Appendix S1.

MATERIALS AND METHODS

This study was approved by the Institutional Review Board of Shinshu University Hospital. Dermoscopic images of LM in 15 children and adolescents (13 Japanese, designated as cases 1–13, and 2 Caucasian, designated as cases 14 and 15) were retrospectively collected and analysed. None of the lesions was believed to be congenital, as none of the parents could recall having similar lesions. With the exception of 3 Japanese adolescents (cases 10–12), all patients were less than 14 years old at first clinic visit. Twelve of the 15 patients returned for regular follow-up, the duration of which ranged from 26.7 to 103.4 months (mean 59.0 months, median 48.0 months; Table SI[1]). As of August 2014, no biopsies had been performed for any of the lesions.

All images were taken with a non-polarized oil-immersion dermoscope and saved in JPEG format. The DI proposed in our previous publication (13) was calculated for each dermoscopic image. The DI represents variegation in colour included in a dermoscopy image of the nail plate. In adult patients, it is known that greater colour variegation in the image is associated with higher suspicion of melanoma. Details of the calculation method have been presented previously. Briefly, each pixel of a colour image contains information on the 3 primary colours, R, G and B, which may be considered as independent variables. Therefore, a 3-dimensional vector consisting of R, G and B as its components was defined as the pixel colour vector. Variegation in a colour image was measured by the variety of directions of pixel colour vectors. The DI was calculated as follows: $\mathbf{p}_i = (R_i, G_i, B_i)$ for the *i*-th pixel in a colour space. To express the direction of $\mathbf{p}_i$ explicitly, we introduce latitude, θ_i, and longitude, ϕ_i, which may be defined as follows:

$$\theta_i = \cos^{-1}\left(\frac{\sqrt{R_i^2 + G_i^2}}{\sqrt{R_i^2 + G_i^2 + B_i^2}}\right), \phi_i = \cos^{-1}\left(\frac{R_i}{\sqrt{R_i^2 + G_i^2}}\right).$$

Here, θ_i and ϕ_i are measured from the plane and from the R axis in the plane, respectively. Throughout this paper, angles are given in units of radians. As the root mean square (RMS) of a set of (ϕ_i, θ_i) represents variation in the direction of $\mathbf{p}_i$, the RMS value is used as a DI. The DI is defined according to the following formula:

$$DI = \sqrt{\frac{1}{N}\sum_{i=1}^{N}\left[\left(\phi_i - \bar{\phi}\right)^2 + \left(\theta_i - \bar{\theta}\right)^2\right]}$$

In calculating the index, we paid special attention to ensuring that the spatial resolution of each image was the same.