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### TRICHOSCOPIC DIFFERENTIATION OF ALOPECIA AREATA AND TINEA CAPITIS IN PEDIATRIC PATIENTS WITH PATCHY HAIR LOSS: A COMPARATIVE STUDY

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#### ABSTRACT

Pediatric patients with patchy hair loss often pose diagnostic challenges for dermatologists, as various factors can contribute to this condition. Trichoscopy, a noninvasive and swift diagnostic tool, offers enhanced accuracy in detecting patchy hair loss patterns. Unlike conventional clinical dermatology, trichoscopy involves examining the skin perpendicular to its surface and parallel to the histological plane, revealing subtle features invisible to the naked eye. In this study, we aimed to differentiate between alopecia areata and tinea capitis in pediatric patients using trichoscopic analysis. Forty patients, comprising 20 with alopecia areata and 20 with tinea capitis, underwent comprehensive evaluations, including trichoscopy, clinical examinations, fungal culture, 10% potassium hydroxide (KOH) laboratory investigations, and microbiological analyses. Trichoscopic examination revealed distinctive features: comma-shaped, corkscrew-shaped, and zigzag hairs were characteristic of tinea capitis, while short vellus hairs, yellow dots, and exclamation marks predominated in alopecia areata cases. Our findings suggest that trichoscopy enables rapid and accurate diagnosis of alopecia areata and tinea capitis in pediatric patients, offering a valuable noninvasive diagnostic approach.

**Keywords:** Dermatology, Patchy hair loss, Trichoscopy, Alopecia areata, Tinea capitis.

#### INTRODUCTION

The patient and their family are subjected to a great deal of psychological and emotional stress, because this severely undermines children's self-esteem who care for him or her [1]. To overcome the problems caused by hair loss, the cause should be identified and treated early [2]. Trichotillomania, traction alopecia, and alopecia areata are among the most common causes of hair loss in pediatric patients. In order to effectively treat patients with hair loss, clinicians need to differentiate between hair loss due to primary dermatologic conditions and hair loss due to systemic diseases [3].

The scalp was infected with tinea capitis, a fungal infection. Invasion of the hair shaft by *Trichophyton* and *Microsporum* dermatophytes, are the main culprits. There may be One or more patches of hair loss, associated with inflammation, scaling, pustules, and itching [4]. An

alopecia areata (AA) is when your hair begins to fall out from a number of body parts, usually your scalp[5]. There is usually a superficial appearance of normal skin beneath small bald patches associated with alopecia areata. Many different shapes can be seen in these patches, but most of them are round or oval in shape [6].

In addition to examining the patch for fungal agents, it may be possible to diagnose the cause of focal hair loss. If it is unclear what is causing the hair loss, a scalp biopsy may be recommended [7].

By using trichoscopy, morphologic structures that aren't visible to the naked eye can be detected noninvasively. Although the trichoscope is easy to use, it is a more complex instrument than a magnifying glass, as it allows skin layers to be superimposed. An image obtained in histopathology, however, allows visualizing

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the whole skin surface or deep layer, which is entirely different from the image obtained here [8]. Hair and scalp disorders can be diagnosed and treated with trichoscopy. Hair disorders are not commonly managed with this method. Anogenetic alopecia, scarring, and alopecia areata alopecia can all be readily diagnosed by dermatologists using this test [9].

Different trichoscopic features of tinea capitis and alopecia areata will be assessed in pediatric patients with localized patches of hair loss.

## METHODOLOGY

Statistical analysis was conducted on forty patients with Hair loss in patches on the scalp, solitary or multiple without gender predilection, ages (12 years) with Alopecia areata or tinea capitis and no sex predilection. The following patients were excluded: (1) those with concomitant dermatological conditions and (2) patients with a history of tinea capitis or alopecia areata topical treatment (one month) or systemic treatment (three months). A 16MP camera from Panasonic, the LUMIX S5, for photographed the patches of hair loss after collecting the patient's history, conducted a clinical exam, and examined the skin scrapings and plucked hairs microscopically with KOH 10%, cultured fungal cultures, and examined trichoscopically.

### Laboratory Examination

It was necessary to collect an adequate number of specimens from the edges of the hair loss area (scales or plucked hairs). A 10% potassium hydroxide solution was used to mount hair roots and skin scrapings. Spores were examined microscopically on the heated slide. After four weeks of incubation at 30°C and frequent inspections, Sabouraud's agar media was used for the culture.

### Trichoscope Examination

An immersion gel-free hand-held trichoscope was used in this study to the skin surface was blocked from reflecting light. There were two magnifications (20x and 40x) of The study used DermLite DL3 trichoscopes. LED bulbs, battery-rechargeable lithium batteries (replaceable), and handle and head pieces made up the device.

Gel-coated lesion after covering, place the trichoscope gently over the lesion after it has been switched on and moved about 1 cm away from the lesion. In most cases, the focus only needs to be adjusted once (An examiner should position their eyes as closely to the eyepieces as possible). Avoid transmission of infection by disinfecting the lens with a cotton swab soaked in alcohol. The DermLite DL3 Gen Trichoscope was used to digitally photograph the lesion(s). The two dermatologists who evaluated the findings evaluated the findings.

## STATISTICAL ANALYSIS

An audit was conducted to ensure the accuracy and completeness of all collected data. A statistical analysis was carried out with precoded data entered into the SPSS software program version 15 (SPSS).

## RESULTS

### Clinical Data

Alopecia areata affected 13 female subjects and 7 male subjects, with 65 and 35 percent, respectively. The average age of the group was 1. 5–11 years with median  $\pm$  inter quartile range (IQR) 5.25 (3.3, 8.0). The duration of lesions ranged from 2 to 12 weeks with median  $\pm$  IQR 4.00 (2.3, 11.0). The number of lesion(s) ranged from 1 to 2 with median  $\pm$  IQR 1.0 (1.0, 2.0). The size of the lesion(s) ranged from 0.5 to 3 cm with median  $\pm$  IQR (2.0  $\pm$  0.6  $\times$  1.5  $\pm$  0.7). In tinea capitis patients, the study was carried on 15 male 75.0% and 5 females 15.0%. Their age ranged from 2–11 years with median  $\pm$  IQR 5.0 (3.5, 7.1), the duration of the lesion(s) ranged from 2 to 12 weeks with median  $\pm$  IQR 4.00 (2.3, 11.0). The number of lesion(s) ranged from 1 to 2 with median  $\pm$  IQR 1.0 (1.0, 1.0). The size of the lesion(s) ranged from 1 to 3 cm with median  $\pm$  IQR (2.1  $\pm$  0.8  $\times$  1.6  $\pm$  0.8).

### Laboratory data

All patients were examined directly using a microscope after mounting the specimens on KOH 10% after collection of specimens from the lesion(s). In 13 cases, The test results for tinea capitis patients were positive in 32.5% of cases, while false negative results were found in seven cases, or 17.5%, while all cases of alopecia areata were negative. The incidence of *T. virialus* in six patients, 15.0%, *M. desjudensis* in six patients, 15.0%, *T. rubrum* in three patients, 7.0%, and *T. verrucosum* in five patients, 13.0%, was observed.

### Trichoscopic data

It has been determined that 18 patients with tinea capitis had short broken hairs (Figure 1), followed by 13 patients with 65.0% black dots, 11 patients with 55.0% comma shaped hairs, 9 patients with 45.0% corkscrew hairs, and 5 patients with 25.0% zigzag hairs (Table 1).

Black dots accounted for 60.0% of the trichoscopic features in 12 alopecia areata patients (Figure 2), yellow dots accounted for 55.0% in 11 patients, exclamation marks accounted for 55.0% in There were 11 patients, in which 9 had white hair (45.0%), eight had short vellus hairs (40.0%), eight had short broken hairs (40%), and three were found to have pig tail growing hair (15%).

**Table: 1 Tinea capitis features on a trichoscopic level**

	Frequency (N= 40)	Percent (%)
Comma shaped hairs		
Present	22	55.0
Absent	18	45.0
Zigzag shaped hairs		
Present	10	25.0
Absent	30	75.0
Black dots		
Present	26	65.0
Absent	14	35.0
Short broken hairs		
Present	36	90.0
Absent	4	10.0
Corkscrew hairs		
Present	18	45.0
Absent	22	55.0

In people with hair loss, short broken hairs and black dots were the most prevalent trichoscopic findings. However, both are nonspecific because they can occur in other conditions as well. There are three types of hairs that are diagnostic of tinea capitis: zigzag types, corkscrew types, and comma shaped types

**Table: 2 The different characteristics of alopecia areata based on trichoscopic findings.**

	Frequency (N= 40)	Percent (%)
Black dots		
Present	24	60.0
Absent	16	40.0
Yellow dots		
Present	22	55.0
Absent	18	45.0
Microexclamation mark		
Present	22	55.0
Absent	18	45.0
Short vellus hairs		
Present	16	40.0
Absent	24	60.0
Pig tail regrowing hair		
Present	6	15.0
Absent	34	85.0
Short broken hairs		
Present	16	40.0
Absent	24	60.0
White hairs		
Present	18	45.0
Absent	22	55.0

Patients with alopecia areata commonly have black dots on their scalps, but these are not specifically associated with the disease, since they can also be seen in conditions like Tinea capitis and trichotillomania. Short velvet hairs, yellow dots, and exclamation marks are nonetheless present were the specific characteristics of the pattern.

## DISCUSSION

Hairless patches of the scalp are most often caused by Alopecia areata and tinea capitis in pediatrics [10]. Especially for the nonscaly type, tinea capitis may appear similar to alopecia areata. Due to the length of time it may take to obtain lab results like fungal cultures or biopsy for With the recent development of trichoscopy, we

can diagnose both alopecia areata and tinea capitis [13, 14].

In studies about tinea capitis, few patients were included and trichoscopic findings were unique [13]. According to Ekiz et al. [14], The hairs were shaped like commas, zigzags, corkscrews, and black dots found in tinea capitis patients at trichoscope examination.

The present study found that 55% of patients reported comma-shaped hairs, which has been observed in some studies that included fewer patients [14–16]. Fungal invasions of the ectothrix and endothrix types produce It has slightly curved and fractured comma hairs. Due to bending and cracking successively, comma hair can probably be explained as the product of hyphae filling the hair shaft [15].

Among 20 patients in There was a 25.0% prevalence of zigzag hair in the current study and 45.0% had corkscrew-shaped hairs; similar findings were found in other studies [14, 16]. According to [16], There is a tendency in black patients to have zigzag or corkscrew hairs similar to the comma hair.

There was a 90.0% share of short broken hairs among Study participants with tinea capitis, which was consistent with previous studies [13, 14]. It is possible to see Tinea capitis is characterized by short broken hairs, however it may also be a sign of other conditions of severe condition.

The percentage of tinea capitis cases with black dots (13 out of 20 patients) was 65.0% in our study, as reported by Sandoval et al. [17]. Broken hairs or dystrophic hairs cause black dots [18].

A comma-shaped hair and a corkscrew hair pattern were found in Several studies have reported zoophilic infections [16]. Among the species studied, *T. paniculatum*, *M. canis*, and *T. species* were isolated from our patients due to farming and socioeconomic conditions.

Ultimately, short broken hairs have the highest incidence, followed by black dots, commas, and corkscrews. Tinea capitis has characteristic trichoscopic features such as comma-shaped hairs, zigzags, and corkscrews. Ticea capitis and alopecic areata are not unique to the condition, as they can also appear in trichotillomania and short dystrophic hairs can indicate Symptoms of the disease are more severe. Several large-scale studies have been conducted on alopecia areata patients. Exclamation marks, yellow dots, black dots, broken hairs, and yellow dots are trichoscopic features associated with AA.

Approximately 55% of alopecia areata patients (11 out of 20 patients) were identified with yellow dots; this finding has also been reported in other studies [20, 21]. There are yellow or yellowish-pink dots of varying sizes characterized by these spots and color and are round or polycyclic. When using video trichoscopy, it is easier to observe them than when using handheld trichoscopy [18]. A characteristic of AA incognita is Yellow dots and short yellow lines can be seen growing hairs. The presence of isolated yellow dots could indicate other conditions besides alopecia areata, according to Inui [23], including a person with trichotillomania may suffer from hypotrichosis simplex, tinea capitis, or trichotillomania.

According to the current study, 55.0% of alopecia areata cases had exclamation mark hair; a similar finding was found in other studies [14, 18, 20]. Rather than calling them "exclamation mark hair," tapering hairs are preferred because their shape is different from exclamation mark hairs. A trichoscopy can more readily detect this condition than the naked eye because In the direction of the follicles, the hair shafts narrow. As reported by authors [12, 14, 19], Alopecia areata is diagnosed by tapering hairs in the present study. Yellow dots, short vellus hairs, and pigtail hair were associated with higher sensitivity and diagnostic ability. In cases with active At the perimeter of the lesions, there may be alopecia areata, it was seen as a sign of active alopecia areata.

According to our study, The percentage of tinea capitis patients (12 out of 20) is 60.0% had black dots under trichoscopic examination. Other studies have also detected this finding [19, 20]. AA has been associated with black dots caused by fragmented hair shafts, which serve as an indication of active disease as well as a measure of severity of AA [18]. There is a strong correlation between black dots and alopecia areata, indicating that black dots can be used as a sensitivity index of the disease only in conjunction with Short vellus hairs or yellow dots. Throatillomania and tinea capitis cases also had black dots in this study, whereas Ekiz et al. [14] found no evidence for black dots.

The present study found The majority of alopecia areata patients (8 out of 20) have short vellus hair under trichoscopic examination; this finding has been found in previous studies as well [14, 19, 20]. There may be or may not be clinically noticeable short vellus hairs in a patch of skin [24]. In addition to being a diagnostic feature for AA, short vellus hair has also been shown to provide valuable AA is nondestructive, indicating its prognosis as Inui et al. [18] have stated. An adequate treatment regimen or spontaneous remission is also indicated by clusters of short vellus hairs; however, in the current study, the cases had not been treated prior to study entry, so Remission had spontaneously occurred.

Among alopecia areata patients, we found 15.0% (3 out of 20 patients) to have regrown hair in their pigtails; similar findings have been observed in other studies [19]. If present, pig tail hair can be trichoscopically diagnosed as Alopecia areata remission through spontaneous means and may represent a diagnostic trichoscopic finding.

Among 20 patients with alopecia areata, 40.0% (8 out of 20) had short broken hairs. Broken hairs are thought to be clinical markers of active AA, according to Inui et al. [18]. Ko se and Gu lec and Ekiz et al [14] noted broken hairs as a nondiagnostic sign in tinea capitis cases in their studies.

We found white hairs in 45.0% (9 of 20 patients) of the patients with alopecia areata in the present study; this could be a trichoscopic diagnostic sign as well as a sign that alopecia areata was spontaneously remissioning.

The severity and activity of AA can be predicted by certain trichoscopic features. Known to reflect exacerbation of disease, tapering hair represents disease activity. Patients with hair disorders will benefit from these trichoscopic findings. It is possible to detect AA by observing the yellow dots and short vellus hairs. The yellow dots found in AA are abundant, unlike the yellow dots found in trichotillomania. A combination of Hairs that are broken, tapering, and black indicates AA, with the exception of trichotillomania, which is not a reliable clinical diagnosis [20]. In the study of Inui et al. [18], Yellow dots, yellow cadaverized hairs, and exclamation mark hairs were all shown to be sensitively detectable for types of AA that can be difficult to diagnose clinically, such as alopecia areata incognita. Tinea capitis and trichotillomania may also cause broken hair.

A trichoscopic study identified Trichoscopic features most commonly seen as black dots. A yellow dot on the skin, an exclamation mark on the skin, white hairs,

broken vellus hairs, yellow spots on the skin, and hair that is growing from pigtales were next most common. Alopecia areata, however, is characterized by The short vellus hair, yellow dots, and exclamation mark hair which need to be evaluated further through clinical and histopathological means if the trichoscopy does not reveal them

## CONCLUSION

As a result of its characteristic findings, tinea capitis hairs, as well as zigzag or corkscrew hairs, are more likely to be present in tinea capitis than in alopecia areata hairs, and this can Hairs originating from alopecia areata and tinea capitis can be distinguished by using this method. Yellow dots or exclamation marks are also characteristic of alopecia areata, which are absent in tinea capitis. Dermatologists use trichoscopy as their stethoscopes today.

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