

### ALERGIA CUTÂNEA EM CRIANÇAS

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**RESUMO** – No diagnóstico de dermatite de contacto alérgica é fundamental, tal como nos adultos, a história e localização das lesões, mas alguns produtos e/ou hábitos característicos das crianças e adolescentes podem ser responsáveis por quadros clínicos pouco usuais. Os alérgenos mais importantes na criança são os metais, como o cromo (calçado) e o níquel (por vezes associado ao cobalto ou paládio; este último também responsável por reacções granulomatosas de contacto), sobretudo nas jovens, dada a popularidade dos adornos baratos. Recentemente, surgiram entre os jovens outras fontes de sensibilização, como os telemóveis. Outros potenciais alérgenos são os ingredientes de produtos tópicos, sobretudo antissépticos; o mercúrio e derivados ainda são utilizados nalguns países, mas as reacções alérgicas, mesmo em crianças pequenas, não são em geral clinicamente relevantes. Cosméticos, em particular de limpeza cutânea, podem originar sensibilização a componentes das fragrâncias ou conservantes. Derivados da borracha, muitas vezes responsáveis por dermatite ao calçado ou às fraldas, resinas e plantas também podem ser fonte de sensibilização. Adicionalmente, alguns alérgenos ocupacionais (p. ex, cabeleireiras, construção civil e metalúrgicos) também ocorrem em adolescentes. A alteração da legislação, referente à presença de alérgenos em produtos comuns, pode levar à redução da incidência de alergia de contacto em crianças (p. ex, ao níquel nos adornos e telemóveis e às tintas capilares em menores de 16 anos). O uso de p-fenilenodiamina nas tatuagens temporárias de henna continua a ser um problema. As provas epicutâneas em crianças são seguras; a maioria dos autores consideram as reacções irritativas pouco frequentes (excepto em atópicos, em particular a metais) e podem utilizar-se as mesmas concentrações que no adulto. No entanto, não se pode excluir a possibilidade de reacções falso+ ou falso- e, na suspeita de potencial irritativo, devem também testar-se concentrações inferiores. Dada a reduzida área cutânea para testes, a menor exposição ambiental a alguns alérgenos e a hipermobilidade das crianças pequenas, alguns autores recomendam utilizar séries standard reduzidas, embora outros alertem para o risco de se ignorarem muitas reacções. De qualquer modo, é importante ter em conta a história e o quadro clínico e testar, sempre que necessário, outros possíveis alérgenos e produtos pessoais.

**PALAVRAS-CHAVE** – Dermatite; Alergia de Contacto; Criança; Alérgenos; Hipersensibilidade.

### SKIN ALLERGY IN CHILDREN

**ABSTRACT** – As with adults, the history and localization of the dermatitis are crucial for the diagnosis of allergic contact dermatitis, certain contactants and/or habits that are characteristic for the child/adolescent may be responsible for unusual clinical presentations. The most important allergens in children are metals, such as chromium (in shoes) and nickel (sometimes associated with cobalt or palladium, the latter also giving rise to contact granulomas), particularly in girls, due to the popularity of cheap jewellery. More recently, other sources, like cell phones, emerged among young adults. Other allergens identified are ingredients of topical pharmaceutical products, particularly antiseptic agents; mercury and its derivatives are still used in some countries, but allergic reactions, even in young children, are most often not clinically relevant. Cosmetics, particularly skin care products and wipes, may give rise to sensitization to fragrance components or preservative agents. Rubber derivatives, often responsible for shoe or diaper dermatitis, resins, and plants may also be among the sensitization sources involved. Moreover, certain occupational allergens (e.g., those associated with hairdressing, construction, and metalworking) are found in adolescents. Changing regulations concerning the presence of allergens in common products, the incidence of contact allergy in children might decrease in the future (e.g. nickel in jewellery and mobile phones and hair dyes in children below the age of 16 years). The use of p-phenylenediamine in temporary henna tattoos still remains a problem. Patch testing in children is safe; most authors consider that irritant

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reactions are not frequently observed (except in atopics, particularly with metals) and the same patch test concentrations as in adults can be used. However, the possibility of false-positive and false-negative reactions has to be considered and, if there is doubt about irritancy, lower patch test concentrations should also be tested. Due to reduced test surface area, diminished environmental exposure to certain allergens and particularly hypermobility of young children, testing with an abbreviated standard series is recommended by some, although others warn that many reactions may thus be missed. Anyway, it is important to take into account the history and clinical picture and to always add possible other allergens and personal products used.

**KEY-WORDS** – Dermatitis; Allergic Contact; Child; Allergens; Hypersensitivity.

**Conflitos de interesse:** Os autores declaram não possuir conflitos de interesse.  
*No conflicts of interest.*

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Allergic contact dermatitis in children has always been considered rare; their eczematous conditions have mostly been attributed to endogenous factors such as atopic or seborrheic dermatitis, sometimes in association with irritancy induced by soap, clothing, etc. One of the reasons for this would be their reduced exposure to environmental allergens (professional, cosmetic, pharmaceutical), while some authors also refer to a lower reactivity and sensitization capacity of children's skin<sup>1</sup>. However, as allergic contact dermatitis was not often suspected in children, little patch testing was performed<sup>2</sup>. Fortunately, since the 1980's, this diagnosis has been more frequently considered<sup>3</sup>, although, as is also the case for photoallergic contact dermatitis, still under-diagnosed.

The most important allergens observed in children are metals, ingredients of topical pharmaceutical products and cosmetics, temporary tattoos, and to a minor extent rubber additives and resins, and plants<sup>4</sup>.

Among the metals, nickel is still the most common allergen. Ear piercing along with atopy have been regarded as major risk factors for the development of

nickel sensitization, especially in girls, albeit that nickel and other metals often cause irritant patch test reactions on atopic skin. The restrictions on the concentration of nickel allowed in consumer products for prolonged skin contact (jewelry and textile accessories), advised by the authorities in Europe in the beginning of the '90's, has caused a decline in the prevalence of nickel allergy in some countries<sup>5</sup>, such as Denmark and Germany, however, not in other countries such as the UK and the southern countries, in particular<sup>6</sup>. Numerous objects still contain nickel<sup>5</sup>, for which the dimethylglyoxime test remains a valuable tool to check for its release: jewelry, metal buttons, zippers and snaps, jeans and belt buckles, orthodontic appliances, metal toys, and so on. Cell phones, a more recent source of nickel sensitization, are now covered by the EU directive as well. Even toy make-up was found to contain nickel, among other metals<sup>7</sup>.

Palladium, which cross-reacts to nickel, is mainly present in orthodontic appliances and (pierced) jewelry and may cause granulomatous reactions<sup>8</sup>.

Cobalt allergies often react together with nickel; not

only metallic objects, but also certain plastic materials may release cobalt salts and induce contact sensitivity. It is also a concomitant allergen to potassium dichromate, for which leather (in shoes) is the most important sensitization source.

For aluminum, vaccines and hyposensitization therapy are reported as being the most important sensitization sources, with reactions often presenting as long-lasting, pruritic, subcutaneous nodules<sup>9</sup>. In many cases, contact allergy is revealed by positive reactions to Finn Chambers used in patch testing or to deodorants, or other products containing aluminum salts. Flare-ups of previous injection sites may be explained by the persistence of this metal in the skin. Probably the aluminum sensitivity is lost with time as this sensitivity is extremely rare in adults.

Many topical pharmaceutical ingredients have been described as allergens in children and should certainly not be overlooked: they include antibiotics (mainly neomycin), antiseptics, and nonsteroidal anti-inflammatory agents, often used to treat atopic dermatitis, benzoyl peroxide used for acne, and even corticosteroid preparations, the latter not infrequently in atopic children<sup>10</sup>. Contact allergy to the new class of topical immunomodulatory drugs esp. for tacrolimus has been reported too. Besides active principles also emulsifiers and vehicle component, and particularly preservatives are potential culprits. Thimerosal has attracted much attention in the literature since it is frequently observed as an allergen (most often not relevant to the skin's condition) in young children: it is used as an antiseptic, disinfectant, and preservative agent for contact lens solutions, eyedrops, and vaccines. A positive reaction to thimerosal should be taken into account with hyposensitization solutions, eyedrops, eye cosmetics, or contact-lens solutions, but does not seem to contraindicate future vaccinations, provided that they are administered intramuscularly<sup>11</sup>. Furthermore, as this molecule contains two allergenic parts – mercury and thiosalicylic acid – one must consider cross-reactions with other mercurials and with the photoproduct of piroxicam, which is chemically related to the thiosalicylic acid part. Efforts are now being made to omit thimerosal from commonly used vaccines<sup>12</sup>.

The market for cosmetic products specially formulated for children is expanding. Consequently, one can expect cosmetics to become more important causes of contact allergy. Almost every ingredient may be responsible, but fragrance components and preservative agents, such as methyl- or methylchloroisothiazolinone, in particular, and formaldehyde-releasers in skin-care

products and cleansing wipes are the main allergens. Although guidelines for the maximum concentration of preservatives and fragrances in cosmetics have been provided<sup>12</sup>, it has been demonstrated that cosmetic toys may contain much higher concentrations of fragrance<sup>13</sup>. No extra safety requirements for those products intended for children are required<sup>14</sup>.

Cocamidopropyl betaine, an amphoteric surfactant, has been reported in the USA to be an important allergen in “no more tears” shampoo's and baby washes<sup>15</sup>; allergic reactions are due to impurities present in it.

Contact and sometimes photocontact allergy to sunscreen agents, and particularly octocrylene, a UV-B sunscreen and a stabilizer, are increasingly being reported in children<sup>16</sup>.

Children may also become allergic to plants, such as *Primula* and *Compositae*, the latter often crossreacting to fragrances (Figs. 1 and 2). Moreover, as the use of herbal preparations is dramatically increasing, contact allergy to “natural” ingredients in them such as tea tree oil, especially when photoaged (oxidation products!), calendula *officinalis*, etc. is more frequently observed. Hydrolysed proteins or grain extracts are often used in moisturizers for maintenance therapy in atopic dermatitis; although contact-allergic reactions to these products may occur, also contact urticaria and/or protein contact dermatitis have been reported, which has given rise to discussions as to their use in this population<sup>17,18</sup>.

Temporary henna tattoos gained popularity in Western adolescents, especially during holidays. Whereas contact allergy to henna itself seems to be rare, additives are added to make the process going faster and to



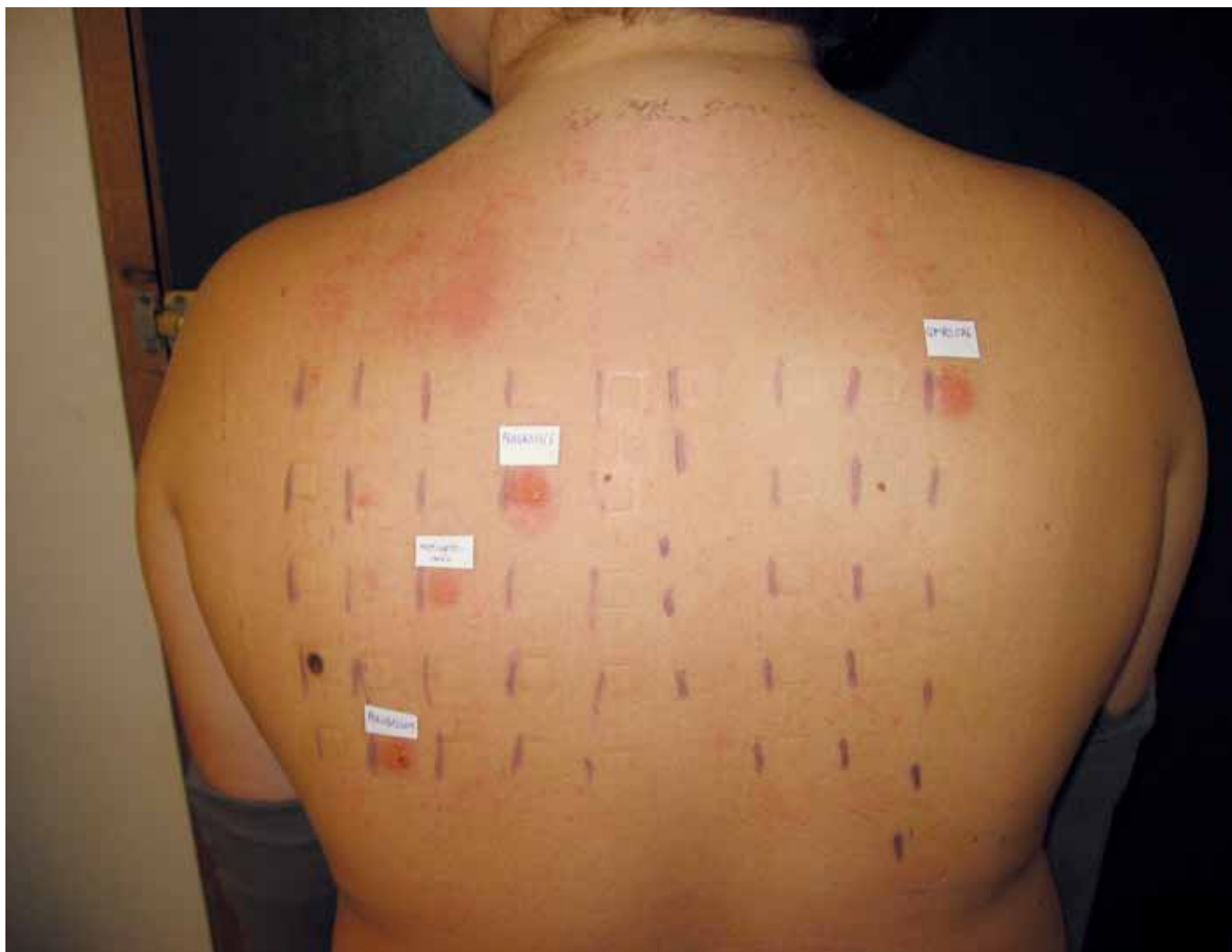
**Fig. 1** - Clinical presentation of *Compositae* plant dermatitis in a 13-year old boy.

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**Fig. 2** - *Compositae* and shoe dermatitis (rubber additives) in the same patient.

obtain a more dark pigment, particularly para-phenylenediamine (PPD), and a strongly allergenic permanent hair-dye, the concentration of which may be very high, even although the use of diaminobenzene-derivatives is forbidden for dyeing skin<sup>12</sup>. The eczematous reactions may be long-lasting and present as EEM-like or lichenoid reactions, or produce depigmentation<sup>19,20</sup> or hyperpigmentation, and even as hypertrophic scars<sup>21</sup>. Such allergies may have consequences for the future of these children as certain professions become risky, for instance hair dressing, and clothing dyed with azo- or disperse dyes, which are cross-reacting chemicals, may become responsible for textile dermatitis. The clinical picture of clothing dermatitis may closely resemble ato-



**Fig. 3** - Positive patch tests to the causal allergens: *Compositae* mix (sesquiterpene lactone mix in the baseline series negative!), fragrance mix I, *myroxylon pereiirae* (balsam of Peru), as well as mercapto-mix.

pic dermatitis and is difficult to diagnose especially in those children with a history of AD.

Among rubber additives, thiurams, mercapto chemicals, and more seldom carbamates are causal allergens, often in shoe dermatitis. Thiourea derivatives in neoprene are found in sport's equipment<sup>15</sup>, such as in e.g. goggles, trainers, footwear and diving suits. A particular type of diaper dermatitis reminiscent of a cowboy's belt and gun holsters (hence "Lucky Luke") was reported by Roul et al.<sup>22</sup>, provoked by the rubber parts used for the new anti-leaking system in these diapers.

With regard to resins, PTBPF resin is the most frequently used phenol-formaldehyde (PF) resin and is mainly used in neoprene-type adhesives and all-purpose glues. They may be responsible for contact dermatitis from, for example, knee-guards, adhesive tape, limb prosthesis, glues for electrodes to monitor sudden death in infants, and swimming goggles. The natural resin colophonium, obtained from pine trees, is a typical allergen in adhesive tape and in shoe tackifiers, which cross-react to fragrances. Indeed, also natural products such as plants, particularly those belonging to the *Compositae* family are potential causes of dermatitis in children, esp. atopics<sup>23</sup>.

### CONCLUSION

Contact allergy in children is more frequent than previously suspected. The most important allergens observed in children are metals, ingredients of topical pharmaceutical products and cosmetics (preservative agents, sunscreens!), temporary tattoos, and to a minor extend rubber additives and resins, and plants. If there is a suspicion by history and clinical picture, or there is unexplained eczema at particular body sites, patch testing should be performed at all ages. Patch testing in children is safe, but false-positive reactions are possible. Indeed, positive reactions must be interpreted carefully, particularly in atopics since their skin is readily irritated; this is especially the case for metals. An abbreviated baseline series, supplemented with allergens suggested by the history, should be used.

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