

# The Changing Pattern of *Tinea Capitis* in Jamaica

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## ABSTRACT

The species of dermatophyte fungi causing tinea capitis vary from country to country and may also change with time. This study was done to identify the predominant organisms causing tinea capitis in the Jamaican population. It was a retrospective study looking at all fungal culture requests to the Microbiology Department at the University Hospital of the West Indies during the period January 1, 1998 to December 31, 2002. The results showed a gradual switch from the dominance of *Microsporum audouinii* (61.5%) in 1998 to the dominance of *Trichophyton tonsurans* (85%) in 2002. The mean age was 8.6. Females constituted 55.7% of positive cases and males, 44.3%.

# El Patrón Cambiante de la *Tinea Capitis* en Jamaica

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## RESUMEN

Las especies de hongos dermatofitos que causan la tinea capitis varían de país en país, y también pueden cambiar con el tiempo. Este estudio se realizó con el propósito de identificar los organismos predominantes que causan la tinea capitis en la población jamaicana. Se trata de un estudio retrospectivo que revisó todas las solicitudes de cultivos fúngicos hechas al Departamento de Microbiología del Hospital Universitario de West Indies durante el periodo del 1ero. de enero de 1998 al 31 de diciembre de 2002. Los resultados mostraron un cambio gradual del predominio de *Microsporum audouinii* (61.5%) en 1998 al predominio de *Trichophyton tonsurans* (85%) en 2002. La edad promedio fue 8.6. Las hembras constituyeron el 55.7%, y los varones el 44.3% de los casos positivos, respectivamente.

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## INTRODUCTION

*Tinea capitis* is a dermatophyte infection of the scalp with invasion of the hair shafts. Most species of dermatophytes are capable of invading hair but some species have a distinct predilection for the hair shaft. Those species of dermatophyte fungi most likely to cause *tinea capitis* vary from country to country and from region to region. Additionally, in any given location, the species may change with time.

In most parts of Europe, *Microsporum canis* has become the dominant organism in *tinea capitis* (1). In North America, in the 1940s and early 1950s, *Microsporum audouinii* was the most common organism responsible for *tinea capitis*. However, since the late 1980s to 1990s, there has been a shift in causative organism with *Trichophyton tonsurans* largely replacing *Microsporum audouinii* (2). A similar rise in the prevalence of *Trichophyton tonsurans* has been recorded in urban areas in the United Kingdom (1).

*Microsporum audouinii* and *Trichophyton tonsurans*, however, have two different types of hair invasion and clinical presentation. *Microsporum audouinii* has an ectothrix type invasion in which the basic lesions are patches of partial alopecia, often circular in shape, but showing numerous broken-off hairs, dull grey from their coating of arthrospores. Inflammation is minimal, but fine scaling is characteristic, usually with a fairly sharp margin. *Trichophyton tonsurans*, however, causes an endothrix infection in which a relatively non-inflammatory type of patchy baldness occurs. Formation of black dots (swollen hair shafts) as the affected hair breaks at the surface of the skin is classical in this condition but such findings may be inconspicuous. The patches, which are usually multiple, may show minimal scaling, sometimes mimicking seborrheic dermatitis.

In the late 1990s and early 2000s, there were anecdotal reports from dermatologists in Jamaica of increasing

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numbers of patients with *tinea capitis*. They also noted a change in the clinical pattern of the disease from an ectothrix type to an endothrix type. In addition, it was felt that the response of the condition to treatment with griseofulvin had diminished. In 1951, Jacobson documented *Microsporum audouinii* as the most common cause of dermatophyte scalp infection in Jamaica (3). With a very mobile population, it is possible that the epidemiological picture of *tinea capitis* in Jamaica has changed in a similar way to that in the United States of America (USA) and the United Kingdom (UK).

The purpose of this study was to identify the predominant organisms causing *tinea capitis* in the Jamaican population, the age group affected and whether there was any gender preference.

### SUBJECTS AND METHODS

This was a retrospective study looking at all fungal culture requests on hair and scalp specimens sent to the Microbiology Department at the University Hospital of the West Indies (UHWI) during the period January 1, 1998 to December 31, 2002. A portion of these samples had been mounted in potassium hydroxide solution and examined microscopically for the presence of fungal elements. The remainder of each sample had been cultured on Sabouraud's dextrose and Mycobiotic agar. Cultures were incubated at 29°C in Petri dishes for up to 4 weeks. The dermatophytes were identified based on cultural characteristics including colonial morphology as well as microscopic findings on teased preparations of the fungal growths in lactophenol cotton blue. Where teased preparations were inconclusive, slide cultures were done.

Data obtained from the laboratory reports included microscopic findings and fungal culture results. The clinical records of all patients whose samples were sent to the laboratory were retrieved and data on age and gender collected.

### RESULTS

There were a total of 177 requests for fungal cultures on hair and scalp scrapings. These requests originated from clinics and wards at the UHWI and two private dermatological practices. The number of requests for fungal cultures increased from 19 in 1998 to 47 in 2002. Of these, there were 79 positives (44.6%) for dermatophyte infection and 13 (7.3%) for non-dermatophyte fungi including *Aspergillus* species, yeast (not *Candida albicans*), *Penicillium* species, saprophytic fungi and *Candida albicans*. Of the 79 positive for dermatophytes, three cases grew two dermatophyte species. Three clinical notes could not be located to verify the age of the patients. There were 10 dermatophyte positives in 1998, 12 in 1999, 19 in 2000, 18 in 2001 and 20 in 2002, representing a gradual increase between 1998 and 2002 (Fig. 1).

The species identified, included, in order of frequency, *Trichophyton tonsurans*, *Microsporum audouinii*, *Trichophyton mentagrophytes*, *Trichophyton rubrum*, *Microsporum canis* and *Microsporum gypseum* (Table 1). The term "Tri-

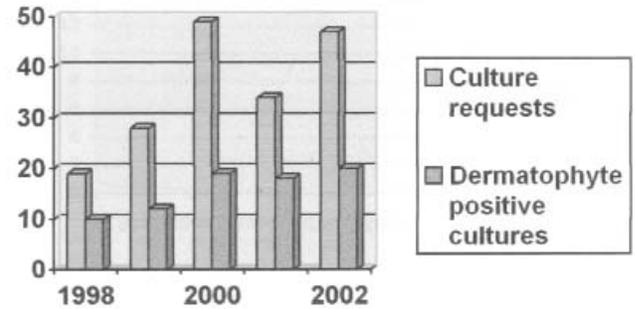


Fig. 1: The number of fungal culture requests and dermatophyte positive cultures per year.

Table 1: The total number of each dermatophyte species cultured

Dermatophyte species	Total number
<i>Trichophyton tonsurans</i>	36
<i>Microsporum audouinii</i>	31
<i>Trichophyton mentagrophytes</i>	7
<i>Trichophyton</i> species	4
<i>Trichophyton rubrum</i>	2
<i>Microsporum canis</i>	1
<i>Microsporum gypseum</i>	1

*chophyton species*" was used for those organisms, which were of the genus *Trichophyton* but the species were not identified.

When the number of each organism identified per year was counted, a picture emerged of a dramatic change in the dominant species between 1998 and 2002 (Fig. 2). In 1998,

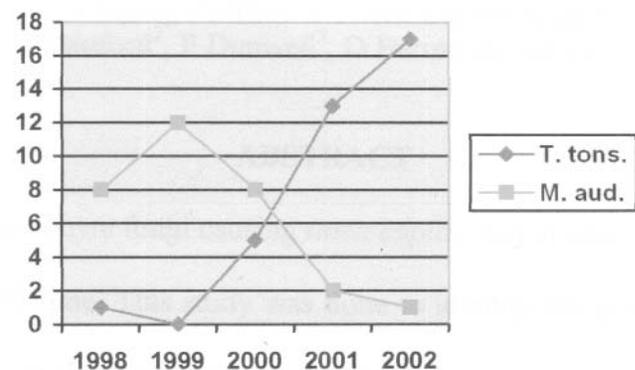


Fig. 2: The number of positive cultures for *Trichophyton tonsurans* and *Microsporum audouinii* species per year.

the dominant species was *Microsporum audouinii* with eight cases, comprising 61.5% of the cases and moving to 100% of cases in 1999. However, this number gradually decreased to one in 2002 comprising only 5% of cases. In contrast, in 1998 there was only one positive culture for *Trichophyton tonsurans* comprising 7.7% of cases, whereas by 2002, it was the dominant species with 17 positive cultures comprising 85% of cases (Table 2). Of the total that were positive for

Table 2: The number of each species isolated per year

Species	1998	1999	2000	2001	2002
Trichophyton tonsurans	1	0	5	13	17
Microsporum audouinii	8	12	8	2	1
Trichophyton mentagrophytes	2	0	2	3	0
Trichophyton species	0	0	2	0	2
Trichophyton rubrum	2	0	0	0	0
Microsporum canis	0	0	1	0	0
Microsporum gypsum	0	0	1	0	0

*Microsporum audouinii*, 21 (67.7%) were also positive on preliminary microscopy. Of those that were positive for *Trichophyton tonsurans*, 28 (77.7%) were also positive on preliminary microscopy.

Females constituted 55.7% of positives and 44.3% were males. This difference was not statistically significant ( $p = 0.128$ ). The age range for the patients with positive cultures was 2 to 49 years. The mean age was 8.6 with a standard deviation of 7.74. Of those 18-years and over, four were males and two were females. Of this adult group, two cases were caused by *Microsporum audouinii*, one by *Microsporum gypsum*, one by *Trichophyton mentagrophytes*, one by *Trichophyton tonsurans* and one by *Trichophyton species*.

## DISCUSSION

The results showed a gradual change in species domination from *Microsporum audouinii* to *Trichophyton tonsurans* over the five years of the study. This change was similar to that noted in North America. In the USA, this change was thought to be partly due to the introduction of griseofulvin in the late 1950s (4). *Microsporum audouinii* has a higher susceptibility to griseofulvin and requires a shorter course of treatment for eradication. On the other hand, *Trichophyton tonsurans* is relatively resistant to griseofulvin requiring higher doses and longer courses for eradication but the organism is more susceptible to treatment with terbinafine than *Microsporum audouinii* (1, 2). Until recently, griseofulvin has been the treatment of choice in Jamaica, not only because of its previous efficacy against *tinea capitis* but also because of its affordability and relative safety in children. The susceptibility of *Microsporum audouinii* to this drug and the relative resistance of *Trichophyton tonsurans* may have contributed to this change in species domination.

The immigration of Hispanics including Mexicans who were from areas where the dominant organism was *Trichophyton tonsurans* has also been cited as a factor in the species change in the USA (4). In Jamaica, the increased travelling between the USA, other Caribbean countries, Central and South America may have contributed to the changes in species. Certainly, in Trinidad and Tobago, in a study done in 1990 to 1991, the dominant species was *Trichophyton tonsurans* (5). This organism has also been reported to be dominant in Venezuela, Cuba and Puerto Rico (5).

The change from an ectothrix pattern (which is the

classical *tinea capitis* pattern known by most doctors) to an endothrix pattern (resembling seborrhoeic dermatitis and with patchy hair loss) may have lead to misdiagnosis and increased spread of the disease. In a study done in the Department of Dermatology at the St Luke's-Roosevelt Hospital Center, New York, of seven adult patients diagnosed with *Trichophyton tonsurans*-positive *tinea capitis*, four had previously been diagnosed with seborrhoeic dermatitis, one with alopecia areata, one with folliculitis and one with *tinea capitis* (6).

There was no statistically significant difference between the number of females affected and the number of males in this study. Studies done in Trinidad and Tobago showed significantly more males affected (55 males of 70 cases) in *tinea capitis* infection (5). The study in New York also showed a dominance of males in the paediatric patients (with 45 males of 70 cases), the majority of whom were of African-American extract (6). Jacobson in his publication in 1951 also reported seeing *tinea capitis* more commonly in boys in Jamaica.

The factors contributing to infections in males and females may differ. Factors which may make females more vulnerable to infection are: more elaborate hairstyles which may lead to less frequent shampooing, known to have some spore-removal benefits and traction hairstyles which may also increase the susceptibility of the hair follicle to infection (6). The role of the woman as the primary caretaker of children in the household may also increase the susceptibility of female adults (6). For males on the other hand, barbers must be considered as a possible reservoir for the disease (6). The adoption by men of hairstyles which increase traction (eg braids) and which may lead to less frequent shampooing may make them more vulnerable.

The adult group in this study also showed two cases of *Microsporum audouinii* and one case of *Microsporum gypsum* infection, which is uncommon. Most adult cases of *tinea capitis* are caused by *Trichophyton species* (6). An explanation for the decreased susceptibility to *Microsporum species* in adulthood is the increase in sebum production after puberty. The triglyceride-rich content of sebum may have fungistatic properties against ectothrix infections but not against endothrix infections. In adult *tinea capitis*, decreased immunity from human immunodeficiency virus (HIV), human T-cell lymphoma-leukaemia virus type-1 (HTLV-1) infections or other immunocompromised states may also play a significant role.

The actual incidence of *tinea capitis* in Jamaica is not known. It is treated by general practitioners and paediatricians as well as dermatologists. For many of these cases, no fungal cultures are done and patients are treated empirically based on clinical findings. The policy at the University Hospital of the West Indies and the two private dermatological practices in the study is to do microscopy and fungal cultures on all suspected cases of *tinea capitis*. However, the population attending these clinics and practices may have been

skewed as one gender may be more likely to visit a dermatologist or more difficult cases may have been more likely to seek the opinion of a dermatologist. It must also be taken into consideration that particular clinical patterns of infection may have been more easily diagnosed and thus not referred. There are therefore, limitations on how much this data can be used to reflect the status of *tinea capitis* in Jamaica or even in the Kingston and St Andrew area.

*Tinea capitis* infection may be rising in Jamaica with a preponderance of *Trichophyton tonsurans* infection. Due to the change in pattern, it will become important for practitioners to consider *tinea capitis* as a differential diagnosis for seborrhoeic dermatitis and certain forms of alopecia, especially when they are unresponsive to conventional therapies. Where possible, fungal cultures should be obtained. In addition higher doses and longer courses of griseofulvin should be employed or terbinafine should be used as the drug of choice in patients with an endothrix pattern of *tinea capitis*, which may support the likelihood of *Trichophyton tonsurans* infection. Studies using fluconazole or itraconazole have

also shown satisfactory cure rates in *tinea capitis* due to *Trichophyton species* and thus these drugs may be considered as alternatives. Whichever drug is used, practitioners must be prepared for unusual clinical presentations requiring longer courses of medication for eradication.

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