Fungal nail infections (onychomycosis)

Fungal infection of the nails is known as "onychomycosis". It is increasingly common with increased age. It rarely affects children.

Which organisms cause onychomycosis?

Onychomycosis can be due to:

- **Dermatophytes** such as *Trichophyton rubrum* (*T. rubrum*), *T. interdigitale*. The infection is also known as tinea unguium.
- **Yeasts** such as *Candida albicans*.
- **Moulds** especially *Scopulariopsis brevicaulis* and *Fusarium* species.

![Onychomycosis from T rubrum with secondary bacterial infection](image1)
![Complete nail destruction](image2)
![Lateral onychomycosis](image3)

![Nail infection due to Microsporum canis (rare)](image4)
![All nails are yellow due to T rubrum infection](image5)
![Extensive tinea unguium due to T rubrum](image6)

More images of candida nail infection ...

Clinical features of onychomycosis

Onychomycosis may affect one or more toenails and/or fingernails and most often involves the great toenail or the little toenail. It can present in one or several different patterns:

- **Lateral onychomycosis**. A white or yellow opaque streak appears at one side of the nail.
- **Subungual hyperkeratosis**. Scaling occurs under the nail.
- **Distal onycholyis**. The end of the nail lifts up. The free edge often crumbles.
- **Superficial white onychomycosis**. Flaky white patches and pits appear on the top of the nail plate.
- **Proximal onychomycosis**. Yellow spots appear in the half-moon (lunula).
- **Onychoma or dermatophytoma**. This is a thick localised area of infection in the nail plate.
- **Complete destruction of the nail**.

**Tinea unguium** often results from untreated **tinea pedis** (feet) or **tinea manuum** (hand). It may follow an injury to the nail.

Candida infection of the nail plate generally results from **paronychia** and starts near the nail fold (the cuticle). The nail fold is swollen and...
Fungal nail infections, onychomycosis including tinea unguium. DermNet NZ

red, lifted off the nail plate. White, yellow, green or black marks appear on the nearby nail and spread. The nail may lift off its bed and is tender if you press on it.

Mould infections are usually indistinguishable from tinea unguium.

Onychomycosis must be distinguished from other nail disorders such as:

- Bacterial infection especially *Pseudomonas aeruginosa*, which turns the nail black or green.
- *Psoriasis*.
- Eczema or dermatitis.
- Lichen planus.
- Viral warts.
- Onycholysis
- Onychogryphosis (nail thickening and scaling under the nail), common in the elderly.

**Nail clippings to confirm diagnosis of onychomycosis**

Clippings should be taken from crumbling tissue at the end of the infected nail. The discoloured surface of the nails can be scraped off. The debris can be scooped out from under the nail.

Previous treatment can reduce the chance of growing the fungus successfully in culture so it is best to take the clippings before any treatment is commenced:

- To confirm the diagnosis – antifungal treatment will not be successful if there is another explanation for the nail condition.
- To identify the responsible organism. Moulds and yeasts may require different treatment from dermatophyte fungi.
- Treatment may be required for a prolonged period and is expensive. Partially treated infection may be impossible to prove for many months as antifungal drugs can be detected even a year later.

A nail biopsy may also reveal characteristic histopathological features of onychomycosis.

**Treatment of onychomycosis**

Fingernail infections are usually cured more quickly and effectively than toenail infections.

Mild infections affecting less than 50% of one or two nails may respond to topical antifungal medications but cure usually requires an oral antifungal medication for several months. Combined topical and oral treatment is probably the most effective regime.

**Devices used to treat onychomycosis**

Recently, non-drug treatment has been developed to treat onychomycosis thus avoiding the side effects and risks of oral antifungal drugs.

Lasers emitting infrared radiation are thought to kill fungi by the production of heat within the infected tissue. Laser treatment is reported to safely eradicate nail fungi with one to three, almost painless, sessions. Several lasers have been approved for this purpose by the FDA and other regulatory authorities. However, high-quality studies of efficacy are lacking.

- Nd:YAG continuous, long or short-pulsed lasers
- Ti:Sapphire modelocked laser
- Diode laser

Photodynamic therapy using application of 5-aminolevulinic acid or methyl aminolevulinate followed by exposure to red light has also been reported to be successful in small numbers of patients, whose nails were presoftened or evulsed using urea ointment for a week or so.

Iontophoresis and ultrasound are under investigation as devices used to enhance the delivery of antifungal drugs to the nail plate.

**Related information**

**References:**
- Device-based Therapies for Onychomycosis Treatment Skin Therapy Letter. 2012;17(9)

**On DermNet NZ:**
- Onychomycosis – pathology
- Introduction to fungal infections
- Laboratory tests for fungal infections
- Treatment of fungal infections
- Nail disorders

**Other websites:**

http://www.dermnetnz.org/fungal/onychomycosis.html
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- Onychomycosis – Medscape Reference
- Onychomycosis – emedicinehealth
- Fungal infection of nails – British Association of Dermatologists
- Patient information: Fungal nail infections (The Basics) – UpToDate (for subscribers)

Books about skin diseases:

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