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Skin Care of the Healthy Newborn

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Routine care of a newborn may be an intimidating task for new parents. This routine care includes tending to the skin of the infant. Maintaining a healthy, intact cutaneous barrier is important psychologically for the parent and medically for the child. Clinicians should be able to offer guidance concerning the basics of skin care, to dispel any misconceptions concerning baby products, and to optimize cutaneous integrity for the comfort and well being of the infant.

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Basic skin care is essential to neonates and young infants. Maintenance of cutaneous integrity and appropriate wound care not only protect infants against the absorption of toxins, fluids, and electrolyte imbalances but also provide infants with an antimicrobial barrier, insulation, tactile sensation, and comfort.

Following birth, neonates must adapt to new aerobic surroundings.¹ An optimally functioning cutaneous barrier is necessary for homeostasis in the extrauterine environment. Insults to infant skin, such as irritant and allergic contact dermatitis, are common concerns, and care should be taken to avoid them.^{2,3} Infection and trauma are other problems for which the neonate is at increased risk.

Newborns are particularly susceptible to toxic accumulations of substances because of absorption through their skin. Stratum corneum thickness and cutaneous permeability of term infants, however, are not different from that of adults.^{4,6} Infants have a larger surface area to volume ratio and a decreased ability to detoxify chemicals. These special considerations suggest that one guiding principle in planning

an appropriate regimen to optimize the protective functions of the skin should be the scrupulous limitation of exposure to chemicals in skin care products. Subtle and pervasive advertisement of baby care products, as well as a "more is better" philosophy, often mistakenly lead parents to believe that the products contain few nontoxic ingredients, when in fact baby care products commonly contain irritating and possibly toxic substances⁷ (Table).

At Birth

The skin of full-term newborn babies is well developed, is opaque with few visible veins, has few wrinkles, and exhibits no edema. At birth, skin is covered to a variable extent by a whitish coating of sebaceous material and epidermal cellular debris called *vernix caseosa*. This physiologic substance, which may contain protective antimicrobial proteins,¹⁰ is fully formed at 36 to 38 weeks' gestation. If left in place, the vernix caseosa is shed gradually, appearing as desquamation of the skin during the first few days of life. By 40 weeks' gestation, it is found only in body creases. Excess vernix caseosa can be gently removed, along with any blood or meconium, by rinsing with plain sterile water.^{11,12} Many nurses remove the substance for cosmetic purposes, but care should be taken not to irritate or break down the skin with excessively vigorous handling. There is no significant difference in respiratory rate, heart rate, or oxygen saturation between immersion bathing versus dry sponging immediately after birth.¹¹ Bathing the newborn in lukewarm water (approximately 100.4°F) may cause less cooling of the core body temperature, may induce less crying, and does not increase the risk of bacterial infection.^{12,13}

Washing the newborn with an antiseptic solution such as chlorhexidine produces detectable levels in the bloodstream.¹⁴ In place of these solutions, caretakers should be sure to scrupulously wash their hands with a nonantimicrobial cleanser that has a mild alkaline to neutral pH. This will prevent skin colonization of the infant and interrupt potential

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nosocomial transmission. Hand washing is simple and cost-effective provided that an effective cleansing agent is used and that the frequency of washing is not enough to cause undue cutaneous irritation.¹⁵

Wound Care

Newborns normally will have at least one break in the integrity of the skin—at the umbilical cord site. Additionally, infants born in the United States may be circumcised or may have a small opening at the site of a fetal monitor electrode. Wound care should be meticulous from the beginning. Skin infections are not uncommon and accounted for 5% of pediatric nosocomial infections in a large prospective study of 78,120 patients in the Hospital for Sick Children in Toronto, Canada.¹⁶

After cutting and clamping the umbilical cord, a compound is often applied to the umbilical stump to reduce the risk of infection. Many neonatal care units have recently abandoned the use of bactericidal agents in favor of dry cord care. However, there is a risk of developing omphalitis if the clinician chooses not to cleanse the umbilical stump with a bactericidal agent; thus, the clinician must watch for the signs and symptoms of this condition.¹⁷ Pathogenic bacteria readily colonize exposed necrotic tissue of the umbilical stump; thus, the diaper should at least be folded away from the stump to promote drying. In addition, application of emollients should be avoided. Triple dye (2.29 g brilliant green, 1.14 g proflavine hemisulfate, 2.29 g crystal violet, and water to make 1000 mL) is an effective agent against *Staphylococcus aureus*, a common cause of umbilical cord infection. However, it may be toxic or carcinogenic¹⁸ and has been shown to actually promote colonization by gram-negative organisms.¹⁹ There is no difference in colonization or infection rates when comparing thrice daily application of triple dye²⁰; one-time-only application of triple dye; or single application of triple dye with daily alcohol, daily bacitracin, daily povidone iodine, and daily silver sulfadiazine.²¹ Another study found that triple dye was superior to alcohol and bacitracin in reducing bacterial colonization.²² However, differences in

ease of use and perceived cleanliness exist, with daily povidone iodine being the agent preferred by nursing staff. Additionally, the time until cord separation varies with the compound used: approximately 10 days with povidone iodine and approximately 13 days with triple dye.²³ For ease of at-home care, daily triple dye application would appear to be most convenient and most acceptable to the caregiver. Parents should be instructed that cord separation is variable with this regimen and usually occurs between days 8 and 26, though earlier separation is not a cause for worry.

Wounds at other sites on the newborn should be cleansed with mild soap and water followed by application of topical bacitracin for several days. To prevent infants from accidentally ingesting topical agents, care should be taken to use mittens or gauze to cover any areas infants might place in their mouth.

Diaper Area

Diaper dermatitis is the most common childhood skin infection,²⁴ with prevalence estimates from 4% to 15% in diaper-wearing infants.²⁵ Some studies show that at any given time as many as 30% of infants experience mild diaper dermatitis, with 6% experiencing moderate to severe cases.²⁴ In a

Potential Side Effects of Topical Skin Care Products in Infants

Product	Potential Side Effect
Triple dye	Skin necrosis
Povidone iodine	Hypothyroidism and goiter
Alcohol	Skin necrosis
Tincture of benzoin	Contact dermatitis, ⁸ skin breakdown
Triclosan	Contact dermatitis
Neomycin	Contact dermatitis
Silver sulfadiazine	Kernicterus
Monitor leads or adhesives	Skin breakdown
Adhesive remover ⁹	Toxic epidermal necrolysis
Baking soda	Respiratory failure (secondary to aspiration)
Corticosteroids	Skin atrophy, striae, adrenal suppression, Cushing syndrome

prospective study, 15.2% of healthy Italian infants wearing superabsorbent diapers experienced diaper dermatitis.²⁶ In infants without other conditions such as seborrheic dermatitis, acrodermatitis enteropathica, psoriasis, metabolic disorders, or Langerhans cell histiocytosis, the etiology of diaper dermatitis is usually a combination of irritant dermatitis and secondary infection. *Candida* species have been reported to be cultured from 40% of diaper dermatitis cases at 72 hours.²⁵ Group A β -hemolytic streptococcal infections appear as either tender and erythematous or beefy red psoriasiform perianal lesions with yellowish crusting of the borders.²⁷

Contributing factors to diaper dermatitis include occlusion, warmth, humidity, maceration, higher urinary pH, and abrasion damage. Bacterial ureases found in the stool split urea and release ammonia. This elevates the pH of the diaper-occluded region compared with nonoccluded skin. These factors lead to irritation, skin permeability, and extensive colonization with *Candida* or *Streptococcus*.²⁸ Breast-fed babies have lower incidence of this rash due to the resultant lower urinary pH.²

Preventive measures start with frequent and prompt diaper changes. Choosing diapers with breathable covers keeps the skin drier and prevents heat buildup. This reduces the incidence of diaper dermatitis by 38% to 50% and reduces the survival of *Candida* species by almost two thirds.²⁴ Breathable diapers also are more comfortable than conventional diapers.²⁹ Absorbent gelling materials also have reduced the incidence of diaper rash. Compared with regular disposable or cloth diapers, disposable superabsorbent diapers are superior at keeping skin dry, creating a favorable pH,³⁰ minimizing mixing of fecal matter and urine (which forms ammonia), and preventing diaper dermatitis.³¹ Disposable diapers also minimize skin maceration, decrease exposure to fecal irritants, and better contain enteric pathogens.³²

Limiting the spread of pathogens from fomites or direct contact might prevent other children from getting diarrhea, which also is a risk factor for diaper dermatitis.³² In addition, using disposable rather than cloth diapers helps children avoid penetrating wounds from safety pins. If parents choose to use cloth diapers, commercial laundering has been associated with lower incidence of diaper rash than home washing.³³ There also are diapers on the market that deliver petroleum to the child's skin, preventing dehydration and reducing irritation and the severity of the dermatitis.³⁰

Preventive measures against diaper dermatitis should include meticulous cleaning of the infant.

The diaper area should be cleaned with lukewarm water and gently patted dry. The use of hair dryers is not recommended because cases of thermal burn have been reported.³⁴ The genital area should be thoroughly cleansed, but no attempt should be made to retract the foreskin.³⁵ The necessity of popular baby wipes is not proven, but high-quality wipes have not been shown to irritate normal skin and are convenient.³⁰ Zinc oxide paste can be used to protect the skin, as well as treat the dermatitis,²⁸ though eosin 2% has been shown to be a more effective treatment.³⁶ Powders such as cornstarch or talcum powder can help dry the skin when vesicles or maceration are present, but their use should be carefully controlled because of the hazards of aspiration.³⁷ Baking soda should not be used because of the risk of inducing hypernatremia and metabolic alkalosis.^{38,39} Leaving the diaper off whenever possible also is helpful in patients with diaper dermatitis. Over-the-counter medicated ointments containing white petrolatum, zinc oxide, or sucralfate can decrease the duration of established dermatitis. However, caregivers should carefully review the contents of the product before use.

Finally, although it is less common, some infants will have true allergic dermatitis.⁴⁰ This may be from detergents or topical medications such as antibiotics, particularly if these have been used on already sensitized skin, exacerbating a mild dermatitis.⁴¹

Treatment of classical diaper dermatitis consists of an antifungal ointment such as clotrimazole, a drying agent such as zinc oxide, and scrupulous diaper hygiene as described above. Hydrocortisone 1% ointment can be used to decrease inflammation, if necessary.

Parents should be instructed on preventive diaper area care and the appropriate products. Surveys show that free samples distributed by manufacturers significantly influence the selection, number, and type of products used. Clinicians should be aware of the implied endorsement a patient may perceive when products are distributed in the hospital setting.⁴²

Bathing and Hair Care

Bath time is frequently an enjoyable time for parents and infants to play and have contact with each other. Parents should be given early anticipatory guidance to never leave bathing infants unattended, even for a moment.⁴³ Daily or even more frequent baths are probably not harmful, but they are probably unnecessary unless the child has become dirtier than usual.⁴⁴ Children with atopic dermatitis should have fewer baths, as bathing

removes lipids from the skin and promotes drying, irritation, and pruritus.⁴⁵

In the normal full-term infant, plain water or a mild, nonirritating, tear-free soap in lukewarm bathwater can be used. Bathing with a mild soap rather than water alone has little if any effect on colonization of bacterial pathogens.¹³ Dyes, fragrances, preservatives, and other additives vary considerably; products should be examined carefully for their ingredients, regardless of whether they are advertised as mild or nonirritating.⁴⁶ Cleansers with near-neutral pHs such as Dove[®] Soap, Baby Bar and Cetaphil[®] are less irritating to the skin than many other products on the market.⁴⁷ Cetaphil, a non-soap, lipid-free liquid cleanser, has been clinically proven to be nonirritating.⁴⁸ Choosing a cleanser that has a near-neutral pH will minimize the effect on the acid mantle of the skin and minimize the dissolution of lipids.⁴⁹ Soaps should be rinsed off immediately and not be left in contact with the baby's skin for extended periods. In uncircumcised boys, no attempt should be made to retract the foreskin until the child is 3 to 4 years of age, as entrapment may occur; this includes attempts to wash inside it.⁵⁰

The bathwater also can be used to wash the baby's hair.⁴⁶ Cradle cap is a common self-limiting condition in which the vertex of the scalp is covered by thick, whitish to yellowish, greasy scales. An emollient such as petrolatum should be rubbed into the scalp and left on for an extended period (overnight). This loosens the scales so that some can be brushed off before gentle shampooing. Cleansing should start with a mild nonmedicated baby shampoo and progress to a tar-containing one if there is no improvement.⁵¹ Cases that do not respond to this treatment can be treated cautiously with ketoconazole 2% shampoo. No trials concerning the absorption or safety profile of ketoconazole shampoo in infants have been performed, though preliminary studies indicate that there is either minimal cutaneous absorption or rapid metabolism in infants.⁵² Topical steroids are usually not necessary; in fact, eosin can achieve the same results without the side effects.⁵¹

Although the skin of a normal mature infant is smooth, pink, and velvety at birth, it is not unusual for it to appear dry and scaly soon thereafter. Dry air, heated air, or frequent bathing also can cause dry skin that should be treated symptomatically with emollients, as needed. White petrolatum with no additives or preservatives is safe and effective; bland lotions or creams also can be used in mild cases. Because skin dryness may reflect systemic dehydration, the fluid intake of infants should be checked to see if it is adequate.

Nail Care

The nails of infants should be kept reasonably short so the babies do not accidentally excoriate their skin. Special care should be taken that only the nail is trimmed and not the nail bed, which is not only painful but also causes bleeding that can introduce infection.

Laundering

Baby clothing, blankets, bibs, and other items should be made of a material such as cotton that can withstand high-temperature laundering and sanitization to kill bacteria such as *Staphylococcus*.⁴⁵ The detergent should be free of perfume and enzymes because these agents are potential allergic or irritant sensitizers.⁵³ Agents in laundry detergent appear to be a rare cause of allergic contact dermatitis, accounting for only 0.7% of dermatitis patients.⁵³ This figure, however, may include false-positive reactions that likely represent irritant dermatitis. Clothing treated with fabric softener is less likely to cause irritation to the skin of babies, especially in atopic patients.⁵⁴ The use of hypochlorite bleach on rubber elastic in garments, and incomplete rinsing out of the bleach, have been known to occasionally cause contact dermatitis.⁵⁵

Solar Exposure

Infants are exposed to certain environmental hazards, some of which arise during caring for the skin. In addition to burns, powder inhalation, and chemical absorption, infant skin should be protected from sun exposure. Parents should understand that UV rays remain present even in cool weather and that tanning is the skin's response to damage that has already occurred. In addition to the risk of acute sunburn and phototoxic and photoallergic reactions, all of which can be acquired within minutes, cumulative lifetime sun exposure leads to an increased risk of developing actinic keratoses, nonmelanoma and melanoma skin cancers, and premature photoaging later in life.⁵⁶ Cutaneous malignant melanoma also may arise as a consequence of intense intermittent exposure to UV radiation.^{57,58} Infants exposed to direct sunlight or even overcast midday skies should be covered with lightweight clothing and shaded with a canopy or hat. Regular use of sunscreen to frequently exposed areas also is necessary.⁵⁶ Sunscreens containing aminobenzoic acid, methoxycinnamate, and oxybenzone should be avoided because of the risk of photoallergic contact dermatitis.^{56,59} It should be stressed to parents that multiple forms of safety measures offer their babies' skin the best protection.⁶⁰

REFERENCES

1. Yosipovitch G, Maayan-Metzger A, Merlob P, et al. Skin barrier properties in different body areas in neonates. *Pediatrics*. 2000;106:105-108.
2. Janniger CK, Thomas I. Diaper dermatitis: an approach to prevention employing effective diaper care. *Cutis*. 1993;52:153-155.
3. Bruckner AL, Weston WL. Beyond poison ivy: understanding allergic contact dermatitis in children. *Pediatr Ann*. 2001;30:203-206.
4. Fairley JA, Rasmussen JE. Comparison of stratum corneum thickness in children and adults. *J Am Acad Dermatol*. 1983;8:652-654.
5. Cunico RL, Maibach HI, Khan H, et al. Skin barrier properties in the newborn. *Biol Neonate*. 1977;32:177-182.
6. Harpin VA, Rutter N. Barrier properties of the newborn infant's skin. *J Pediatr*. 1983;102:419-425.
7. Cetta F, Lambert GH, Ros SP. Newborn chemical exposure from over-the-counter skin care products. *Clin Pediatr*. 1991;30:286-289.
8. James WD, White SW, Yanklowitz B. Allergic contact dermatitis to compound tincture of benzoin. *J Am Acad Dermatol*. 1984;11:847-850.
9. Ittmann PI, Bozynski ME. Toxic epidermal necrolysis in a newborn infant after exposure to adhesive remover. *J Perinatol*. 1993;13:476-477.
10. Yoshio H, Tollin M, Gudmundsson GH, et al. Antimicrobial polypeptides of human vernix caseosa and amniotic fluid: implications for newborn innate defense. *Pediatr Res*. 2003;53:211-216.
11. Nako Y, Harigaya A, Tomomasa T, et al. Effects of bathing immediately after birth on early neonatal adaptation and morbidity: a prospective randomized comparative study. *Pediatr Int*. 2000;42:517-522.
12. Henningson A, Nystrom B, Tunnell R. Bathing or washing babies after birth? *Lancet*. 1981;2:1401-1403.
13. Medves JM, O'Brien B. Does bathing newborns remove potentially harmful pathogens from the skin? *Birth*. 2001;28:161-165.
14. West DP, Worobec S, Solomon LM. Pharmacology and toxicology of infant skin. *J Invest Dermatol*. 1981;76:147-150.
15. Larson E. Skin hygiene and infection prevention: more of the same or different approaches. *Clin Infect Dis*. 1999;29:1287-1294.
16. Ford-Jones EL, Mindorff CM, Langley JM, et al. Epidemiologic study of 4684 hospital-acquired infections in pediatric patients. *Pediatr Infect Dis J*. 1989;8:668-675.
17. Janssen PA, Selwood BL, Dobson SR, et al. To dye or not to dye: a randomized, clinical trial of a triple dye/alcohol regime versus dry cord care. *Pediatrics*. 2003;111:15-20.
18. Siegfried E, Shah P. Skin care practices in the neonatal nursery: a clinical survey. *J Perinatol*. 1999;19:31-39.
19. Speck W, Driscoll J, O'Neil J, et al. Effect of antiseptic cord care on bacterial colonization in the newborn infant. *Chemotherapy*. 1980;26:372-376.
20. American Academy of Pediatrics Committee on Fetus and Newborn. Skin care of newborns. *Pediatrics*. 1974;54:682-683.
21. Gladstone IM, Clapper L, Thorp JW, et al. Randomized study of six umbilical cord care regimens. comparing length of attachment, microbial control, and satisfaction. *Clin Pediatr*. 1988;27:127-129.
22. Andrich MP, Golden SM. Umbilical cord care: a study of bacitracin ointment versus triple dye. *Clin Pediatr*. 1984;23:342-344.
23. Golombek SG, Brill PE, Salice AL. Randomized trial of alcohol versus triple dye for umbilical cord care. *Clin Pediatr*. 2002;41:419-423.
24. Akin F, Spraker M, Aly R, et al. Effects of breathable disposable diapers: reduced prevalence of *Candida* and common diaper dermatitis. *Pediatr Dermatol*. 2001;18:282-290.
25. Thomas I. Superficial and deep candidosis. *Int J Dermatol*. 1993;32:778-783.
26. Kazaks EL, Lane AT. Diaper dermatitis. *Pediatr Clin North Am*. 2000;47:909-919.
27. Herbst R. Perineal streptococcal dermatitis/disease: recognition and management. *Am J Clin Dermatol*. 2003;4:555-560.
28. Ferrazzini G, Kaiser RR, Hirsig Cheng SK, et al. Microbiological aspects of diaper dermatitis. *Dermatology*. 2003;206:136-141.
29. Grove GL, Lemmen JT, Garafalo M, et al. Assessment of skin hydration caused by diapers and incontinence articles. *Curr Probl Dermatol*. 1998;26:183-195.
30. Odio M, Friedlander SF. Diaper dermatitis and advances in diaper technology. *Curr Opin Pediatr*. 2000;12:342-346.
31. Wong DL, Brantley D, Clutter L, et al. Diapering choices: a critical review of the issues. *Pediatr Nursing*. 1992;18:41-54.
32. Van R, Wun CC, Morrow AL, et al. The effect of diaper type and overclothing on fecal contamination in day-care centers. *JAMA*. 1991;265:1840-1844.
33. Grant WW, Street L, Fearnow RG. Diaper rashes in infancy: studies on the effects of various methods of laundering. *Clin Pediatr*. 1973;12:714-716.
34. Deans L, Slater H, Goldfarb IW. Bad advice; bad burn; a new problem in burn prevention. *J Burn Care Rehab*. 1990;11:563-564.
35. Lerman SE, Liao JC. Neonatal circumcision. *Pediatr Clin North Am*. 2001;48:1539-1557.
36. Arad A, Mimouni D, Ben-Amitai D, et al. Efficacy of topical application of eosin compared with zinc oxide paste and corticosteroid cream for diaper dermatitis. *Dermatology*. 1999;199:319-322.
37. Silver P, Sagy M, Rubin L. Respiratory failure from corn starch aspiration: a hazard of diaper changing. *Pediatr Emerg Care*. 1996;12:108-110.
38. Gonzalez J, Hogg RJ. Metabolic alkalosis secondary to baking soda treatment of a diaper rash. *Pediatrics*. 1981;67:820-822.

39. Fuchs S, Listernick R. Hyponatremia and metabolic alkalosis as a consequence of the therapeutic misuse of baking soda. *Pediatr Emerg Care*. 1987;3:242-243.
40. Weston WL, Bruckner A. Allergic contact dermatitis. *Pediatr Clin North Am*. 2000;47:897-907.
41. Wilkowska A, Grubska-Suchanek E, Karwacka I, et al. Contact allergy in children. *Cutis*. 1996;58:176-180.
42. Hayden GF, Nowacek GA, Koch W, et al. Providing free samples of baby items to newly delivered parents. an unintentional endorsement? *Clin Pediatr*. 1987;26:111-115.
43. Simon HK, Tamura T, Colton K. Reported level of supervision of young children while in the bathtub. *Ambul Pediatr*. 2003;3:106-108.
44. Forfar JO. The normal baby: routine care. *BMJ*. 1971;4:28-32.
45. Leung AK, Barber KA. Managing childhood atopic dermatitis. *Adv Ther*. 2003;20:129-137.
46. Janniger CK, Bryngil JM. Hair in infancy and childhood. *Cutis*. 1993;51:336-338.
47. Baranda L, Gonzalez-Amaro R, Torres-Alvarez B, et al. Correlation between pH and irritant effect of cleansers marketed for dry skin. *Int J Dermatol*. 2002;41:494-499.
48. Tyebkhan G. Skin cleansing in neonates and infants—basics of cleansers. *Indian J Pediatr*. 2002;69:767-769.
49. Gfatter R, Hackl P, Braun F. Effects of soap and detergents on skin surface pH, stratum corneum hydration and fat content in infants. *Dermatology*. 1997;195:258-262.
50. Wright JE. Further to “the further fate of the foreskin.” *Med J Austral*. 1994;160:134-135.
51. Janniger CK. Infantile seborrheic dermatitis: an approach to cradle cap. *Cutis*. 1993;51:233-235.
52. Brodell RT, Patel S, Veglarcik JS, et al. The safety of ketoconazole shampoo for infantile seborrheic dermatitis. *Pediatr Dermatol*. 1998;15:406-407.
53. Belsito DV, Fransway AF, Fowler JF Jr, et al. Allergic contact dermatitis to detergents: a multicenter study to assess prevalence. *J Am Acad Dermatol*. 2002;46:200-206.
54. Hermanns JF, Goffin V, Arrese JE, et al. Beneficial effects of softened fabrics on atopic skin. *Dermatology*. 2001;202:167-170.
55. Jordan WP Jr, Bourlas MC. Allergic contact dermatitis to underwear elastic. chemically transformed by laundry bleach. *Arch Dermatol*. 1975;111:593-595.
56. Janniger CK. Solar exposure in children. *Cutis*. 1992;49:401-402.
57. Noonan FP, Recio JA, Takayama H, et al. Neonatal sunburn and melanoma in mice. *Nature*. 2001;413:271-272.
58. Whiteman DC, Whiteman CA, Green AC. Childhood sun exposure as a risk factor for melanoma: a systematic review of epidemiologic studies. *Cancer Causes Control*. 2001;12:69-82.
59. Cook N, Freeman S. Photosensitive dermatitis due to sunscreen allergy in a child. *Australas J Dermatol*. 2002;43:133-135.
60. Olson AL, Dietrich AJ, Sox CH, et al. Solar protection of children at the beach. *Pediatrics* 1997;99:E1.