

Fungal Skin & Nail Infections: Diagnosis & Laboratory Investigation

Association of
Medical Microbiologists

Quick Reference Guide for Primary Care

For consultation and local adaptation



- B**
- ❑ Approximately 45% of dermatology samples received are positive for fungal infection¹
 - ❑ 91% of positives are detected by microscopy which provides the most rapid diagnosis¹
 - ❑ Culture distinguishes dermatophyte from non-dermatophyte moulds, which may alter treatment

C WHEN SHOULD I TAKE DERMATOLOGICAL SAMPLES FOR FUNGI?^{6,13,14}

When are samples NOT needed?

- Uncomplicated athlete's foot
- Mild infections of the groin
- Mild skin ringworm

When should I take samples for fungi?

- When oral treatment is being considered – scalp ringworm or nail disease
- In severe skin fungal infections e.g. moccasin-type athlete's foot
- Skin infections refractory to initial treatment
- When the diagnosis is uncertain

Note: ensure clinical details are stated including treatment, animal contact and overseas travel

HOW SHOULD I TAKE SAMPLES FOR FUNGAL INVESTIGATION?²

- Swabs are of no value for dermatophytes
- Wipe off any treatment creams before sampling
- Keep any samples at ROOM temperature, do NOT refrigerate
- Samples should be collected into folded dark paper squares^{3,4} (secure dark paper squares with a paper clip and place in a plastic bag; or use commercially available fungal packets e.g. Mycotrans, Dermapak)
- To remove creams, lotions or powders, clean with 70% alcohol

Skin scrapings:

- Scrape skin from the advancing edge of lesion. Use a blunt scalpel blade or similar
- 5mm² of skin flakes are needed for microscopy and culture

Nail samples:

- In superficial infections scrape surface of infected nail plate with scalpel blade
- Most viable fungi are usually found in most proximal part of diseased nail
- Sample diseased part of nail with chiropody scissors
- Clippings should include full thickness of the nail and extend as far back from nail tip as possible

Hair samples:

- Pluck hair from affected areas and take skin scrapings from associated scalp lesions (hair alone is insufficient).
- A new soft toothbrush may be useful to collect specimens as an adjunct (see methods in references^{5,6})

INTERPRETING THE LABORATORY REPORT

C **When to treat:**

- A positive microscopy (fungal elements seen) is sufficient to start antifungals
- A positive dermatophyte culture with negative microscopy is still significant
- A negative microscopy or culture does not rule out fungal infection, particularly with kerion and nail infections. If clinical appearance very suggestive of fungal infection, repeat sample and start treatment

B **Significant fungi isolated and reported:**¹

- The most common dermatophytes are *Trichophyton rubrum* (70%) and *T. interdigitale* (21%)
- *Epidermophyton floccosum* and *Microsporium* species are also encountered
- *T. tonsurans* and *T. violaceum* cause 6% of scalp dermatophyte infections¹
- *Scytalidium* spp. are the only non-dermatophyte moulds that can cause both skin and nail infections⁷
- *Candida* spp are more likely to affect the finger nail or finger nail folds. *C. albicans* and *C. parapsilosis* are the most common yeasts causing onychomycosis, other species eg: *C. glabrata*, *C. guilliermondii*, *C. krusei* and *C. tropicalis* are primarily associated with paronychia^{13,14}

C **Fungi of uncertain clinical significance:**⁸

- Non-dermatophyte moulds (*Aspergillus* spp., *Fusarium* spp., *Scopulariopsis* spp., and *Acremonium* spp.) are rarer causes of nail infection, usually following nail trauma or underlying dermatophyte infection
- Such a diagnosis requires positive direct microscopy, isolation of the organism in pure culture and, IDEALLY, on repeated occasions
- A repeat sample is usually requested to confirm significance of non-dermatophyte moulds

B **Antifungal susceptibilities:**^{9,10,11,12,14}

- Susceptibility testing of dermatophytes is not required, as antifungal resistance is unusual and there is no known correlation between antifungal susceptibilities and outcome

This evidence-based guidance was developed by the HPA Primary Care Unit and GP Microbiology Laboratory Use Group, in collaboration with GPs, AMM and UK Clinical Mycology Network. It is in line with Clinical Knowledge Summaries & SIGN.

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TREATING FUNGAL SKIN AND NAIL INFECTIONS

CONDITION	COMMENTS	DRUG	DOSE	LENGTH OF TREATMENT
Dermatophyte infection of the fingernail or toenail For children seek expert advice	Treat only if infection is confirmed by laboratory. Only use topical treatment if superficial and involving single digit and distal.	5% amorolfine nail lacquer ^B (for superficial)	1–2x/weekly fingers toes	6 months 12 months
	Idiosyncratic liver reactions occur rarely with terbinafine.	Terbinafine ^A	250 mg OD fingers toes	6–12 weeks 3–6 months
	For infections with yeasts and non-dermatophyte moulds use itraconazole. ^C Itraconazole can also be used for dermatophytes	Itraconazole	200 mg BD fingers toes	2 courses of 7 days/month 3 courses of 7 days/month
Dermatophyte infection of the skin	Take skin scrapings for culture. Treatment: 1 week terbinafine is as effective as 4 weeks azole. ^A If intractable consider oral itraconazole. Discuss scalp infections with specialist.	Topical 1% terbinafine ^{A+}	OD - BD	1 week ^{A+}
		Topical undecenoic acid or 1% azole ^{A+}	1–2x/daily	4–6 weeks ^{A+}

Follow-up: Eradication of the fungus generally restores the nail to its pre infection state¹⁴

KEY **A** **B** **C** **D** indicates grade of recommendation good practice point

Grading of guidance recommendations

Study Design	Recommendation Grade
Good recent systematic review of studies	A+
One or more rigorous studies, not combined	A-
One or more prospective studies	B+
One or more retrospective studies	B-
Formal combination of expert opinion	C
Information opinion, other information	D
Good practice point	<input checked="" type="checkbox"/>

References

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