

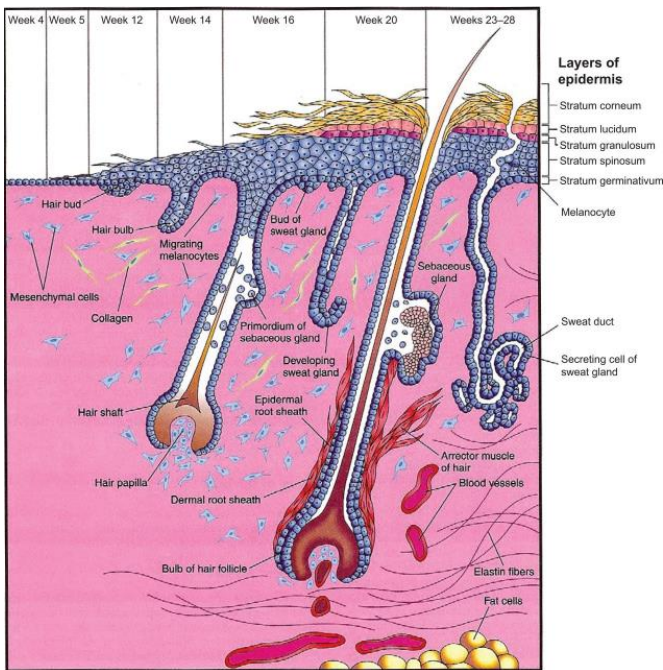
# NEONATAL SKINCARE GUIDELINE

## 1. Purpose

The purpose of this guideline is to provide consensus-based recommendations from the neonatal healthcare team for the prevention and management of skin breakdown and wounds in infants admitted to the NICU/SCN.

## 2. Background

The skin is the largest organ in the body, providing first line defense from infection, and water and electrolyte loss. Fetal epidermis begins to develop between weeks 4-6 of gestation and continues till term age. Neonatal skin differs from adult skin both structurally and functionally, due to thinner skin layers, weaker bonds between these layers, and less active glands. The newborn skin at birth also has an alkaline pH, becoming more acidic in the few days after birth. These differences make the skin of neonatal patients more vulnerable to injury. These differences also impact risk of infection, thermoregulation, fluid and electrolyte balance, and absorption of topical substances, such as creams or drugs.



From Moore, K. L., & Persaud, T. V. N. (2003). *The developing human: Clinically oriented embryology* (7th ed., p. 488). Philadelphia, PA: W. B. Saunders. Copyright 2003 by Elsevier.

### *Differences between term & preterm infant skin*

There are additional key differences between term and preterm skin. The layers of epidermis are significantly fewer in preterm infants. Vernix only starts developing at around 28 weeks. At 22-24 weeks, keratinocytes are differentiated in the stratum corneum, reaching 2-3 cell layers by 28 weeks, and further increasing to 15 layers at 32 weeks. The junction between the dermis and epidermis is also weaker in preterm infants compared to term infants because the anchoring fibers are fewer and thinner. This makes preterm infants

more susceptible to skin injury due to medical adhesives, as the bond between the adhesive and the skin is stronger than the bond between the epidermis and dermis layers. Preterm skin is also more permeable, affecting water and electrolyte losses, and absorption of topical substances, such as creams, drugs, and disinfectants. While the permeability of skin does accelerate after birth, the functions of the skin may not reach maturity for 2-4 weeks post-natal age and can take much longer in extremely low gestational age (ELGA) infants.

### *Clinical Implications*

Skin injury in the NICU is common, with an estimated prevalence of 9.25-43.1% in the neonatal population. It occurs in both preterm & term infants, with the youngest and most acutely ill infants being at highest risk. The primary cause of skin injuries in the neonatal population are medical adhesives & devices, friction, thermal & chemical burns, infection, birth related injury, and IV extravasation.

The focus of this skin care guideline is **prevention as the primary intervention**, guided by a neonatal skin injury risk assessment tool that guides skin related care in neonatal patients. Additional information for skin injury management is also provided.

## 3. Neonatal skin assessment tool

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- A neonatal skin injury risk assessment should be done on all infants admitted to the NICU within 4 hours of admission and when tissue injury first noted. Scoring should be q12hr thereafter.
- *The Northampton Neonatal Skin Assessment Tool (NNSAT)* is used to assess risk for skin injury, and the total score is documented in the health record. The frequency of skin injury risk assessment is determined based on NNSAT score
- Skin injury risk scores should be reported during nursing handover & daily multidisciplinary team rounds (if score 16 or greater)

## NEONATAL SKIN INJURY ASSESSMENT – NORTHAMPTON NEONATAL SKIN ASSESSMENT TOOL

\* Mobility:  
 - Restricted: full ROM not possible due to condition and/or medical devices  
 - Immobile: no spontaneous movements  
 \*\* Nutritional status:  
 - Normal: parenteral nutrition at 90 ml/kg or enteral feeds at 150 ml/kg  
 - Restricted: parenteral nutrition at 70-90 ml/kg or enteral feeds 120-150 ml/kg  
 - Severely Restricted: parenteral nutrition < 70 ml/kg or enteral feeds < 120 ml/kg

Category	0	1	2
<b>Gestation</b>	Term (>37 wks)	32-36+6 weeks	Less than 32 weeks
<b>Weight</b>	More than 2 kg	Between 1-2 kg	Less than 1 kg
<b>Age</b>	Over 14 days	Between 7-14 days	Less than 7 days
<b>Skin Integrity</b>	No damage	Small amount of damage	Extensive damage
<b>Temperature control</b>	Normal	Unstable during care	Generally poor control
<b>Mobility</b>	Normal	Restricted*	Immobile*
<b>Nutritional status</b>	Normal	Restricted**	Severely Restricted**
<b>Medical Devices</b>	No Device	Nasal cannula Gastric tube (NG/OG) Small splint Phototherapy eye mask	Assisted ventilation – including CPAP
<b>Level of Care</b>	Normal	Special (all NICU babies)	Intensive (intubated)

### Final Score

<b>0-8</b>	Low risk - assess every shift
<b>9-15</b>	Moderate risk – assess every 6-8 hours
<b>16-24</b>	High risk – assess every 4-6 hours

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Extreme Risk – assess every 2-4 hours

Adapted from McGurk, F. (2004). Skin integrity assessment in neonates and children. *Pediatric Nursing*, 16(3), 15-18

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## UNIVERSAL SKIN INTEGRITY CARE PLAN

- Ensure proper hand hygiene when providing care
- Keep skin clean and dry
- Avoid Coban self-adhesive wrap on skin
- Visually assess IV site hourly
- Do not squeeze heel/wrist too much during blood collection
- Hold pressure on site till bleeding stops post bloodwork
- Use positioning aids to:
  - Ensure flexed position
  - Offload and redistribute pressure
  - Support developmental care
- Follow Diaper Dermatitis Guideline and apply skin barrier cream PRN
- Document any existing or new skin injuries on Epic Avatar. Consider taking a photo and uploading to EPIC (ensure consent has been obtained)
- Using adhesives and/or products appropriately (**Appendix B**)
- Remove adhesives as per guidelines (**Appendix C**)
- Ensure infant is not lying on medical equipment such as IV tubing, NG tubes, Temp probe
- Educate family/caregivers on skin injury prevention
- Include skin assessment score in discussions on daily multidisciplinary rounds & discuss prevention and/or treatment of skin injuries
- Start humidity as per NICU Standards of Care Thermoregulation SOP (MNWH 343)

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- Bathe as per NICU Standards of Cares (No soap for the first 7 days of life on all patients <32 weeks gestation)

Score	Risk	Skin Assessment	Prevention and Interventions							
			General Skin Care	Reposition Infant	Probe Reposition	Diaper Changes	Pain Relief	Non-Invasive Ventilation	Skin Antisepsis	
>24	Extreme	Q6hr with care	NO ECG leads on skin Apply Duoderm Extra Thin under SpO2 and temp probe. Patient lays on UltraCare sheet (i.e., blue burn sheet) for 7 days If skin cleaning is required, use warm sterile water and gently blot skin - <b>never rub or wipe skin</b>	Q2-3hr *2-person re-positioning due to risk for friction*	Q2-4h	Q3-4hr * May require more frequent diaper changes to prevent skin injury and avoid fungal infections*	Ensure adequate pain management and consider continuous infusions and bolus' PRN	Ensure ears are not rolled up under CPAP hat  Duoderm Extra Thin on skin for interface protection	Clean Skin with appropriate swab as per <b>MNWH 359</b> .  Adhere to appropriate scrub and dry times	Clean skin with sterile water after disinfectants have dried
16-24	High	Q4-6h with care	Apply barrier dressing(s) to protect bony prominences and high-pressure areas (i.e., Mepilex foam dressing)	Q4-6h *2-person re-positioning d/t risk for friction*						
9-15	Moderate	Q6-8h		Q4-6h						

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0-18	Low	Q12h		Q3-4h	Q3-6h	With care	Ensure adequate pain management	prongs are not on septum)		
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## SKIN INTEGRITY PREVENTION & TREATMENT GUIDELINES

TYPE & CAUSE OF INJURY	PREVENTION	TREATMENTS
<p><b>BRUISING</b></p> <p>Blood collection</p>	<ul style="list-style-type: none"> <li>Do not hold limbs too tightly.</li> <li>Do not squeeze during blood collection.</li> <li>Hold pressure <u>on site</u> until bleeding stops.</li> </ul>	
<p>Pressure from medical devices i.e. CPAP, IVs</p>	<ul style="list-style-type: none"> <li>Do not pull straps too tightly.</li> <li>Ensure Duoderm Extra Thin is applied to high pressure areas like the septum or bridge of nose.</li> <li>Choose the appropriate size of mask/prongs for the baby.</li> <li>Rotate between different interfaces q3-4 hours.</li> <li>Ensure ears are not rolled up under the hat.</li> <li>Avoid using Coban self-adhesive.</li> </ul>	<ul style="list-style-type: none"> <li>Use different sites when blood work is required.</li> <li>Monitor the extent of bruising and peripheral pulses of affected limb(s).</li> <li>Ensure skin is intact. If breakdown is visible, use Mepilex Border Flex Lite Foam Dressing. Consider using the Mepilex Border Flex Lite (4x5 or 7.5x7.5) as a dressing if the wound is open.</li> </ul>
<p>Positioning of baby</p>	<ul style="list-style-type: none"> <li>Avoid having the baby lie on hard objects i.e. IV hubs, leads</li> <li>Change positioning of patient minimum q 6hrs</li> <li>Cover high pressure or high friction areas with Mepilex Lite Foam Dressing.</li> </ul>	
<p><b>EXCORIATION/DERMATITIS</b></p>		

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<p>Removal of adhesive</p>	<ul style="list-style-type: none"> <li>• Avoid use of adhesives unless necessary or use minimal amounts.</li> <li>• Double back tapes when securing IV or softer tapes (blue tape: 3M Micropore S).</li> <li>• Cut transparent dressing to size.</li> <li>• Use sterile water to assist in removal of adhesives.</li> <li>• Low and slow removal of adhesives.</li> </ul>	
<p>NAS/Medication</p>	<ul style="list-style-type: none"> <li>• More frequent diaper changes or leaving diapers open to air.</li> <li>• Apply barrier cream.</li> <li>• Ask families to bring in different wipes or diapers from home to trial.</li> </ul>	<ul style="list-style-type: none"> <li>• Follow diaper dermatitis guidelines.</li> <li>• Apply Mepilex Lite Foam Dressing (cut to size) to weeping areas.</li> <li>• Apply Mepilex Border Flex Lite (4x5 or 7.5x7.5 cm) to open wounds.</li> <li>• Consider applying a Zinc Oxide-based cream (add %) or giving po/IV Zinc (must be ordered by Md/NP/RD).</li> </ul>
<p>Pressure Injuries</p>	<ul style="list-style-type: none"> <li>• Reposition patient q6hrs min.</li> <li>• Cover high pressure areas with Mepilex Lite.</li> <li>• Ensure moist areas are completely dried after baby receives a bath i.e. behind ears, armpits, groin, buttocks.</li> <li>• Apply Duoderm Extra Thin under hard plastic medical equipment i.e. IV luer locks, leads, Chest tubes...</li> </ul>	

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<p><b>EXTRAVASATION</b></p> <p>IV infusions/meds</p>	<ul style="list-style-type: none"> <li>• Use transparent film dressing to secure IVs (i.e., Tegaderm).</li> <li>• Ensure IV insertion site is visible at all times.</li> <li>• Monitor IV site hourly.</li> <li>• Flush IV to verify patency before administering or starting any infusion. Take extra caution when medications are known to be caustic.</li> </ul>	<ul style="list-style-type: none"> <li>• Stop infusion.</li> <li>• Attempt to aspirate any residual medication/infusion from IV catheter.</li> <li>• Leave the IV catheter in place until the site has been assessed by MD/NP.</li> <li>• Consider the need for Hyaluronidase (must be ordered by MD/NP).</li> <li>• Cover with Mepilex Lite Foam Dressing if the site is weeping or oozing (cut to size).</li> </ul>
<p><b>CHEMICAL BURNS</b></p> <p>Aseptic skin preparation solutions</p>	<ul style="list-style-type: none"> <li>• Do not use cleaning solutions to aid in removing adhesives.</li> <li>• Use appropriate solution for appropriate age group (refer to MNWH 359)</li> <li>• &lt; 1kg - Green Swabs</li> <li>• &gt; 1 kg - Red Swabs</li> <li>• Refer to MNWH 359 and use an appropriate solution for appropriate procedure (e.g. Urinary catheterization vs. IV start).</li> <li>• For all babies, rinse and remove the disinfectant from skin with water once dried and the procedure is completed.</li> <li>• For ELGAs &lt;1 week old, rinse skin of cleaning solution with sterile water once dried and the procedure is completed</li> </ul>	<ul style="list-style-type: none"> <li>• Cleanse skin with sterile water</li> <li>• Apply Mepilex Border Flex Lite (cut to size).</li> </ul>

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	<ul style="list-style-type: none"> <li>Avoid “pooling” of cleaning solutions. Use Drain Sponge over skin around stump during umbilical line insertion.</li> </ul>	
<p><b>ISCHEMIA</b></p> <p>Peripheral and umbilical lines</p>	<ul style="list-style-type: none"> <li>Ensure brisk cap refill to all digits.</li> <li>Hourly visual monitoring of lines and digits.</li> </ul>	<ul style="list-style-type: none"> <li>Remove arterial catheter.</li> <li>Consider applying topical nitroglycerin spray or ointment to affected digits (must be ordered by MD/NP).</li> </ul>








\*Dressings are to be changed when visibly soiled, saturated, or lifting

\*If **prevention** dressing is intact, it should be changed weekly.









\*Wound assessment should be done daily (pull back dressing, and reapply, do not change dressing if it is intact).

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## Appendix B: Products and Uses

Product Type and Description	Images	Uses
<p><b>Acrylates</b></p> <p>3M Transpore Tape (Clear tape)</p> <p>TOH Inventory numbers</p>		<ul style="list-style-type: none"> <li>• Securing PIVs in low/moderate risk infants</li> <li>• Double back tapes or fluff with cotton ball</li> <li>• Securing suture tails for Umbilical Lines</li> </ul> <p><b>*Should not be routinely used on skin to secure NGT/OGT, Nasal Prongs etc.*</b></p>
<p>3M Multipore Dry (White cloth tape)</p> <p>NICU inventory</p>		<ul style="list-style-type: none"> <li>• NG/OGT securement</li> <li>• NP securement</li> <li>• Option for ETT securement</li> </ul>
<p>Strappal Fabric Strapping tape (ETT tape)</p>		<ul style="list-style-type: none"> <li>• ETT Securement</li> </ul>
<p><b>Hydrocolloids</b></p> <p>Duoderm Extra Thin TOH Inventory numbers</p>		<ul style="list-style-type: none"> <li>• Under SPO2 Probe</li> <li>• Under Non-Invasive Devices</li> <li>• Under temperature probe</li> <li>• Under ECG leads</li> <li>• Under moustache for Nasal ETT securement</li> <li>• Under PIV hub for High Risk Infants</li> <li>• Under abdominal tapes for chest tube securement</li> </ul>  
<p>Neobar ET Holder</p>		<ul style="list-style-type: none"> <li>• Oral ETT Securement</li> </ul>



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Product Type and Description	Images	Uses
<p><b>Polyurethane + Acrylates</b></p> <p>Transparent Film</p>		<ul style="list-style-type: none"> <li>• PIV securement</li> <li>• O2 Nasal Prong securement</li> <li>• OGT/NGT securement</li> </ul>
<p>Tegaderm HP</p> <p>TOH Inventory number</p>		<ul style="list-style-type: none"> <li>• PICC Securement</li> </ul>
<p><b>Hydrogel</b></p> <p>Electrodes</p> <p>NICU inventory</p>		<ul style="list-style-type: none"> <li>• ECG Monitoring</li> </ul>
<p><b>Silicone</b></p> <p>3M Micropore S</p> <p>(Blue tape)</p> <p>NICU inventory</p>		<ul style="list-style-type: none"> <li>• Used with a gauze to cap bloodwork dressing</li> <li>• Used to PIV securement in ELGA population</li> <li>• Used for securing Nasal Prongs</li> </ul>  
<p>Mepilex Lite Foam Dressing (moisture wicking dressing)</p> <p>Absorbent thin foam dressing</p> <p>NICU inventory</p>		<ul style="list-style-type: none"> <li>• Friction areas</li> <li>• Moist areas</li> <li>• Superficial wounds/tears/cracks</li> <li>• Low exudating wounds “weeping”</li> <li>• High Pressure areas/wounds</li> </ul>  <ul style="list-style-type: none"> <li>• <b>Change q8-12hrs or PRN</b></li> <li>• <b>Change when wet /soiled</b></li> </ul>

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Product Type and Description	Images	Uses
<p>Mepilex Border Flex Lite</p> <p><b>Self-adherent thin bordered foam dressing</b></p> <p>Dressing used to cover wounds</p> <p>NICU inventory</p>		<ul style="list-style-type: none"> <li>• Open Wounds</li> <li>• Chemical burns</li> <li>• Chest tube dressing</li> </ul>    <p>Cap blood work dressing for High/Extreme Risk Infants <b>2 sizes available:</b>            Small: heel pokes, small wounds or areas of skin breakdown            Large: chest tube dressing, larger wounds or areas of skin breakdown</p>
<p>Drain Sponge</p> <p>TOH Inventory number</p>		<p>Prevention of chemical burns during umbilical line insertion</p>
<p>3M Coban</p> <p>TOH Inventory number 1 inch x 5 YRD #211670</p>		<p><b>*Avoid using this product on skin for all patients</b></p>
<p>Silicone Contact Layer Adaptic Touch</p> <p>TOH Inventory number 5 cm x 7.6 cm, #212125</p>		<p><b>Non-adhesive contact silicone layer</b></p>

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Product Type and Description	Images	Uses
<p>Hydrogel Gel Nu-gel or Intrasite TOH Inventory number Tube 15 g, #212165</p>		<p>Hydrogel</p>
<p>Wound Cleanser Hypochlorous Acid Vashe Wound Solution TOH Inventory number #212190</p>		<p>Wound cleanser 2 minute soak, clean open wound and surrounding skin, pat dry and continue with wound dressing</p>

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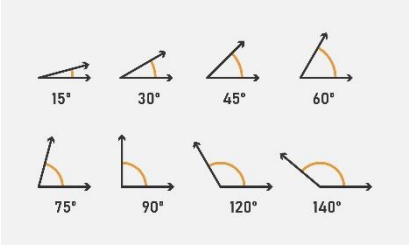
## Appendix C: Medical Adhesive Removal Techniques

Adhesive Base Type	Images	Removal Technique
<b>Acrylates</b> 3M Transpore tape (Clear tape)		Low and Slow
3M Multipore Dry (White cloth tape)		Soak top layer Then Low and slow
Strappal Fabric Strapping tape (ETT tape)		
<b>Hydrocolloids</b> Duoderm Extra Thin TOH Inventory number		Low and Super Slow
Neobar ET Holder		
<b>Polyurethane + Acrylates</b> Tegaderm		Stretch and Roll Slowly
Tegaderm HP		

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<p><b>Hydrogel</b> Electrodes</p>		<p>Moisten then Loosen</p>
<p><b>Silicone</b> 3M Micropore S (Blue tape)</p>		<p>Low and Slow</p>
<p>Mepilex Lite Foam Dressing</p>		
<p>Mepilex Border Flex Lite</p>		

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Removal Technique		How To:
Adhesives should be removed/stretched close to the skin level using < 120-degree angle		
Low and Super Slow	Low and Slow	<ul style="list-style-type: none"> <li>- 2 handed technique</li> <li>- Remove slowly</li> </ul>
Soak Top Layer- then Low and Slow		<ul style="list-style-type: none"> <li>- 2 handed technique</li> <li>- Soak top layer with Sterile Water</li> <li>- Remove Slowly</li> </ul>
Stretch and Roll Slowly		<ul style="list-style-type: none"> <li>- 2 handed technique</li> <li>- Stretch and roll dressing slowly to remove</li> </ul>
Moisten then Loosen		<ul style="list-style-type: none"> <li>- 2 handed technique</li> <li>- Moisten with Sterile Water</li> <li>- Loosen dressing and remove</li> </ul>

### Additional Notes:

After removal of adhesive, **clean area with sterile water and pat dry** prior to reapplication of an adhesive.

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**DO NOT USE** any alcohol-based products to remove adhesives.

Adhesive removers are not recommended in the preterm population.