Dermoscopy and scanning electron microscopy in two cases with hair shaft damage secondary to hair straightening

Sir,

We present two cases of hair shaft damage, apparently induced by physical and chemical factors, showing characteristic features on dermoscopy and scanning electron microscopy.

Two female patients, 21 and 18 years of age, both with a primarily curly hair type, presented to the dermatology out-patient department with complaints of hair breakage, which became worse over the last few weeks. Both patients gave a history of frequent hair straightening using both thermal and chemical means. The patients were also using shampoos frequently. There was no history of hair colouring in both the patients. Both patients were otherwise healthy, with no other significant skin or systemic disease. There was no family history of any significant hair, skin, or systemic disorders.

Clinical examination revealed relatively normal hair density [Figures 1a and 2a] with brittle hair and a few isolated nodes. Dermoscopy of the hair shaft showed intermittent bright yellow areas over the hair shaft and trichorrhexis nodosa [Figures 1b and 2b]. Trichoptilosis was also seen. Scalp examination was otherwise normal. Light microscopy using a dissection microscope (10×–50×) showed varying degrees of hair shaft damage – including trichorrhexis nodosa and trichoptilosis [Figures 1c and 2c]. There was no evidence of any bubbles in the hair. Scanning electron microscopy (scanning of platinum-coated hair specimens was carried out using a scanning electron microscope Model: JSM 6390 LA, JEOL, at 15–20 kV) showed various stages of hair shaft damage ranging from irregular overlay and lifting up of the cuticle to the typical fractured hair shaft in an area of trichorrhexis nodosa [Figures 1d, 1e, and 2d].

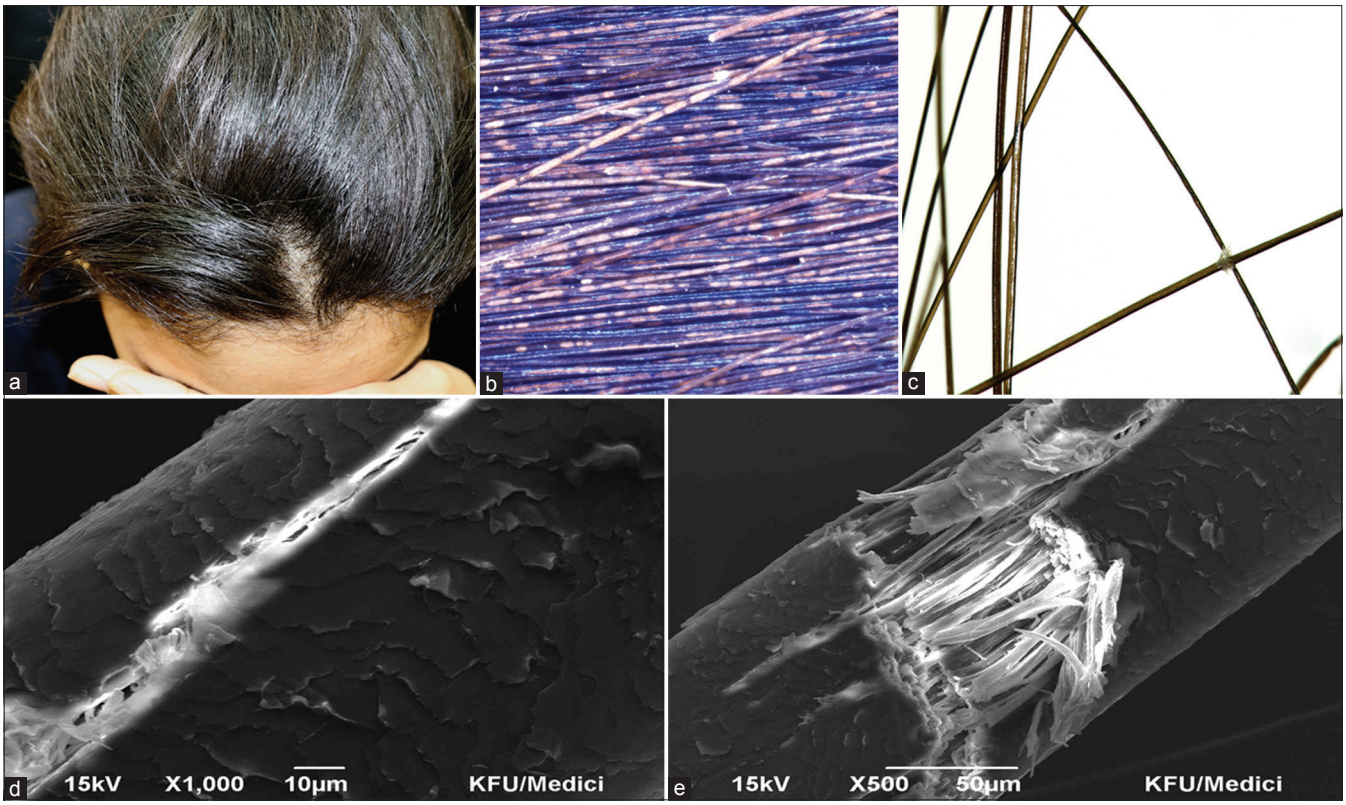

Figure 1: (a) Patient A: Clinical image showing relatively normal hair. (b) Patient A: Dermoscopy polarized light DermLite Foto II Pro with Canon 650D SLR showing multiple area of yellowish discoloration, weathering, and fractured ends ×100. (c) Patient A: Dissection microscopy showing trichorrhexis nodosa ×200. (d) Patient A: Scanning electron microscopy showing trichorrhexis nodosa ×500. (e) Patient A: Scanning electron microscopy showing cracks in the hair shaft (Patient A) ×1000

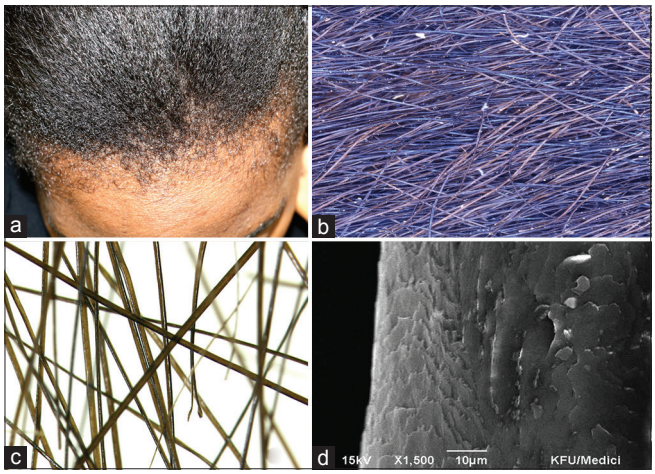

Figure 2: (a) Patient B: Clinical image. (b) Patient B: Dermoscopy polarized light DermLite Foto II Pro with Canon 650D SLR showing multiple area of yellowish discoloration, weathering, and fractured ends ×100. (c) Patient B: Dissection microscopy showing trichoptilosis ×200. (d) Patient B: Scanning electron microscopy showing irregular overlay and lifting up of cuticles ×1500

Laboratory investigations of both patients – including complete blood count, iron and ferritin levels, thyroid functions tests and vitamin D levels – were within the normal limits.

A clinical diagnosis of hair shaft damage secondary to chemical and physical factors was made and both patients were advised to completely stop hair-straightening procedures, as well as minimize the use of shampoos. Regular use of hair conditioners was advised.

Hair shaft damage secondary to hair straightening has been reported to be common in people of African descent. Hair straighteners can remove the monomolecular layer of fatty acids covalently bound to the cuticle, leading to changes in water permeability and hair shaft damage. The breakage and rearrangement of disulfide bonds can also contribute to hair shaft damage.[1,2] The risk for such hair shaft damage is more in curly hair seen in people of African descent. This is partly due to inherent factors, like a relatively low level of cysteine in the hair.[3,4] Recently, dermoscopy has been shown to be a useful tool in detecting the hair shaft damage early.[1,5]

We propose that the yellow areas seen on dermoscopy probably indicate early signs of hair shaft damage – areas that are likely to develop complete fractures later. Although the trichoscopic features of damaged hair have been well described, to the best of authors' knowledge, the intermittent yellowish pat ches on the hair shaft on polarized light dermoscopy as a possible early marker of shaft damage has not been previously described. These two cases highlight the usefulness of dermoscopy in assessing the extent of hair damage in patients presenting with significant hair shaft damage secondary to chemical or physical factors.

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Conflicts of interest
There are no conflicts of interest.

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