemical injury in a preterm neonate.

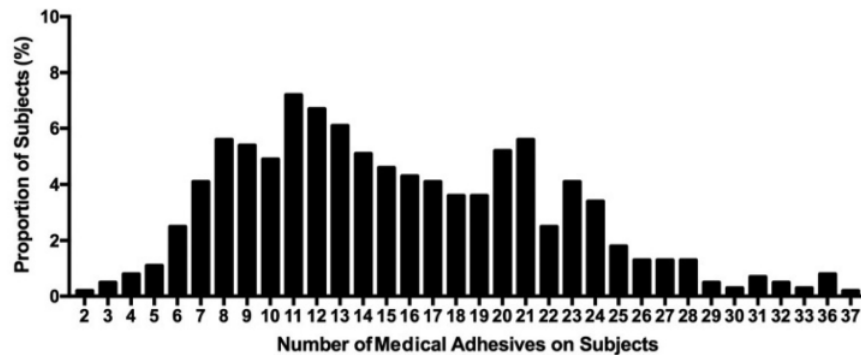
**Standardizzazione delle
procedure di reparto**

[Catherine Noonan¹](#), [Sandy Quigley](#), [Martha A Q Curley](#)
Skin integrity in hospitalized infants and children: a prevalence survey
J Pediatr Nurs 2006

CASI-MARSI: entità del fenomeno

- +++Neonati, Prematuri, Prime settimane di vita (tipicità della cute)
- +++Bambini delle Terapie Intensive Neonatali e Pediatriche più esposti (female, age 2 years or younger, hospital stays longer than 5 days, infection, edema, and surgery as independent risk factors)

Figure 1.
ADHESIVE USE ON SUBJECTS



Adv Skin Wound Care 2019 Apr;32(4):176-182.

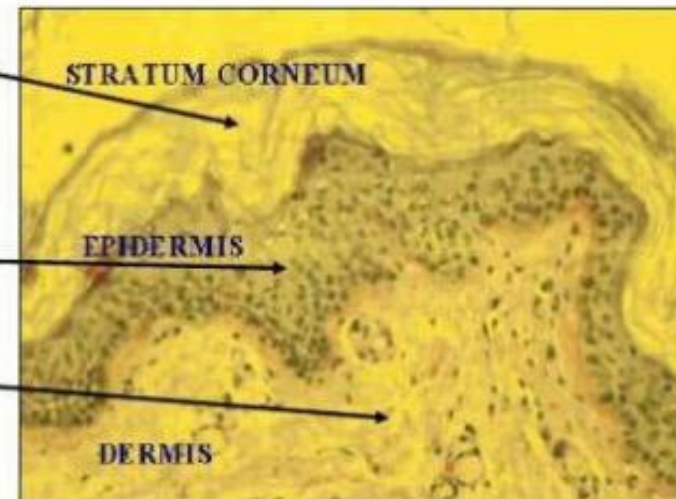
Full Term Infant Skin

Healthy infants

- Well-formed stratum corneum.....note multiple layers (10-20)

- Thick epidermis

- Structural proteins present in the dermis

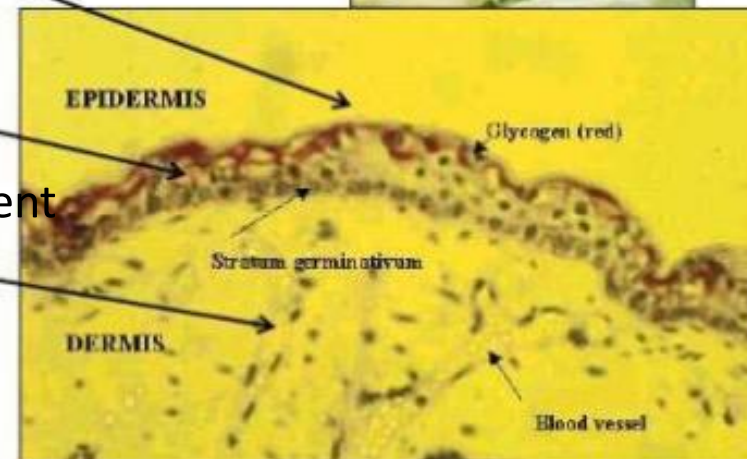


"Shaping the Future of Pediatric Vascular Access 2012"



Premature Infant Skin

- Stratum corneum poorly developed or absent
- Thin epidermis
- Dermis not fully formed and deficient of structural proteins



"Shaping the Future of Pediatric Vascular Access 20

These characteristics amplify the risks for pressure injury, epidermal stripping, dermatitis, and bacterial colonization and invasion.

Transepidermal Water Loss (TEWL)

- Water of respiration normally moves through the stratum corneum from below.
- The rate of transepidermal water loss (TEWL, g/m²/hr) is a measure of skin barrier integrity
- TEWL is higher (faster) when the barrier is damaged.

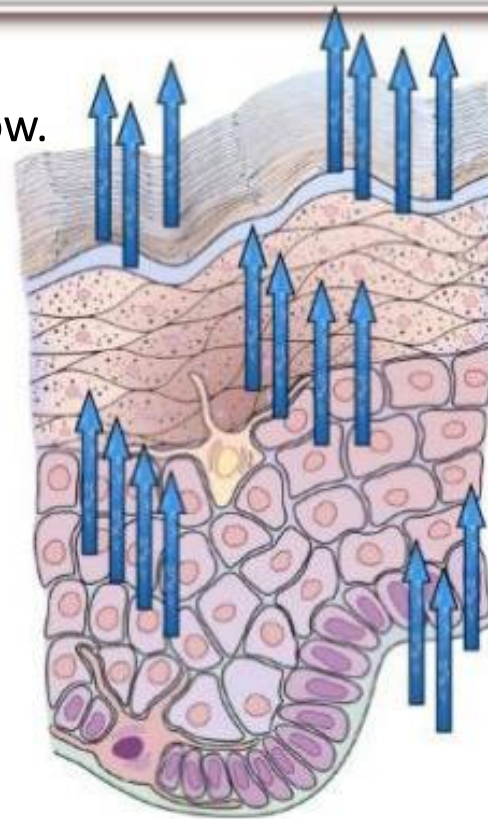
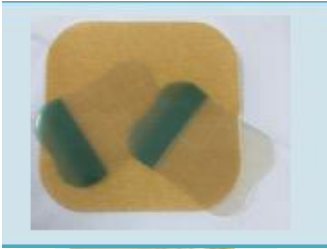


Table 1. Types of medical adhesives.

Adhesive Type	Backing	Uses
Acrylates 	Cloth Silk Polyester (woven, non-woven) Paper, Plastic Foam, Polyurethane (film)	Secure medical devices (ETT, IV, NG tube, oxygen cannula)
Hydrocolloid 	Film	Ostomy care Platform underneath tape Integrated into adhesive products (ETT holder, umbilical catheter securement)
Hydrogel 	Plastic Reflective cover	EKG electrodes Temperature probes
Silicone 	Woven polyester Plastic	Secure EEG electrodes "Platform" between skin and tape Border of wound dressings
Zinc Oxide	Plastic	Use only on top of hydrocolloid platform

Classificazione

WOUND CARE



Medical Adhesives and Patient Safety: State of the Science

Consensus Statements for the Assessment, Prevention, and Treatment of Adhesive-Related Skin Injuries

Laurie McNichol ■ Carolyn Lund ■ Ted Rosen ■ Mikel Gray

CE
3.3
ANCC
Contact
Hours

Mechanical

Skin (Epidermal) stripping—Removal of one or more layers of the stratum corneum occurring 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^{1,16,17}



Medscape

Source: NAINR © 2014 Elsevier Science, Inc.

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^{16,18,19}



Medscape

Source: NAINR © 2014 Elsevier Science, Inc.

Skin tear—Wound caused by shear, friction and/or blunt force resulting in separation of skin layers; can be partial- or full-thickness²⁰



Photo courtesy of 3M

Dermatitis

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^{10,21}



Photo courtesy of 3M

Allergic 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^{10,21,22}



Photo courtesy of Ted Rosen



Other

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



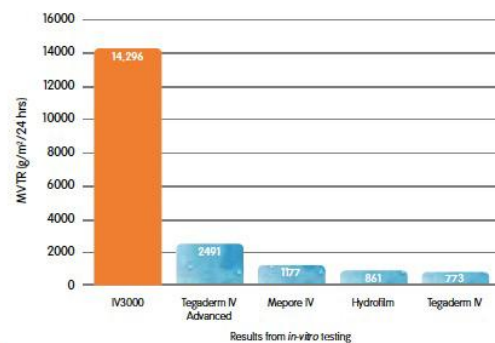
Photo courtesy of 3M

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)



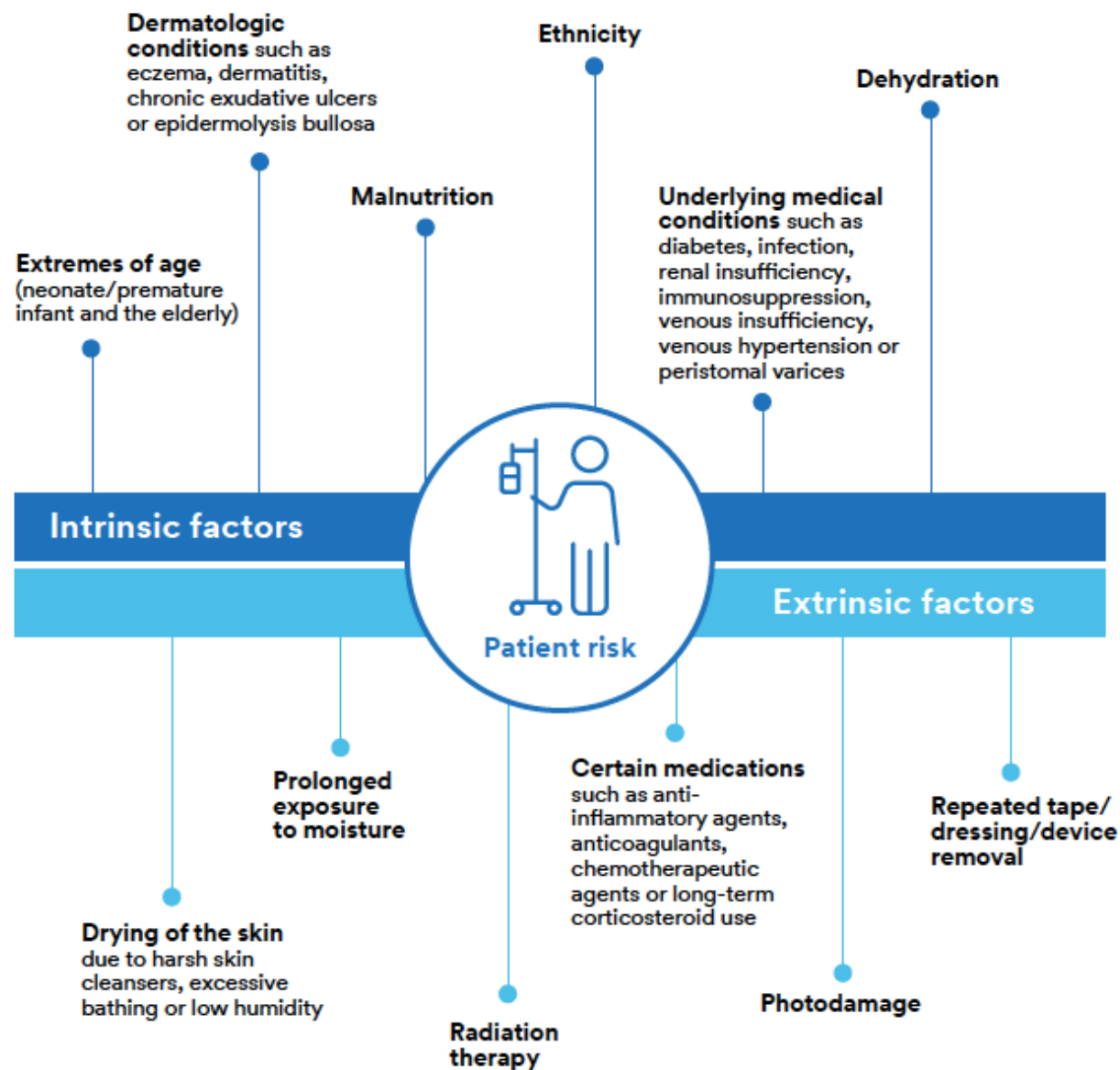
Photo courtesy of
Teresa Conner-Kerr

Moisture vapour transmission rates (MVTR)^{4,7}



Utilizzare membrane
semipermeabili trasparenti
ad alta traspirabilità!

Prevenzione

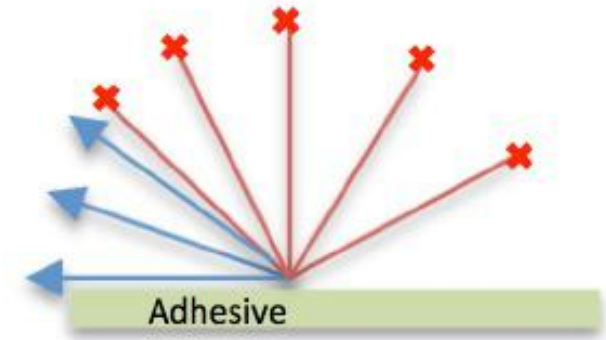


Uso di bundles

Table 2

Key elements for adhesive application and removal

1. MARSİ is defined as any erythema persisting 30 min post adhesive removal (also known as epidermal stripping) (McNichol et al., 2013)
2. Identification of type of adhesives is required to best understand application and removal techniques
3. Adhesive products consist of a top layer (backing) and adhesive layer (base) (McNichol et al., 2013)
4. The type and composition of adhesive informs the removal technique (e.g. polyurethane (transparent) films require a different removal technique than hydrocolloid/acrylate adhesives)
5. Risk of neonatal MARSİ is increased by i) removal of an adhesive within 24 h s of application, ii) use of an incorrect removal angle, iii) use of bonding agents with adhesive application (e.g. Tincture of Benzoin) (Brandon et al., 2018; Lund, 2014)
6. Adhesives should be removed with a low angle to the skin (McNichol et al., 2013)
7. Removal of adhesives should i) start with a folded edge (if no folded edge, roll an area of the adhesive until an edge is created), ii) be done by pulling gently and slowly (McNichol et al., 2013)
8. Removal should be performed using two hands, one to support surrounding skin and one to pull gently (Brandon et al., 2018)
9. Evidence regarding the safety and efficacy for removal agents is limited (Brandon et al., 2018)
10. Non-pharmacological pain management strategies should be used (Nanavati et al., 2013).



Scegliere il giusto adesivo per il giusto scopo!

Improper choice of tape

Using tape with excessive adhesion for the purpose

Wrong choice of tape (ie, not using a tape with stretch for an area where swelling or movement is anticipated)

Table 1: Level of adhesion consideration

Critical securement	Multipurpose	Gentle to skin
Securing medical devices Heavy tubing (e.g. endotracheal tube, chest tube nasogastric tube)	Securing medical devices (e.g. ostomy bag) Immobilising body parts	Anchoring dressings Lightweight tubes/devices (e.g. IV)
		

← Higher level of adhesion

Moderate level of adhesion

Lower level of adhesion →

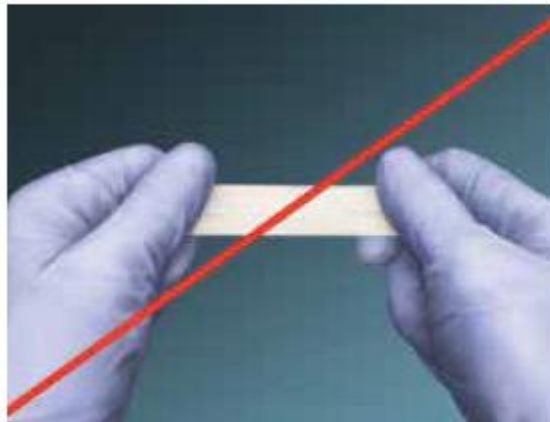
Utilizzare le corrette tecniche di applicazione!



1. Apply tape to skin without stretching or tension.



2. 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.
- Minimize 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.

Utilizzare le corrette tecniche di rimozione!

Proper tape removal is critical in reducing the incidence of MARSI.



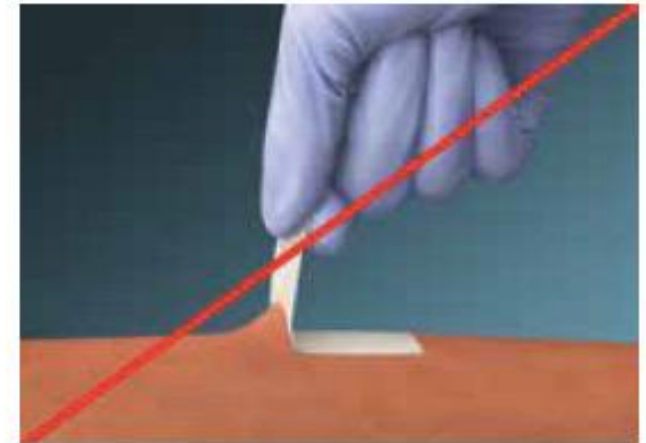
1. Loosen edge of tape.

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.



2. Stabilize the skin with one finger at the peel line.

3. 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.



4. Pulling tape at a vertical angle (perpendicular) to the skin will pull at the epidermis, increasing the risk of MARSI.

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

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

Bonding Agents



ATTENZIONE aumentano il rischio di lesione cutanea!

Adhesive Removers

Removal Agents*

- Avoid agents with high alcohol content and scent⁸
- SILICONE derivative products or WATER are currently preferred (based on pediatric studies⁴)
- Clean any residual removal agent from the skin prior to reapplication of adhesive(s)
- More evidence is required regarding emollients and oils as removal agents
- There is limited evidence regarding the frequency of use of removal agents for neonates

ATTENZIONE a quali
prodotti si usano, alcuni
sono tossici!



Utilizzo di film barriera sulla cute

Il film barriera non irritante Cavilon è un film barriera privo di alcol, a base di terpolimero acrilico che forma un rivestimento protettivo trasparente e traspirante sulla cute per proteggerla dalla frizione, traumi adesivi e fluidi corporei (quali urina e/o feci e essudato della ferita).

- ▶ Non irrita, anche su pelle lacerata o irritata¹⁶
- ▶ Non interferisce con i rivestimenti dei dispositivi assorbenti per incontinenza¹⁷
- ▶ Conveniente offre fino a 72 ore di protezione¹⁸
- ▶ Trasparente per agevolare il monitoraggio della cute
- ▶ Compatibile con preparati per uso cutaneo (quali clorexidina gluconato e iodopovidone)¹⁹
- ▶ Consente l'adesione di medicazioni, prodotti adesivi e dispositivi¹⁹
- ▶ Consente al vapore-umidità di traspirare dalla cute
- ▶ Non è necessario rimuovere il prodotto tra un'applicazione e un'altra

Benefits of a barrier film

In one study of skin complications around peripherally inserted central catheter (PICC) lines, local skin complications were noted in 62% of patients in the standard care group compared to just 6% in the barrier film group.¹⁶

6%

of patients experienced skin complications when a barrier film was applied.

62%

of patients experienced skin complications with standard care.

Nessun studio sui neonati

George M, Pal U, Guduri V, Smith G. Use of a skin protectant (3M™ Cavilon™ No Sting Barrier Film) to reduce local skin complications around PICC lines. WCET Journal 36(4) 8-13, October-December 2016.

Cambio medicazione

The Centers for Disease Control and Prevention (**CDC**) recommends that in adult and adolescent patients, ***CVC transparent dressings be changed at least weekly, except in those pediatric patients in whom the risk of dislodging the catheter outweighs the benefit of changing the dressing.***

-
1. O'Grady N, Alexander M, Dellinger E, et al. *Guidelines for Prevention of Intravascular Catheter-Related Infections*. Bethesda, MD: Centers for Disease Control and Prevention, National Institutes of Health. *MMWR*. 2002;51(RR-10).

The National Association of Neonatal Nurses (**NANN**) guidelines state that :
“in light of the potential for damage to the stratum corneum layer of the skin and dislodgement of the catheter when the dressing is removed, a dressing change is recommended when the transparent dressing no longer adheres to the catheter or skin or becomes damp or soiled.”

Gauze and tape dressings, a transparent dressing with gauze underneath or an occlusive tape on top, require changing every 48 hours.

Pettit J, Wyckoff MM. *NANN (National Association of Neonatal Nurses) Peripherally Inserted Central Catheters Guideline for Practice*. 2nd ed. Glenview, IL: National Association of Neonatal Nurses; 2007.



Rimozione della medicazione trasparente



**Antisepsi appropriata della cute con
Clorossidina al 2% in alcol isopropilico al 70%**

- ✓ Minima quantità necessaria alla disinfezione della cute
- ✓ No scrubbing
- ✓ Rimozione del disinfettante in eccesso con SF sterile

In the meantime we recommend the following on the basis of current evidence: (1) Extreme caution is recommended for use of topical antiseptics particularly alcohol based preparations in extreme preterm infants (Level 2D); (2) Care must be taken to avoid pooling of the solution under infant and washing with normal saline after cleansing with topical antiseptic may prevent severe chemical burn in extreme premature babies (Level 2D); and (3) Povidone Iodine for skin antisepsis should be avoided in extreme preterm infants (Level 2C).

World J Clin Pediatr 2016 May 8; 5(2): 159-171



FIGURE 1. Medical adhesive-related skin injury and chemical injury in a preterm neonate.

Applicazione del protocollo SICA-PED in 104 neonati

- (5) reasoned choice of the implant exit site with the RAVESTO Tunneling technique,
- (6) anchoring without stitches, and
- (7) exit point protection with the use of glue and transparent semipermeable membrane.

Tab 3. Post-procedural complications: late.

	CICC= 103	FICC= 1
Dislodgment	1 (0.96%)	—
Secondary misplacement	1 (0.96%)	—
Local ecchymosis	—	—
Infection of exit site	1 (0.96%)	—
Local pain at exit site	—	—
Lumen occlusion	—	—
CRT	—	—
CRBSI	3	—



SHORT REPORT



Securement of central venous catheters by subcutaneously anchored sutureless devices in neonates

Vito D'Andrea^a , Giovanni Barone^b, Lucilla Pezza^a, Giorgia Prontera^a, Giovanni Vento^a and Mauro Pittiruti^c

There is increasing evidence of the usefulness and safety of subcutaneously anchored sutureless devices for securing central venous catheters.

Pittiruti et al. [15] reported the use of SAS in 95 pediatric patients (including neonates, infants and children) with a high effectiveness: there was only one case of dislodgment (1.05%), secondary to skin erosion due to an ulcer caused by SAS.

Such complication, though very rare, may be hopefully minimized (a) by a proper technique of SAS insertion (the nitinol anchor should be placed deep under the skin, and not in the layers of the skin), (b) by placing a gauze or some soft silicon or polyurethane pad under the SAS, so to minimize the trauma to the skin, (c) by avoiding traction to the catheter during dressing change, and (d) by proper surveillance of the exit site.



Epicutaneo-caval catheters in neonates: New insights and new suggestions from the recent literature

The Journal of Vascular Access

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DOI: 10.1177/1129729819891546

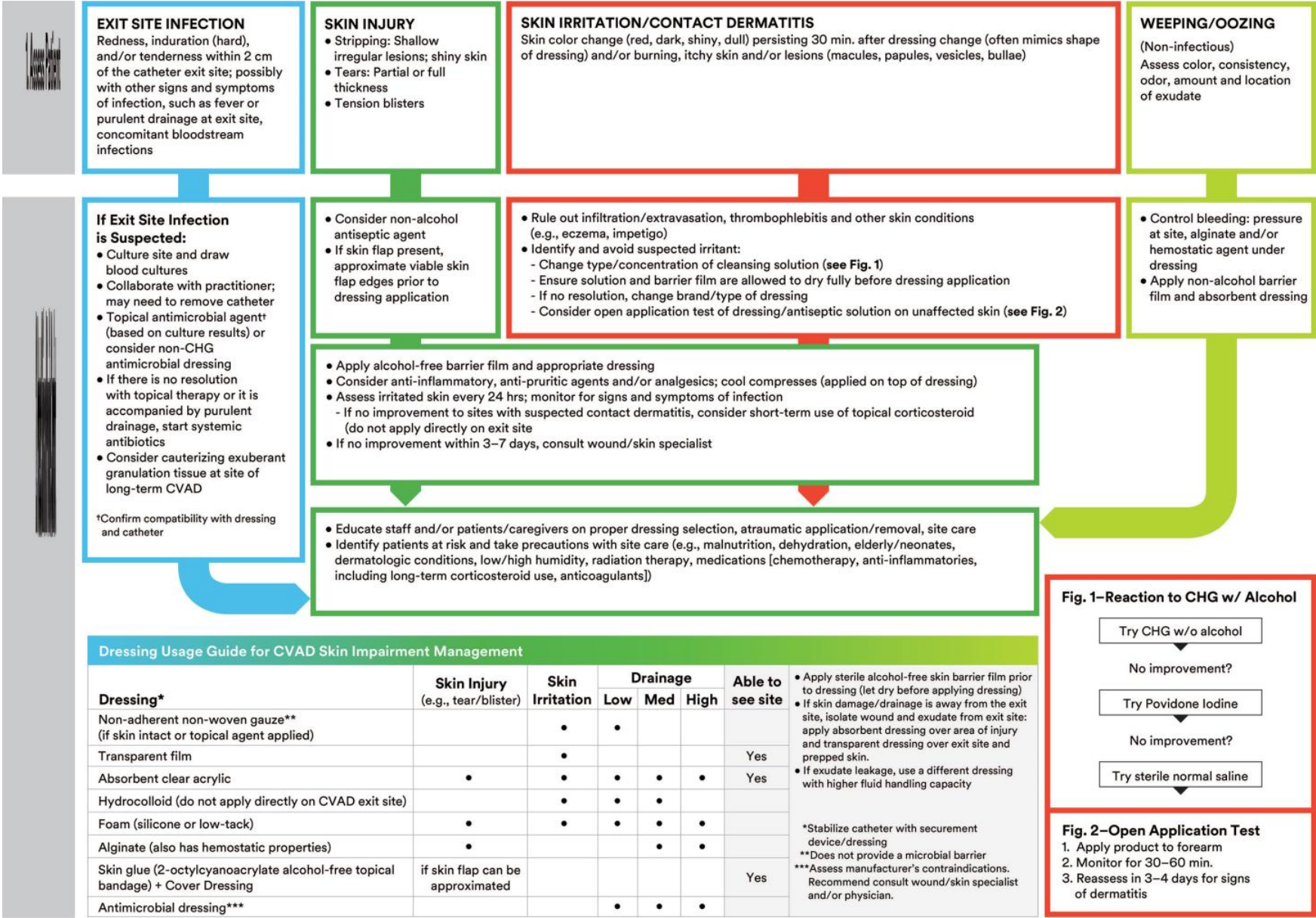
journals.sagepub.com/home/jva



Use glue for securement

There is a huge heterogenicity between different NICU policies as regards the securement of ECC. Accidental dislodgement and line migration is a frequent complication and it often requires reassessment of the position of the tip and/or replacement of the catheter.⁴⁸ Recently, cyanoacrylate glue has been widely used for securing different types of venous access devices. In our institution, we applied cyanoacrylate glue with transparent semipermeable dressing and we were

able to significantly reduce accidental dislodgement from 35% to 20% ($p < 0.007$; unpublished data). Cyanoacrylate glue is safe, inexpensive and easy to apply, and it yields the additional advantage of being very effective in preventing any bleeding/oozing at the puncture site. Removal of cyanoacrylate glue is also consistently easy and harmless.



Management of Central Venous Access Device–Associated Skin Impairment An Evidence-Based Algorithm

Daphne Broadhurst, Nancy Moureau, Amanda J. Ullman, The World Congress of Vascular Access (WoCoVA) Skin Impairment Management Advisory Panel

Algoritmo di prevenzione e management delle lesioni cutanee

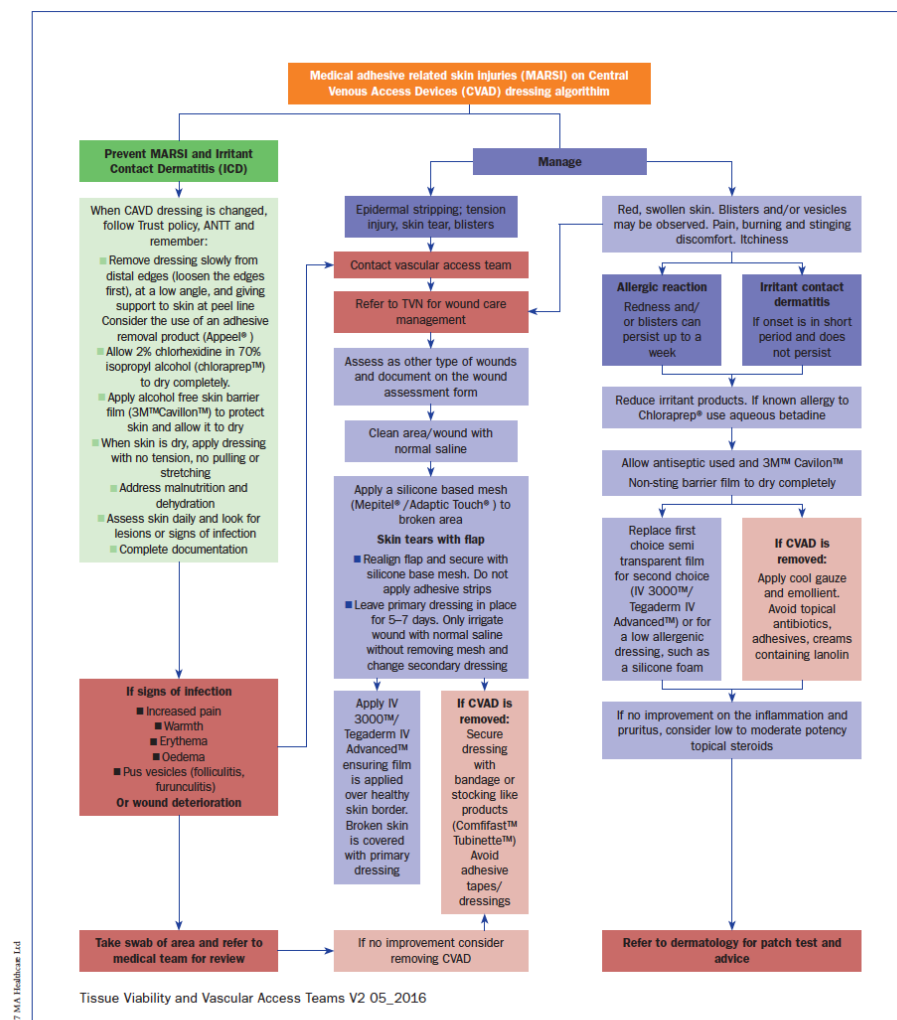


Figure 2. Intervention to prevent medical adhesive-related skin injuries

Chiama l'esperto!



www.shutterstock.com - 2316485399

Jan Hitchcock and Louise Savine
British Journal of Nursing, 2017, (IV Therapy Supplement) Vol 26, No 8



TEAM ACCESSI VASCOLARI PEDIATRICI BENEVENTO

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Grazie!