

Temporary holiday “tattoos” may cause lifelong allergic contact dermatitis when henna is mixed with PPD

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Summary

Temporary tattoos are becoming more popular especially among teenagers. For this purpose henna tattoos are usually used. Although pure henna is relatively safe, combining it with other colouring agents such as para-phenylenediamine (PPD), may cause skin sensitisation. Several cases of contact allergy from temporary tattoos have been reported, each with positive reactions to PPD.

Six cases of allergic contact reaction to temporary tattoos are reported. In all cases, the responsible agent was PPD. Two were also allergic to black ‘henna’ hair dye which also contained PPD. They had been sensitised on earlier holidays by their temporary tattoos.

Temporary holiday tattoos may cause lifelong contact allergy. Although the allergenicity of pure henna is low, the allergenicity of PPD is high. Holiday ‘tattoo’ reactions are going to be common until PPD is removed from the mixture.

Keywords: black henna, contact dermatitis, hair dye allergy, para-phenylenediamine (PPD), temporary henna tattoo

Introduction

The history of body painting with henna goes back to about 5000 years. Egyptians used to colour fingernails and hair with henna. In the 12th century, henna arrived in India for use in adornment of hands and feet. Only with time body painting with henna in India attained its cultural meaning. In Persian art, particularly on miniature representations of weddings, the participating dancers’ and women’s hands are adorned with henna ornamentations. It is assumed that henna in the glowing heat of Arabia was probably laid on the skin because of its refreshing characteristics. In the Middle East, Asia and Africa, henna has cultural importance.

Several motifs, such as geometrical, flowers, butterfly or fish designs can be used.¹

Henna is a greenish powder obtained from the crushed leaves of the traditional Indian plant *Lawsonia inermis*. This plant contains lawsonia, a pure natural substance which produces a red colour that not only dyes hair but also the nails, fingers, palms and soles. It leaves hair shiny and smooth. The various colours available are black henna, brown henna, red henna, purple henna and mahogany henna.^{1–3}

Skin painting (pseudo tattooing) with henna is traditionally performed mainly by the Muslims or Hindus (Fig. 1). However, henna use is becoming more extensive worldwide and temporary henna tattoos are becoming more popular especially among teenagers (Fig. 2). It is a safe alternative to permanent tattoos. Why are temporary tattoos so popular? The answers are listed in Table 1. The painted henna tattoo can easily be obtained from a street side artisan or available in a ‘do-it-yourself’ kit. It lasts approximately 3 weeks.

Recently, transient artists have begun to use black henna mixtures to temporarily paint the skin. Henna

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Figure 1 Traditional body painting with henna.

is used alone or in combination with other colouring agents such as PPD. It is added to henna to speed up dyeing and to improve pattern definition. It has been known as a strong, delayed type skin sensitiser.^{4–7}

In this article, reactions to temporary henna tattoos will be summarized. Dermatologists and aestheticians need to be aware of these reactions.

Case Reports

Case 1: A 38-year-old female teacher developed a severe angioedema of her eyelids, face, scalp and tongue with in hours of using a commercial product of henna, which she applied on her hair. For the last 6 months she has been applying natural powder henna several times which she obtained from an herbalist without causing any complaint. This case was accepted as an angioneurotic oedema. She was treated with corticosteroid injections and oral antihistamines. Henna has been documented as a cause of type I hypersensitivity.²

Case 2: A 9-year-old girl applied temporary henna tattoo on her right arm and 1 week later she repeated the same process. In the following 2 days, erythema and papulovesicular eruptions developed at the application site (Figs 3, 4). Patch tests were performed with the European standard series, specific hairdressing agents, commercial and natural henna. The patient showed 3 + reaction to commercial henna and PPD at 48, 72 and 96 h. She was treated with topical steroid cream twice daily. A slight postinflammatory hypopigmentation has been observed.⁷

Case 3: A 7-year-old boy was admitted at the outpatient clinic because of itchy erythematous papulovesicular



Figure 2 Pseudo-tattooing in a teenager.

Table 1 Why choose temporary tattoos for skin painting?

Painless
No risk of HIV or hepatitis
Cheap
Newest trend
Fun to decorate
Last for days
Apply anywhere
Easy to remove

eruptions on his left arm. These lesions appeared after having applied temporary henna tattoo with a do-it-yourself kit to his left arm. Patch tests were performed with European standard series and commercial tattoo products. The patients showed 1 + reaction to commercial henna (Fig. 5).

Case 4: A 12-year-old girl applied temporary henna tattoo on her left arm. Several days later, erythema, oedema and itching developed. Patch test showed 2 + reaction to PPD.⁷



Figure 3 Allergic contact dermatitis at a temporary tattoo site.



Figure 4 Positive patch test with PPD at 48 hours.

Case 5: A 10-year-old boy was admitted at the outpatient clinic with itchy and vesicular eruptions on the neck. He had temporary henna tattoo for the second time. Patch test revealed PPD reaction. The lesion persisted and biopsy obtained from the bird shaped skin lesion showed irregular parakeratosis, acanthosis and spongiosis of the epidermis. The dermis showed monomorphous lichenoid lymphoid infiltrate (Fig. 6).



Figure 5 Do it yourself temporary tattoo with itchy dermatitis.

Case 6: An 18-year-old girl had allergic reactions around her ear, neck and frontal area after dyeing her hair. She had temporary tattoos several times in the past years. With the last application, she developed vesicular reaction on her tattoo. She had used topical corticosteroids for that reaction. However, after dyeing her hair, she had more severe reaction and had to be admitted to the dermatology department. Patch test showed 2 + reaction to PPD (Fig. 7).

Discussion

Reaction to henna may occur within a few hours of topical application in the form of angioneurotic oedema of the face and lips. Immediate reactions such as urticaria has been described in relation to henna.^{2,3}

PPD is a strong sensitizer and its use in temporary tattoos is associated with a high risk of active sensitisation. It is important to emphasise that the growing popularity of this fashion among young people will possibly result to an increase of PPD sensitisation in the general population.

Tourists should be aware of the risk of these prolonged cutaneous and permanent immunologic side-effects resulting from so called temporary henna tattoos. The well-known complications related with pseudo tattooing are listed in Tables 2, 3. Suggestions for temporary henna tattoo lovers can be seen in Table 4. Countries known to



Figure 6 Vesicular allergic contact dermatitis from temporary tattoo on the neck.



Figure 7 Hair dye allergy after sensitisation with temporary henna tattoo.

Table 2 Complication of using temporary henna tattoos.

Sensitisation to PPD and related compounds
Postinflammatory hypo & hyperpigmentation
Lichenoid reactions
Permanent scarification

Table 3 Sensitisation to PPD through 'black henna' and risks of other allergic reactions.

PABA-based sunscreens or creams
Azo or dispersible textile dyes
Semi-permanent hair dyes
Para-aminosalicylic acid

Table 4 Suggestions for temporary tattoo lovers.

On the street:	Insist on 'pure henna'
	– Refuse 'black henna'
	– See the label when possible
At home:	– Avoid kits that contain para-phenylenediamine
	– Patch test small area for several days before full application
	– Ensure the skin is completely normal before application

Table 5 Countries known to have dangerous black henna tattooists.

– Turkey	– Egypt	– Mexico
– Australia	– Greece	– Indonesia
– Thailand	– Spain	– India
– Philippines	– South Africa	– Hawaii, USA

have dangerous black henna tattooists are shown in Table 5.

The use of PPD is allowed in the European Union for hair dyes for a maximum concentration of 6% free base. In skin painting, not only is the use of PPD and derivatives prohibited, but also the concentrations are much higher than allowed. The long duration of skin contact, the high concentrations of sensitising materials, and the lack of a neutralizing agent dramatically increase the risk of allergic contact sensitisation with potential long-term consequences.

This article might be helpful in diagnosis and for following temporary henna tattoo cases with complications. The major disadvantage of temporary henna tattoo is sensitisation risk with PPD. Long-term consequences include dyschromic scars and contact dermatitis after colouring with PPD-based dyes. The delayed type

sensitisation with PPD may cause lifelong allergy to hair dyes as well.

Conclusion

Sensitisation to PPD and its derivatives can follow temporary holiday tattoos. Natural henna is relatively safe, the addition of PPD to henna may increase the risk of allergic reactions. This paper draws attention to patients with allergy to PPD containing hair dye who were initially sensitised by temporary tattoos. Temporary PPD-containing henna tattoos may cause lifelong hair dye allergic contact dermatitis.

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The Editor writes: Temporary adhesive “tattoos” for children can also cause allergic contact dermatitis. Today I saw a 5 year old girl who, after application of a temporary adhesive “Barbie tattoo”, developed a vesicular eczema at the application site. Patch tests confirmed that this was due to colophony allergic contact dermatitis.