

REVIEW / PRACA POGLĄDOWA

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**MORPHOLOGICAL-FUNCTIONAL CONSIDERATIONS OF NEONATALS'
AND EARLY CHILDREN'S SKIN CARE**

**MORFOLOGICZNO-CZYNNOŚCIOWE UWARUNKOWANIA
PIELĘGNACJI SKÓRY NOWORODKA I MAŁEGO DZIECKA**

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S u m m a r y

Skin of children, especially neonates and infants, shows profound anatomic and functional differences compared to an adult's skin. Skin's immaturity and lack of fully developed natural protective qualities, results in its immense fragility, tenderness and irritability. Due to these factors, it is crucial to use procedures considering the morphological and functional state of the skin in nursing.

Based on data analysis from medical literature, up-to-date recommendations for skin, hair and nail care have been presented, for both infants and early children. Special attention has been given to navel, 'diaper' area and dry skin care.

S t r e s z c z e n i e

Skóra dzieci, szczególnie noworodków i niemowląt, wykazuje znaczne różnice anatomiczne i funkcjonalne w porównaniu ze skórą człowieka dorosłego. Niedojrzałość skóry i brak w pełni wykształconych naturalnych właściwości ochronnych powoduje, że jest ona niezwykle wrażliwa, delikatna i bardzo łatwo ulega podrażnieniom. Z powyższych względów konieczne jest stosowanie w pro-

cesach pielęgnacyjnych procedur uwzględniających stan morfologiczny i czynnościowy skóry.

Na podstawie analizy danych z piśmiennictwa medycznego przedstawiono aktualne zalecenia dotyczące pielęgnacji skóry, włosów, paznokci niemowlęcia i małego dziecka. Szczególną uwagę zwrócono na pielęgnację pępka, okolicy „pieluszkowej” oraz skóry suchej.

Key words: skin, children, skin care

Słowa kluczowe: skóra, dzieci, pielęgnacja

INTRODUCTION

Child skin care procedures are frequently based on tradition and cultural customs. There are many errors

committed in nursing procedures; among others, it is erroneous to believe that an infant's skin is fully

developed and does not demand any special nursing regime, that skin care products cause damage to the skin, or that no special care measures are necessary [1].

Moreover, for the last years, the problem of proper skin care for neonates, infants and early children has been intensifying due to a wider range of baby care products [2] and general overuse of cosmetics in neonatal and infant care [3]. Competitiveness of cosmetic and pharmaceutical businesses, as well as aggressive advertisement in mass media, often result in parents' disorientation as for selecting the best product for their children [4, 5]. Improper care impacts significantly on skin damage, often of a long-run character [1]. Using cosmetics which are not proper for the child's age, especially when in regard to neonates and infants, results in a risk of undesirable effects, and even toxic reactions [3, 6].

Basic skin care rules applying to nursing a baby include learning the build, the growth, the physiological distinctness of the functional state of the skin, as well as clinical observing, monitoring the state of the skin [1].

Infant skin care demands a specialist approach. The current guidelines for neonates, infants and early children's skin care were compiled on the basis of detailed analysis of literature and opinions of experts in neonatology, paediatrics and dermatology/venereology [1, 7, 8].

SPECIFIC CHARACTERISTICS OF NEONATAL, INFANT AND BABY SKIN

Skin of neonates and infants, in its build and function, does not differ greatly from the adults' skin. It consists of epidermis, dermis and subcutis. It contains appendages (sweat glands, sebaceous glands and hair follicles), blood vessels, lymphatic vessels and axon terminals. The anatomical specificities of neonatal, infant and baby skin result in differences in their functioning [4, 9, 10]. Neonatal skin gradually adapts to the extrauterine environment [3]. At the moment of baby's birth, its epidermis is completely formed, while its dermis and subcutis are not completely mature yet [9]. In the first year of life, intensive maturing processes occur in the skin, differing in intensity depending on the localization [10]; around the 6th month of life, most functions of this organ normalize [9]. Development of protective functions of the skin occur until the end of the first year of life [8, 11]. The build of the skin changes gradually as well, and after

2nd-3rd year of life, its anatomical build resembles the adult human's skin [4, 5, 9, 12].

Differences in the build of the skin in an adult and in a neonatal or infant consist mostly in: ratio of its area to the body mass, maturity of skin layers, growth, size and placement of glands, as well as type of hair [4, 5].

The higher ratio of skin area to body mass amounts to:

- in neonates – 2.3,
- in infants aged 6 months – 1.8,
- in children aged 5 years – 1.5,
- in children aged 10 years – 1.3 [13].

Children's and babies' epidermis, owing to a less intensive keratinization, is slightly thinner than adults'. [9] In neonates, its thickness amounts to 50 µm [4, 5]. Epidermis in a neonatal delivered at term, does not differ in build from the epidermis of an adult. Within epidermis, four morphologically different cell layers (keratinocytes) are distinguished: basal layer (*stratum basale*), spinous layer (*stratum spinosum*), granular layer (*stratum granulosum*) and cornified layer (*stratum corneum*). Basal layer is thin, and it consists of a single layer of cells, placed on basement membrane. This layer is built of keratinocytes, melanocytes and few Merkel cells. Melanocytes partake in a synthesis of skin pigment, melanin. [9] Basement membrane is properly developed, although the dermis-epidermis border is narrower. The cell layout in the spinous layer is less cohesive, as it contains less desmosomes. The granular layer may be interrupted or not clearly marked, visible clearly only on the palm surface of hands, or the sole surface of feet [4, 5]. The cornified layer is what conditions the protective role of skin to a large extent [9]. The cornified layer in babies and children is poorly developed [5, 12], until the age of one year consisting of several layers of loosely placed, flattened, lifeless cells lacking nuclei, called comeocytes [4, 5]. In adults, keratinocytes adjoin tightly, and are tiled over each other in many layers. The cornified layer contains keratin, lipids, and natural moisturizing factor (NMF), responsible for binding water and for skin's elasticity [4, 5, 10]. The surface of epidermis is covered by lipid coating (*sebum*), creating a system preventing excessive transepidermal water loss (TEWL). Its function consists in epidermis hydration, as well as regulating absorption of external substances [8, 10].

In the initial years of life, the neonate's epidermis is coated with white, wax-like substance called *vernix*

caseosa, which protects the foetus against maturation from the amniotic fluid, facilitates passage through the cervix, maintains optimal moisture level of the skin, protects against infective factors [9, 12], and due to the fact of containing lipid elements, it gives the skin a wax-like appearance [9].

Dermis is built of connective tissue and fibres placed in so-called amorphous grand substance. It consists of papillary layer located directly beneath the epidermis, and deeper located reticular layer, composed mainly of collagen fibres (fibrous connective tissue) [9]. Dermis thickness in neonates and infants is lower than in adults. Collagen fibril and elastic fibre bundles develop up to the 6th month of age [4, 5]. Blood vessels in neonates and infants are numerous, widened [4] and located shallowly [6].

Subcutis in a full-term neonatal is in a mediocre development, and it is constructed from small adipocyte lobules [4, 5]. We distinguish white and brown adipose tissue. White adipose tissue serves a role of isolation and is a source of energy [14], while brown adipose tissue (brown fat) forms ca. 5% of a neonate's body mass, and is a specialized energetic tissue, performing key role in thermoregulation processes, through the processes of oxidizing fatty acids. [9, 12]. Brown adipose tissue is located in certain areas of skin: suprascapular area, sternalis area, and in axillae.[9]

Sudoriferous glands are differentiated between eccrine and apocrine glands [9]. Eccrine sudoriferous glands are shaped similar to the ones in adults [4, 5] and they function from birth. They are concentrated, with highest density on hands, feet, and head (400/cm²) [9]. Full-term neonatal has six times more sudiferous glands per skin area unit than an adult, but their production efficiency is three times lower. Infants born earlier than 32nd week of foetal life do not sweat, and in infants born in 37th week of pregnancy, only the sudoriferous glands of the cephalic skin are active [14]. Apocrine sudoriferous glands do not develop until puberty [4, 5].

Sebaceous glands are developed at the moment of birth [4, 5]. They occur almost on the whole skin, with the exception of hands and feet. In majority, they form pilosebaceous units together with hair follicles. Their largest density occur on the hairy facial and cephalic skin. In a neonatal, they occur in highest density over the nose, forehead and cheeks [9]. Until puberty, their activity is limited [6].

Hair follicles are properly developed, and they contain thin, bright hair, which regress after 2-3 months, when darker, thicker hair grow in their place (so-called terminal hair) [5].

Neonate's skin is not colonized with bacteria [5, 7] and it is protected by vernix caseosa [4]. Coagulase-negative staphylococci (*Staphylococcus epidermidis*) gradually settle in the areas around fossa axillaris, genitals and hairy cephalic skin. *Staphylococcus aureus* is a contamination resulting from the baby's contact with medical personnel or the mother [7]. Over age, the baby's cutaneous flora enriches and it protects the skin from pathogenic microorganisms. [12]

All skin layers in neonates, infants and babies contain more water than is the case with adults. [4, 5]

After birth, the epidermic barrier is characterized by the skin's neutral pH of 6.2-7.5. The skin's surface acidizes rapidly, [4] and reaches 5.0-5.5 by the 3rd week of life [15]. The optimal skin pH is 5.5-6.0, and it prevents excessive bacteria growth on its surface [4].

Skin serves a number of key roles in maintaining the body's homeostasis [1]. The most important include: protection from the impact of external environmental factors, either of a mechanical, physical, chemical or biological nature [5, 9], regulation of transepidermal water loss (TEWL) [1, 15, 16, 17]. Through participating in maintaining balance between the body and its surroundings, it serves a key role in adapting to life [5]. It performs a vital function in thermoregulation, excretion, immunity processes of the organism [1, 5, 9], vitamin D₃ synthesis [4,9] as well as synthesis of the skin pigment melanin [7]. Skin is also a responsive sensor [5]. The receptive function of skin consists in receiving pain, touch, warmth and cold stimuli through nerve terminals [4, 5]. Touch facilitates and accelerates the development of the receptive function. After birth, close contact between mother and child is advisable [5].

Cutaneous barrier functions properly in full-term neonates. In mechanical protection, a key role is performed by the process of cornification (keratisation). Epidermis cells undergo constant renewal and desquamation, which allows the microbes on the skin surface to be eliminated. In addition, the mechanical immunity from external mechanical factors is aided by the condense tissue of epidermis, plenty fibres of dermis, and the corrugated shape of the connection between epidermis and dermis. Chemical barrier is dependent upon sebaceous coating, skin's acidic pH (4.2-5.6), and upon keratin, which is an acid-

resistant substance. Resistance to physical factors applies mainly to protection from ultraviolet radiation, through processes of melanogenesis, epidermis keratinisation and absorption of active solar radiation. In protection from microbes, the acid reaction of skin, as well as drying and the process of desquamation of the epidermis's upper layers, play the vital role. [9]

The key element ensuring thermal homeostasis in infants, is thermoregulation [9]. In infants, neonates (especially prematurely born) thermoregulation system is highly labile. This is caused by easy warmth loss through radiation and conduction through the thin epidermis, dermis and subcutis, as well as by distorted reaction to body's cooling, resulting from the central thermoregulatory system's immaturity [4, 5]. Body temperature in babies changes with the fluctuation of environment's temperature [14]. Skin of an adult, owing to the coils of blood vessels, the work of sudoriferous glands and the isolating role of subcutis, is an efficient thermos regulating system [4, 5].

Transcutaneous absorption (resorption) is of a crucial meaning in therapy with external preparations and the systemic toxicity of substances reaching baby's skin. Differences in permeability apply first and foremost to the cornified layer in epidermis, as well as to certain regions of skin. In babies, resorption occurs easily through skin folds, anogenital region, and mucous membranes. Absorption occurs through epidermis, glands and hair follicles. [9]

Skin's immunological system (skin associated lymphoid tissue – SALT) contains Langerhans cells, keranocytes, lymphocyte T-cells [4, 5], vessel endothelium cells, macrophages/monocytes and mastocytes [4, 5]. The immunological system of the skin performs its role in preventing skin cancers and fighting skin infections [9].

Skin performs a metabolic function. Under the influence of UV rays, 7-dehydrocholesterol is transformed into cholecalciferol, an inactive form of vitamin D₃ [3]

CLINICAL CONSEQUENCES OF INFANT'S SKIN IMMATURITY

The immature skin of an infant does not ensure a proper protection from the effects of external factors. Limited infection immunity, excessive response to irritants [3, 7, 11, 15], increased tendency to epidermis maturation [7], as well as easier occurrence of a reaction in form of bullae [7, 9] is observed.

Neonates and infants are in a higher risk of increased absorption of chemicals from the surface of epidermis, and of distortions in thermoregulation [2].

The very thin cornified layer of the epidermis, performs poorer in preventing water loss from the epidermis. The lipid coating on its surface is regenerated slower as well, which results in the occurrence of skin dryness symptoms [4]. During the initial two weeks of a baby's life, physiological desquamation of epidermis is observed. This results from the transition from the aquatic environment during the foetal stage, to the aerial environment past birth. The desquamation occurs around the wrists, ankles and on the lateral part of the corpus. After sequential 3 weeks, it recedes spontaneously, and, if occurred on a minor scale, it does not demand any special treatment [12].

Infant skin is characterized by a higher risk of disturbance in the structure and function of the epidermis barrier from the effect of soap and other cleaning factors, which can lead to skin surface dehydration, and in effect, to the increase in its damage vulnerability [7].

The increased body area to body mass ratio, is a cause of increased permeability, both for harmful substances and treatment products [9, 10]. Warmth loss through vaporizing plays a special role immediately after birth, when the neonatal is coated with amniotic fluid. The vaporizing can decrease the body temperature by 3°C during the first minutes after birth. Heat loss from vaporizing occurs during bath, and in every situation, when the skin is moist [14].

High, adverse body area to its mass, as well as large body area vulnerable to heat loss in comparison to the heat energy production capability, cause the necessity of intensifying the metabolic processes [14].

Acid reaction of the skin prevents excessive growth of microbes on its surface. Due to the higher pH level, and a not fully mature immunological system, the neonate's skin is more vulnerable to infections [15]. Features of the skin's immunological system's immaturity are observed in prematurely delivered neonates, which effects in the tendency of a more rapid colonization of their skin with microbes [9].

Due to the decreased melanin content, a higher harmfulness of ultraviolet exposure is observed [7]. In infants, the thinner basal layer and the more loose layout of cells in the spinous layer, as well as the lower number of melanocytes, result in higher permeability and deeper permeance of ultraviolet radiation. Natural

cutaneous barrier does not ensure a sufficient protection from the negative effect of ultraviolet radiation. Due to the deficiently developed subcutis, a poorer protection of an infant's body from the thermal activity of the solar radiation occurs, blood vessels become dilated, erythema reaction appears more rapidly, and in addition, it is more escalated than in an adult [18].

SKIN, HAIR AND NAIL CARE IN REGARD TO NEONATES, INFANTS AND EARLY CHILDREN

Skin care belongs to basic healthcare regarding infants and early children. Maintaining cleanness, elasticity and continuity of skin conditions the control over thermoregulation and water and electrolyte balance, the preservation of properly functioning protective barrier [4, 9] and the baby's comfort [9]. Washing and cleaning must not cause damage to the protective hydrolipid coating, nor induce any changes in the balance of the bacterial microflora. [6] Babies' mothers/guardians need to be instructed about basic rules regarding skincare: delicate cleaning, proper moisturising, preventing friction and maturation in cutaneous folds, as well as protection from solar radiation [11].

Foetal fluid is advisable to allow vernix caseosa to remain on the neonate's skin, due to its properties: antibacterial [1, 12], moisturizing and facilitating the neonate's adaptation to the extrauterine environment [1], as well as nourishing [12]. The exception should be made for neonates whom their mothers delivered with a diagnosed contagious condition [1].

According to World Health Organization's (WHO's) guidelines of 2003, as well as to the standpoint of a group of experts considering skincare in infants and early children (Scrape 2012 et al.), the first bath of a full-term neonatal should occur after its life functions and body temperature have stabilized [1, 11, 19], that is, after about 6 hours from the moment of birth [19], in a heated room, in water of a temperature $<37^{\circ}\text{C}$, and it should not last longer than 5 min. [1] For babies born earlier than the 26th week of life, it is advisable to rinse the neonate's body with sterile water [19]. The first bath of premature, dystrophic, endangered or diseased babies, should be performed only after the clinical state is fully stabilized [14].

The bath should be swift and efficient [14]. In order to prevent hypothermia, bath should take only several minutes (10 min). Body washing should be limited to

vulnerable places: face, neck, joint flexion areas. It is not advisable to remove the foetal liquid with washing [19].

In the expert group's standpoint presented by Szczapa et al. (2012) considering skincare in neonates and early children, bath is presented as more beneficial, as it causes lower heat loss, lower trans epidermal water loss (TEWL), lower loss of releasing the cornified layer of epidermis, and it has no influence on the frequency of skin infections and bacterial colonization of the baby's skin [1, 8].

A routine bath of an infant should be performed in a stably placed bathtub. Neonates and early children incapable of sitting, should be immersed in a bathtub to the half of their body. [1, 19] An advisable water temperature should approximate the body warmth: $37-37.5^{\circ}\text{C}$ [1, 7], and the air temperature should vary between $21-22^{\circ}\text{C}$ [1]. After the infant's bath, its skin should be dried with a soft towel. Healthy babies' skin needs no moisturising after bath [1, 2, 7]. Performing bath before bed facilitates falling asleep and improves the quality of sleeping [1].

Until the age of about 2 years, it is not advised to use shampoo for washing cephalic skin. With older children, it is advisable to use shampoos of an approximate pH to the one of the child's tears; such which do not irritate conjunctivae. [2]

A proper care of nails consists in clipping them in such a way that would not allow an infant to scratch itself with its plate's sharp edge. Fingertips are to be prevented from injury, as such could open doors to an infection [2].

In protecting infant skin from possible infection, the carer's hands' washing and disinfecting, prior to care procedures, as well as maintaining a proper hygiene of the entire house, are of crucial importance. [9]

USING SKINCARE COSMETICS

The main duty of infant skincare cosmetics is to protect the fragile skin from irritations and damage caused by external factors: atmospheric agents, friction and occlusion, e.g. caused by a diaper, irritating effect of e. g. the contents of urine and feces: ammonia and fecal enzymes [6]. Using cosmetics has primarily to ensure proper hygiene, provide protection from natural excretions, and reduce the effect of factors enabling irritation, skin drying and infection [4].

The main principle to be followed during bath and cleaning of the infant's skin, rests on the procedures not to dry the skin or destroy its natural acidity [9, 8]. The selection of care products should be individually adjusted to the child's age [4, 6, 12], the season of the year [12], the state of its skin, and the financial capabilities of the parents. Infant skin care products should be attested by the Institute of Mother and Child, ensuring that the contents are composed in accordance with the demands of infant skin, that no fragrances or colorants are included [4, 5], and they ought to be registered in the Institute of Occupational Medicine in Lodz [12]. When assessing permeation of neonatal skincare products, different transepidermal water loss (TEWL) as well as different stratum corneum hydration (SCH) should be taken into account [17]. Any contents with a potential of aggressiveness to the skin should be debarred [3]. Yet, many drugstore-available products are being advertised as “*safe for babies*”, “*with no preservatives*”, of the indicated pH, or “*dermatologically tested*”. Such information is not always true [2].

The Seventh Amendment to Cosmetics Directive, in force since September 11th, 2004, stresses the need to increase safety of using cosmetics on babies up to 3 years of age, by a precise toxicological estimation of the products [6].

According to the standpoint of the group of experts considering skincare in infants and babies (Szczała et al., 2012), liquid washing products softening water, not causing irritations or pH changes, should be used, while products moisturizing the skin of full-term neonates should not be in use until reaching a later stage of life [1]. Necessity of reducing the use of soaps and other washing products or syndents in the infant stage should be stressed. Such products can be used to wash the baby's axillae and groins [11]. In the skincare of infants and babies, one can use a soap fulfilling all requirements of using it in infants and babies, or yet more delicate gels containing new generation detergents [4].

In washing babies whose skin is regular, it is recommended to use syndents – synthetic detergents, nicknamed “*soapless soaps*”, free of colouring or aromatic agents, and with a minimized amount of preservatives; of a pH approximate to skin's physiological pH of 5.5-6.0 [12].

In their composition, infant cosmetics should contain, among other ingredients, provitamin B₅, vitamin E, EFAs, vegetable extracts acting as soothing,

coating or moisturizing substances (tilia herb extract, oat extract, mint extract), natural sun filters protecting from the harmful effect of UV radiation, while not distorting the synthesis of vitamin D₃ [12].

NAVEL CARE

The region remaining after the cut umbilical cord poses a potential infection risk. Sealing of the umbilical stump lasts from 5-8 to 20 days. The umbilical stump should be regarded as a potential portal of entry for infection [9].

There is no unequivocal opinion on the umbilical stump care.

After bath, it is advised to dry the stump with a clean swab, and leave the navel exposed to dry [16]. It is not advisable to use disinfectants or topical antibiotics; nor should the area be covered with any band aid; covering it with a sterile swab should be adequate [7]. Dipping the stub during bath has not been observed to pose a danger [16].

In the neonatal ward of Medical Academy in Wrocław, research was conducted to assess different umbilical stump care methods: “*dry*”, with Octenisept, and with 70% alcohol. The research proved the longest time of umbilical stump detachment for the group using 70% ethanol, and the shortest time for the group using the dry method. The highest occurrence (31.3%) of complications was observed in case of using 70% alcohol, compared to 20.8% with Octenisept, and the lowest occurrence (15.4) with the “*dry*” method. The average time for stump detachment was 24.4 days with 70% alcohol, 17.8 days in the group using Octenisept, and 13.4 days for the “*dry*” care method. [20]

“DIAPER” REGION CARE

The “*diaper*” region is especially vulnerable to topically irritative factors, including: urine, feces, detergents used as ingredients in washing agents, mechanical factors and wrongly selected cosmetics [21]. Infection periods and negligence in care procedures may result in an inflammatory condition called diaper dermatitis [9, 22].

Diapers should be changed every 3-4 hours, and after each micturition and defecation. Upon each diaper change, the “*diaper*” region should be cleansed with warm water [7] and a delicate syndent [20], or with soft care tissues, and carefully dried afterwards, with special attention paid to skin folds [7, 9].

To protect skin from feces and urine, oily preparations are used [22]. Gluteus region care creams/emulsions contain, among other ingredients: allantoin and D-panthenol [7]. On the other hand, the opinion about preparations based on zinc is not unequivocal [7, 22]. These preparations have the consistency of a paste, and, due to the fact, that they fit tightly to healthy skin, they cause irritations and provoke inflammation syndromes [22].

Opinions vary also with respect to using powders. In his work, Adam R. (2008) claims it not to be advisable to use powders in the area of perineum. In support of this claim, he finds that during application powder occurs to float in the air around the baby, which may cause aspirational pneumonia in some infants [22]. Meanwhile, Czarnecka-Operacz M. (2013) accepts powders containing talcum or starch to be used for protecting the skin from humidity. Powders should not be jointly used with liquids such as cleansing cream or skincare oil, for the sake of irritation risk [7].

An additional activity to consider is airing the perineum area past each diaper change [20].

Due to a high risk of diaper dermatitis posed mainly during infancy and early childhood, it is advisable to systematically observe the diaper area for any anomalous lesions or reddening, and to ensure adequate hygiene [21].

For cleaning their children's skin, many parents readily use skincare tissues containing light cleansing agents. It must be stressed, that the use of skincare tissues is to be limited for neonates and babies [7]. They should only be used in exceptional situations, mainly during travel, or at walks [5]. Research was conducted to prove, that in infants older than one month, the use of tissues resulted in no negative effects; they do not distort the skin's integrity, and the moisturising of the skin is comparable to the effect of the common procedure with cotton wool and water [23].

SKIN DRYNESS

In the first weeks of an infant's life the functioning of its sebaceous glands is inconsiderable. This leads to a total disappearance of the skin's lipid coating, possibly leading to skin dryness (*xerosis cutis*) [3, 12].

Also in healthy babies, in the autumn-winter season, skin dryness may appear, manifesting itself in flaky dandruff, mainly on the shin, shoulders and the corpus. In some infants, these lesions result from

pruritus. In case of such, it is advisable to moisturize the skin, or delicately grease it with emollients [3]. The use of emollients on neonates should be restrained during hot days [11].

Emollient is a neutral preparation used for baby skin care, available in many cosmetic forms, such as: unguent, cream, emulsion, balm, which acts as a softening, moistening and smoothing agent for the epidermis [2]. Emollients contain vegetable or animal lipids; they can also be produced synthetically, or extracted from mineral oils. Most often to be used are: oils (mineral or vegetable), hydroxycarbons (Vaseline, paraffin), waxes (beeswax, candelila), fats [7].

For babies with a dry skin, prone to atopy, emollient bath liquids, of a cleansing effect, which do not require an additional use of soap, are advised. In addition, systematic moisturizing and nourishing of the infant's skin can be achieved through the usage of skincare creams [4].

CRADLE CAP

Cradle cap is a result of excessive stimulation of sebaceous glands, occurring in the pilose areas of cephalic skin, as well as the areas around eyebrows. Initially small yellowish brown eschars, they may develop into an extensive, hard cast, if neglected.

Should any such lesions be noticed, warm compresses of neonatal skincare oil, or of olive oil, need to be used [12].

DIAPER DERMATITIS

In the diaper contact area, cutaneous lesions termed diaper dermatitis may occur in infants and babies. In the etiopathogenesis of these lesions, the most important are the irritants found in urine and feces (ammonia and enzymes), the increase in moisture content and in temperature in the diaper contact area, and its friction against the skin. Prolonged action of these factors weakens the epidermis barrier, leads to irritations, higher tendency to epidermis attrition, increased pH of the skin, and to creating perfect conditions for the growth of *Candida albicans* and for bacterial penetration. Several different adapting factors influence the frequency, the area and the course of occurrence: hygiene neglect, soaps, cosmetics, detergents, type and manner of use of diapers, diarrhoea, infections, medicines used, manner of

feeding, teething, hot summer, infants' skin immaturity, and a predisposition to atopy [5].

Diaper dermatitis occurs in almost every infant. It is most frequent to appear between the ages of 6 to 12 months in case of occurrence of the adapting factors. Clinically, three periods of different degree of lesions, are indentified, with a chance of transfer between one another. In the first, lightest period, erythema and outward epidermis desquamation occur in the genital, gluteus and groin regions. Lesions may also include abdomen and sacral area [12]. A prolonged action of irritant factors leads to the entering into second period. Within the erythema, papulae, pustulae and surface erosions appear, with a possibility of creating exuding surfaces. The lesions in groins and folds are aggravated, with infection of *Candida albicans* and bacteria. Third period consists in a prolonged disease process, and it is a result of continuous action of irritant factors. Erythemainfiltrative foci, papulae, bullae, deep erosions, and even ulcerations are observed [5].

In most cases, the lesions recede naturally, after increase in hygiene procedures' frequency [5]. Should the symptoms not recede over several days but aggravate, medical advice must be sought. Diaper dermatitis occurs especially often secondary to atopic dermatitis and sebaceous dermititis. It should be differentiated from common herpes and from epidermolysis bullosa [5]. A cutaneous inflammation of this region, unconceding to treatment, may also symptomize other diseases: candidiasis, psoriasis, disorder in zinc absorption, or Langerhans cell histiocytosis [21].

Intensifying skincare treatments, application of nappy pants with an absorbing gel insertion, and changing them every 3-4 hours, are of primary importance when treating diaper dermatitis. It is advisable to treat the lesion-affected skin with paste and mash containing zinc and talcum, which have a desiccating, protective and anti-inflammatory effect. In case of infection with *Candida albicans*, aqueous solutions of gentian, as well as antimycotic preparations, are effective. In bacterial infections, external use of antibiotics is advised, with systemic use exceptionally allowed [5].

In a multicentre comparative study by Kaszuba et al., skincare characteristics and tolerance were identified for Alantan, Bepanthen, Linomag and Sudocrem®, used topically on babies of 1 month to 3 years of age with diagnosed diaper dermatitis of a

mediocre intensity level. The study shows, that Sudocrem® is a product well tolerated by the vulnerable and fragile skin of infants and babies, and that it presented outstanding therapeutic effectiveness and action rate against diaper dermatitis, when compared with other products under the research [24].

CONCLUSION

Incompetent skincare of a baby disturbs the immature cutaneous-cell barrier. Using inadequate skincare cosmetics may cause the loss of the lipid coating, which effects in a lowered resistance to bacteria, viruses and fungi.

Information on the selection of proper baby skin care products should be delivered by general practitioners, midwives and nurses. In cases of doubt, difficulty or grievous course of inflammation, specialized dermatologist-venerologist consultation is strictly recommended.

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Received: 5.06.2015

Accepted for publication: 3.08.2015