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Recommended Citation

Zhao, Johnny and Cohen, Philip R., "Frictional alopecia of the distal legs: case series and review." *Dermatology Online Journal*.22,8. . (2016).

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Peer Reviewed

Title:

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Journal Issue:

[Dermatology Online Journal, 22\(8\)](#)

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Publication Date:

2016

Permalink:

<http://escholarship.org/uc/item/9hz9t0df>

Keywords:

Alopecia, ankle, calf, cicatricial, friction, friction-induced alopecia, frictional, frictional alopecia, leg, lower extremity, lower-extremity, non-cicatricial, non-scarring, scarring, sock

Local Identifier:

doj_32179

Abstract:

BackgroundAcquired alopecia of the lower legs may occur secondary to friction due to socks, footwear, or both on the lower extremities. There is scant literature that reports on this phenomenon.

Methods and MaterialsWe describe 5 patients who presented with alopecia of their lower legs induced by socks, footwear, or both.

Methods and Materials: We reviewed PubMed for the following terms: ankle alopecia, friction alopecia, frictional alopecia, lower extremity alopecia, non-scarring leg alopecia, and sock alopecia. We also reviewed papers containing these terms and their references.

ResultsAcquired frictional alopecia of the lower extremities is often an asymptomatic condition found incidentally on physical examination. The condition can persist for many years despite removal of the source of friction.

ConclusionThe incidence of acquired frictional alopecia of the lower extremities may be greater than reflected in previously published reports. It is a non-scarring subtype of alopecia that was noted as an incidental finding during the patient's dermatology appointment.



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Photo Vignette

Frictional alopecia of the distal legs: case series and review

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Dermatology Online Journal 22 (8): 12

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Abstract

Background

Acquired alopecia of the lower legs may occur secondary to friction due to socks, footwear, or both on the lower extremities. There is scant literature that reports on this phenomenon.

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We describe 5 patients who presented with alopecia of their lower legs induced by socks, footwear, or both. Methods and Materials: We reviewed PubMed for the following terms: ankle alopecia, friction alopecia, frictional alopecia, lower extremity alopecia, non-scarring leg alopecia, and sock alopecia. We also reviewed papers containing these terms and their references.

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Acquired frictional alopecia of the lower extremities is often an asymptomatic condition found incidentally on physical examination. The condition can persist for many years despite removal of the source of friction.

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Keywords: Alopecia, ankle, calf, cicatricial, friction, friction-induced alopecia, frictional, frictional alopecia, leg, lower extremity, lower-extremity, non-cicatricial, non-scarring, scarring, sock

Introduction

Alopecia is categorized as scarring and non-scarring. Frictional alopecia is a subtype of non-scarring traumatic alopecia caused by repetitive friction on hair-bearing areas of skin [1]. In this report, we describe a series of five men who presented with friction-induced alopecia of their lower extremities in a distribution corresponding to locations covered by either socks, footwear, or both.

Case Reports

Five men were noted to have a non-scarring alopecia in a distribution over the bilateral lower extremities. The clinical characteristics of these patients are summarized in Table 1. Their ages ranged from 39 years to 65 years (median: 45 years); however, their hair loss initially appeared when they were teenagers or in their third decade.

Table 1. Clinical characteristics of men with acquired frictional alopecia of their distal legs

C	Age	R	Location	Comments	Age of onset
1	39y	Ca	From lower calf to ankles bilaterally	Alopecia corresponds to sock-line	First noticed as a teenager
2	43y	Ca	From mid-calf to ankles bilaterally	Alopecia corresponds to tan-line and sock-line	First noticed in his 20s
3	45y	A	From mid-calf to ankles bilaterally	Alopecia persisted even though he currently wears socks up to the ankles	Has been present for several years
4	59y	Ca	From mid-calf to ankles bilaterally	He wore socks and cowboy boots	First noticed in his 20s
5	65y	Ca	From just below the knees to the ankles bilaterally	Patient wears knee-high boots extensively	First noticed as a teenager

Abbreviations: A – Asian, C – Case, Ca – Caucasian, R – Race, Y – Years

All patients were seen for unrelated dermatologic issues; the alopecia was discovered during a complete cutaneous examination. Two of the patients mentioned that the alopecia was present since they were teenagers, two mentioned that it appeared in their twenties, and another mentioned that it had been present for several years. The affected area was asymptomatic in four of the men; one man had mild pruritus in the distribution of his alopecia. There was no past medical history of lower extremity arterial insufficiency or peripheral neuropathy in any of the patients.

Cutaneous examination showed that the distribution of the hair loss in four of the five men extended from the mid-calf distally to the ankles (Figures 1-3).



Figure 1 (A and B). Anterior (A) and lateral (B) views of frictional alopecia of the bilateral lower extremities from the mid-calf to the ankles in a 39-year-old man. His absence of hair begins at the junction between his distal hyperpigmented tan-line and the proximal border of his sock-line. Bilateral syndactyly of toes two and three is a coincidental and unrelated finding (A).



Figure 2 (A and B). Frictional alopecia of the bilateral lower extremities extending from the mid-calf to the ankles in a 43-year-old man. The distribution of alopecia corresponds to the areas normally covered by his socks (A). A closer view of the patient wearing socks shows that the proximal border of the alopecia corresponds to the tan areas of his legs that are not covered by his socks (B).



Figure 3 (A and B). Anterior (A) and posterior (B) views of frictional alopecia of both legs extending from the mid-calf to the ankles in a 45-year-old man.

In one patient the distribution started just below the knee; this patient had a history of chronically wearing knee-high boots (Figure 4).



Figure 4 (A and B). Distant (A) and closer (B) anterior views of the distal legs of a 65-year-old man who regularly wore knee-high boots. The absence of hair corresponds to the distribution of his footwear.

Furthermore, two of the men had a prominent tan line corresponding to the upper sock border and this line also matched the most proximal origin of alopecia (Figures 1 and 2). In all cases, the follicular ostia were preserved, a marker of non-scarring alopecia. Peripheral pulses were easily appreciated by palpation in every patient and there were no cutaneous signs or symptoms of arterial insufficiency.

Management included observation and periodic monitoring in the four men for whom the alopecia was asymptomatic. Oral fexofenadine, 180 mg daily, was suggested for the man who had mild pruritus associated with the alopecia.

Discussion

A thorough search of the existing literature reveals a dearth of information about the epidemiology of acquired frictional alopecia. There are no large studies examining the phenomenon and the data are limited to scattered case series and case reports. It is likely

that the actual prevalence of acquired frictional alopecia of the lower extremities is much higher than that reported in the literature. It is a benign and often asymptomatic condition.

In the two largest series of frictional alopecia, every patient was male [1,2]. However, albeit rarely, women have been described with frictional alopecia in individual case reports [3,4]. The gender distribution of our patients was similar to that of other larger case series: all were men. One potential reason that could be responsible for this observation is that men in the United States may wear ankle-length socks more frequently than women. In addition, a possible confounding factor could be that women also preferentially shave their legs, and therefore a friction-induced alopecia caused by socks would be less noticeable.

One interesting theme in the existing literature is that frictional alopecia is commonly reported in athletes. The racial distribution of our patients was four (80 percent) Caucasian men and one (20 percent) Asian man. The prevalence of frictional alopecia based on ethnicity is seldom described; one study includes only Iraqi men, and another reports only Italian athletes [1, 2].

The frictional alopecia of the lower extremities in the five men of our case series was an incidental finding on physical examination. The distribution of the alopecia from either the mid-calf or just below the knee to the ankles is consistent with either sock or knee-high boot wear. In addition, the affected areas were consistent with a previous study that also demonstrated lower leg alopecia in patients with extensive tight trouser or sock wear [1]. In this study, the frictional alopecia involved the thighs as well in 22 (44 percent) patients; herein, the patients were noted to frequently wear dishdasha, a traditional Arabic garment. Another patient with frictional alopecia involved only the bilateral posterolateral aspects of her calves due to repetitive contact with water-slides at an amusement park [5]. Additional individuals with frictional alopecia have been described, in which the hair loss occurs as a result of contact between gymnasts' forearms and ring-ropes, between a gymnast's head and balance beam, and between the headband of a Walkman and the head [2-4].

The clinical differential diagnosis of frictional alopecia of the lower extremities is summarized in Table 2. A complete history and physical examination will often enable the practitioner to make the correct diagnosis of frictional alopecia of the lower extremities; for example, the distribution of the alopecia corresponds to the sites covered by socks or other garment wear. The borders of the alopecia are either sharp or non-distinct. The follicular ostia are preserved. However, if the hair loss is asymmetric or patchy, a biopsy of the affected area may be warranted to evaluate for other causes of alopecia.

Table 2. Differential diagnosis of acquired frictional alopecia of the lower extremities

Diagnosis	Distinguishing Features
Alopecia universalis	Complete lack of hair over the entire body
Arterial insufficiency	Claudication symptoms and absence of peripheral pulses
Follicular mucinosis	Biopsy of hair follicle shows mucin and atypical lymphocytes
Frictional alopecia of the lower extremities	Localized non-scarring alopecia in the distribution of socks or footwear
Laser hair removal or treatment with intense pulsed light	History of previous hair removal treatment
Lipodermatosclerosis	Painful, indurated tapering of leg often in a patient with chronic venous insufficiency
Morphea or scleroderma	Firm plaques with violaceous or erythematous border; overlying skin can also be hyperpigmented or hypopigmented
Waxing or shaving	History of waxing or shaving provided by patient

The definitive pathogenesis of frictional alopecia of the lower extremities remains to be established. Yet, the most likely explanation is that repetitive trauma of chronic sock or footwear causes stress on the hair follicles. However, even when the source of friction is removed, the alopecia can persist. In addition to friction, in older individuals or patients with an older onset age of alopecia of the distal legs, the alopecia may, in part, be secondary to age-associated dropout of hair follicles.

Skin biopsies performed on five patients in one study did not show any pathologic changes [1]. Frictional alopecia of the lower extremities is a non-scarring alopecia; follicular ostia are preserved. In addition, there is no inflammatory component.

There has been no reported treatment for frictional alopecia. In our patients, none of the individuals expressed unhappiness with the alopecia or a desire to have it treated. Established treatments for other subtypes of alopecia are not appropriate or useful. Topical minoxidil or oral finasteride in men are most frequently used for androgenetic alopecia, but there is no evidence for their use in frictional alopecia. Hair transplants could be a potential therapeutic intervention.

Conclusion

Acquired frictional alopecia of the lower extremities is described in five men. It was discovered as an incidental finding on cutaneous physical examination during their office visit for an unrelated dermatologic complaint. It is a non-scarring subtype of alopecia that has seldom been described in the literature. The alopecia persists even after the source of friction has been removed. There have been no reported treatments for frictional alopecia and none of our patients desired therapeutic intervention.

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