A healthy 3-year-old white girl presented to the pediatric dermatology clinic for evaluation of thin hair. She was born with little hair and slowly grew thin blond hair. Her hair has always remained short, and she has only had one haircut. The patient’s mother never noted any scalp abnormalities such as scale or dermatitis. The child does not seem to play with her hair. Her mother notes times when clumps of hair pull out without discomfort. A laboratory work-up prior to presentation revealed normal thyroid studies and an incidental iron deficiency anemia for which she was on oral iron replacement. There was no family history of alopecia, thin hair, or autoimmune disorders.

Examination revealed an alert and active 3-year-old girl. Her hair was blond, sparse, with a fine texture (see Figures 1 and 2). There were no patches of complete alopecia. Her scalp revealed no abnormalities such as erythema or scale. There

CME EDUCATIONAL OBJECTIVES

1. Identify the clinical features of loose anagen syndrome.
2. Distinguish between loose anagen syndrome and other types of alopecia in a young child.
3. Understand the natural history of loose anagen syndrome.

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Figure 1. Sparse, thin, fine hair, barely reaching the nape of her neck.
were no hairs broken off at the scalp. Her eyelash and eyebrow hair was normal in appearance and density. A single hair pull test easily and painlessly revealed 10 hairs. No nail pitting was noted.

### Diagnosis:

**Loose Anagen Syndrome**

### DISCUSSION

Loose anagen syndrome, a fairly common cause of hair thinning in children, was first described in 1989. Most children with this disorder are girls older than 2 years of age with a mean age of 6 years. This is rare in males and uncommonly reported in the teenage years. This syndrome more often affects children with blond hair. The presenting complaint from parents often includes one of the following: thin, sparse, or unruly hair; hair does not grow/has not needed a haircut; and hair that pulls out in clumps.

Physical exam in these children reveals sparse and thin hair with hair regrowth of varying lengths. Areas of complete smooth alopecia are absent. Nails, eyelash, and eyelashes are normal. The hair may be diffusely fine and sometimes matted or unruly at the occipital scalp. A hair pull test (gentle pulling on a localized clump of hair with < 6 telogen hairs pulled out as normal) in loose anagen syndrome will be painless for the child and will often result in extraction of several dystrophic anagen hairs.

Hair goes through three cycles during growth and shedding, anagen (growth), catagen (resting), and telogen (shedding) phases. Hair is typically shed in the telogen phase, but in loose anagen syndrome, they are abnormally shed during the growing or anagen phase. They do not complete their complete growth phase that should last for 3 years or longer; therefore, hair length in affected individuals is shorter. With light microscopy, these anagen hairs have a ruffled, bent cuticle due to the abnormal adhesion between the cuticle and the inner root sheath (see Figure 3).

The genetics of loose anagen syndrome are variable with sporadic and autosomal dominant cases reported. Keratin mutations have been identified in some individuals with loose anagen syndrome; it is likely that these mutations affect the inner root sheath and disturb its normal supportive and anchoring function. There has been speculation that there is an association with developmental or ectodermal abnormalities, as there are case reports associated with Noonan syndrome, and neurofibromatosis type 1.

The differential diagnosis of a young child with diffuse hair thinning includes: alopecia areata, loose anagen syndrome, telogen effluvium, trichotillomania, and more rarely thyroid disease, anemia or other systemic illness. The history and physical exam often typically clarify the diagnosis. Clinical findings and history of short thin hair never requiring a haircut is typical in loose anagen syndrome.

This is in contrast to telogen effluvium in which history may reveal a stressful event in the child’s life, such as an illness or hospitalization 1 to 4 months prior to the hair loss. In telogen effluvium, the hair pull test will reveal mostly telogen hairs (resting phase, the tip is devoid of color and white) in contrast to the misshapen anagen hairs found in loose anagen syndrome. The diagnosis of telogen effluvium is often one of exclusion.

The physical exam in alopecia areata may reveal sharply demarcated, completely alopecic patches; this rarely presents as diffuse hair loss. Trichotillomania clinical findings include jagged patches of partial alopecia with broken hairs and regrowth of varying lengths.

In most cases, a primary care provider can make the diagnosis of loose anagen syndrome based on the clinical findings and history. If needed, a referral to a dermatologist for hair microscopy can aid in diagnosis. Dystrophic anagen hairs may not always be present in affected patients, as loose anagen patients cycle in and out of shedding periods. A biopsy is not indicated.

Suggested treatment for loose anagen syndrome is observation and reassurance. Most often, hair density and appearance improves as children get older. There have been cases in which topical minoxidil treatment resulted in thicker longer hair. This may be an option for severe loose anagen syndrome in older children.

### REFERENCES