

Playing with Fire: UV Exposure Patterns, Distribution of Nevi, & Risks to Young Patients

Data suggest that both cumulative exposure and short-term exposure to intense UV levels promote formation of melanocytic nevi—well-known indicators of melanoma risk.

With summer now over, family vacation season ended, and school begun, the number of children visiting our offices with sun-burned or tanned faces, arms, legs (and more) will hopefully be on the decline. We as dermatologists cringe to see this skin damage, especially in younger patients, because we know that cumulative UV exposure is clearly linked to an increased risk for both melanoma and non-melanoma skin cancer. A specific marker of UV exposure and damage, the number of melanocytic nevi is an accepted indicator of melanoma risk.¹ In fact, the total number of common melanocytic nevi has been identified as one of the most important independent risk factor for cutaneous melanoma.²

In the past few years, researchers have learned more about the association of acute UV damage in children with the development of melanocytic nevi. Their findings suggest that dermatologists must continue to actively advocate appropriate sun protection and avoid-

ance strategies for children and adolescents while also seeking to identify and monitor those patients who may be at high risk for future skin cancers.

Intensity versus Duration

Some debate persists regarding the significance of intense UV exposure periods versus cumulative UV exposure. The data currently existing are mixed and allow no clear conclusion. Investigations into the influence UV exposure on non-melanoma skin cancer development have documented that intense, intermittent UV exposure leads to DNA damage and repair enzyme activation that at some point breaks down, leading to activation of cellular growth.³ Other studies, such as those discussed here, have attempted to assess the influence of intense, intermittent UV exposure on the development of nevi (with their implications for long-term cancer risk). Studies looking specifically at UV exposure in children have been inconclusive regarding mole

development and cellular activation.

A study of six- and seven-year-old German children suggests that the frequency of exposures to intense UV radiation—rather than cumulative duration of exposure or frequency of exposure to lower levels of UV radiation—during vacations is associated with higher numbers of melanocytic nevi.⁴ The study involved 2,189 individuals recruited in 2002. Trained staff members conducted total body counts of melanocytic nevi, and parents provided information about a variety of exposure factors. Using a negative binomial regression model for multivariable analysis, researchers identified a significant association between number of melanocytic nevi and “the frequency of vacation episodes associated with sun exposure in areas with an intense ultraviolet radiation.” However, there appeared to be no association between nevi counts and cumulative duration of vacation sun exposure in such areas. Furthermore, there was no association between nevi counts and any variable related to vacation sun exposure in areas with low UV radiation.

An earlier study by Bauer et al., also involving young German children, found a similar association between nevus counts and intermittent intense sun exposure during vacations, but those findings suggested that cumulative UV exposure also influences nevus development.⁵ The longitudinal study with three-year follow-up involved 1,232 children two- to seven-years-old. Researchers conducted total body nevus

NEW

In Your Practice

Direct Hit. Researchers may be one step closer to developing of a new anti-HIV drug based on a common dermatologic prescription. Published online in *Cell Host & Microbe*, a study found that acyclovir may directly suppress HIV-1 in tissues already infected with herpes virus. Researchers previously found that acyclovir can suppress HIV-1 in those co-infected with herpes viruses but these findings regarding infected tissues provide new insights.

The Stench of Skin Cancer. You may one day diagnose skin cancer by smell as well as sight, suggests a report presented at the conference of the American Chemical Society. In the air above tumor sites in 11 patients diagnosed with BCC, researchers found a different profile of chemicals relative to healthy skin. They did not reveal the specific chemicals found or their concentrations, but researchers plan to develop odor profiles for all three forms of skin cancer.

counts and assessment of pigmentary features of children along with nevus counts on arms of parents, who completed a standardized interview about the child's sun exposure, sunburns, and sun-protective behavior.

Multiple linear regression analysis showed that light skin complexion (skin Type II vs. IV, $p = 0.022$), freckling of the face ($p < 0.001$), and history of sunburns ($p = 0.005$) in children was associated with higher numbers of incident nevi. Higher nevus counts in children were also associated with parent characteristics, such as nevus counts on mothers' ($p < 0.001$) and fathers' ($p = 0.004$) arms and at least one parent being of German descent ($p = 0.006$).

The authors concluded that, "Total cumulative sun exposure seems to be the crucial environmental risk factor for the development of nevi, whether the child is exposed to chronic-moderate or intermittent-high ultraviolet light doses."

Another study, this one involving 743 white children in Denver, also suggested an important contributing role for chronic UV exposure.⁶ Researchers collected parental reports of each child's site-specific sunburns annually for two years (starting when subjects were ages five to six). In the third year, they counted and anatomically mapped nevi. Analysis revealed higher nevus density for boys (36.0 nevi/m²) than for girls (31.0 nevi/m²; $P = 0.04$), with highest density on the face, neck, and lateral forearms. Nevus density was significantly higher in chronically versus intermittently sun-exposed areas ($P < 0.0001$). "When adjusted for host factors, total number of sunburns was significantly associated with higher total nevus prevalence ($P = 0.01$ for one burn)," researchers wrote.

Falling on Deaf Ears?

Taken together, the data from these and other studies indicate that UV exposure is detrimental to young patients,

Risks of UV Exposure Before Age 20

We know that chronic UV exposure is linked to both melanoma and non-melanoma skin cancer. A 2003 case-control study* investigating painful sunburns, lifetime sun exposure and risk factors for melanoma, NMSC, melanocytic nevi, and more involved 966 individuals. The recall of painful sunburns before the age of 20 was associated with an increased risk of:

Odds ratios with 95% confidence intervals adjusted for age, sex, and skin type

Squamous cell carcinoma	1.5 (0.97; 2.3)
Nodular basal cell carcinoma	1.6 (1.1; 2.2)
Multifocal superficial basal cell carcinoma	2.6 (1.7; 3.8)
Actinic keratoses	1.9 (1.4; 2.6)
Malignant melanoma	1.4 (0.86; 2.1)
Melanocytic nevi	1.5 (1.1; 2.0)
Atypical nevi	1.4 (0.88; 2.3)

Researchers noted: "Lifetime sun exposure was predominantly associated with an increased risk of squamous cell carcinoma (p -value for trend=0.03) and actinic keratoses (p -value for trend <0.0001) and to a lesser degree with the two types of basal cell carcinoma."

*Kennedy C, Bajdik CD, et al; Leiden Skin Cancer Study. The influence of painful sunburns and lifetime sun exposure on the risk of actinic keratoses, seborrheic warts, melanocytic nevi, atypical nevi, and skin cancer. *J Invest Dermatol.* 2003 Jun;120(6):1087-93.

whether exposure is chronic or limited to brief but intense episodes. The finding that more than two-thirds (69 percent) of American children in the Denver study⁶ had had at least one sunburn during the reporting period (most frequently-burned body areas were the face, shoulders, and back), confirms that parents and children do not always practice sun safety.

We as a specialty must emphasize the full range of appropriate sun protective behaviors for children and adults, including sun avoidance and use of UV-blocking clothing and shelters to minimize exposure. The finding by Bauer et al.⁷ that children who used sunscreen and wore more clothing spent significantly longer periods on holidays in sunny climates ($p < 0.001$ and $p = 0.006$, respectively) and were more likely to be active outdoors while at home ($p < 0.001$ and $p = 0.012$, respectively), suggests that many parents and children may over-estimate the protective benefits of sunscreens. We must be sure to emphasize the limi-

tations of sunscreens and advocate their use as part of a more comprehensive UV-avoidance strategy. ■

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