

Inability to Grow Long Hair: A Presentation of Trichorrhesis Nodosa

To the Editor:

First identified by Samuel Wilks in 1852, trichorrhesis nodosa (TN) is a congenital or acquired hair shaft disorder that is characterized by fragile and easily broken hair.¹ Congenital TN is rare and can occur in syndromes such as pseudomonilethrix, Netherton syndrome, pili annulati,² argininosuccinic aciduria,³ trichothiodystrophy,⁴ Menkes syndrome,⁵ and trichohhepatoenteric syndrome.⁶ The primary congenital form of TN is inherited as an autosomal-dominant trait in some families. Acquired TN is the most common hair shaft abnormality and often is overlooked. It is provoked by hair injury, usually mechanical or physical, or chemical trauma.^{7,8}

Chemical trauma is caused by the use of permanent hair liquids or dyes. Mechanical injuries are the result of frequent brushing, scalp massage, or lengthy backcombing, and physical damage includes excessive UV exposure or repeated application of heat. Habit tics, trichotillomania, and the scratching and pulling associated with pruritic dermatoses also can result in sufficient damage to provoke TN. Furthermore, this acquired disorder may develop from malnutrition, particularly iron deficiency, or endocrinopathy such as hypothyroidism.⁹ Seasonal recurrence of TN has been reported from the cumulative effect of repeated soaking in salt water and exposure to UV light. Macroscopically, hair shafts affected by TN contain small white nodes at irregular intervals throughout the length of the hair shaft. These nodes represent areas of cuticular cell disruption, which allows the underlying cortical fibers to separate and fray and gives the node the microscopic appearance of 2 brooms or paintbrushes thrusting together end-to-end by the bristles. The classic description is known as paintbrush fracture.¹⁰ Generally, complete breakage occurs at these nodes.

A 21-year-old white woman presented to our clinic with hair fragility and inability to grow long hair of 2 years' duration. The hair was lusterless and dry. Dermoscopic examination revealed broken blunt-ended hair of uneven length with minute pinpoint grayish white nodules (Figure 1). Small fragments could be easily broken off with gentle tugging on the distal ends. She reported a history of severe sunlight and seawater exposure during the last 2 summers and the continuous use of a flat iron in the last year. Microscopic examination of hair samples with a scanning electron microscope showed the characteristic paintbrush fracture (Figure 2). She had no history of diseases, and blood examinations including complete blood cell count, thyroid function test, and iron levels were within reference range.

We hypothesize that the seasonal damage caused by exposure to UV light and salt water with repeated trauma from the heat of the flat iron caused distal TN. The patient was given an explanation about the diagnosis of TN and was instructed to avoid the practices that were suspected causes of the condition. Use of a gentle shampoo and conditioner also was recommended. At 6-month follow-up, we noticed an



Figure 1. Dermoscopy revealed broken blunt-ended hair of uneven length with minute pinpoint grayish white nodules (original magnification $\times 30$).

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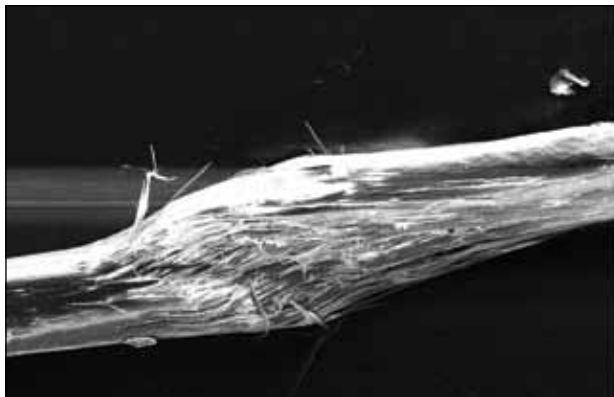


Figure 2. Scanning electron microscopy showed characteristic paintbrush fracture of the hair shaft (original magnification $\times 748$).

improvement of the quality of hair with a reduction in the whitish nodules and a revival of hair growth.

Acquired TN has been classified into 3 clinical forms: proximal, distal, and localized.¹ Proximal TN is common in black individuals who use caustic chemicals when styling the hair. The involved hairs develop the characteristic nodes that break within a few centimeters from the scalp, especially in areas subject to friction from combing or sleeping. Distal TN primarily occurs in white or Asian individuals. In this disorder, nodes and breakage occur near the ends of the hairs that appear dull, dry, and uneven. Breakage commonly is associated with trichoptilosis, or longitudinal splitting, commonly referred to as split ends. This breakage may reflect frequent use of shampoo or heat treatments. The distal acquired form may simulate dandruff or pediculosis and the detection of this hair defect often is casual.

Localized TN, described by Raymond Sabouraud in 1921, is a rare disorder. It occurs in a patch that is usually a few centimeters long. It generally is accompanied by a pruritic dermatosis, such as circumscribed neurodermatitis, contact dermatitis, or atopic dermatitis. Scratching and rubbing most likely are the ultimate causes.

Trichorrhexis nodosa can spontaneously resolve. In all cases, diagnosis depends on careful microscopy examination and, if possible, scanning electron microscopy. Treatment is aimed at minimizing mechanical and physical injury, and chemical trauma. Excessive brushing, hot-combing, permanent waving, and other harsh hair treatments should be avoided. If the hair is long and the damage is distal, it may be sufficient to cut the

distal fraction and to change cosmetic practices to prevent relapse.

Dermatologists who see patients with hair fragility and inability to grow long hair should consider the diagnosis of TN. Acquired TN often is reversible. Complete resolution may take 2 to 4 years depending on the growth of new anagen hairs. All patients with a history of white flecking on the scalp, abnormal fragility of the hair, and failure to attain normal hair length should be questioned about their routine hair care habits as well as environmental or chemical exposures to determine and remove the source of physical or chemical trauma.

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