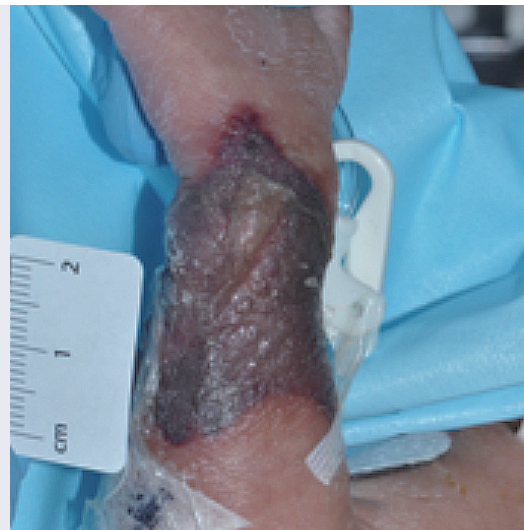


# Best Practice Statement

## Principles of wound management in paediatric patients

2014



Wound aetiology,  
assessment  
and diagnosis in  
paediatric patients

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Child- and young  
person-centred  
wound management

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Napkin-associated  
dermatitis prevention  
and management

**BEST PRACTICE STATEMENT:  
PRINCIPLES OF WOUND  
MANAGEMENT IN PAEDIATRIC  
PATIENTS**

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Extravasation wound on arm

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# Developing best practice for wound management in paediatric patients

There is a need for clear and concise guidance for UK clinicians as to how to deliver optimal care to paediatric patients with wounds. There are no existing UK guidelines in this area for healthcare professionals who work with paediatric patients.

Paediatric care is particularly challenging, as there is a lack of research available to guide practice; a lack of tools for standardising assessment, which can lead to inappropriate treatment choices; and a lack of product standardisation across formularies, along with a poor understanding of which of these products can be used in paediatric patients.

One method of supporting clinicians is through the development of a best practice statement (BPS). In developing this Wounds UK BPS, the relevant research has been reviewed, and expert opinion and clinical guidance have been sought. The key principles of best practice ensure increased clinician awareness, letting them exercise due care and process to promote delivery of the highest standards of care across all care settings, by all healthcare professionals.

BPSs are intended to guide practice and promote a consistent and cohesive approach to care. BPSs are primarily intended for use by registered nurses, midwives and the staff who support them, but can contribute to multidisciplinary working and guide other members of the healthcare team.

This document will draw from a wide range of informational sources to help standardise care of paediatric patients with wounds. Statements are derived from the best available evidence — including current literature, existing or previous initiatives at local or national levels, and expert opinion — at the time of development.

This is the first edition of *Best practice statement: Principles of wound management in paediatric patients*. It seeks to explain, in accessible and meaningful language, the rationale for application of wound care knowledge in paediatric patients with wounds. During the peer-review process, a panel of paediatric tissue viability nurses has convened, discussed and commented on drafts in order to produce a document that provides practical advice to support clinical decision-making.

This BPS seeks to provide clinicians with a best practice guide covering several areas of wound management in paediatric patients:

- Wound aetiology, assessment and diagnosis in paediatric patients (p2)
- Child- and young person-centred wound management (p5)
- Napkin-associated dermatitis prevention and management (p10)

**Angela Rodgers**  
Chair

## GUIDE TO USING THIS DOCUMENT

Each of the sections that follow offer advice about caring for the skin and wounds of paediatric patients. The best practice statements, their rationale, and how to demonstrate best practice for all sections have been compiled in the appendix on page 12.

## SECTION 1: WOUND AETIOLOGY, ASSESSMENT AND DIAGNOSIS IN PAEDIATRIC PATIENTS

Although a full-term baby's skin is structurally comparable to that of adults, it possesses only 60% of the epidermal and dermal thickness, and a much more fragile epidermal-to-dermal junction (Campbell and Banta-Wright, 2000). As children grow, their skin layers thicken, but paediatric patients generally have more vulnerable skin than adults. A number of other considerations (Box 1) mean that the approach to wound management in paediatric patients must differ from that in adults.

Regardless of age, wound healing follows the same physiological processes (Rodgers, 2010). Just as in adults, wounds in paediatric patients heal in three phases: the inflammatory phase (the body's normal response to injury), the proliferative phase (when the body structures regenerate and healing begins) and the maturation phase (when the scar tissue is formed) (RCHM, 2012). Special care must be taken to create the right environment for healing through all phases, regardless of the mechanism of wound healing (e.g. primary intention, secondary intention, skin graft/flap), while considering the physiological differences in neonatal and paediatric skin (Table 1, p3).

### Aetiology of paediatric wounds

The causes of wounds in infants and children may differ from those in adults. Acute wounds occur from trauma such as road traffic accidents, dog bites, lacerations, burns and scalds, or from surgical interventions.

Chronic wounds such as pressure ulcers are largely caused by medical device-related pressure, friction and shear; invasive lines/tubes (e.g. gastrostomy/tracheostomy tubes) can give rise to hypergranulation or skin excoriation (Butler, 2006). Other causes include purpura fulminans due to meningococcal sepsis, epidermolysis bullosa, myelomeningocele, ulcerated haemangioma and vascular anomalies (Rodgers, 2010; White and Butcher, 2006). For neonates and young infants, invasive lines can lead to extravasation or emboli-induced ischaemic injuries.

If a wound fails to progress towards healing according to the expected trajectory (depending on comorbidities), the wound may be considered a chronic wound, or there may be an underlying condition that needs to be diagnosed and treated. When this occurs, refer the patient to a specialist member of the multidisciplinary team in line with local guidelines.

### Wounds resulting from maltreatment

Keep in mind that not all wounds are a result of medical/clinical issues. Maltreatment of a child can result in wounds that present in a typical way (e.g. abrasion, bruise, laceration, burn/scald, bite). Skin signs of maltreatment are often accompanied by other physical injuries, as well as other signs of abuse (e.g. neglect, emotional abuse) (NICE, 2009).

A concise history must be obtained of how an injury/wound occurred. Suspicion should be raised if:

- Accounts of the mechanism of injury keep changing, differ, or are implausible or inconsistent with the injury
- The mechanism of injury is inconsistent with the child's age/developmental stage, normal activities and existing medical conditions
- Delay in seeking medical attention
- Lack of concern from parent/guardian
- Demeanour/behaviour of child causes concern (NICE, 2009).

Concerns about maltreatment must be documented accurately and reported immediately according to local child protection policies (NICE, 2009).

### Documentation

Accurate documentation is essential to safe and effective care, and integral to determining the patient-centred plan of care in paediatric patients with wounds. Documentation should be performed as per the Nursing and Midwifery Council and Royal College of Nursing Guidelines (NMC, 2009; RCN, 2012).

### Key points:

1. The approach to wound management in children must differ from that in adults
2. Record baseline data as part of a holistic assessment of both the patient and wound, and reassess and monitor treatment on a regular, ongoing basis
3. Consult a specialist member of the multidisciplinary team in line with local guidelines the event of suspected/confirmed infection or if the wound fails to heal
4. Ensure the special needs of paediatric patients and their parents/guardians are accommodated

### Box 1: Wound care considerations in paediatric patients (Patel and Tomic-Canic, 2014)

- Reduced ability to thermoregulate
- Increased body surface-to-weight ratio
- Increased transepidermal water loss
- Propensity towards epidermal stripping
- Immature immune, renal and hepatic systems, which increase risk of infection
- Limited mobility (e.g. in babies)
- Inability to verbally communicate
- Different ways of expressing pain

**Table 1: Key differences in neonatal and paediatric skin (IMAG, 2004; White and Butcher, 2006; Visscher et al, 2013)**

Neonatal skin	Factors affected	Considerations
<b>Stratum corneum</b> 2–3 cells thick (may be absent in very pre-term infants*), compared to ~20–30 cells in an adult	Reduced barrier functions leaving skin more prone to chemical absorption, bacterial colonisation and infection Transepidermal water loss is increased, affecting fluid balance	Avoid topical application of potentially toxic chemicals (e.g. iodine, alcohol) Good hand hygiene Consider fluid losses +/- nursing in humidity
<b>Fibrils</b> that connect dermis to epidermis are reduced in numbers and widely spaced	Prone to damage from skin stripping (especially during removal of adhesives) and shearing forces (e.g. from poor moving/handling techniques, nails, hand jewellery, equipment with surface contact)	Minimise use of adhesives Use sterile silicone adhesive removers Minimise handling Remove all hand/wrist jewellery, keep nails short
<b>Subcutaneous fat</b> may be reduced or even absent in very pre-term infants	Reduced energy stores, less 'shock absorption', temperature regulation poor	Increased calorific intake (as per dietician) Reposition as handling allows to prevent pressure ulcers Minimise occasions where cooling could occur (e.g. handling, bathing, excessive exposure)
Increased levels of <b>type III collagen</b>	Increased tensile strength and ability to repair damaged tissue faster and more effectively	Faster wound healing (dependent on other factors affecting wound healing)
Increased <b>sebaceous secretions</b> in newborn infants	Can lead to spots on face/nose	Reassure parents it is normal and will not last beyond a few weeks once hormone activity regulates postnatally

\*After birth, skin of a premature infant weighing >1000g will mature to that of a term baby within 2–4 weeks and 4–8 weeks if weighing <1000g (Atherton, 2010)

**Box 2: Factors that could delay wound healing\***  
Adapted from NHS QIS (2009) and Wounds UK Best Practice Statement (2013)

**Medications/treatments**

- Antibiotics
- Anticoagulants
- Chemotherapy
- Glucocorticoid steroids
- Inotropes

**Comorbid conditions**

- Anaemia
- Allergies/sensitivities
- Diabetes
- Immunocompromise
- Infection
- Incontinence
- Obesity
- Oedema
- Respiratory/circulatory disease
- Wound infection

**Contributing factors**

- Concordance
- Immobility
- Poor nutrition
- Social isolation
- Socioeconomic status

\*Not exhaustive

Written information about the dressing and treatment plan should be provided to parents/guardians in accessible language that lets them understand and participate to the extent needed. Patient education should be delivered at an age-appropriate level. For example, education of adolescents is ideally provided on a one-to-one basis with respect for their privacy (Baharestani, 2007).

**Assessment**

A thorough assessment begins with recording baseline data. If a photograph is taken, consent in line with local policy must be

obtained from the parent/guardian. Record any factors that could delay healing (Box 2), along with the results of wound assessment (Box 3, p4).

Management goals (e.g. moisture balance, debridement, reduction of microbial load) and the care plan of care should be set based on this assessment. Wounds should be reassessed (and re-documented) regularly and examined for signs of progress, delayed healing and infection. All wounds will have a degree of colonisation; if critical colonisation or infection is suspected, consider the use of ap-



appropriate antimicrobial wound management products and/or consult a relevant specialist member of the multidisciplinary team in line with local guidelines (NHS QIS, 2009). Review and revise the plan of care accordingly, based on the most recent assessment of the patient and wound. Document the clinical rationale for any changes in management.

When a patient has more than one wound, each one should be assessed separately and have a separate, documented plan of care (NHS QIS, 2009).

### Pain/anxiety assessment

Pain is whatever the child says it is and must be taken seriously by the clinician (McCaffrey and Beebe, 1989). Fear and anxiety can increase pain intensity, disability, emotional distress and the need for increased doses/use of medications (Vervoot et al, 2006). Therefore the clinician should not separate the two, and must manage them as a whole.

Commonly encountered pain in relation to wound care can typically be categorised as acute rather than chronic. Acute pain may be associated with the wound itself or occur during wound management procedures (e.g. cleansing, dressing change). Chronic pain in children tends to present as abdominal pain, limb pain or headache (Reaney and Trower, 2010). It occurs persistently or recurrently (at least three times over the course of 3 months) and is not usually associated with minor injury (Schechter, 2006). However, chronic pain

can occur due to hypertrophic/keloid scar tissue or contractures caused by tight scars. Paediatric patients tend to report ‘pain all over’, so it is critical that pain be adequately assessed to rule out systemic causes, but not to the extent it increases anxiety.

Assessment should involve explaining, to the child’s level of understanding, the distinction between hurt and harm (Schechter, 2006). It is also helpful to ask the child to use one finger to point to where the pain originates. Pain should be assessed on an ongoing basis, throughout wound management: ideally, before, during and after a procedure (e.g. dressing removal, cleansing, dressing application) (WUWHHS, 2004).

Pain assessment scales (Table 2) can be used as a guide in conjunction with ongoing holistic assessment of the child, his/her behaviour and the family (Baulch, 2010). This assessment must take into account the cause(s) of the pain (physical and psychological), whether it is acute, chronic or acute on chronic, where it is coming from, how intense it is and what makes it better/worse (APAGBI, 2012).

In a sedated or unconscious infant/child, monitoring of vital signs may be useful to detect pain. Children with limited cognitive or physical function may have a typical expressor of pain such as a facial twitch; it is important to listen to the parent/carer, who knows the child best, as this can help identify these indicators (Baulch, 2010).

**Table 2: Recommended pain assessment scales according to age (APAGBI, 2012)**

Child’s age (with normal or assumed normal cognitive development)	Measure
Newborn–3 years old Intensive-care setting Sedated/unconscious patient	COMFORT Scale or Face, Legs, Activity, Cry, Consolability (FLACC) Scale
4 years old	Faces Pain Scale-Revised (FPS-R), COMFORT or FLACC
5–7 years old	FPS-R
7 years old+	Visual Analogue Scale (VAS), NRS, FPS-R

### Box 3: Wound assessment

#### Pain and anxiety

- Pain and anxiety levels
- Analgesia requirements (e.g. regular/ongoing, at dressing change)

#### Wound dimensions

- Length, width, depth
- Tracking/undermining
- Photograph

#### Tissue type (specify percentages)

- Necrotic
- Sloughy
- Granulating
- Epithelialising
- Hypergranulating
- Haematoma
- Exposed bone/tendon
- Presence of foreign body

#### Exudate

- Levels (e.g. low, moderate, high)
- Consistency (e.g. serous, haemoserous, purulent)

#### Periwound skin

- Dry/scaling
- Erythema
- Excoriation
- Fragile
- Maceration
- Oedema
- Healthy/intact

#### Potential signs of infection

- Heat
- Wound bed deterioration (e.g. new slough or necrosis)
- Pain (e.g. increased intensity, new triggers)
- Increasing exudate
- Increasing odour
- Friable granulation tissue

Adapted from NHS QIS (2009) and Wounds UK Best Practice Statement (2013)

## SECTION 2: CHILD- AND YOUNG PERSON-CENTRED WOUND MANAGEMENT

The key goals of holistic wound management in children are to alleviate/minimise pain, lessen emotional distress and minimise scarring (Box 1). Care of the paediatric patient with a wound should be holistic and child-centred. The treatment plan should consider the whole child, not simply the wound being treated, and be concerned with the overall experience of the child and family. Children, young people and parents should be viewed as partners in care, to shape and plan treatment, with services coordinated around the child's and family's particular needs (Young, 2006). An age-appropriate approach to care is also essential; for example, children and adolescents can be encouraged to self-report pain (Wounds UK Expert Working Group, 2013).

This section will cover the principles of four key areas of child-centred wound management in paediatric patients:

- Analgesia/pain management
- Epidermal blistering and stripping
- Wound cleansing and debridement
- Dressing selection.

### Analgesia/pain management

Decisions regarding the type of analgesia to be used must be carried out by a suitably qualified healthcare practitioner before prescription and administration (Table 1, p6). Doses must be carefully calculated, usually based on the patient's weight. The time from administration to effect depends on the type of drug, route of administration and the patient's ability to metabolise the drug; therefore, it must be administered and given enough time to take effect before commencing the procedure. Relevant monitoring must be used with some analgesics (e.g. nitrous oxide or opiates) per local guidelines (APAGBI, 2012).

Anxiety can increase the perception and intensity of pain. As such, nonpharmacological methods of pain management should also be employed (Box 2, p6). The bedside is considered a 'safe space' for the child, so dressing

change should be carried out in a treatment room (if possible), to allow psychological separation from the safe space. By the same token, mealtimes should not be interrupted. Parents/guardians should be present during dressing change, and cradle the child if possible, to reduce pain levels by alleviating anxiety (Reaney and Trower, 2010). Other interventions include distraction, play therapy, hypnosis, breast-feeding (neonate/infant) and use of familiar comforter/toy.

### Epidermal blistering and stripping

Epidermal skin is loosely bound to the dermis in infants, making them susceptible to blisters and epidermal tears. When there is increased friction and/or tension at the interface between the skin and the wound dressing (e.g. due to use of adhesives), shear forces loosen the connections between the epidermis and dermis, leading to separation of the skin layers and resulting in skin blistering (where fluid seeps between the layers) or stripping (where the epidermis is removed) (Johansson et al, 2012) (Figure 1, p6).

The presence of wound exudate, even at normal healing levels, can exacerbate the risk of skin blistering and stripping as moisture increases friction forces and softens the skin which, in turn, weakens the outer layers (Johansson et al, 2012). Paediatric patients in general have immature and more fragile skin than adults, which also puts them at risk (Box 3, p7).

Epidermal blistering and stripping in patients with wounds tends to occur secondary to the use of adhesive dressings and adhesive tape used to secure tubes and lines. Blistering and stripping are the primary causes of skin breakdown in neonatal intensive care units (Lund et al, 2001).

Epidermal stripping can be avoided by carrying out good skin hygiene, using silicone tapes and non-adhesive dressings where possible, and properly and gently applying adhesive tapes and dressings and remov-

### Key points:

1. Prevent and manage pain and anxiety in paediatric patients
2. Prevent epidermal blistering and stripping
3. Cleanse only after thoroughly assessing the patient and wound
4. Adapt dressing selection to the special needs of paediatric patients with wounds

### Box 1: Aims of wound care (Rodgers, 2010; Bale and Jones, 2006)

The main objectives when caring for a wound are to restore the function of injured tissue and do no harm. Treatment should:

- Minimise pain and trauma
- Minimise scarring
- Lessen emotional distress, and promote dignity, comfort and wellbeing
- Create the optimum environment for the healing process to take place
- Promote a moist wound healing environment
- Prevent temperature fluctuations
- Remove devitalised tissue and excess exudate
- Prevent/treat infection
- Restore skin barrier function
- Ensure cost-effectiveness

**Table 1: Commonly used analgesics\***

Simple oral analgesics (e.g. paracetamol and ibuprofen)	Very effective for procedural pain, especially when given together. The analgesic dose of paracetamol is higher than the anti-pyretic one. (Ibuprofen not suitable for patients <6 months or for whom NSAIDs are contraindicated)
Opiates	Very effective, quick-acting analgesics for more severe pain, with morphine being the most widely used in children. Can be administered orally, transmucosally, nasally and intravenously. Intravenous morphine doses can be titrated during long procedures to allow for continual effect
Nitrous oxide	Provides rapid-onset and -recovery analgesic effects for procedural pain. Tends to be used (per local guidelines) in patients older than 5–6 years with ‘normal’ cognitive and physical function due to need for self-administration. Repeated dosage can lead to bone marrow toxicity; appropriately monitor patients
Sucrose	Provides an effective analgesic effect in neonates. Can be administered directly into the mouth or by applying solution to a dummy. Very small amounts are recommended. Can be repeated during long procedures
General anaesthetic	May be required for some patients undergoing extremely painful or complex procedures (e.g. perianal wound management, wound debridement, burn and scald assessment and management)

\*Based on APAGBI, 2012; Kanagasundaram, 2001; Reaney and Trower, 2010; Rogers et al, 2006; Taddio et al, 2008)

ing them with a sterile silicone adhesive remover when they are used (Butler, 2006) (Box 4, p9).

**Wound cleansing and debridement**

Wound cleansing is the process of using fluid/gel to remove loose wound debris and remnants of dressings (NATVNS, 2012). Although not all wounds need to be cleansed, it is important because it can help manage the microbial load, allow better visualisation of wound tissue and help prepare the wound bed for further management and application of dressings.

The decision to proceed with wound cleansing — and which solution to use — should be based on a holistic assessment of both the patient and the wound (Figure 2, p7). Keep in mind that some dressings have wound-cleansing properties or may be contraindicated with certain cleansing solutions; check manufacturer instructions before initiating cleansing.

When cleansing a wound, adhere to the principles of standard infection control precautions. To avoid damage to the wound bed and periwound skin, do not undertake



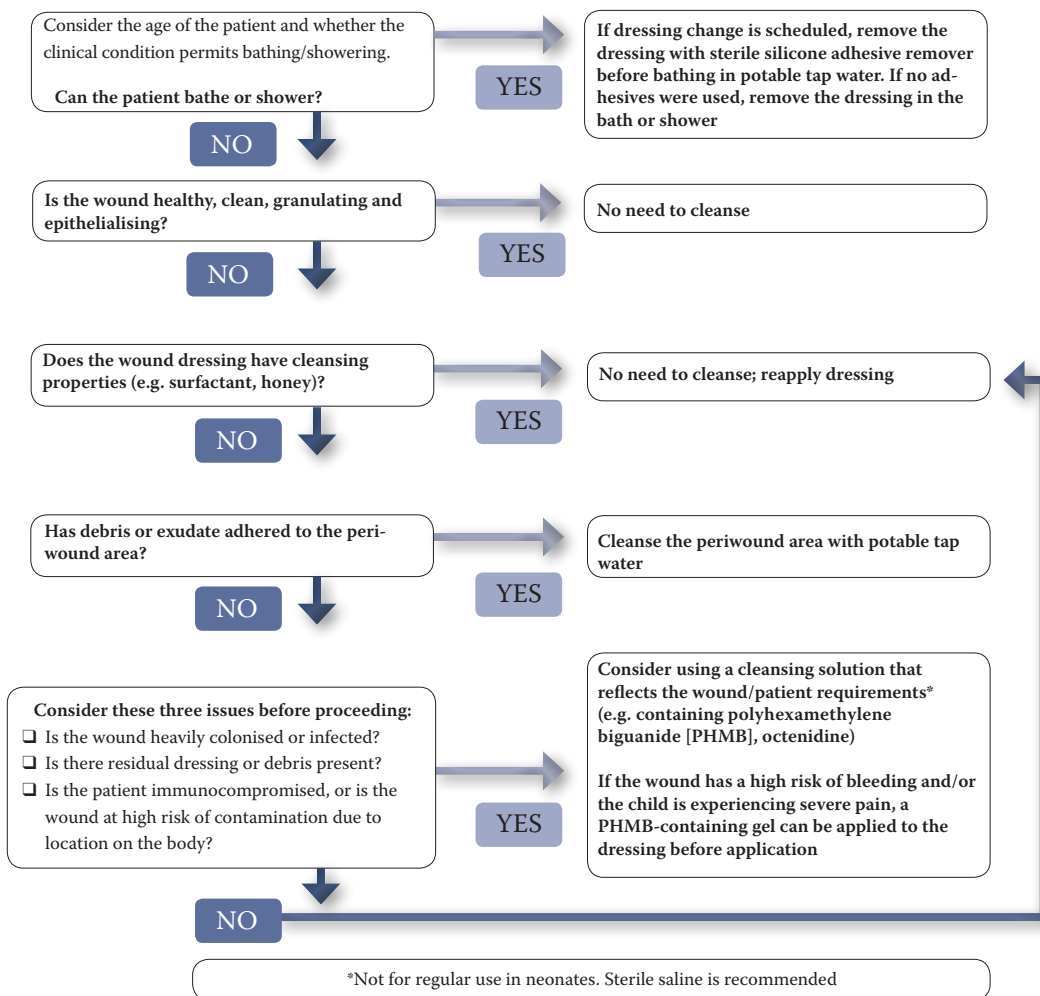
**Figure 1: Epidermal stripping**

**Box 2: Supplementary approaches to pain management**

- Allow appropriate time and preparation, pre-arranging time for care with parents/guardians when possible
- Address anxiety as well as pain, and ensure adequate pain relief is given in addition to any routine analgesia
- Allow the child an age- and status-appropriate degree of control and participation
- Employ play therapy involvement/distraction
- Use of a familiar comforter/toy
- Hypnosis
- Breast-feeding (neonate/ infant)
- Involve the parent/ guardian in care
- Remember that care in taking the dressing off is as important as in putting it on
- Safeguard the patient to make sure they are safe and secure during wound assessment and treatment
- Keep the patient warm
- Use a calm, quiet environment



Figure 2: Paediatric wound cleansing flowchart



Box 3: Causes of/risk factors for skin blistering and stripping (Ousey et al, 2011; Koval et al, 2007)

- Movement at the wound site
- Choice of dressing
- Adhesive tape/dressing use
- Poor adhesive-removal technique
- Size of wound (larger wounds)
- Anatomical location (e.g. near a bony prominence)
- Medications (e.g. corticosteroids)
- Comorbidities (e.g. eczema)
- Excessive oedema

cleansing using a high-pressure method (e.g. irrigation, showering). For patient comfort and to aid wound healing, cleansing solutions should be at body temperature (NATVNS, 2012).

Wound cleansing may be contraindicated in neonates and unstable paediatric patients because of the risk of core-temperature fluctuation. Cleansing should also be avoided in wounds with a high risk of bleeding (e.g. ulcerated haemangioma); in these cases, a polyhexamethylene biguanide gel can be applied directly to the dressing, to aid cleansing in these fragile wounds, but may not be required for dressings containing wound-cleansing properties.

For babies, toddlers or children with restricted mobility, bathing may be required to facilitate dressing removal and wound cleansing, and to minimise pain and trauma. In these cases, saline should be used. If plain tap water is to be used, the tap should be allowed to run for 5 minutes (to discharge the microbial load in the plumbing system) before filling the bathtub. Be sure to be especially conscious of privacy and dignity issues in older children and adolescents when proceeding with bathing (Baharestani, 2007).

Debridement may be safely carried out in a wide range of paediatric wounds to help prepare the wound bed, promote

**Table 2: Wound products commonly used in paediatric patients**

Type	Actions	Indications/use	Precautions/contraindications
Alginates/CMC	Absorb fluid Promote autolytic debridement Moisture control Conformability to wound bed	Moderately to highly exuding wounds Special cavity presentations in the form of rope or ribbon Combined presentation with silver for antimicrobial activity	Do not use on dry/necrotic wounds Use with caution on friable tissue (may cause bleeding) Do not pack cavity wounds tightly
Foams	Absorb fluid Moisture control Conformability to wound bed	Moderately to highly exuding wounds Special cavity presentations in the form of strips or ribbon Low adherent versions available for patients with fragile skin Combined presentation with silver or PHMB for antimicrobial activity	Do not use on dry/necrotic wounds or those with minimal exudate
Honey	Rehydrate wound bed Promote autolytic debridement Antimicrobial action	Sloughy, low to moderately exuding wounds Critically colonised wounds or clinical signs of infection	May cause 'drawing' pain (osmotic effect) Known sensitivity
Hydrocolloids	Absorb fluid Promote autolytic debridement	Clean, granulating/epithelialising, low- to moderate-exuding wounds Thicker versions can be used to debride sloughy/necrotic wounds	Do not use on highly exuding wounds May encourage overgranulation May cause maceration
Hydrogels	Rehydrate wound bed Moisture control Promote autolytic debridement Cooling	Dry/low to moderately exuding wounds	Do not use on highly exuding wounds or where anaerobic infection is suspected May cause maceration
Iodine	Antimicrobial action	Critically colonised wounds or clinical signs of infection Low to moderately exuding wounds	Use under specialist supervision only Do not use on dry necrotic tissue Known sensitivity to iodine Do not use on children <6 months
Low-adherent wound contact layer (e.g. lipido-colloid, silicone)	Protect new tissue growth Atraumatic to periwound skin Conformable to body contours	Low to highly exuding wounds Can be used as a carrier for topical preparations (e.g. honey)	May dry out if left in place for too long Known sensitivity to silicone
Non-alcohol-based barrier film	Prevent epidermal stripping of periwound skin secondary to adhesive removal Protect against skin erosion from wound exudate or other moisture	Skin at risk of epidermal stripping Wounds with high levels of exudate or exposure to other moisture (e.g. moisture- or napkin-associated dermatitis) Sensitive periwound skin	Known sensitivity to silicone (if a silicone-based product)
Activated charcoal	Odour absorption	Malodorous wounds Combine presentation with silver for antimicrobial activity	Do not use on dry wounds
Polyhexa-methylene biguanide (PHMB)	Antimicrobial action	Low to highly exuding wounds (depending on dressing presentation) Critically colonised wounds or clinical signs of infection May require secondary dressing	Known sensitivity to PHMB
Silver	Antimicrobial action	Critically colonised wounds or clinical signs of infection Low to highly exuding wounds (depending on dressing presentation)	Use under specialist supervision only Some may cause discolouration Known sensitivity to silver Prolonged use (e.g. longer than 2–4 weeks)
Polyurethane film	Moisture control Breathable bacterial barrier Transparent (allow wound visualisation)	Primary dressing over superficial low exuding wounds Secondary dressing over honey or hydrogel for rehydration of wound bed	Do not use on patients with fragile/compromised periwound skin Do not use on moderately to highly exuding wounds

structural restoration and regeneration of damaged tissue, remove necrotic tissue, and reduce the bacterial load and factors that result in a wound's becoming stuck in the inflammatory stage of healing (Patel and Tomic-Canic, 2014). Autolytic debridement is the method typically used in paediatric patients, along with conservative sharp, surgical and biosurgical (larval) debridement (Durante, 2014).

When choosing a method of debridement, clinicians should consider the patient's age, size of the wound, type of wound, location of the wound, selectivity of the method, the pain management that will be required and the length of the procedure, as well as the clinician's level of competence with debridement methods (Patel and Tomic-Canic, 2014; Durante, 2014).

For example, surgical debridement is suited to patients with larger wounds (e.g. burns) who are not contraindicated for general anaesthesia (McCord, 2006). Autolytic debridement is a good choice for small wounds where the patient is not immunocompromised or does not have other risk factors for developing a chronic wound (McCord, 2006; Quigley and Curley, 1996). First-hand experience has found that autolytic debridement is ideal for paediatric and neonatal wounds as, quite often, the area of demarcation between viable and non-viable tissue exceeds expectation.

### Dressing selection

Historically, dressing products are developed and indications determined based on

adult research studies (McCord and Levy, 2006). As a result, the practitioner usually must adapt the products available for use in children to reduce risk of surrounding skin damage by avoiding covering more body surface than necessary. In addition, clinicians need to ensure that the dressing products selected have been shown to be safe and effective for the intended indication and population (Baharestani, 2007) (Table 2, p8).

The dressing chosen should optimise the environment for moist wound healing to take place; prevent infection; minimise pain and trauma; prevent cooling; and be cost-effective (Box 5). Dressing selection in paediatric patients should be based on the wound-healing phase, wound location, amount of exudate, tissue type, age of the child and signs of wound colonisation (McCord and Levy, 2006).

All open wounds are contaminated with microbes; however, the presence of non-multiplying microorganisms is not of clinical concern. If a wound shows signs of local infection, manage as per local protocol. If the wound becomes infected, consult with a specialist member of the multidisciplinary team in line with local guidelines.

In general, prophylactic use of antimicrobials is strongly discouraged (Wounds UK Best Practice Statement, 2013). Refer to local guidelines regarding the management of burns and scalds, as antimicrobials may be recommended to prevent complications such as Toxic Shock Syndrome.

#### Box 4: Interventions to prevent epidermal blistering and stripping

- Alcohol-free liquid skin barrier film on the skin under adhesive dressings in neonates >30 days old
- Clear film dressings to secure intravenous sites
- Pad splints and padded hook-and-loop-closure straps over splints rather than tape
- Soft silicone or lipidocolloid dressings to treat areas of denudation secured with tubular latex-free stretchy gauze netting
- Adhesive dressing/tape removal with a sterile silicone adhesive remover, which renders removal of an adhesive dressing atraumatic

#### Box 5: Special considerations in paediatric dressing selection

##### Size

- Many dressings come in suitable sizes for adults
- Many can be cut to size; ensure that cutting the dressing does not reduce effectiveness of the product or deposit debris in the wound

##### Irritants

- Paediatric skin may be more sensitive to product ingredients
- Care should be taken to identify irritants (e.g. fragrance, alcohol, iodine and lanolin)
- Alcohol-based adhesive removers, chlorhexidine and povidone-iodine may cause chemical burns and should be avoided, particularly in patients younger than 6 months
- Use alcohol-free adhesive removers and barrier films

## SECTION 3: NAPKIN-ASSOCIATED DERMATITIS PREVENTION AND MANAGEMENT

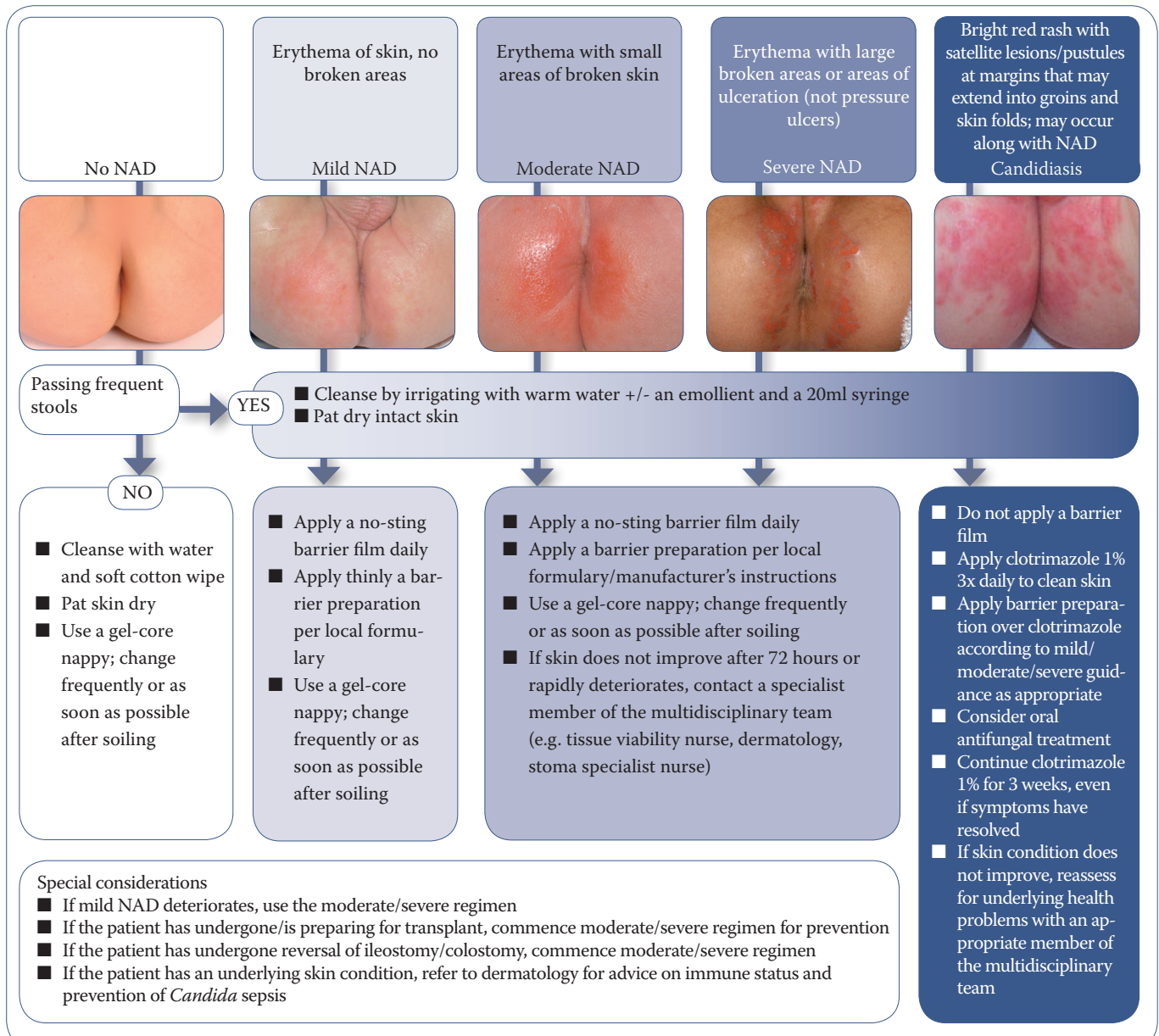
Napkin-associated dermatitis (NAD), or nappy rash, generally describes inflammatory changes to the skin due to exposure to moisture or colonisation with *Candida albicans*, often under a nappy or incontinence pad (NICE, 2013). NAD is one of the most common skin complaints in infants (Longhi et al 1992). This type of skin breakdown can occur in patients who are continent or who are

not wearing a napkin/absorbent pad; therefore, older children can be at risk and should be treated in an age-appropriate manner (Baharestani, 2007). If NAD is not managed appropriately, it can lead to pain and anxiety for the patient and parents/guardians. Clinicians must know how to prevent and manage skin breakdown in this area, according to the severity of the damage (Figure 1).

**Key point:**

1. Clinicians must know how to prevent napkin-associated dermatitis (informally known as nappy rash) and how to best manage it if skin does break down, depending on the severity of the damage

Figure 1: Guidelines for prevention and care of napkin-associated dermatitis (NAD)





### Causes and risk factors

The interaction of urine and faeces under a nappy increases ammonia production, which raises skin pH in the area. The higher skin pH reduces skin's barrier function, leaving it more susceptible to damage from the proteolytic and lipolytic enzymes present in faeces. Repeated or prolonged exposure to these irritants, combined with increased hydration, maceration and friction to the skin under the nappy will likely result in NAD (Stamatas et al, 2011; Rowe et al, 2008; Buckingham and Berg 1986). The occurrence and severity can be influenced by age of the child, volume, consistency and frequency of stooling, diet, medication, underlying disease, existing skin conditions and poor hygiene (Dorko et al, 2003; Longhi et al 1992) (Box 1).

### Caring for NAD

Parents and carers must be educated on how to clean the skin and apply barrier preparations (Wondergem, 2010; Gupta and Skinner, 2004). They should be discouraged from bringing in and applying their own preparations if NAD is present. However, if the preparation is not causing damage or preventing skin from healing, the regimen may be continued. Document the preparation being used to ensure there are no contraindications with other aspects of the care plan, which should follow good practice.

### Barrier preparations

Barrier preparations are used to prevent faeces coming into contact with the skin, reduce humidity and maceration, and minimise transepidermal water loss (Ratliff and Dixon, 2007; Wolf et al, 2000). A no-sting occlusive barrier spray, film, cream or ointment should be applied according to manufacturer instructions in line with the local formulary. For patients at higher risk or those with moderate to severe NAD, a paste containing a water-impermeable substance should be used, to better protect the underlying skin from moisture (Heimall et al, 2012; Neild and Kamat, 2007). Barrier preparations should not contain perfumes and have a low paraben content.

### Nappies and incontinence pads

Although a Cochrane review concluded there was insufficient evidence to support or refute the use of disposable nappies for preventing NAD, many researchers agree that their superabsorbent properties, in combination with frequent nappy changes, are helpful for preventing and managing NAD (Baer et al, 2006; Neild and Kamat, 2007; Heimall et al, 2012; Atherton, 2005; Gupta and Skinner, 2004).

Disposable nappies contain cellulose pulp and superabsorbent polymers that lock moisture away from the skin, keeping skin dry and clean and maintaining optimal pH. The fasteners, back sheets and stretch ability help reduce leakage. Disposable nappies also are non-toxic and biologically inert, and do not contain allergens (e.g. natural rubber latex, disperse dyes) (Oakley, 2014). In addition, they are available in different shapes and sizes, depending on age and gender of the child.

In a hospital setting, reusable nappies are not recommended (Oakley, 2014; Baer et al, 2006; Neild and Kamat, 2007; Heimall et al, 2012; Atherton 2005; Gupta and Skinner, 2004). It is also suggested they can contribute to NAD, in particular, papulo-nodular NAD (Maruani et al, 2013).

### Special considerations

Commence a moderate to severe regimen if the patient is:

- Passing frequent loose/watery stools
- Receiving chemotherapy
- Has undergone/is preparing for transplant of any kind
- Is immunosuppressed
- Has undergone reversal of ileostomy/colostomy.

Whenever possible, manage the cause of loose stools (e.g. alter diet, refer to dietician for assessment if required, limit/change antibiotics). If the patient has an underlying skin condition, refer to dermatology.

#### Box 1: Some risk factors for development of NAD

- Antibiotic therapy
- Chemotherapy
- Immunosuppression
- Diarrhoea (persistent)
- Reversal of stoma
- Short gut syndrome
- Underlying skin conditions (e.g. psoriasis, eczema, epidermolysis bullosa)
- Zinc deficiency

#### Box 2: Practical tips for managing NAD

##### Good practice:

- Whenever possible bathe or shower the child once or twice daily, especially in moderate to severe cases (Atherton, 2001)
- Use of emollients to cleanse and further protect the skin (Blume-Peytavi et al, 2009)
- Encourage consistency in care between staff and parents/carers
- Always change a nappy as soon after soiling as possible
- Use disposable gel-core nappies
- At home, reusable nappies can be used but are not advised in cases of moderate to severe/recurrent NAD

##### Things to avoid:

- Baby wipes of any kind for neonates (Ratliff and Dixon, 2007)
- Strongly perfumed soaps, moisturisers and wipes (Sarkar et al, 2010)
- Re-usable nappies
- Stopping/changing a regimen before 48 hours unless skin condition is deteriorating



# APPENDIX 1: BPS APPLICATION TO PRACTICE: PRINCIPLES FOR THE CARE AND TREATMENT OF PAEDIATRIC WOUNDS

Best practice statement	Reason for best practice statement	How to demonstrate best practice
The approach to wound management in children must differ from that in adults	The causes of wounds in children may differ from those in adults, and there are important differences in the physiology and skin of children	Create a guide for wound management in paediatric patients that accounts for the physiologic and aetiologic differences
Record baseline data as part of a holistic assessment of both the patient and wound, and reassess and monitor treatment on a regular, ongoing basis	To create a historical record that will guide treatment decisions and provide clinical rationale for changes in the plan of care. To ensure the patient is concordant with treatment and the wound is responding to treatment	Clearly document the assessment and reassessment processes, including factors that could delay healing, tissue and wound characteristics, whether the wound is progressing towards healing and whether a change in treatment is required
Consult a specialist member of the multi-disciplinary team in line with local guidelines the event of suspected/confirmed infection or if the wound fails to heal	To confirm infection status and to prevent inappropriate product or medication use, and to determine why the wound has failed to progress towards healing	Clearly document the rationale, date and team member to whom the patient was referred
All reasonable steps should be taken to prevent and manage pain and anxiety in paediatric patients	Pain is whatever the child says it is, and needs to be taken seriously. Anxiety can increase the perception of pain, which can have negative psychological effects on the child and the child's reaction to treatment	Assess pain using an age-appropriate scale. Select analgesia and dosage in consultation with a suitably qualified healthcare professional. Employ non-pharmacologic pain/anxiety management
Prevent epidermal blistering/stripping by carrying out good skin hygiene (including alcohol-free liquid skin barrier under adhesive dressings), using silicone tapes and non-adhesive dressings where possible, and removing adhesive tapes and dressings using a sterile silicone adhesive remover	Paediatric patients have immature and more fragile skin than adults, which puts them at risk. Epidermal stripping and blistering are a preventable complication that can cause pain and anxiety related to wound management	Enact a plan for skin hygiene, and dressing and tape application and removal that incorporates best practices
Cleanse only after thorough assessment of patient and wound	To ensure wound cleansing is carried out only when appropriate, using the appropriate method	Clearly document the assessment and cleansing process using a clinical decision-making pathway such as that in Section 2, Figure 1 (p7)
Adapt dressing selection and use to the needs of paediatric patients with wounds. Dressings may have to be adapted to reduce risk of surrounding skin damage by avoiding covering more body surface than necessary	Some dressing types are contraindicated or should be used with precaution in children, infants and neonates. Dressings may not be available in sizes small enough for paediatric patient	Enact a guide for dressing selection that incorporates the special physiological needs of paediatric patients while addressing factors associated with the wound type and clinical indications, such as in Section 2, Table 2 (p8)
Clinicians must know how to prevent napkin-associated dermatitis and how to best manage it if skin does break down, depending on the severity of the damage	Napkin skin care in paediatric patients can pose many challenges for healthcare providers and parents/guardians and, if not managed appropriately, can increase infection risk and lead to pain and anxiety for the patient and parents/guardians	Enact a protocol that incorporates assessment of skin status, prevention efforts and treatment with appropriate barrier preparations using a clinical decision-making pathway such as that in Section 3, Figure 1 (p10)
Ensure the special needs of paediatric patients and their parents/guardians are accommodated	Paediatric patients have special psychosocial needs, and their parents/guardians may react differently to the child's care than they would their own	Consider the whole child, not simply the wound being treated, as well as the experience of the child and family when integrating and coordinating services

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