

Challenge 0909-2

September 2009

Trichophyton tonsurans -skin scraping, athlete's foot.

HISTORY

This sample was sent as simulated skin scrapings from a patient with athlete's foot. Participants were expected to isolate and identify *Trichophyton tonsurans*.

CMPT QA

The sample was verified by a reference laboratory. *Trichophyton tonsurans* was isolated as 4+ pure culture, viable for 27 days.

SURVEY RESULTS

All participants that processed the sample were able to isolate and identify the isolate to the *Trichophyton* genera (see Table 1).

IDENTIFICATION

T. tonsurans grows readily on Sabouraud's agar and produces colonies with various types of colors and surface textures. ¹

Microscopic morphology

Hyphae are septate, with many variable shaped microconidia all along the hyphae or on short conidiophores that are perpendicular to the parent hyphae.

Microconidia are produced laterally on undifferentiated hyphae or on simple conidiophores. They are usually teardrop or club shaped but may be elongated or enlarged to round "balloon" forms. Intercalary and terminal chlamydosporidia are common in older cultures. ^{1, 2, 3}

Macroconidia are rare, irregular in form, and a bit thick walled. May have spiral coils and arthroconidia. ³

Colony morphology

Trichophyton tonsurans is considered moderately slow growing as colonies mature in about 12 days on Sabouraud's dextrose agar. This species has a partial requirement for thiamine. ³

Colony morphology is highly variable. The surface of the colony may be white, grayish, yellow rose or brownish. The surface is usually suede-like, with many radial or concentric folds. The reverse is usually reddish brown, yellow or colorless. ^{1, 3}

The Committee recommends that all Proficiency Testing samples should be processed as routine samples even when there is a staff shortage or high workload.

CLINICAL RELEVANCE

T. tonsurans is an anthropophilic dermatophyte most frequently causing tinea capitis and less frequently tinea corporis. ¹

Trichophyton tonsurans causes endothrix hair invasion. Hyphae grow down the hair follicle and then penetrate the hair shaft, leaving the cuticle surface of the hair intact. The hyphae within the hair convert to spores replacing the cortex. This may cause the hair shaft to weaken. *T. tonsurans* has been the major etiological agent isolated from cases of tinea capitis in North America. Many wrestling and judo participants in many countries are affected with tinea capitis and/or corporis by *T. tonsurans*. ⁴

Tinea corporis, caused by *T. tonsurans*, may consist of three or more clinical types. For example, tinea corporis may appear with an eczema-like pattern, black dot ringworm, or an inflammatory type like a kerion. ⁴

T. tonsurans

Differential diagnosis

T. mentagrophytes: microconidia are very round and clustered; macroconidia are cigar shaped and thin walled; coiled spiral hyphae are often seen.

T. rubrum: microconidia usually form singly all along the sides of the hyphae; macroconidia are long, narrow, and thinwalled, with parallel sides (pencil-like), and have 4-10 cells.

T. schoenleinii: hyphae are highly irregular, and knobby. The subsurface hyphae usually form characteristic antler-like branching structures commonly called favic chandeliers. Microconidia and macroconidia are absent.

T. tonsurans and *T. mentagrophytes* are urease positive.

T. mentagrophytes and *T. rubrum* grow well on *Trichophyton* agar, No.6 (NH₄NO₃), whereas *T. tonsurans* grows poorly.

Table 1: Results received – *Trichophyton tonsurans* challenge

Reported	No of labs
<i>Trichophyton mentagrophytes</i>	1
<i>Trichophyton mentagrophytes</i> (<i>T. tonsurans</i> less likely)	1
<i>Trichophyton schoenleinii</i>	1

Although the incidence of *T. tonsurans* dermatophytoses in adults is variable, this organism has emerged as a leading cause of pediatric dermatophytoses in the United States. As many as 1 in 20 children develop tinea capitis with *T. tonsurans*, and a significant larger proportion of children harbor the pathogen in an asymptomatic state.⁵

TREATMENT

Ketoconazole, clotrimazole, itraconazole, terbinafine, naftifine, and amorolfine are in general active in vitro against *Trichophyton*.

Terbinafine and itraconazole are now commonly used in treatment of infections due to *Trichophyton* species and other dermatophytes.

For treatment of tinea capitis and onychomycosis, oral therapy is usually preferred.

REFERENCES

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4. Ohno S, Tanabe H, Kawasaki M, Horiguchi Y. Tinea corporis with acute inflammation caused by *Trichophyton tonsurans*. *J Dermatol*. 2008;35:590-593.
5. Shroba J, Olson-Burgess C, Preuett B, Abdel-Rahman SM. A large outbreak of *Trichophyton tonsurans* among health care workers in a pediatric hospital. *Am J Infect Control*. 2009;37:43-48.