



Update on Newborn Bathing



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ABSTRACT

The skin, along with other organ systems, makes rapid changes as the newborn moves from an intrauterine aquatic environment to an extrauterine atmospheric environment. Some of these changes include the development of an acid mantle and an increase in skin hydration.

While skin care and bathing practices have traditionally been based on the patient's culture, regional customs and anecdotal experience, recent evidence-based recommendations have been made and will be presented in this article (AWHONN, 2013). Hopefully, with further research and the incorporation of evidence-based recommendations into skin care of the infant, we will see improved skin health and a decrease in skin disease in infancy and childhood.

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The skin, along with other organ systems, must change rapidly as the newborn moves from an intrauterine aquatic environment to an extrauterine atmospheric environment. These changes are dramatic immediately after birth, but the maturation of infants' skin structures & functions continues during the first months and year of life. Some of these changes to the skin include the development of an acidic surface, an increase in skin hydration, an increase in stratum corneum thickness and a mature functioning of the sebaceous and sweat glands.¹ Most important is the development of the skin barrier function. This is a combination of skin surface pH, transepidermal water loss (TEWL), skin hydration and other biophysical properties, which are associated with the skin's protective functions. It is during this period of physiologic transition that the first bath is given.

Special Consideration

The skin functions as a protective barrier against harmful pathogenic organisms and toxins, provides thermal regulation and maintains internal fluid balance. At birth, an infant's skin pH is greater than 6.0 but it falls to approximately 4.95 within several days (96 h) of birth.^{2,3} A pH less than 5.0 is credited with bacteriocidal properties and serves in defense against microorganisms.

An acidic pH contributes to stratum corneum immune function by inhibiting colonization of pathogens. A rise in skin pH from acidic to neutral causes an increase in the total number of bacteria and a shift in the species present.⁴ Increased pH may reduce stratum corneum integrity and may increase its susceptibility to mechanical damage. Some evidence suggests that changes in pH are associated with the prevention and pathogenesis of skin diseases such as atopic dermatitis, irritant contact dermatitis and wound healing.⁵

Premature infants bathed every two to four days had no difference in skin flora or colony counts.⁶ Another study of premature infants showed that bathing with cleansers or water reduced colonization for only a brief time.⁷

In addition to hygiene, the initial bath of the baby also removes blood and body fluids which could contaminate health care workers or others in contact with the baby. Until newborns are bathed, universal precautions, including use of gloves by health care workers, are required.

While skin care and bathing practices have traditionally been based on the patient's culture, regional customs and anecdotal experience; more recent evidence-based recommendations have been made and will be presented in this article.⁸ Recommendations will include the timing of the first bath, routine bathing frequency, tub versus immersion bathing and considerations for selection of a cleansing agent.

Vernix, unique to humans, is a cheesy white protective covering of the newborn skin in utero. It develops in a cephalocaudal manner beginning at the end of the 2nd trimester with the thickest coating noted between 36 and 38 weeks.⁹ Vernix detaches from the skin as the levels of pulmonary surfactant rise, resulting in a progressive increase in the turbidity of the amniotic fluid.¹⁰ Surface distribution depends on gestational age, type of birth, birthweight, race, gender, and the presence of meconium.¹¹ It is composed of 10% protein, 10% lipids and 80% water.¹² Due to the hydrophobic lipid matrix, it has a surface tension similar to petrolatum without being occlusive. Vernix protects the fetus from the maceration of the amniotic fluid and allows the fetus to move freely in utero without chafing. Additionally, vernix serves a variety of important roles including: protection from infection, decreased skin permeability, pH development, skin cleansing & moisturizing, and wound healing.^{11,13,14}

Antimicrobial peptides in vernix may control skin colonization by commensal flora and free amino acids in vernix may act as a trophic factor for the developing gut. The retention of vernix on newborn skin has been shown to assist with the development of the acid mantle, even

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after bathing with a mild cleanser as long as the vernix was not mechanically removed.^{11,14} The World Health Organization¹⁵ and the Neonatal Skin Care Evidence-Based Clinical Practice Guideline⁸ recommend leaving residual vernix caseosa intact on the skin and allowing it to wear off with normal care and handling.

First Bath

The goal of the first bath should be to remove unwanted soil such as blood and meconium and to leave residual vernix intact. Bathing in the immediate postbirth period carries risks of hypothermia, respiratory compromise and increased oxygen consumption. Therefore, the first bath shouldn't be given until the infant's vital signs and temperature have stabilized.¹⁶ However, many hospitals give the baby their first bath based on their unit work flow which usually addresses the potential for transmitting blood-borne pathogens. Considerations for the timing of the first bath should also include the stability of the newborn as well as the impact on skin-to-skin time, breastfeeding initiation and early family interaction.¹⁷

In one randomized control trial of 100 infants, babies were assigned a bath at four hours of age or at one hour of age. No temperature differences were found before or after the bath or at one or two hours later.¹⁶ Another study investigated the effect of a bath at two hours versus one hour of age in 80 healthy term infants. Axillary temperatures at 10, 20, and 60 min after the bath did not differ between the two groups.¹⁸

Bathing has also been shown to destabilize temperature and vital signs in premature infants.¹⁹

The AWHONN Neonatal Skin Care Guideline⁸ recommends that the first bath be given between 2 and 4 h of age, after the vital signs and temperature are stable. The World Health Organization (WHO) recommends delaying the first bath until 6 h of age. This allows time for the infant to transition to extrauterine life with emphasis on maternal-infant bonding and early breastfeeding.

Bathing with antiseptic cleansers for the first or subsequent baths is not currently recommended by the American Academy of Pediatrics & American College of Obstetrics and Gynecology²⁰ or the Centers for Disease Control and Prevention.²¹ While chlorhexidine has been shown to reduce colonization for up to 4 h, there are concerns regarding its potential absorption. While toxicity from absorption has not been documented, most nurseries do not routinely use chlorhexidine for bathing. Daily chlorhexidine gluconate bathing in critical care units has become common practice. It has been shown to decrease infection in pediatric intensive care unit patients more than 2 months of age.²² This practice has not been studied in NICU patients, as there is potential for toxicity with repeated full body exposure to chlorhexidine on a daily basis. Bathing full term neonates with chlorhexidine gluconate reduces skin colonization with microorganisms in some areas, such as the axilla, but not in the groin.²³ In premature infants, bathing with chlorhexidine gluconate reduced skin colonization only transiently.²⁴ Concerns have also been raised about the potentially negative effect it may have on normal skin colonization.

Thermoregulation is a primary consideration in the timing and location of the first bath. Bathing may be performed at the bedside or in the nursery without compromising thermal stability when the room is warm (80 °F) and free of drafts.²⁵ A full term newborn with a temperature of more than 36.8 can be bathed almost immediately after birth without compromising thermal stability if these environmental controls are in place.^{26,27}

Several methods of providing a newborn's first bath are practiced in hospital settings. These practices include sponge bathing, small tub bathing, immersion tub bathing, and swaddled tub bathing. In sponge bathing, the infant has one part of the body exposed at a time for washing with a cloth from a basin of water. Increased heat loss leading to cold stress, along with crying and agitation can occur.²⁸ Behavioral distress cues, decreased oxygen saturation and increased heart rate have been seen during sponge bathing of preterm infants. Therefore, routine

sponge bathing is not recommended for ill premature infants.¹⁹ Small tub bathing is done at many hospitals since basins are provided for each patient. Most infants are too large to fit adequately in these basins and their entire upper bodies are exposed to air putting them at risk of cold stress. Tub immersion bathing places the entire infant's body, except the head and neck, into warm water (approximately 100.4 °F). Being immersed in water deep enough to cover the shoulders appears more comfortable for the baby than sponge or cloth bathing.^{27,29} Covering the body with warm water ensures an even temperature distribution and decreases evaporative heat loss. Keep the duration of the bath as short as possible; some clinicians suggest 5 min to prevent cold stress and limit exposure to soap.²⁶

If clinically possible, immersion bathing appears superior from a developmental perspective, too.³⁰ Infants immersed in a tub showed a reduction in crying and inducement of a calm quiet state.^{27,29} One study of immersion versus sponge bathing in 102 newborns, for their first and subsequent baths, reported that the immersion bathed babies had significantly less temperature drop, were more content and their mothers reported more pleasure with the bath. There was no difference in cord healing, bacterial colonization of the cord, or frequency of diaper dermatitis between immersion and sponge bathed infants.^{27,31} In another study, immersion bathing resulted in less variability in body temperature and overall higher body temperatures among fifty late preterm infants.³² The influence of bathing or washing on skin barrier function was studied by Garcia Bartels et al.³¹ Fifty-seven healthy term infants were either bathed or washed with tap water and a cloth twice a week for four weeks. Both skin care regimens did not harm the adaptation of the skin barrier during this time but barrier function was found to differ between the forehead, abdomen, upper leg and buttock sites.

Bathing does not seem to negatively affect umbilical cord healing or skin microflora development. Stable premature infants without umbilical catheters and term infants with umbilical clamp in place can safely be bathed this way.⁸

In swaddled bathing, infants are swaddled in a flexed, midline position with a soft blanket or towel before they are immersed in a warm tub of water. Since infants experience random uncontrolled motor movement when placed in a bathtub, swaddling decreases random movements and promotes a secure feeling.³³ Because swaddling promotes a calm, quiet state in the newborn, parental stress is also reduced. Most newborns usually cry at some point during their bath as they experience a range of different and new stimuli including undressing, temperature change, and the touch of a wash cloth and water. They may calm themselves or need calming. Many infants have quiet, alert periods during which they can respond to sights and sounds around them.

A newborn bath during the postpartum hospital stay is an excellent time to teach parents how to physically care for their baby in addition to discussing the unique characteristics of their newborn. The nurse can identify infant states, interpret infant behavior, elicit select reflexes, and model calming and orienting the newborn.³⁴ This is an excellent opportunity for the parents to engage with their newborn and facilitates the development of emotional and physical connections.

Routine Bathing

If a baby has their diaper area wiped with diaper changes, they don't need bathing more than 2–3 days/week. More frequent bathing may dry out their skin. The effect of standardized skin regimes on neonatal skin barrier function was studied over an eight week period.³⁵ Sixty-four term infants were randomized to water only, water plus wash gel, water plus cream after bath and water plus wash gel plus cream after bath. Babies were bathed twice a week during the study. TEWL, stratum corneum hydration (SCH), pH, neonatal skin condition score and umbilical cultures were done on Day 2 and Weeks 2, 4 and 8. There was no difference in umbilical cultures among the groups. The TEWL was lower (improved) and SCH was better with cream compared

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