Contact Dermatitis in Children

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From the moment of birth, children's skin is exposed to numerous environmental stimuli and can therefore be affected by a number of different clinical pictures of contact dermatitis [1–5].

18.1 Contact Irritation

Indeed, in children, and in particular in newborns, the skin is particularly sensitive to irritants. Factors that contribute to the high incidence of primary irritant reactions include the wide use of topical antiseptics, the prolonged skin contact with feces and urine, and the frequent occlusion conditions. The most common clinical patterns of primary irritant contact dermatitis are perianal dermatitis, dermatitis of the napkin area, and perioral dermatitis.

An irritant contact dermatitis to plastic hospital identification bracelets in the newborn has also been described [6].

18.1.1 Perianal Dermatitis of the Newborn

The incidence of this condition ranges from 5 to 20%, being higher in newborns fed with cow's milk formula than with mother's milk [7–9]. The attribution of this difference to a higher fecal pH in formula-fed infants [8] has not been confirmed [9]. Although the precise cause remains unknown it is likely that perianal eczematous eruptions are an irritant response to fecal constituents, although clearly individual susceptibility also plays a role.

In the majority of cases the affliction appears in the first 8 days of life. The erythema, of variable intensity, extends for about 2–4 cm around the anus; in more severe forms it is associated with edema and erosions. It resolves spontaneously in 1–2 months. It may be associated with napkin dermatitis.

18.1.2 Irritant Contact Dermatitis of the Napkin Area

Irritant contact dermatitis in the napkin area (neither the term "napkin dermatitis", used to

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G. Angelini et al. (eds.), *Clinical Contact Dermatitis*, https://doi.org/10.1007/978-3-030-49332-5_18

refer to any pathological process occurring in this zone, nor the term "diaper dermatitis", referred to the causal factor alone, are to be taken as synonyms) is linked to various factors whose relative importance and combination type can vary in each case [10–13]. However, it rarely occurs except when diapers are being used and there is some degree of urinary or fecal incontinence.

18.1.2.1 Etiology

One factor that has a role in the etiology of the complaint is friction between the skin and the diaper. In fact, the sites most affected are those where there is the greatest friction, namely the internal surface of the thighs and convex surface of the genitals and buttocks. It is very likely the friction that causes the initial alterations of the stratum corneum.

Maceration of the corneum in damp conditions is an important predisposing factor. Damp conditions make the skin more fragile and increase the skin susceptibility to friction damage. Thus, the simple combination of friction and damp may be responsible for many mild cases of irritant contact dermatitis in the diaper zone. Moreover, the barrier function is altered when the skin is damp, increasing the transepidermic permeability and so making the skin more prone to irritation [12, 14, 15]. In any case, in itself, prolonged skin occlusion can produce erythema, especially if the site is continually damp [16].

The presumed role of ammonia, produced through bacterial degradation of urinary urea, as an important causal factor is no longer supported, since the ammonia levels present in diapers in the morning and the presence of urea-degrading bacteria are not different in babies with or without primary irritant dermatitis of the napkin area [12, 13]. The bacteria isolated in affected babies do not release ammonia faster or in greater quantities than in healthy babies. Moreover, it has been shown that different concentrations of ammonia in the urine do not cause significant erythema when applied in occlusion for 24 hours on babies' skin, whereas erythema does arise when the skin is previously abraded [12]. Therefore, ammonia can aggravate the eruption when the skin integrity is impaired.

The urinary pH may have a role, not due to a direct effect on the skin but due to the increased action of fecal proteases that accompanies the higher pH values [15]. Ureases, produced by various fecal bacteria, increase the pH in the presence of urine, which would explain the observation that babies fed cow's milk are more prone to dermatitis than breastfed babies, since the feces of the former babies are more easily colonized by bacteria producing ureases [17]. Finally, urine seems to increase the transdermic permeability to a greater extent than plain water does [15].

Feces have an irritant action on the skin due to their enzymes content, produced by various bacteria [18, 19]. The irritant effect of these enzymes is reinforced by other factors such as the altered barrier function and high pH.

Additionally, there is still widespread use of liquid soaps [20] and talcum powder, both of which can increase the risk of irritant dermatitis.

Quantitative studies have demonstrated that the bacterial flora isolated in children with irritant contact dermatitis of the napkin area is no different from those isolated in the same area in healthy children [13, 21]. It has also been shown that the type of dermatitis of the napkin area does not affect the bacterial flora [22].

Instead, an etiological role of *Candida albicans*, isolated in most cases of dermatitis of the napkin area but only rarely in the same area in healthy children, is much more likely [13, 21, 23]. There is also a correlation between the severity of the dermatitis and fecal levels of *C. albicans* [11]. However, the role of *C. albicans* is complicated by the issue of the relation between dermatitis of the napkin area and candidosis in the same area. According to most authors, the latter may be considered a complication of the former. Experimental maceration of the skin by occlusion is a requisite in order to achieve engraftment of *C. albicans* [24], and this fungus can colonize the skin affected by dermatitis of the napkin area when it is present in the feces.

Importance has often been attributed to detergents and antiseptics used to wash diapers, in the onset or increased severity of the complaint. However, the rinsing action of modern washing machines makes persistence of sufficient quantities of these substances on diapers as to cause problems an unlikely event. Moreover, the observation of the dermatitis also when disposable diapers are used implies that such factors do not have a significant role.

The use of broad-spectrum antibiotics in infants seems to increase the incidence of irritant dermatitis of the napkin area [25], in parallel with increased values of *C. albicans* at the level of the rectum and skin in these infants.

In short, the precise etiology of the dermatitis is still unknown. Friction and maceration are important predisposing factors. Proteolytic and lipolytic enzymes have an irritant action, above all when the barrier function is impaired and the environment is characterized by a high pH. The increased pH is linked to the action of fecal ureases on the urine and to the newborn's diet. When present in the feces, *C. albicans* aggravates the complaint.

18.1.2.2 Clinical Features

Irritant contact dermatitis of the napkin area does not generally manifest before the third week of life. It most often starts between the third and the twelfth week, showing a peak between the seventh and twelfth week.

The incidence of the complaint is not known but very probably it is rarer than in the past, due to the generalized use nowadays of disposable diapers, even if about 50% of infants are affected to some extent in some moment of their infancy [11]. Both sexes and all races develop the complaint.

The most common clinical form is erythema of the convex surfaces in direct contact with the diaper: the buttocks, genitalia, lower abdomen, pubic area, and upper thighs (Figs. 18.1, 18.2, 18.3, and 18.4). The groin folds are generally

Fig. 18.1 Contact dermatitis of the napkin area

Fig. 18.2 Contact dermatitis of the napkin area

Fig. 18.3 Contact dermatitis of the napkin area with erythema of the convex surfaces

Fig. 18.4 Contact dermatitis of the napkin area with erythema of the convex surfaces

spared. In some cases, the eruption is confined to the diaper margins and brought on by skin friction or prolonged contact with clothing at the edges of the diaper.

Another described pattern is a localized eruption at the lateral areas of the upper thighs and buttocks, bilaterally or more often unilaterally, affecting the areas in direct contact with the bands that fasten the diaper [26, 27]. This effect could be due to irritation, but could also be an effect of contact sensitization to rubber or glue chemicals [28].

In acute forms, the erythema has a glazed appearance and is followed by epidermic detachment. Long-lasting cases present fine desquamation. A post-inflammatory hypopigmentation can persist in racially pigmented infants. Occasionally, the picture is of vesico-erosive type, evolving to superficial rounded ulcerative lesions with raised crater-like margins. Involvement of the genitals can lead to dysuria, or to acute urine retention in male newborns, severely affecting the gland.

Another clinical variant is intense erythema affecting the deepest parts of the folds, with clear, scaly margins along which small pustules are evident. The latter are scattered also in the peripheral zones of the erythema (satellite lesions). The eruption is associated with a remarkable proliferation of *C. albicans*, present also in the feces.

A less common clinical variant is psoriasiform erythematous lesions with fairly adherent desquamation, of micaceous type. The eruption (commonly termed napkin psoriasis) features an acute onset and rapid spread [29]. It has been noted that children with this clinical variant have a greater risk of onset of true psoriasis already in childhood or later as adults [30–33].

The herpetiform clinical variant is very rare; it shows vesico-pustulous erosive lesions (similar to those of herpes simplex) [34], and superimposed gluteal granulomas, due to the prolonged use of topical corticosteroids.

The eruption can also affect distant sites, such as the lateral faces of the thighs, internal faces of the knees and heels, especially if particularly occlusive plastic diapers are used. In some cases an acute disseminated eruption with no apparent cause is observed: the clinical

aspect is of nummular lesions of the trunk and confluent erythematous-squamous areas at the axillae and the neck.

Irritant dermatitis of the napkin area can also be the first sign of atopic dermatitis or of childhood seborrhoeic dermatitis. The histological picture is generally of a primary irritant dermatitis, with epidermal spongiosis and mild inflammatory changes in the dermis.

As regards the prognosis, primary irritant napkin dermatitis nearly always responds to treatment and resolves when diapers are no longer used. However, the complaint may be the first sign of susceptibility to a chronic dermatitis, such as atopic dermatitis or psoriasis.

18.1.2.3 Differential Diagnosis

In the second week of life the diaper zone can be affected by a rash featuring confluent erythematous patches with distinct margins. The borders of these lesions present desquamation or pustules, and around them there are usually satellite pustules. This clinical picture, together with oral candidosis, is typical of neonatal candidiasis, an infection transmitted to the newborn at birth. Differential diagnosis of this rash must be made with a *Candida* infection superimposed on dermatitis of the napkin area.

In cases of primary irritant napkin dermatitis resistant to suitable treatment, differential diagnosis with a zinc deficiency should be taken into account, especially in cases of premature birth. Even if plasma levels of zinc are normal this does not exclude the diagnosis. A zinc deficiency is normally associated with involvement of the perioral zones, erosive paronychia and lesions of the palmar creases of the hands.

One of the most frequent clinical pictures of Langerhans' cell histiocytosis in children is intertrigo, that appears during the first weeks of life. Initially, the eruption presents as small yellowish papules, that tend to become confluent and ulcerate. The scalp is almost always involved, and in particular the retroauricular folds.

It is also possible to observe, albeit only occasionally, dermatophyte infections of the napkin zone. The clinical aspect, that may be modified by topical corticosteroid treatment, may be difficult to distinguish, at differential diagnosis, from a postprimary irritation of the same site.

18.1.2.4 Treatment

In each case the individual etiological factors must be analysed. Particular attention should be paid to the diapers. The use of good quality disposable diapers, particularly those containing absorbent gelling materials, yields a lower incidence of dermatitis than the traditional washable cotton diapers [11, 35–37]. The gels absorb about 80 times their own weight of water: this reduces the skin wetting and hence maceration [38]. With this type of diapers the skin pH values remain within normal range [35]. Highly absorbent diapers with added "breathable" microporus film membranes reduce the prevalence of *C. albicans* and the incidence of dermatitis [39]. Moreover, the use of diapers whose internal layer is impregnated with an emollient, usually white soft paraffin, reduces the severity of the dermatitis [39].

Frequent changing of diapers is essential, especially after defecation. The use of antiseptic solutions before washing cotton diapers is a common and adequate measure: quaternary ammonium compounds are the best choice, and benzalkonium chloride is perhaps the one most commonly used. Machine washing is most appropriate but "biological" detergents should not be used. Drying diapers outside in the sun makes them stiff and should be avoided.

Care of the skin should be scrupulously carried out at each diaper change. If the diaper is dry a water-repellent emollient like white paraffin can be used. If wet, then the skin should be washed with water and an emollient milk, dried and then treated with the water-repellent cream. This must be done very gently, with minimum friction. The use of talcum powder and other non prescription preparations should be discouraged. Topical corticosteroids are useful, preferentially 1% hydrocortisone in an ointment base, to be applied twice a day after the bath.

However, it should be remembered that they will have a greater power of absorption in occlusion. It is important to bear in mind that in male newborns it is possible that corticosteroids absorption may interfere with the descent of the testes [40]. A superimposed *Candida* infection must be treated with topical antimycotics.

18.1.3 Contact Cheilitis and Perioral Dermatitis

These complaints, linked to irritant contact with foods (citrus fruits, tomato, fish), can develop above all in the first 2–3 years of life in both atopic and non atopic subjects. The irritation can also be induced by saliva, especially if the child continually licks the lips and surrounding skin ("lick eczema") (Figs. 18.5, 18.6, 18.7, 18.8, and 18.9). If objects are sucked on, this may be the cause of perioral dermatitis among infants and very small children [5]. Erythema, desquamation and dry skin are associated with characteristic burning, pricking sensations, pruritus and tingling.

18.2 Contact Allergy

Contact sensitization and allergic contact dermatitis are common in children and more frequent than was previously believed [1–5, 41–64]. In the past, allergic contact dermatitis was considered rare in children on two grounds: that there might be reduced exposure to allergens and that the child's immune system could be less susceptible to contact allergens. Various studies in more recent years have demonstrated that the incidence of contact allergy in children increases with age, while the percentage of positive reactions to patch tests ranges very widely, from 25.2 to 95.6% [41–64]. This great variation is likely due to differences in study design, patient

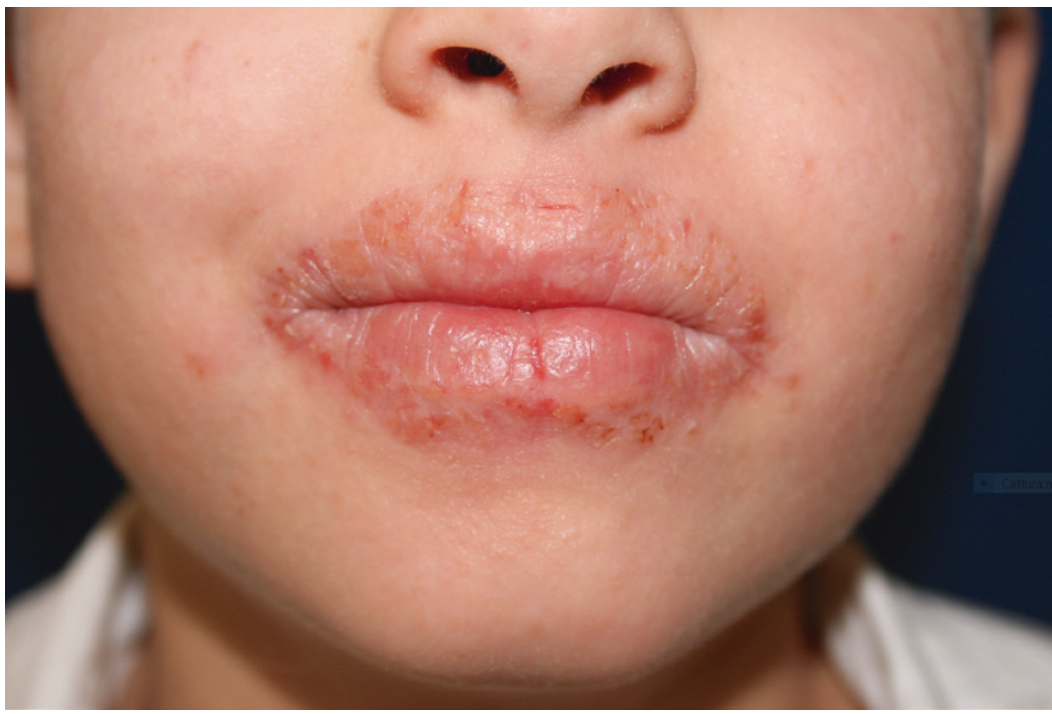

Fig. 18.5 Irritant contact cheilitis and perioral dermatitis induced by saliva

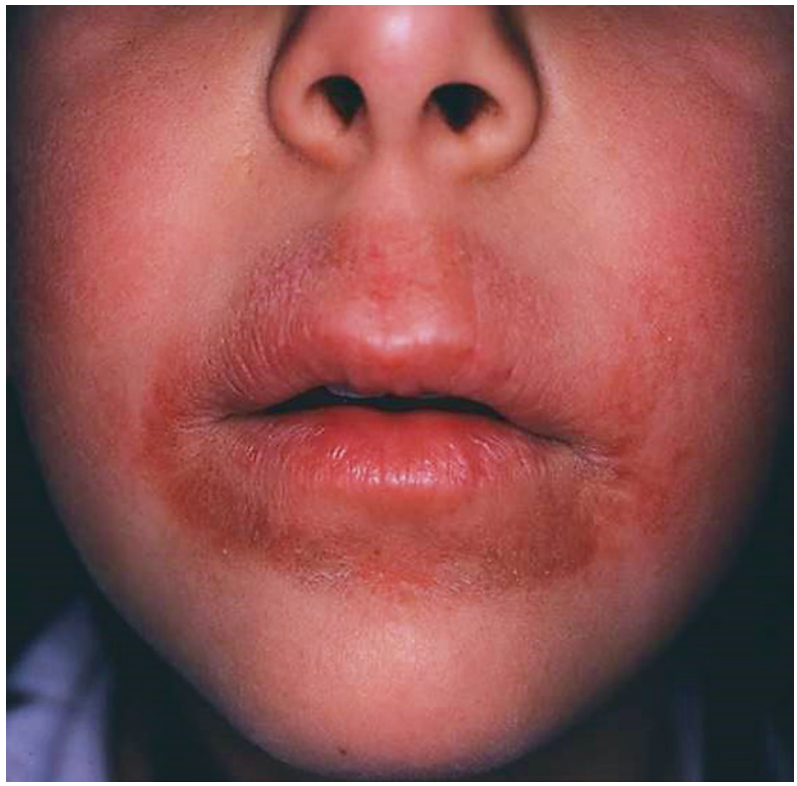

Fig. 18.6 Irritant contact cheilitis and perioral dermatitis induced by saliva

Fig. 18.7 "Lick eczema"

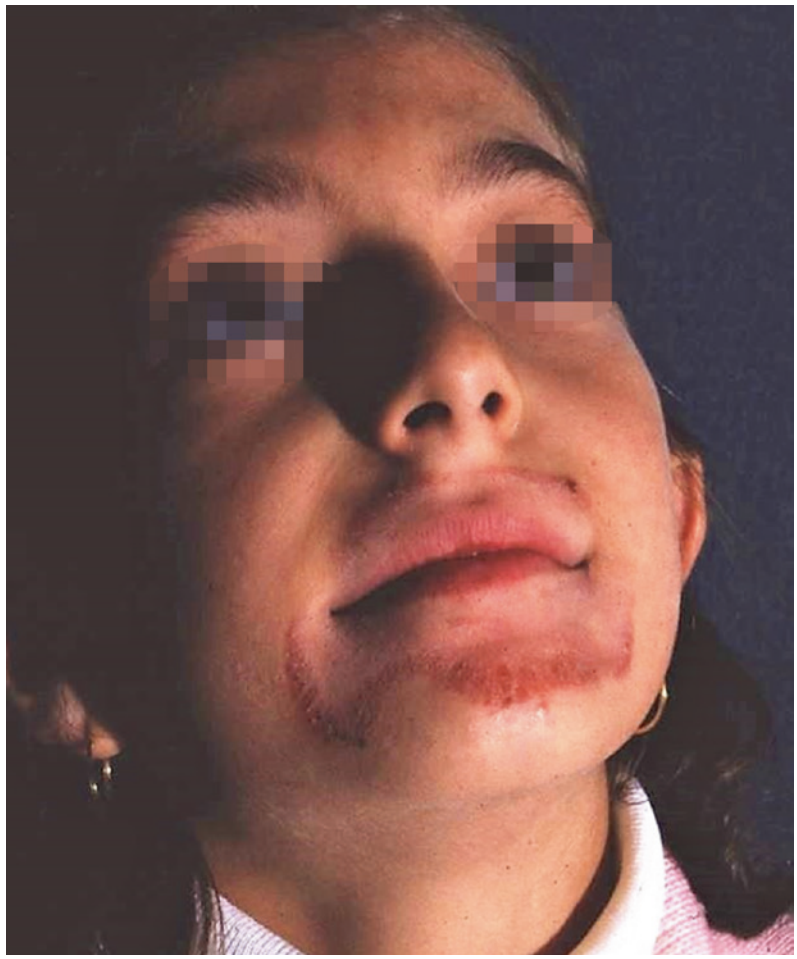

Fig. 18.8 "Lick eczema"

selection, and patch test methodology. Reports in literature also show that allergic contact dermatitis accounts for up to 20% of all types of dermatitis in children [43, 64].

18.2.1 Clinical Features

As regards gender differences, although some authors have reported a comparable incidence in males and females [51, 65, 66], others have observed a higher frequency in females [67], especially in view of the problem of nickel allergy in the population over the age of 12 years [50, 53].

As to age, in fact, most studies have demonstrated an increased frequency of contact sensitization with age, related to the increased exposure to environmental allergens. This also applies to the development of multiple sensitivities [48]. Contact allergy seems to be rarer in the first months of life, as also demonstrated in experimental studies. Sensitization to pentadecylcatechol was obtained in 44% of children below 1 year of age, in about 58% between 1 and 3 years old, and in 87% of children between 4 and 8 years old [68]. Cases of allergic contact dermatitis are also been reported in newborns between 1 week and 7 months old [58, 59].

The clinical manifestations in children are generally the same as those in adults. The localization of the dermatitis is often indicative of the allergens involved [3–5]. Also in children, "id"

Fig. 18.9 "Lick eczema"

reactions at a distance from the initial focus can be observed, as well as generalized forms, pictures of systemic contact dermatitis or airborne contact sensitivity (e.g., methylisothiazolinone when the child is exposed to paint in rooms) [69, 70]. Moreover, children can also become sensitized through contact with products used by their parents (connubial contact dermatitis) [71], or present non classically eczematous [3, 45] and nummular forms [72].

Concurrent contact allergy may be present in children affected by atopic dermatitis and should be suspected when the dermatitis is not controlled by conventional topical treatment, or extends to new areas. Patients with atopic dermatitis are chronically exposed to various sensitizers present in topical medicaments and skin care products.

P*ersonal Experience.* From 1998 to 2008, we have studied 1,899 children (1032 females and 867 males), aged between 0 and 12 years (mean age: 7.6 years), consecutively observed either for *de novo* contact dermatitis on previously healthy skin or skin affected by a preexisting skin disease (dermatitis of the napkin area, atopic dermatitis, infantile seborrhoeic dermatitis). Of these children, 236 (12.4%) were affected by atopic dermatitis [45, 46].

Patch tests were done with the SIDAPA (Italian Society of Allergological, Occupational, and Environmental Dermatology) baseline test series at the same conditions as in adults. When indicated by the clinical history, further products used by the little patient were tested. The response to the patch tests was assessed at 48 and 72 h. The relevance of positive responses was established according to the patient's clinical history [73].

Contact sensitization was revealed in 514 (27.1%) children; the remaining 1385 patients (72.9%) were likely affected by irritant contact dermatitis. The percentage of positive reactions increased with age, from 2.5% in the first year of life to 34% by the age of 12. In the first 6 years of life the percentage was 19.6%, and reached 30.4% between the seventh and twelfth

year of life. There was a higher percentage of sensitization in females (30.9%) (Fig. 18.10) than males (22.5%). Polysensitization was found in 267 children (51.9%), with a mean number of positive reactions per child of 1.9. No significant differences were found in the percent positive reactions between children with atopic dermatitis (21.6%) and children without the disease (27.3%). The current or past clinical relevance was 89% in non atopic dermatitis subjects and 70% in those with atopic dermatitis.

In the population of non atopic children, nickel sulfate, potassium bichromate, thimerosal, fragrance mix, cobalt chloride and thiuram mix were responsible for the highest number of positive reactions. Allergy to nickel was more frequent in girls, while chromium and mercaptobenzothiazole were prevalent in boys. In the age range from 0 to 6 years the most common allergens were thimerosal (8.3%), fragrance mix (5.1%), and nickel (4.4%), whereas in the age range from 7 to 12 years the main substances were nickel (9.8%), chromium (5.6%), and cobalt (4.1%).

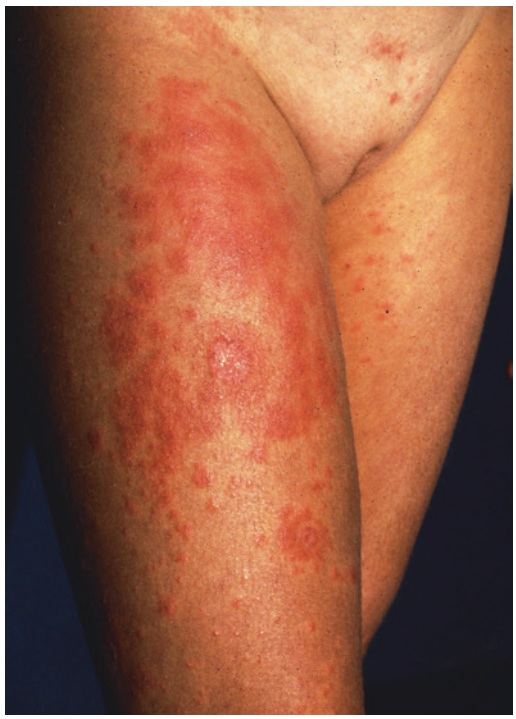

Fig. 18.10 Allergic contact dermatitis due to pyrrolnitrin

In the population of atopic children, the number of positive reactions ranged from 0% in the first and second years of life to 38.5% by the age of 12. The most frequent positive reactions were to nickel (7.1%), wool alcohols (6.1%), and fragrance mix (5.1%).

The sites affected by contact dermatitis depended on the allergen responsible. Involvement of the regions coming in contact with metals (ear lobes and periumbilical region) was very common (Figs. 18.11 and 18.12), as was involvement of the feet due to contact with shoe components (Fig. 18.13). Unlike what might be expected, contact allergy seemed to be fairly rare in the napkin region; in fact, only in 2 children were positive reactions elicited: a non atopic boy aged 5 months with contact allergy to pyrrolnitrin (Fig. 18.14), and another non atopic boy of 7 months with contact allergy to fragrance mix. In the literature, too, there are few reports of allergy to rubber components in diapers [26, 28] (Fig. 18.15).

The high prevalence of irritant contact dermatitis (72.9%) we observed may be due to various different reasons. Abouth one third of the subjects tested was under the age of 6, a period of life when the incidence of contact allergy is notoriously lower than at older ages. Most of the children tested in the first two years of life were affected by napkin dermatitis, on which the onset of contact allergy was rarely observed, despite widespread use of topical agents. Finally, it cannot be excluded that in some cases the culprit allergen was not tested.

In conclusion, this study in a large population of unselected children demonstrated that contact allergy is equally common in children and adults. The disease increases with age, related to the ever more common environmental exposure to potentially sensitizing substances. In children with atopic dermatitis the incidence of contact allergy is not different from that in non atopic subjects. Contact allergy acquired in infancy has important repercussions on the child's life and may play an important role in the decision about the future occupation as an adult.

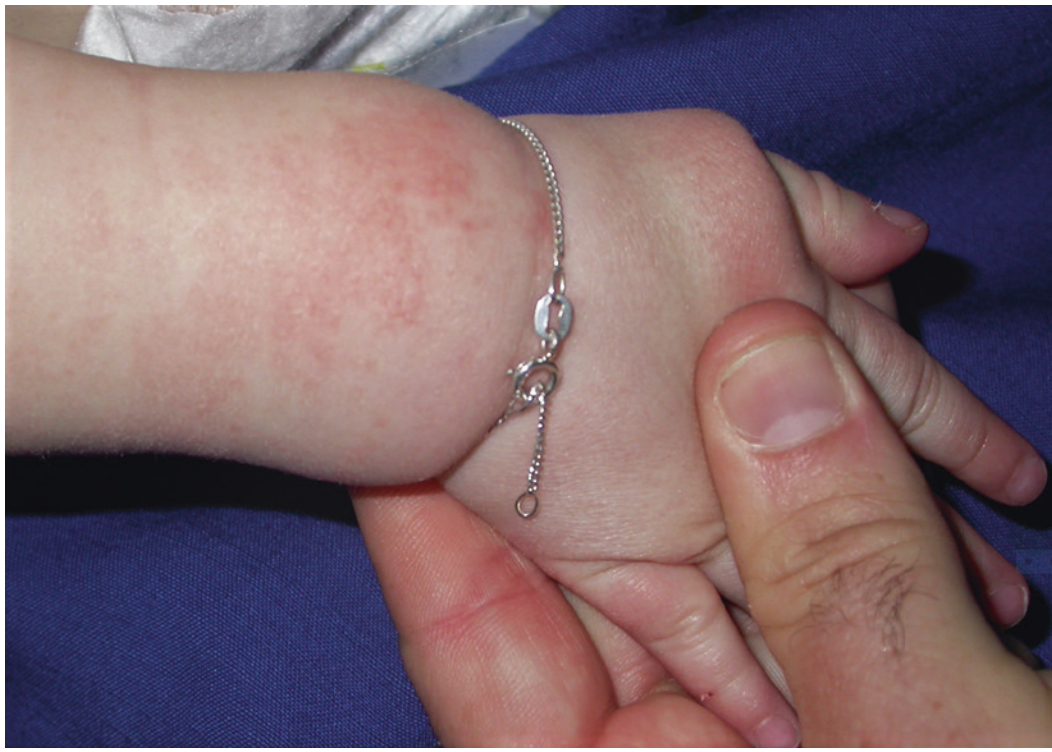

Fig. 18.11 Allergic contact dermatits due to nichel

18.3 Patch Testing

Patch testing in pediatric patients is considered safe. The general view is that children can tolerate the same patch test concentrations as adults [3–5], even if some authors propend for a reduced concentration. Although there are no specific studies in children, the risk of active sensitization should be extremely low, as it is in adults [74]. The only problems in children are of a technical nature, in view of the small patch test surface, their hypermobility (that can cause detachment of the patch test material, in particular in younger children), and the parents' possible reluctance to allow patch testing.

Owing to the different type of exposure in children as compared to adults, and the problem of the limited patch tests area available, it is advisable to use a reduced standard series, with added allergens based on the patient's clinical history. In very young children with an even more limited test area, the selection of the allergens becomes still more critical. In some cases it may be necessary to perform the tests in several stages. Moreover, the pediatric patch test series must be adapted to the geographic area, since the exposure pattern can vary from one nation to another (Table 18.1). Reading of the patch tests is done as in adults, two readings being recommended on day 2 and days 5–7, since studies in adults have shown that a certain percentage of contact allergies is missed if late readings are not done [75] (see Chap. 23). Although it is extremely challenging, close assessment of the relevance of positive reactions is of the utmost importance.

18.4 Common Allergens

18.4.1 Metals

Nickel is the most common allergen in children [46, 76–78]. Ear piercing is one of the major

Fig. 18.12 Allergic contact dermatits due to nichel in metallic buckle

risk factors, so the frequency of nickel allergy is higher in girls. In any case, there are numerous sources of exposure to nickel in children: jewelry, metal buttons, zippers, jeans buckles, metal toys, metal accessories on shoes, etc. Orthodontic appliances containing nickel may be at the origin of the sensitization, and may cause stomatitis, cheilitis, perioral dermatitis, and even generalized eruptions and systemic contact dermatitis [79, 80].

When testing infants, and in particular atopic children, with nickel the risk of false-positive reactions should be borne in mind: in fact, pustulous reactions can be observed [46].

Allergy to cobalt is often associated with nickel allergy; indeed, the sources of exposure to the two allergens are similar. Other major sources of cobalt in adolescents are tattoo ink, make-up, and leather [81].

The most common source of sensitization to chromium in children seems to be leather, especially leather shoes.

Important sources of aluminium exposure in children are aluminium-adsorbed vaccines. Clinically, the reactions are often long-lasting (months to years), pruritic subcutaneous nodules at the injection site [82]. Aluminium allergy tends to decline over time [83, 84]. Aluminium allergy can also be due to aluminium-containing extracts used for hyposensitization to type I allergens [83, 84], or to treatment with aluminium-containing eardrops, toothpastes, antiperspirants, and other skin care products [85].

18.4.2 Pharmaceutical Products

Various active principles and additives of topical medicaments have been reported as allergens in children, including antibiotics, antimicrobials, non steroidal antiinflammatory agents, preservatives.

Thimerosal is a frequent allergen in young children [46, 86, 87]. It is used as an antiseptic and preservative agent for contact lens solutions, eyedrops, and vaccines; these last are the

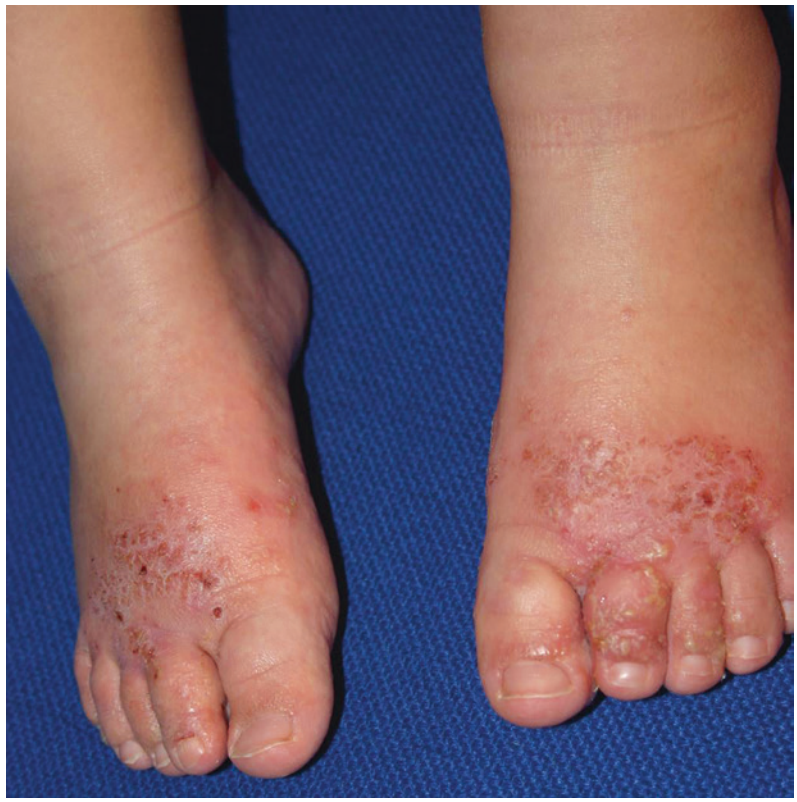

Fig. 18.13 Allergic contact dermatits from rubber shoes

most common cause of such an allergy. In most cases, positive reactions to thimerosal are not relevant to the patient's skin conditions. Contact allergy to thimerosal does not seem to contraindicate future vaccinations, provided that they are administered intramuscularly. Another point to be taken into account is the risk of crossreactions with other mercurials and with the photoproduct of piroxicam (chemically related to the thiosalicylic acid component in thimerosal) [88].

18.4.3 Skin Care Products and Cosmetics

Cosmetics are one of the most common causes of allergy, especially in adolescents. All the different ingredients can be implicated, particularly fragrances (perfumes, deodorants, moisturizers). Preservatives are another frequent cause of contact allergy in children. Methylisothiazolinone, for example, is present in many products for children (wipes, creams, liquid soaps, shampoos). It is also used in the preservation of paint and can cause airborne allergic dermatitis in sensitized subjects [69].

Contact allergy to sunscreen ingredients has also been reported as a possible cause [5].

18.4.4 Toys

Preservatives, such as parabens, methylchloroisothiazolinone, and 2-chloro-N-methylchloracetamide in play gels have been described as a cause of acute dermatitis [89–91]. Cases of contact allergy to plastic materials have also been reported [92].

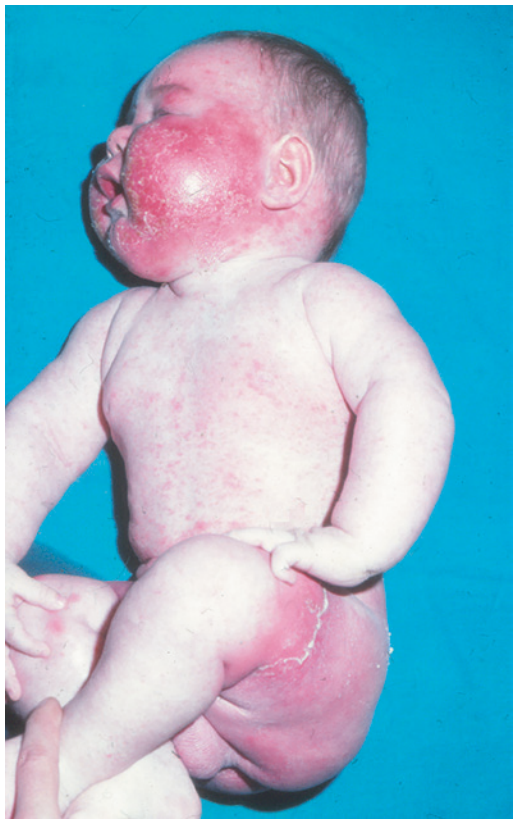

Fig. 18.14 Allergic contact dermatits of the napkin area due to pyrrolnitrin and id-reaction

Table 18.1 Suggested pediatric baseline series

Nickel sulfate (5% pet.)
Cobalt chloride (1% pet.)
Potassium dichromate (0.5% pet.)
Fragrance mix I (8% pet.)
Fragrance mix II (14% pet.)
Balsam of Peru (25% pet.)
Neomycin (20% pet.)
Paraphenylenediamine (1% pet.)
Thiuram mix (1% pet.)
Mercaptobenzothiazole (2% pet.)
Mercapto mix (1% pet.)
Carba mix (3% pet.)
Paraben mix (16% pet.)
Formaldehyde (1% aq.)
p-tert-Butylphenol formaldehyde resin (1% pet.)
Colophony (20% pet.)
Wool alcohols (30% pet.)
Methylchloroisothiazolinone/methylisothiazolinone (0.01% aq.)
Thimerosal (0.1% pet.)

18.4.5 Shoes and Sport Equipment

In cases of a persistent foot eruption, a possible allergy to shoe components, such as rubber (mercaptobenzothiazole, thiocarbamates, thiuram derivatives), glues (*p-tert*-butylphenol formaldehyde resin), leather (potassium dichromate), and dyes (paraphenylenediamine and other disperse dyes in leather and socks), must be taken into account.

Rubber additives are implicated in cases of dermatitis provoked by sports equipment, as well as thiourea derivatives, and textile dyes [93].

18.4.6 Tattoos

Even in young children, an important source of contact allergy to paraphenylenediamine is temporary black henna tattoos, typically made while on vacation. This is an important allergy, bearing in mind the risk of possible future reactions to hair dyes, azo dyes in textiles, rubber chemicals, sulfonamides, local anesthetics (benzocaine, procaine), and *p*-aminobenzoic acid in sunscreens [94].

18.4.7 Plants

While playing, children often come in contact with plants. In a review on plant dermatitis in Australia, children are considered at risk [95]. The *Rhus* species (poison ivy, poison oak, poison sumac) are most often involved in contact allergy in children in the USA: exposure may be direct or indirect (transfer of the allergen via pets), the latter being more difficult to diagnose [96].

In Australia, cases of bindii (*Soliva pterosperma,* of the Compositae family) dermatitis have been reported. The dermatitis affects the palms of the hands, soles of the feet, elbows and knees and is mostly observed in boys who play sports. The eruption, that appears in the spring and early summer, persists for months and manifests with papulous lesions and sometimes desquamation and pustules [97].

Fig. 18.15 Allergic contact dermatits due to rubber elastic of pants

Many plants derivatives present in cosmetics can, of course, induce allergic reactions [98].

18.4.8 Occupational Allergens

Some occupational activities can induce contact sensitization in adolescents; the most common among these are hairdressing, construction works and metal works [48, 53, 99].

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