

Ringworm of the scalp

Ringworm is a skin infection caused by a fungus. Historically, ringworm was thought to be caused by a worm, a belief brought about by the raised circular rings it causes in the body. Hence it became known as ringworm. The cause of ringworm was not discovered until 1843 when a Hungarian doctor named David Gruby discovered that it was caused by a fungus.

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He called the fungus *Microsporum audouinii*. The rash can appear almost anywhere on the body, with the scalp, feet and groin being common sites. Any skin infection caused by a fungus is called tinea.

Ringworm of the scalp mainly affects children. Treatment is with antifungal medication which generally needs to be used for several weeks. Antifungal shampoo is generally not effective alone and oral antifungal medication is required to ensure adequate treatment and prevent re-occurrence. It's estimated that 10% to 20% of people will have a fungal skin infection at some point during their lifetime.

What is ringworm?

Ringworm is caused by parasitic fungi that feed on keratin on the outer layer of skin. This type of fungus is known as a dermatophyte. There are many species of fungi and some can infect the skin, nails and hair. There are about 40 species of dermatophyte that can infect the skin to cause ringworm with *trichophyton canis* and *microsporum verrucosum* being the two most common. These fungi thrive on moist and warm skin.

Fungal infection has different classifications depending on where it appears on different parts of the body. Fungal nail infection is medically known as onychomycosis. Athlete's foot is known as tinea pedis. Tinea cruris (commonly known as jock itch) is fungal infection of the groin area and tinea corporis is fungal infection of the body. Scalp ringworm is referred to as tinea capitis.

Body ringworm can affect anyone of any age, although groin infections are more common in young men.

Who is mainly affected?

Scalp ringworm mainly affects young children. It is uncommon in adults. This is thought to be due to the fact normal skin oil (sebum) increases on the scalp after puberty and sebum has antifungal properties.

How is it caught?

Most cases of scalp ringworm are caught from person to person via touching, sharing towels, combs, etc. Fungi and their spores can remain alive on combs, brushes, unwashed towels, furniture and sheets for long periods. Some people are carriers of the fungi meaning they carry the fungi responsible for ringworm on their skin and hair but do not show ringworm symptoms. They are called "carriers".

However, they can pass the fungi on to others who then do develop symptoms. Outbreak of scalp ringworm can break out among close groups such as families, sports teams or schools.

Ringworm can be caught from animals. Dogs, cats, farm animals etc can have fungal infections on their skin. They can pass on the infection, especially to children. Touching an area where animals have been in contact such as a gate or fence can be enough to infect human skin. Ringworm infection is more common in farm populations due to closer animal contact.

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Sometimes ringworm of the scalp can develop with no apparent cause. The fact that fungi release spores is thought to be the cause for these unexplained causes. Fungal spores can be released into the air from an infected person or animal and fall on the scalp of another person. The spores may then develop into fungi and cause infection.

Close contacts of affected people

Household members and other close contacts of an affected person may be advised to have a simple test. A special brush may be used on their hair which is then sent to the lab to see if their hair is contaminated with fungi or fungal spores.

Treatment may be offered if fungi or fungal spores are detected to prevent the fungus from causing a full ringworm infection or spreading to others. Those found to have a heavy fungal growth or high spore count may be advised to take a course of oral antifungal medication while others with a low count may just be treated with an antifungal shampoo or cream. This preventative measure is for close contacts, such as brothers and sisters. Screening in schools where an affected child attends is not usually needed. However, if more than two children in a class are infected, the rest of the class may be screened by scalp brushing

Symptoms

Commonly ringworm of the scalp looks like severe dandruff on various places on the scalp. This may be mistaken for psoriasis. Some infections cause patches of hair loss (bald patches) to develop.

The bald patches are usually inflamed and very scaly. Small broken-off hairs may remain scattered in the bald patches. In some cases painful pustules (boils) develop on the scalp.

A more severe infection develops in a small number of cases. This causes a large 'boggy' swelling in a section of the scalp, called a kerion. This can be oozing and can cause permanent scarring and hair loss if not treated promptly. Severe ringworm infection with kerion or pustules may cause a fever and swelling in the glands of the neck.

Diagnosis

Symptoms are the primary method of diagnosis of a fungal infection. However ringworm of the scalp can be confused with other conditions like psoriasis, severe dandruff or alopecia. Confirmation of diagnosis usually requires a hair sample or a scraping of affected skin being analysed in a laboratory. The sample can be examined under a microscope and can be cultured to confirm that a fungal infection is the cause.

General advice

Where possible, throw out or disinfect (with bleach) items that may be contaminated with fungal spores (eg) hats, combs, pillows, blankets and scissors. Wash hands frequently. Do not share towels and wash used towels frequently. Try not to scratch the affected area of the body or scalp as this can result in the spread to other parts of the body. A short course of an OTC antihistamine such as cetirizine may be helpful to prevent scratching.

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These measures prevent re-infection after treatment and to prevent passing on the infection to others. It is not necessary to keep children off school. However, to ensure that the infection is not transmitted to others, strict adherence to recommended treatment is advised for children.

The scalp of other members of the family should be examined for signs of infection. If there are any signs of scaling or hair loss then should be commenced immediately. If a pet or farm animal is suspected of being the source of the fungal infection then veterinary treatment should be sought.

Is a visit to a GP needed?

A pharmacist will refer an adult or child who has ringworm of the scalp to their GP. This is because ringworm of the scalp is best treated with oral antifungal medication. Other types of ringworm can generally be treated with antifungal cream and a visit to a GP is not needed unless the infection persists.

Treatment

Oral medication

Terbinafine is an antifungal medicine that is commonly used to treat scalp ringworm. Strictly speaking, it is not licensed for this purpose, but it is an effective treatment. A four-week course is usually needed. It is important to finish the course to clear the fungus completely from the scalp. Side effects of terbinafine can include nausea, diarrhoea, indigestion, skin rashes and an unpleasant sense of taste. However these side effects are relatively rare and are generally mild when they occur. Terbinafine should be avoided with liver problems.

Other antifungal medicines, such as itraconazole and fluconazole, are sometimes used. Itraconazole (known under the brand name Sporanox[®]) is available in capsule or liquid form and should be taken for 7 or 15 days. It isn't recommended for use in children, the elderly or people with severe liver disease. Side effects of itraconazole can include nausea, vomiting, indigestion, diarrhoea and headache

Griseofulvin is an alternative option. An 8 to 12-week course of griseofulvin is usually needed. Women of childbearing age should not become pregnant during, and for one month after, treatment with griseofulvin. Men should use contraception during, and for six months after, their own treatment with griseofulvin because of potential adverse effects on the male reproductive system. Side effects of griseofulvin can include nausea, vomiting, mild diarrhoea, headache and indigestion. These side effects (if they occur) generally improve after a few days. Griseofulvin can affect a person's ability to drive and enhance the effects of alcohol.

Griseofulvin enhances the metabolism of oral contraceptives so alternative contraceptive devices (such as condoms) are advised.

Antifungal medicines are generally well tolerated and side-effects are uncommon. However, they do occur in some people and some people should not take them.

Which anti-fungal is more effective?

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According to a systematic review of therapies, there is no significant difference between the different therapies for trichophyton infections while terbinafine was significantly more effective for microsporum infections.¹ Newer treatments such as terbinafine, itraconazole and fluconazole are generally prescribed instead of traditional griseofulvin because they have a broader spectrum of activity, a shorter treatment period and they have less restrictions.

Antifungal creams and shampoos

Because fungi infect deep into the hair shafts where creams and shampoos cannot reach, antifungal creams or shampoos cannot fully clear the infection. Therefore, they cannot cure the condition. However creams and shampoos can clear fungi and fungal spores from the hairs and surface of the scalp.

An antifungal shampoo or cream is advised twice weekly for a couple of weeks in addition to antifungal medication. This is to clear any surface fungi quickly and make it much less likely for the fungus to spread to others. For example, selenium shampoo, ketoconazole shampoo or terbinafine cream. Whelehans pharmacy have a generic version of ketoconazole called Ketozol[®] shampoo and a generic version of terbinafine cream available called Lanafine[®] cream. These generic versions stocked by Whelehans are significantly less expensive than other brands and can provide significant cost savings for customers. There is no evidence that shaving a child's head will prevent ringworm infection or will speed up recovery.

Complications

Severe ringworm brings the risk of permanent scarring and bald patches remaining on the scalp even after treatment. Also, sometimes the inflammation caused by a fungal infection can lead on to a 'secondary' staphylococcal bacterial skin infection. Antibiotic treatment may be needed in these situations.

References

1. González, U., Seaton, T., Bergus, G. et al. (2007) *Systemic antifungal therapy for tinea capitis in children (Cochrane Review)*. The Cochrane Library. Issue 4. John Wiley & Sons, Ltd.