

“Car Seat Dermatitis”: A Newly Described Form of Contact Dermatitis

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Abstract: Over the last several years, our clinic has documented an increasing trend of contact dermatitis presenting in areas that are in direct contact with certain types of car seats composed of a shiny, nylon-like material. Our practice has encountered these cases in both atopic and nonatopic infants, with a seasonal predilection for the warmer months. This brief report highlights some of the key features of this condition and alerts the clinician to this newly described form of contact dermatitis.

CASE REPORTS

While our clinical experience with “car seat dermatitis” encompasses far more than this case series, this report includes several patients for which we obtained adequate clinical data and photo documentation. From 2006 to 2009, we observed twenty-one patients with “car seat dermatitis,” with the main historical and clinical information detailed in Table 1.

DISCUSSION

With the exception of our prior brief report (1), little published information exists on contact dermatitis attributable to infant car seats. However, it is worth mentioning that an extensive search on the Internet may reveal blogs and comments regarding personal accounts of rashes thought to be attributed to the infant car seats. In 2006, our practice began to recognize and subsequently document similar cases. From 2006 until present, our private practice clinic has observed an increasing trend of dermatitis involving areas in direct

contact with the infant car seat. In 2007, our clinic did not do as well documenting similar cases because of our own lack of effort. Since 2008, our clinic has now strived to improve our documentation of cases to provide the objective clinical evidence to the manufacturers of infant car seats.

The distribution of the dermatitis remains the key finding in establishing any diagnosis of a contact dermatitis, and our case series supports this notion. The eruption is strikingly uniform among affected patients, symmetrically and bilaterally involving all or a portion of seven key exposure regions: both elbows, both upper posterior thighs, both lower lateral legs, and often, but not always, the occipital scalp (Fig. 1A–C).

The two main areas affected are the lower lateral legs (21/21 patients; 100%) and the elbows (20/21 patients; 95%) (Figs. 2 and 3). Scalp involvement, typically in a bandlike distribution on the occipital aspect, was seen in 9/21 patients (43%) (Fig. 4). The presence on the occipital scalp is largely dependent upon whether a head cover was employed on the top of the car seat pad, which would in effect, protect against direct contact to the car

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TABLE 1. *The Clinical Characteristics of 21 Patients*

Patient	Age	Atopic history	Onset	Duration (flare)	Location*	Initial treatment	Initial response	Recurrence of contact areas after barrier/new car seat
1	3 mos	No	8–06	1 mo	Elbows, lower lateral legs	Topical steroid Changed car seat	Good	None
2	4 mos	Yes	8–06	2 mos	Elbows, lower lateral legs (facial and truncal)	Topical steroid Changed car seat	Good	None
3	4 mos	Yes	9–06	2 mos	Elbows, lower lateral legs (truncal)	Topical steroid Changed car seat	Good	None
4	3 mos	Yes	9–06	1 mo	Elbows, lower lateral legs (truncal)	Topical steroid	Fair [‡]	None, but baseline atopic areas remain
5	4 mos	No	10–06	3 mos	Elbows, lower lateral legs	Topical steroid Changed car seat	Good	Not known (lost to follow-up)
6	4 mos	No	10–06	1 mo	Elbows, lower lateral legs (facial)	Topical steroid Changed car seat	Good	None
7	4 mos	No	5–07	4 wks	Elbows, lower lateral legs, upper posterior thighs, scalp	Topical steroid Changed car seat Oral antibiotic for secondary infection	Good	None
8	7 mos	Yes	5–07	4 wks	Elbows, lower lateral legs, scalp (facial and truncal)	Topical steroid Changed car seat	Good	None, but facial atopic areas remain
9	4 mos	No	7–07	2 mos	Elbows, lower lateral Legs, upper posterior thighs, scalp	Topical steroid Changed car seat	Good	Not know (lost to follow-up)
10	4 mos	Yes	2–08	2 mos	Elbows, lower lateral, legs, scalp(facial and truncal)	Topical steroid Oral antibiotic for secondary infection	Fair [‡]	None, but baseline atopic areas remain
11	4 mos	Yes	3–08	4 wks	Elbows, lower lateral legs	Topical steroid	Fair [‡]	None, but baseline atopic areas remain
12	5 mos	Yes	6–08	4 wks	Elbows, lower lateral legs (also mild facial)	Topical steroid Changed car seat	Good	None
13	9 mos	Yes	6–08	4 wks	Elbows, lower lateral legs, scalp (truncal)	Topical 1 steroid Cloth barrier	Good	None, but baseline atopic areas remain
14	14 mos	No	9–08	2–3 mos	Elbows, lower lateral legs	Topical steroid Changed car seat	Good	None
15	9 mos	No	12–08	7 mos	Lower lateral legs and lateral back bilaterally	Topical steroids	Fair [‡]	None
16	5 mos	Yes [†]	12–08	4 mos	Elbows, lower lateral legs	Topical steroid Changed car seat	Good	None, but later developed facial eczema
17	4 mos	No	6–09	2 mos	Elbows, lower lateral legs, scalp	Topical steroid Changed car seat Oral antibiotic for secondary infection	Good	None
18	5 mos	Yes	6–09	2 mos	Elbows, lower lateral legs, scalp, and an “id” reaction on the trunk (facial)	Topical steroid (Tacrolimus 0.03% for face)	Good	None, but baseline facial atopic areas remain
19	4 mos	Yes	10–09	2 mos	Elbows, lower lateral legs, and an “id” reaction on the trunk	Topical steroid Changed care seat Oral antibiotic for secondary infection	Good	None, but baseline facial atopic areas remain
20	8 mos	No	10–09	2 mos	Elbows, lower lateral legs, scalp	Topical steroid Changed car seat	Good	None
21	6 mos	Yes	10–09	2 mos	Elbows, lower lateral legs, scalp (facial)	Topical steroid Changed car seat (Tacrolimus 0.03% for face)	Good	None, but baseline facial atopic areas remain

*Baseline atopic areas included in parentheses.

[†]Patient 16 developed atopic dermatitis on the face at a follow-up visit few months later.

[‡]These patients who have a “fair” initial response, later did have marked improvement after the car seat was changed at a subsequent appointment.

id, idiosyncratic.

seat itself. Separate from this case series, my personal experience has been that the involvement on the upper posterior thighs is more prevalent in the summer, but in

this particular report it was appreciated only in 2/21 patients (9.5%). The low incidence in this latter location is likely influenced by the clothing covering that portion



Figure 1. **A.** Patient 7 demonstrates the contact dermatitis along the elbows and the upper posterior thighs seen in contact with infant car seat. **B.** Patient 7 also shows the bilateral and symmetrical distribution of the dermatitis on the upper posterior thighs as well as the more commonly involved region of the lower lateral legs. **C.** Additionally, patient 7 had marked involvement of the center of the occipital scalp, representing a common area in contact with the infant car seat.



Figure 2. The elbows and lower lateral legs were the most commonly involved areas of car seat contact dermatitis as seen in patients 11 and 12, respectively.

of the upper posterior thighs in contact with the car seat. It is of interest that one patient who had the typical lower lateral leg involvement also had a bandlike bilateral and

symmetrically distributed contact dermatitis on the lower back (Fig. 5), where the patient's mother reported his clothing would often not fully cover.

One could argue that the distribution of the "car seat dermatitis" closely coincides with the classic extensor sites typical for infantile atopic dermatitis. However, upon closer examination in our patients, the affected areas directly correlate with a contact exposure as the infant is secured in the car seat. It is also important to point out that the bandlike distribution on the occipital scalp is not typical for classic, infantile atopic dermatitis.

Children with atopic dermatitis may develop a contact dermatitis. However, the exact relationship between atopic dermatitis and allergic contact dermatitis is somewhat complex and controversial as the studies are conflicting (2,3). Our case series may support this notion, as a probable contact dermatitis to the car seat was observed in 12/21 atopic patients (57%), compared with 9/21 patients (43%) without an atopic background. Those patients with a history of atopic dermatitis in our



Figure 3. The elbows and lower lateral legs were the most commonly involved areas of car seat contact dermatitis as seen in patients 11 and 12, respectively.

study have affected sites (e.g., face, trunk) additional to the aforementioned key seven areas.

Furthermore, the parents of the infants with a prior history of atopic dermatitis mention that these exposure regions to the car seat were either much worse or less responsive to treatment than their typical counterpart eczematous areas, as the majority of those patients had already been applying mid-potency topical steroids to the suspected areas of contact without any improvement. This observation is paramount in discovering that the infant car seat is the main exacerbating factor in these patients.

Treatment consisted of providing barrier protection to the car seat pad, along with applications of topical steroids to the affected areas. Barrier protection to the car seat pad was achieved by a variety of means, including self-applications of a thick barrier (e.g., blanket, cloth cover), manufacturer replacement of the car seat pad itself with that of a different material, or manufacturer replacement of the entire infant car seat model with that of a different material. Adequate follow-up documentation and treatment response was obtained in 19/21 cases. Rapid improvement was evidenced at follow-up in the



Figure 4. Scalp involvement often presented with a band-like dermatitis as demonstrated in patient 13.

majority of patients. After employing the above protective measures to the car seat pad, atopic patients showed a remarkable improvement in the contact areas to the car seat, but typically continued with their baseline areas of atopic dermatitis, such as on the face or trunk. Of interest, in the four cases (patients 4, 10, 11, 15) with a “fair” treatment response, no barrier protective measures were initially employed, and the dermatitis was treated only with topical steroids. However, after these families adhered to the barrier protective recommendations, an overall improvement in the dermatitis was subsequently observed.

The morphology of the eruption is variable, ranging from acute presentations, with inflamed papules and vesicles, to more chronic presentations, with a refractory-like, lichenified eczematous pattern. In our case series, secondary infection was noted in 4/21 patients (19%). It is of interest to note that idiosyncratic (“id”) reactions were seen in two cases (patients 18, 19), both involving more acute presentations in patients with a prior history of atopic dermatitis.

The increased incidence of “car seat dermatitis” during warmer months is also important to mention, as 17/21 patients (81%) presented during late spring through fall. This is likely resulting from less clothing worn by the infants, with an increased potential for contact exposure under the setting of increased heat and perspiration. Furthermore, in our area of North Texas, it is common to have summer-like temperatures as early as spring and continue until late fall, and even into the winter months. This warm climate likely accounts for the

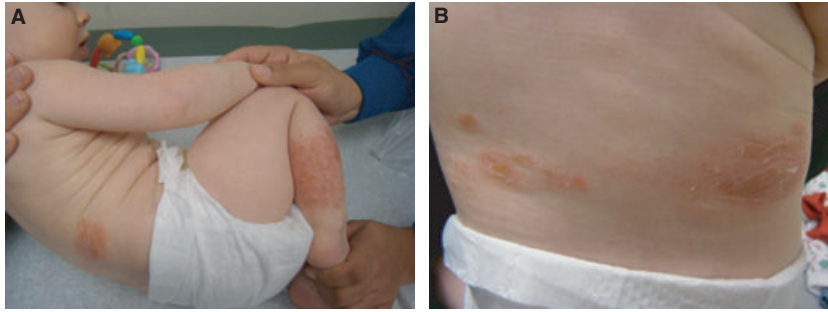


Figure 5. In addition to the lower extremities, patient 15 had bilateral, symmetric involvement of the lower lateral back, consistent with contact exposure where his clothing did not fully protect from the car seat.

increased incidence in our geographic region of the United States.

The infant car seats observed in our case series uniformly contain a seat pad composed of a shiny, nylon-like fabric material that comes in a variety of colors. Car seats containing this material have become quite popular among the largest manufacturers of infant car seats. Furthermore, many internet personal testimonies uniformly mention infants with “rashes” from the car seat models composed of the identical type of nylon-like material.

Like the majority of current car seats, those that we have encountered in our patients contain foam consisting of expanded polystyrene, also known as EPS or Styrofoam. This energy-absorbing material is commonly used in all types of safety equipment because of its ability to absorb impact. As the foam is used in many types of car seats, our practice contends that the nylon-like fabric material of the seat pad plays a more likely etiologic factor than the foam. Additionally, it is noteworthy to mention that a common complaint among many of our patients is that their infants were excessively “sweaty” in this type of car seat. It is unclear at this time whether this increased perspiration could be as a direct result of the fabric material, but it could be argued that the material may be more occlusive in nature than other traditional cotton-like, leather, or suede fabric materials contained within the seat pad. Like many forms of contact dermatitis, sweat likely worsens the dermatitis and the potential release of irritants or allergens.

Treatment focuses on eliminating or at least decreasing the exposure to the fabric material of the car seat pad. Rapid improvement was observed following a change of the car seat to a different material composed of cloth or cotton, or following an application of a thick barrier such as a cloth or blanket to the current car seat pad. With the aforementioned changes, atopic patients show a drastic improvement in the contact exposure sites, but may continue to display their baseline areas of atopic dermatitis. In addition to removing the offending exposure,

applications of mid-potency topical steroids are also quite effective.

To better elucidate potential irritant or allergic components of the infant car seat pad, our practice has maintained informal communication with two of the largest U.S. manufacturers of infant car seats. Because of the proprietary issues of the companies, it is quite difficult to obtain a detailed list of the potential irritant or allergic components used in the manufacturing process of the nylon-like material covering the seat pad. It has been theorized that perhaps a flame retardant component could be the potential culprit contained within the nylon-like material. The eruption is likely caused by a primary irritant contact source, but more information must be obtained to rule out potential allergens within the car seat pad that may be released under the conditions of perspiration, heat and friction, similar to the presentation of an allergic contact dermatitis to shoes.

An obvious criticism of this case series is the lack of patch testing which can be more difficult to perform in infants. Patch testing is an invaluable tool in establishing a diagnosis of an allergic contact dermatitis. This technique has become more utilized in the pediatric population as allergic contact dermatitis in children is an increasingly common condition (4–9). According to a review by Matiz et al, the international data available on pediatric patch testing revealed that the top five global allergens are nickel, cobalt, antibiotics, fragrances, and rubber chemicals. Other allergens detected at a significant rate in the pediatric population included thimerosal and gold (5,6). Standard patch testing, as well as applications of a “use” patch test composed of pieces of the car seat material, will be our next step to include in a future article investigating the possible etiologies of this likely contact dermatitis to the car seats. A potential difficulty with the interpretation of patch testing is the challenge of reproducing similar environmental triggering conditions of heat and perspiration.

In summary, it is important for the clinician to recognize that infant car seat pads containing a shiny,

nylon-like material may play a causative role in contact dermatitis that presents symmetrically and bilaterally on all or a portion of the elbows, the upper posterior thighs, the lower lateral legs, and the occipital scalp. With little current published data on “car seat dermatitis,” we hope to provide future follow-up and additional insight into the potential cause(s) of this newly emerging pattern of contact dermatitis in infants.

ACKNOWLEDGMENTS

We would like to thank Ashlee Dillon, PNP, for her data collection and review of this manuscript.

REFERENCES

1. Ghali FE, Agim N. Pediatric patient care: emerging patterns of contact dermatitis. *Skin and Aging* 2008;16:20–25.
2. Giordano-Labadie F, Rance F, Pellegrin F et al. Frequency of contact allergy in children with atopic dermatitis: results of a prospective study of 137 cases. *Contact Derm* 1999;40:192–195.
3. Czarnobilska E, Obtulowicz K, Dyga W et al. Contact hypersensitivity and allergic contact dermatitis among school children and teenagers with eczema. *Contact Derm* 2009;60:264–269.
4. Jacob SE, Brod B, Crawford GH. Clinically relevant patch tests in children—A United States based study. *Pediatr Dermatol* 2008;25:520–527.
5. Hammonds LM, Hall VC, Yiannias JA. Allergic contact dermatitis in 136 children patch tested between 2000 and 2006. *Int J Dermatol* 2009;48:271–274.
6. Zug KA, McGinley-Smith D, Washaw EM et al. Contact allergy in children referred for patch testing: North American Contact Dermatitis Group data, 2001–2004. *Arch Dermatol* 2008;144:1329–1336.
7. Pigatto P, Martelli A, Marsili C et al. Contact dermatitis in children. *Ital J Pediatr* 2010;36:2–8.
8. de Waard-van der Spek FB, Oranje AP. Patch tests in children with suspected allergic contact dermatitis: a prospective study and review of the literature. *Dermatology* 2009;218:119–125.
9. Matiz C, Hsu JW, Paz Castanedo-Tardan M et al. Allergic contact dermatitis in children: a review of international studies. *J Ital Dermatol Venereol* 2009;144:541–556.