



## **Skin Care for the Newborn : Observations and recommendations**

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**Abstract :** There are a number of ways in which a newborn's skin is different from an adult's. Taking extra precautions is necessary because of its heightened vulnerability to injury and illness. The mother or caretaker has to be reminded of the need of proper skin care, including gentle washing, appropriate hydration and moisturization, avoiding friction and maceration in body folds, and protection from irritants and harsh sunlight. Once the temperature has stabilized and the infant's hemodynamic status is stable, the parents may give their newborn their first bath. During the newborn time, soaps, cleansers, and syndets should be used sparingly and preferably just in the groyne, axillae, and napkin regions. During the warmer months, babies shouldn't be doused with emollients as much.

**Key words:** Newborn, Skin care.

### **INTRODUCTION**

Major skin functions include thermoregulation, protection from injuries, environmental pollutants, and UV radiation, vitamin synthesis, immunological surveillance, and cosmetics. Additionally, it acts as a sensory organ and promotes bonding between a mother and her infant. When a baby is born, they are suddenly thrust from their protected womb into the wide world. Newborn skin has comparable structural components to adult skin, but it also has several distinguishing features (1-3). Table I summarises the most notable distinctions between the skin of adults, term neonates, and premature infants. The most notable differences include thinner, less elastic skin; increased permeability of the stratum corneum; a less developed epidermal barrier; a decrease in melanin production; and a larger skin surface area relative to body weight (700 cm<sup>2</sup>/kg compared to 250 . Although present in great numbers at birth, glands do not produce any hormones until adolescence; the same is true of the dense but inactive sweat glands. Compared to adult skin, the pH of newborn and baby skin is higher, and it contains less free fatty acids (1-3).

### **CLINICAL IMPLICATIONS OF INFANT SKIN**



- During inflammatory processes, blisters are simple to develop because the epidermis is not tightly adhered to the dermis.
- Thermal instability, higher percutaneous absorption, and increased transepidermal water loss are the results.
- Because its outermost layer, the epidermis, is still maturing, the skin is more vulnerable to antimicrobial agents, more likely to respond to irritants, and more prone to maceration as a result of excessive moisture retention.
- Because the epidermis of newborns has less melanin than adult skin, it is more easily damaged by exposure to ultraviolet (UV) radiation.
- Using soaps and cleansers on a regular basis may weaken the skin's protective acid mantle and epidermal barrier, leaving it dry and vulnerable to harm.

TABLE I STRUCTURAL DIFFERENCES BETWEEN NEWBORN AND ADULT SKIN

Structural differences	Infant skin	Adult skin
<b>Epidermis</b>		
Corneocytes	Smaller	Larger
Granular cells	Smaller	Larger
Stratum corneum and epidermis	Thinner	Thicker
Microrelief lines	More dense	Less dense
Depth of surface glyphics	Similar to adult	—
Facultative pigmentation (melanin)	Less	More
<b>Dermis</b>		
Dermal papillae (density, size, and morphology)	More homogeneous	Less homogeneous
Distinct papillary-to-reticular dermis transition	Absent	Present
<b>Compositional differences</b>		
<b>Epidermis</b>		
Natural moisturizing factor concentration	Lower	Higher
pH	Higher (newborn only)	Lower
Sebum	Lower (7–12 month-old infant)	Higher
Stratum corneum water content	Higher	Lower
<b>Dermis</b>		
Collagen fiber density	Lower	Higher (young adul
<b>Functional differences</b>		
Rate of water absorption	Higher	Lower
Rate of water desorption	Higher	Lower
Skin barrier function	Competent	Competent
Transepidermal water loss	Higher	Lower



Source : [https://www.researchgate.net/figure/Infant-and-adult-skin-similarities-and-differences\\_tbl1\\_230872164](https://www.researchgate.net/figure/Infant-and-adult-skin-similarities-and-differences_tbl1_230872164)

## PRINCIPLES OF SKIN CARE OF THE NEWBORN

Gentle washing, sufficient hydration and moisturization of the skin, prevention of friction and maceration in body-folds, and protection from irritants and harsh sunlight are all important tenets of skin care that should be stressed. In the beginning, there is no microbial colonisation. The most prevalent microorganism, coagulase-negative staphylococci (*Staphylococcus epidermidis*), progressively spreads from the axillae and groyne to the scalp. The mother or the nursing staff may introduce the bacteria *staphylococcus aureus* (7,8).

The stratum corneum of the epidermis is where much of the "barrier function of skin" is located. The lipid- and protein-containing keratinocytes are encased in a lipid-rich matrix of cholesterol, ceramides, and fatty acids. The epidermis also secretes a different kind of lipid that, once coming into contact with water in the environment, forms a hydrophilic coating crucial to the skin's ability to retain its natural wetness and its sense of touch. This hydrophilic film's lipid component may cross the epidermal barrier and become an integral part of the skin's protective barrier (4,5). This is crucial information for deciding which cleanser to use on a newborn's delicate skin.

The "acid mantle," the skin's functional potential to generate a surface pH of less than 5, is another significant developmental variable of baby skin. An rise in skin pH from acidic to neutral might produce a transitory increase in the overall number of skin bacteria and a change in the species present(6), thus it is crucial to maintain this acid mantle on the baby's skin.

## ROLE OF VERNIX CASEOSA

The foetal sebaceous glands contribute to the production of vernix caseosa, a complex, lipid-rich material that adheres to the skin of newborns (9). It is made up of dead skin cells, sebaceous oils, and lanugo. Water accounts up 81%, lipids for 19% (epidermal lipids include triglycerides and cholesterol, while dermal lipids include squalene and waxes), and proteins make up 10%. (10). The grade of vernix caseosa varies greatly from person to person. It has been argued that the vernix serves various purposes during birth, such as a barrier to water loss, a temperature regulator, and an innate immune system(11), but most researchers disagree. Vernix caseosa, blood, meconium, and cellular



debris coat a newborn's skin upon delivery; it is best to remove this material, starting with the newborn's head and neck, as soon as possible after birth.

#### BATHING THE NEWBORN

Newborns should be given a bath as soon as possible to remove blood and vernix and to reduce their risk of contracting HIV and hepatitis B from the mother's blood. Once the temperature has stabilised and the baby's hemodynamic status is stable, it is safe to give the newborn his or her first bath. In the first few weeks of life, babies are given baths in lukewarm water (about 37 degrees Celsius) (8,12). A healthy term infant weighing more than 2500 g will get the bath anywhere from 2-6 hours after delivery (12). The body temperature of newborns did not differ substantially whether the bath was given within an hour of delivery or four to six hours later, as reported in a research by Behring et al.(13). Neonatal heat loss while bathing was also seen in a second randomised clinical experiment with 111 full-term newborns, but this time it was not connected to the bather or the setting (14). However, there are times, like the dead of winter, when putting off a bath is acceptable. A premature or low birth weight newborn should wait to be bathed until the umbilical cord has come off.

There is no need to soak a newborn for more than 5 minutes, since doing so will enhance skin moisture and lower the baby's tolerance for friction (8). Water that has been purified to drink or is sterile will do for the first bath. You may protect your baby's skin from any potential damage caused by the first wash by having someone else wear gloves. If possible, try to be soap- and cleanser-free during the first few weeks of your baby's existence (15). Baby should be washed in a warm atmosphere, dried swiftly and completely from head to toe, then wrapped in a warm dry towel and placed close to mom. Newborns should be given a bath as soon as possible to remove blood and vernix and to reduce their risk of contracting HIV and hepatitis B from the mother's blood. Once the temperature has stabilised and the baby's hemodynamic status is stable, it is safe to give the newborn his or her first bath. In the first few weeks of life, babies are given baths in lukewarm water (about 37 degrees Celsius) (8,12). A healthy term infant weighing more than 2500 g will get the bath anywhere from 2-6 hours after delivery (12). The body temperature of newborns did not differ substantially whether the bath was given within an hour of delivery or four to six hours later, as reported in a research by Behring et al.(13). Neonatal heat loss while bathing was also seen in a second randomised clinical experiment with 111 full-term newborns, but this time it was not



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#### CLEANSING AGENTS

The term "cleansing" refers to the process of removing impurities from the skin, such as dirt, germs, dead skin cells, perspiration, and other debris. Babies' delicate skin is more likely to be irritated by soap and water. In India, the vast majority of baby soaps and cleansers fail to include any of their constituents on the label (15). Alkaline soaps and acidic or neutral synthetic detergents are the two main types of cleansers (syndets).

You might think of a cleanser as a combination of a detergent (or surfactant), a skin conditioner (like glycerine), and other ingredients like smell, colour, and preservatives (15). To prevent skin irritation, a baby soap or cleanser should have no added fragrances or colours.

Most cleansers rely heavily on surfactants for their composition. In order to remove the fat-soluble pollutants from the skin, surfactants work by reducing the surface tension between water and air, resulting in a foaming action (8). However, the danger of skin injury and excessive loss of lipids from the stratum corneum rises with increasing foaming strength.

Saponification, in which an alkali reacts with a fat or oil, produces soaps. Natural fats and oils are replaced with lauryl sulphate or its derivatives in synthetic soaps (16). Soaps and detergents with surfactants can disrupt the skin's barrier function in several ways: (a) by reducing the amount of lipids in the skin's outermost layer (the hydrophilic film), (b) by interacting with proteins in the stratum corneum and leading to their denaturation, which can lead to skin irritation, and (c) by increasing the skin's surface pH. A tightening effect, dryness, roughness, and flakiness of the skin



are possible outcomes of all this (5,16-18).

Syndets, also known as synthetic detergents, are a kind of non-soap surfactant that may be used as a soap alternative. That they have no effect on the skin's pH or microbiota is a major plus (19,20) However, they may cause extreme dryness if moisturisers are not also used, and they dissolve quickly. Common syndets include cocoyl isethionate, sodium lauryl sulphate, and betaines.

Soaps are formulated with conditioners such as lanolin, paraffin, or mineral oil to leave skin feeling smooth and supple (15). Superfating describes this phenomenon. Soaps often include glycerin as a conditioner. Some lotions that don't lather include emollients like glycerin, cetyl alcohol, and propylene glycol, but no oils or fats thanks to the syndet that serves as a surfactant in these products. The cleaning power of these liquid treatments is not dependent on the use of water. You just massage them into dry skin to create a lather, then wipe away the residue with a damp washcloth.

Most dermatologists agree with the statement "it is apparent that nothing should be administered to the skin of any newborn without careful evaluation of the possible dangers" from the Textbook of Dermatology by Atherton and Rook (2004). The pH of newborn skin may be over 6.0. pH drops from a healthy 5.5 during birth to a more normal 4.95 after delivery. This "acidic" barrier prevents invaders from getting through. The quantity of germs on the skin and the amount of water lost through the epidermis would both rise if the skin's pH were raised from acidic to neutral. In order for the skin's pH to return to normal after using an alkaline soap, you need wait at least an hour. Consequently, alkaline ph soaps shouldn't be used on newborns. Neutral or slightly acidic pH cleansers with a mild surfactant, chemical and physical stability, and an emollient may be used on term babies and infants in good health. Again, this is something that should be utilised sparingly throughout the neonatal period.

## BABY POWDERS

It's recommended to avoid using them on a baby, even if they're helpful for absorbing moisture in hot and humid conditions and stopping maceration in skin creases. When used excessively, it may cause miliaria to grow and the pores of sweat glands to get clogged (8,27). Another possible risk is



inhaling by accident (27).

### CARE OF THE DIAPER AREA

Diaper areas are huge, damp, humid, occluded environments that are more susceptible to maceration and microbial assault because of the lack of air circulation. Urine and faeces are both highly alkalinizing substances that may erode the skin's protective barrier due to their interaction with the skin.

Napkins, whether they are disposable or machine washable, should be changed regularly, and the mother should be made aware of this. Changing napkins more often will allow the skin to dry and breathe. Mineral oil may be applied on the buttocks to provide a physiologic barrier if frequent changes are impractical (8). Napkin areas may be cleaned with a soft cotton ball dipped in warm water. It's best to clean the rear ends first, then the front. An emulsion, such as baby lotion, may lower the surface tension of sticky faeces, making it easier to remove the filth. Napkin rashes may be treated using pastes made of petrolatum jelly or zinc oxide. It is normally sufficient to wash a diaper in lukewarm water, rinse it well, and then dry it before using it again.

### CARE OF THE SCALP

In infantile seborrheic dermatitis, the spread of lesions may be stopped by using mineral or vegetable oil. Those with crusts or scales on their scalps might use baby shampoo to get rid of them (8). Shampoos, which may be either soaps or synthetic detergents, are designed specifically for this purpose. To minimise dermatitis from shampoos, the amount of time the product spends in contact with the scalp should be kept to a minimum (16). Soaps and shampoos often include cleaning ingredients and lather boosters (21). Medium- to long-chain fatty acids, including laureth sulphate, are effective emulsifiers and, thus, make excellent cleaners. Like "foaming action" in soap, the lather in a shampoo is more for show than function. Some of the most effective lather-makers are short-chain fatty acids like cocamide diethanolamine (21). Additives such preservatives, colours, antioxidants, chelators, scent, and conditioners round out the formula. Most of these are included in infant shampoos, but fragrance, anti-inflammatory compounds, and natural components shouldn't be. Anionic surfactant, which is found in most infant shampoos, guarantees a thorough washing. An



ideal shampoo would have a pH level of baby's eyes, therefore they should have a consistency similar to tears yet not irritate them. Ketoconazole, zine pyrithione, and selenium sulphide are some of the additional compounds used to treat seborrheic dermatitis.

#### OTHER AREAS

Within 5–10 days after delivery, the umbilical chord dries and falls off. The umbilical cord is not the place to use any topical medications. In order to maintain a healthy environment, nails should be maintained short and tidy. Eyes should be carefully cleaned with cotton swabs dipped in boiling water.

#### EMOLLIENTS FOR THE NEWBORN

An emollient is a substance used to make the skin more supple and comfortable. The words "moisturiser" and "lubricant" are also used to describe these substances. Lipids, which may come from either animals or plants, or be extracted from mineral oils, or even be entirely manufactured, make up the bulk of their make-up (22). Among the several categories into which emollients fall are:

Hydrocarbons like paraffin and Vaseline

#### CETYL or STEARYL ALCOHOL, FATTY MATERIAL

Beeswax, lanolin, and other waxes

Mineral oil, vegetable oils include coconut oil, palm kernel oil, ground nut oil, olive oil, mustard oil, and synthetic oil.

Cream preparations are often favoured since the other preparation would be occlusive in the warm Indian weather; emollients may be formulated in two ways: with oil in water emulsion (cream) or with water in oil emulsion (ointment). To preserve barrier function, lessen irritation around the napkin region, and play a part in massage are just a few of the many benefits of using an emollient on a newborn. Emollients are also useful for treating neonatal peeling and scaling dermatitis.

Vegetable oils have a long history of usage in India, particularly for infant massage and skin care. Due to its tiny molecular structure and long history of safe usage, coconut oil is the oil of choice for oil massages on newborns. It is particularly well-suited for dry skin. Olive oil is also helpful for massage, but oils derived from nuts, such as almond oil, should be avoided (24). Antigen-containing allylisothiocyanate, found in mustard oil, is a volatile compound that may trigger contact dermatitis





(25). Extra virgin coconut oil and mineral oil were proven to increase skin surface lipids and enhance skin hydration in a randomised double-blind controlled experiment done in the Philippines (26). Vegetable oils are generally safe, but during hot weather, parents should exercise caution since they might increase the blockage of babies' sweat pores and induce irritating folliculitis.

### **Collodion baby**

Collodion babies are born with a tight, shiny, parch- ment-like membrane over the skin. Collodion mem- brane occurs within a heterogeneous group of skin diseases, and generally spontaneously sheds over 2–4 weeks of life.

Infants with collodion membranes are at risk for temperature instability, skin infection, and hyper- natremic dehydration resulting from excessive water loss across the impaired skin barrier. Affected neonates should be placed in a humidified incuba- tor shortly after birth. Evidence-based guidelines are lacking; however, most researchers recommend maintaining the infant in the incubator until the collodion membrane sheds with humidity set between 40 and 60%.

To promote parental bonding and breastfeed- ing, the baby may leave the incubator for brief periods of graduated time beginning on day of life

2 (30 min initially, increasing to 60 min as the infant's skin improves). Clinical management includes daily bathing and frequent application of bland skin emollient (white petrolatum). Keratolytic creams, such as urea are not recommended for infants, and salicylic acid preparations are contra- indicated in newborns with ichthyosis as percuta- neous absorption may result in systemic toxicity. Serum electrolytes, urine output, temper- atures, daily weights, albumin, blood urea nitrogen, and creatinine levels should be monitored closely. For infants at risk for functional impairment because of collodion membrane, topical or systemic reti- noids can be considered.

### **CONCLUSION**

Newborns' skin functions better and continues to develop after birth when it is treated gently. Recent studies have shown that full-term children at risk for developing atopic dermatitis may be protected against the onset of the condition by using skin emollients regularly from birth. Premature newborns and infants born with severe skin symptoms of genetic illness need special skin care measures while washing and handling.



Babies need extra protection since their delicate skin is easily damaged or infected. Use caution and follow label instructions while using any kind of soap, cleaner, powder, or syndet. Applying coconut oil as an emollient to newborn skin is a cost-effective and simple solution. In the warm weather, however, emollients should be used sparingly.

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