FUNGAL INFECTIONS OF THE NAILS

What are the aims of this leaflet?

This leaflet has been written to help you understand more about fungal infections of the nails. It tells you what they are, what causes them, what can be done about them, and where you can find out more about them.

What is a fungal infection of the nail?

Fungal infections of the nails are also known as dermatophytic onychomycosis, or tinea unguium. The responsible fungus is usually the same as that that causes athlete's foot – a common fungal infection of the skin of the feet, especially between the toes. In athlete's foot the responsible fungus lives in the keratin that makes up the outer layer of the skin. When the fungus spreads to the keratin of the nails, the result is a fungal nail infection.

What causes fungal infections?

Fungi spreading from athlete's foot (known as 'dermatophyte fungi') cause most fungal nail infections. Less often a nail infection is due to other types of fungi, usually yeasts (eg. *Candida*) and moulds which do not cause athlete's foot. These other fungi tend to attack nails that are already damaged, as it is easier for the fungus to invade. Fungal infections of the toenails are common (80%), those of fingernails less so. Both are seen most often in the elderly, those with impaired immune systems, and in people with diabetes, as they are more susceptible to infections in general and fungal infections in particular.

Are they hereditary?

No, but several family members may have them at the same time because they can transfer them to each other.

What are the symptoms of fungal infections of the nails?

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At the start, there are usually no symptoms. Later the nails may become so thick that they hurt when they press on the inside of a shoe. They are then hard to trim. The look of an infected nail, particularly a fingernail, may cause embarrassment. The abnormal nail can damage socks and tights, and may cut into the adjacent skin. The skin nearby may also have a fungal infection; it may itch, or crack or appear white, especially between the toes.

What do fungal infections of the nails look like?

When fungi infect a nail, they usually start at its free edge, and then spread down the side of the nail towards the base of the cuticle. Eventually the whole nail may be involved. The infected areas turn white or yellowish, and become thickened and crumbly. Less commonly there may be white areas on the nail surface. The nails most commonly affected by fungal infections are those on the big and little toes. Sometimes, especially in those who carry out regular wet work such as bar staff or cleaners, the skin around the nail becomes red and swollen. Called paronychia, this can allow infection to get to the nail.

How are fungal infections of the nail diagnosed?

Many nail problems can look like a fungal infection – for example the changes seen in psoriasis, after a bacterial infection or an old injury – however, antifungal tablets will not help them. This is why the diagnosis of a fungal infection must always be confirmed before treatment starts. Your doctor will take a piece from a crumbly area of your nail and send it to the laboratory to check if a fungus can be seen under the microscope or grown in culture. The right treatment may depend on knowing which fungus is causing the trouble; it can take several weeks to get culture results.

Can fungal infections of the nails be cured?

Yes, in most cases.

How can fungal infections of the nails be treated?

Fungal infections of the nail do not clear up by themselves, but not all of them need treatment. Some people with infected toenails are not bothered by them at all. In that case they can sometimes be left alone (although the patient should remain cautious and try not to spread the infection to other parts of the body and nails or other people). On the other hand, if infected nails are embarrassing or uncomfortable then they are usually treated. It is important to treat people whose infections may cause significant health problems such as

those with diabetes or immune suppression, in order to prevent potentially severe health problems.

The aim of the treatment is to get rid of the fungus: the nail will then usually return to normal. However, if the nail was abnormal before it was infected, it will be harder to clear and may just go back to its former state. Nail infections caused by moulds and yeasts can be very resistant to treatment.

Treatments applied to the nail (topical treatments)

- Treatments applied to the nail work less well than those taken by mouth. They are most effective if the infection is treated at an early stage. The treatments used most often are amorolfine nail lacquer and tioconazole nail solution. Alone, they may not be able to clear the deeper parts of an infected nail, though regular removal of abnormal nail material with clippers or filing can help with this. Used in combination with an antifungal remedy taken by mouth, they increase the chance of a cure. They may have to be used for a period of 4 to 12 months before a response is noted. Topical treatments are very safe.

Treatment by mouth (oral treatments)

Before starting on tablets, the doctor will send a piece of the nail to the laboratory to check that the diagnosis of a fungal infection is correct.

Three medicines are available for use in fungal nail infections:

- ***Griseofulvin*** has been used for many years and is the only one of the three medicines licensed for use in children. It is only absorbed fully if taken with fatty foods (e.g. dairy products and milk), and long courses of treatment are usually needed (6 to 9 months for fingernails, and up to 18 months for toenails). Even so, only about three quarters of infected fingernails and one third of infected toenails will clear up. Relapses are common.
- ***Terbinafine*** and ***itraconazole*** have largely taken over from griseofulvin now. They work better and much more quickly, although only about 50% of nail infections are cured.
- Terbinafine is the first line treatment for dermatophyte fungi (the ones that cause athlete's foot). It is taken daily for 6 weeks for fingernail infections and for 12 weeks for toenail infections.
- Itraconazole is effective in treating dermatophytes too; it is also useful for treating other fungi such as yeasts. It is often given in bursts – for one week in every month – because it is deposited into the cuticle of the nail and continues to be effective for a few weeks. Two of these

weekly courses, taken 21 days apart, are usually enough for fingernail infections and three for toenail infections.

Are there any side effects from the treatments?

Oral treatments are more likely to cause side effects than topical ones. Terbinafine occasionally causes a potentially very severe allergic reaction, can make some skin conditions worse, and rarely affects the sense of taste permanently. Itraconazole cannot be taken by people who are already taking some medicines. Both terbinafine and itraconazole can affect the liver, and your doctor may arrange blood tests to check this before and during treatment.

Although griseofulvin is the only licenced treatment in children, many dermatologists might use terbinafine as it is much more effective.

Other potential treatments in the future

Early research suggests that photodynamic therapy (PDT) and laser treatments may be helpful in treating fungal nail infections, but there is not enough data to support routine use at present.

How will I know if the treatment is working?

The new nail will grow slowly outwards from its base, and it may be 6 months to a year after the treatment has finished before the nails look normal again. Fingernail infections clear up more quickly and completely than toenail ones; it can take 18 months for a toenail infection to grow out completely.

Surgical removal of nails

Sometimes very thick nails that are not likely to respond to tablets alone may have to be removed by surgeons under a local anaesthetic, however this is rarely performed since cure rates are not high enough to justify the discomfort of the surgery.

Self care (What can I do?)

- Keep your nails short, dry, and clean. Stick to one nail clipper for the infected nails and another for the normal ones.
- Don’t just treat your nails; use an antifungal cream to treat the skin that has athlete’s foot as well.

- Keep your feet dry, wear cotton socks, changed daily, and use 'breathable' shoes. Normal laundry in hot water clears most of the affected socks, but it can be made more effective if an antifungal spray can be used before laundry. Other clothes would not be infected by laundry with or without antifungal spray.
- Do not share your personal towels and socks with other people to reduce transfer of infection. In swimming pools special slippers should be worn for the same reason.
- Your activities need not be limited during treatment but, to avoid a recurrence, don't walk barefoot around public pools, showers, and locker rooms. Check your feet regularly if you have previously had a fungal nail infection, especially if you are at increased risk such as those with diabetes.
- Avoid cutting the cuticle, either yourself or by a manicurist, since this increases the risk of nail damage and infection.

Where can I get more information about fungal infections of the nails?

Web links to detailed leaflets:

http://www.aafp.org/afp/20010215/663.html
http://www.dermnetnz.org/fungal/onychomycosis.html

Full Cochrane reviews on the treatment of fungal nail infections by tablets, and by topical treatments, can be viewed on the NHS Evidence Resources at: www.library.nhs.uk

For details of source materials used please contact the Clinical Standards Unit (clinicalstandards@bad.org.uk).

This leaflet aims to provide accurate information about the subject and is a consensus of the views held by representatives of the British Association of Dermatologists: its contents, however, may occasionally differ from the advice given to you by your doctor.

This leaflet has been assessed for readability by the British Association of Dermatologists' Patient Information Lay Review Panel

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