The magic touch

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Baby's skin is soft, smooth and beautiful. Touching is one of the key elements of bonding between parents and children. A special feeling is generated whenever mothers touch their babies' skin. On the other hand, a simple touch involves different components such as temperature, pH, moisture, microbiology, irritants, allergens, etc. This interaction by touch may lead to unexpected reactions and sometimes severe health problems. A girl with severe peanut allergy died after kissing her boyfriend who had just eaten a peanut butter sandwich, a case that had been widely reported on the media. Such lethal touch between individuals leading to severe type I hypersensitivity reaction is extremely rare. However, skin in touch with common items and substances can easily create problems as well.

There are two types of skin reactions, irritant contact dermatitis (ICD) and type IV hypersensitivity reaction, both of which are more common than type I hypersensitivity reaction caused by skin contact. Irritant contact dermatitis refers to non-specific inflammation resulting from direct insult to skin caused by a physical or chemical agent. In ICD, the culprit agent is in touch with the skin either "strong enough" or "long enough" to disrupt the skin barrier and cause inflammation. The best-known reaction is "diaper dermatitis", in which a baby's perineal skin is repeatedly in touch with a mild irritant – urine and faeces (Picture 1). In our profession, ICD due to frequent hand washing is a common cause of hand dermatitis, which can be debilitating and potentially impair our clinical duties that involve the use of hands (Picture 2).

Picture 1. Severe irritant contact dermatitis of buttock.

Picture 2. Hand Dermatitis.

Type IV hypersensitivity reaction, also known as allergic contact dermatitis (ACD), is probably the most extensively studied pathological reactions as a result of direct skin contact by external agents. Allergic contact dermatitis is a specific cell-mediated (type IV) hypersensitivity reactions to a hapten with an initial sensitization followed by an elicitation phase.[1] In this specific immune reaction, the antigen is captured and processed by the dermal Langerhans cells which then travel to the regional lymph nodes resulting in clonal proliferation of T lymphocytes. These activated T cells enter the bloodstream and station in the dermis such that an eczematous reaction will be triggered if the skin is in touch with the allergen again. This reaction usually extends beyond the area of allergen contact and takes hours to days to develop. Indeed, ACD is common in the general population and may even be more common in the paediatric population because of children's thin epidermis which facilitates the entrance of allergens into the dermis.[2] In an earlier study, it was estimated that the prevalence of ACD was in the range of 20% in healthy children aged 6 months to 5 years old, in which neomycin, nickel, and potassium dichromate were the top implicated allergens.[3]

Throughout childhood, children's skin is exposed to various skin care products such that there is little opportunity for sensitization. In a study, 89% of 187 paediatric skin care products in the United States labelled as "hypoallergenic", "dermatologist recommended/tested", "fragrance-free", "paraben-free" contained at least one contact allergen, with preservatives and fragrances being the most common sensitizers.[4] Methylisothiazolinone (MI) was found in 11.2% of these products. Methylisothiazolinone is a strong sensitizer and combines with methylchloroisothiazolinone (MCI) under the brand name Kathon™ CG to act as an effective preservative in water-based cosmetics against gram-positive and gram-negative bacteria, yeast, and fungi. The presence of MI and MCI are of concern in both rinse-off (such as soaps and shampoos) and leave-on products (such as emollients) due to their toxicities and ability to induce allergic reactions. We should be aware of other chemical ingredients in skin care products with the potential for skin irritation[5] (Table 1).

Table 1. Common contact allergens.[5]

1. Nickel sulfate	11. Neomycin sulfate
2. Fragrance mix 1	12. Quaternium 15
3. Balsam of Peru	13. Colophony
4. Bacitracin	14. Tixocortol-21-privalate
5. Formaldehyde	15. MCI/MI and MI
6. Cocamidopropyl betaine	16. Cobalt
7. Propylene glycol	17. Fragrance mix 2
8. Wool alcohol	18. Potassium dichromate
9. Lanolin	19. Composite mix
10. Bronopol	20. Parthenolide

Touch gives a magic feeling to humans and is also a basic function of our skin. With so many skin care products used nowadays, the science of skin reaction has become a hot topic for research. Patch test (Picture 3), a test for investigating children with suspected skin allergy, has gained increased popularity.[6] It may help to identify chemicals which are potential culprit allergen for eliciting eczematous (atopic dermatitis) skin reactions.[6] Avoidance of allergen contact should be one of the key steps in treating allergic contact dermatitis and atopic dermatitis.

Picture 3. Patch test on the back of a child.

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