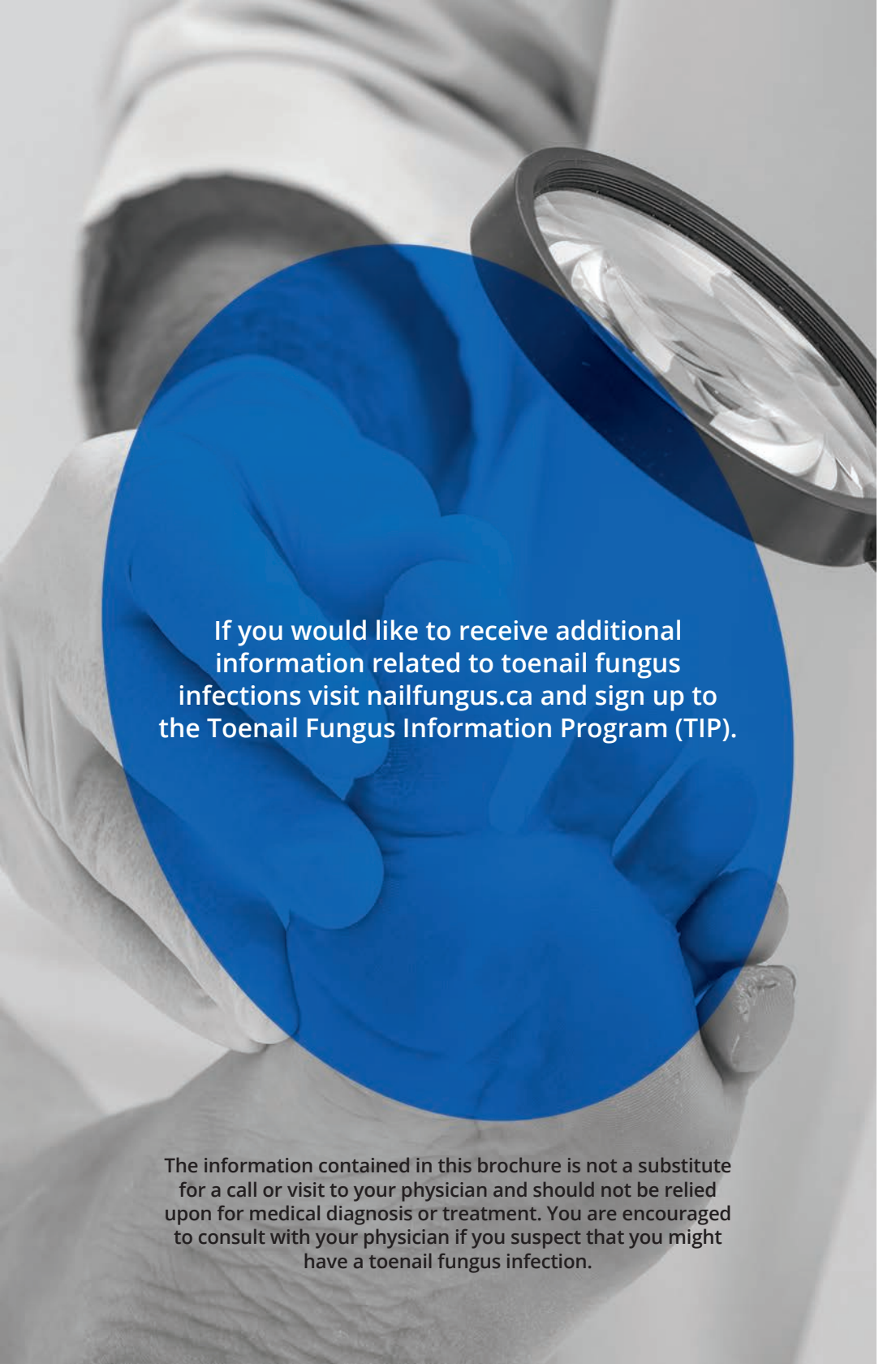




YOUR COMPLETE GUIDE TO TOENAIL FUNGUS INFECTIONS



TOENAIL FUNGUS
INFORMATION PROGRAM



If you would like to receive additional information related to toenail fungus infections visit nailfungus.ca and sign up to the Toenail Fungus Information Program (TIP).

The information contained in this brochure is not a substitute for a call or visit to your physician and should not be relied upon for medical diagnosis or treatment. You are encouraged to consult with your physician if you suspect that you might have a toenail fungus infection.

TABLE OF CONTENTS

Learning about toenail fungus infections 4

What is a toenail fungus infection? 5

Who does toenail fungus infections affect? 6

What are the psychological and social impacts
of toenail fungus infections? 7

What causes toenail fungus infections? 8

How are toenail fungus infections diagnosed? 9

Do you have a toenail fungus infection? 10

What are the approaches to dealing with
toenail fungus infections? 11

- Topical treatments 12
- Systemic or oral treatments 13
- Laser and physical treatments 16

What should I expect from treatment? 17

How can I take control of my toenail fungus
infection? 18

What questions should I ask my doctor? 19

Helpful resources 19

Frequently asked questions 20

Glossary 23

LEARNING ABOUT TOENAIL FUNGUS INFECTIONS

Toenail onychomycosis or toenail fungus infections (TFI). They can range from a simple nuisance to a significant problem in a person's life. It's about the time it takes to treat it; finding an effective treatment option for you, about its social and psychological impacts; and about how uncomfortable and embarrassing it can be.

The good news, however, is the more you know about how to prevent TFI and how to manage and treat it, the easier it will be to deal with and work towards a cure. This booklet provides the information you need to know and will point you in the right direction in treating your TFI.

Keep in mind that working together with your physician will go a long way in helping you address your TFI successfully. You can become an active partner in your treatment by learning as much as you can about TFI and how you can manage it through educational resources, such as this guide. It is essential to understand that there is no substitute for a proper medical diagnosis and treatment plan. Throughout this booklet we will refer to the importance of consulting with your family physician, dermatologist or podiatrist.

These professionals have the knowledge, training and experience to help you fight toenail fungus infections.



WHAT IS A TOENAIL FUNGUS INFECTION?

Onychomycosis is a fungal infection of either the toenails or fingernails. A common, treatable yet contagious condition, it is estimated to account for up to 50% of all nail problems. Onychomycosis is progressive and will not go away on its own, without treatment. Proper detection, diagnosis and early treatment can, however, increase your chances of success and prevent long-term damage to the nail.

Toenail fungus infections are most often caused by fungi or dermatophytes. The fungus usually invades the nail at the free edge and then spreads down the side toward the base. This organism can also cause fungal infections of the skin and it is possible for a fungal infection to spread from the skin to the nails or vice versa. Fungal infections are more likely to affect toenails than fingernails, as fungi grow better in warm, moist conditions commonly associated with wearing shoes and socks.



WHO DOES TOENAIL FUNGUS INFECTIONS AFFECT?

Although everyone is potentially susceptible, there are several risk factors that make a person more likely to get infected. Having an active lifestyle can often expose a person to situations where contact with fungus is more likely. There are also various genetic and health factors that can increase the likelihood of fungal infections.

- People 55 years or older
- People with diminished blood circulation
- People with previous or existing injury or infection of the nail
- People with a weakened immune system (HIV/AIDS, diabetes)

Toenail fungus infections also tend to run in families where it may be passed from one person to another.



WHAT ARE THE PSYCHOLOGICAL AND SOCIAL **IMPACTS** OF TOENAIL FUNGUS **INFECTIONS?**

It should come as no surprise to those affected by toenail fungus infections (TFI) that healing the physical nail is not the only challenge. Dealing with a TFI can involve much more than the efforts to treat the infection.

TFI can be emotionally distressing and have a negative effect on someone's quality of life. In fact, in a recent survey conducted by Leger 360, 50% of the Canadians surveyed said that they changed their behaviour by avoiding going barefoot or wearing sandals because of how their toenails look. Nearly two-thirds of the respondents who had or are suffering from toenail fungus infections claimed that they felt embarrassed about their condition.

Many sufferers feel extremely self-conscious about the appearance of their nails especially during the summer when they are more visible. Nail fungus can cause embarrassment, leading some sufferers to stop activities such as yoga or swimming so that others will not see their toenails.

Your dermatologist and family physician will appreciate if you are open and honest about how you feel, not only physically, but emotionally. He or she will be able to confirm that what you have is a common condition and that you are not alone. Most importantly, they will be able to help you to understand that your feelings are in fact valid.

Fungal nail infections can lead to pain and mobility problems. It may become uncomfortable to wear closed shoes and to walk, exercise or stand. For this reason, early treatment is recommended before the infection becomes more severe or has spread to other toenails or to others around you.

Speak up and take charge of your overall health by addressing issues like TFI that affect your day-to-day happiness. You are your best health advocate.

WHAT **CAUSES** TOENAIL FUNGUS **INFECTIONS?**

Toenail fungus infections (TFI) can be the result of the same type of fungi that cause such conditions as athlete's foot, jock itch and ringworm. These fungi like warm, moist environments and so it makes sense that public areas like gym locker rooms, shower rooms and swimming pools are common areas of exposure.

TFI infections occur more often in feet than hands, probably due to their warm, moist environment created by wearing socks and shoes and the fact that we do not wash our feet as often as we do our hands. The feet also have less blood circulation, making it harder for your immune system to fight off the fungi your feet are exposed to. Other factors that can lead to TFI include:

- Minor skin or nail injuries
- Nail deformities or disease
- Prolonged exposure to moist conditions
- Using tools that have been used on other people
- Wearing closed-in-footwear that is not breathable
- Having diabetes, poor blood circulation or a weakened immune system



Are Toenail Fungus Infections **Contagious?**

TFI are contagious, but not in any way that should cause panic. You can catch a fungal infection from others by sharing such items as nail clippers or nail cosmetics or by walking barefoot in such places as a locker room or around a public swimming pool. Toenail fungus infections can transfer from person to person, within families, as well as from one toenail to another.

HOW ARE TOENAIL FUNGUS INFECTIONS DIAGNOSED?

As the nail is a common place for injuries, temporary changes in your nail's appearance shouldn't be a cause for immediate alarm. While it is estimated that fungal nail infections account for nearly 50% of all nail problems, there are also other conditions that can affect the nail and resemble a nail infection but are separate conditions requiring different treatments.

If the nail changes in appearance for longer than two weeks, it is a good idea to have a doctor diagnose the problem. In order to do so, your doctor will likely:

Perform a physical exam.

In some cases, the diagnosis will be easy to make with a simple examination. Your doctor will evaluate the severity of your infection and will be looking for physical signs such as:

- Discoloration of the affected nail,
- Brittleness of the nail,
- Yellowish and crumbling of the nail,
- Debris under the nail, and/or
- Mild thickening of the nail.



Take a sample for testing.

Your doctor may also take a sample from under the nail, or clip the nail, to be sent to a lab for testing. The tests will confirm whether it is in fact a fungal infection, including the type of fungus, so that he or she can prescribe the right treatment.

Refer you to a specialist.

A number of healthcare professionals may be involved in the diagnosis, treatment and management of TFI. Your general practitioner/family doctor may recommend that you visit a foot care specialist (such as a podiatrist, chiroprapist, or foot care nurse) or a skin and nail specialist (dermatologist) for further care.

DO YOU HAVE A TOENAIL FUNGUS INFECTION?



TFI is not simply a cosmetic problem, it is an infection that can be contagious, cause pain, discomfort, mobility issues and may lead to serious complications.

You may be able to tell if you have a toenail fungus infection by examining your nails for changes in appearance. Here are a few simple questions that may help you determine whether you have symptoms that require you to seek medical advice.

- Do your nails look brittle?
- Has the nail shape changed?
- Are the nail edges crumbling?
- Is there debris trapped under the nail?
- Does the nail seem to be loose or lifting?
- Is the nail thicker than before?
- Do you notice white or yellow streaks?
- Are your nails dull and lacking shine?

If you answered 'yes' to any of the above questions, and have noticed changes in your nail's appearance for longer than two weeks, make sure to see your physician for a proper diagnosis and to help you to decide on the best treatment approach for you.

Seeking treatment early is key, as toenail fungus infections become progressively more challenging to treat with time. If left untreated, toenail fungus infections can lead to other types of infection of the skin. They can also permanently damage the affected nails and potentially lead to a type of skin infection (paronychia) that occurs around the nails.

WHAT ARE THE APPROACHES TO DEALING WITH TOENAIL FUNGUS INFECTIONS?

Prevention

While several factors unique to modern life have resulted in an increased prevalence of nail fungus as well as such risk factors as a previous nail injury, skin infections, family history, poor circulation, smoking, and specific medical conditions, infections of this nature are preventable by following tips such as these:

- Keep feet clean and dry
- Avoid nail polish and acrylic nails (prevent air from reaching the surface)
- Avoid walking barefoot in public showers, pools and locker rooms
- Change shoes and socks frequently
- Keep nails clipped short and straight across
- Wear well-fitting socks and shoes made of breathable materials
- Disinfect clippers and other instruments used to treat nails

Treatment

There are numerous ways to treat toenail fungus infections. Treatment for TFI most often involves a combination of approaches and medications. Therefore, a solid understanding of your options is a worthwhile exercise.

This guide will provide you with an overview of the various treatments available by grouping them into the following categories:

1. Topical Treatments
2. Systemic or Oral Treatments
3. Laser and Physical Treatments

Oral and Topical Treatment Options

Physician administered or prescribed treatments for toenail fungus infection are generally divided into three categories: TOPICAL TREATMENT, ORAL TREATMENT, and PHYSICAL TREATMENT.

Some evidence suggests that a combination of treatments may increase the effectiveness and minimize the chance of recurrence. Your doctor may recommend both topical and oral treatment or both topical and physical treatment to increase your chances of a cure.

This chart lists available oral and topical prescription treatments for toenail fungus infections by key criteria that may be important to you.

Brand Name	Available in Canada	Form	Liver Toxicity Potential	Drug Interactions
JUBLIA™	2014	Topical	NO	N/A*
LAMISIL®	1993	Oral	YES	YES
PENLAC™	2004	Topical	NO	N/A*
SPORANOX®	1993	Oral	YES	YES

* Studies have not been done

There are also over the counter, non-prescription and natural health products available. The information contained in this brochure is limited to prescription drug products available in Canada.

While fungal infections can be difficult to cure, a number of treatment options are available to help you remedy your toenail fungus infection (TFI). The kind of treatment or combination of treatments you decide upon depends on you, on the severity of your infection and your doctor's counsel. By raising this subject with your physician you will be able to benefit from an open discussion on the best course of action.

Topical Treatments

Topical treatments are generally applied directly to the affected nails and have a local effect, meaning that they act against the fungi in the nail and nail bed. The main drawback with topical treatments is that a sufficient amount of medication must penetrate the tough nail plate in order to take full effect on the nail bed where the infection lies. The newer topical treatment options are formulated to be able to penetrate through the nail.

Safety: *Because topical treatments are not absorbed by the body in large quantities, they do not interact with other medications being taken. Topical treatments are much less likely to have severe adverse effects, and their side-effects are usually mild and restricted to the area where the medication is applied.*

Topical nail fungus treatments include Jublia (efinaconazole) and Penlac (ciclopirox).

Jublia, available in Canada since 2014, contains efinaconazole 10% in a clear solution for topical application. Jublia is a prescription medicine used on the toenail (topical) to treat a fungal infection (onychomycosis) caused by certain fungi.

Common side effects: Skin irritation around the toenail such as redness, itching, burning or stinging in the surrounding skin.

Drug interactions: Studies have not been done.



Penlac (ciclopirox topical solution, 8% w/w) is available as a nail lacquer. Available in Canada since 2004, Penlac is a prescription medicine to treat mild to moderate nail fungus along with a treatment program that includes regular removal of the infected nail.

Common side effects: Skin redness around the nail, nail disorders such as shape change, irritation, ingrown toenail and discoloration, application site reaction, burning sensation, dry skin, and itching.

Drug Interactions: Studies have not been done.

Systemic or Oral Treatments

Oral treatments have a systemic effect, meaning the blood stream carries the medication to the nail bed, without needing to penetrate the tough nail plate. For severe fungal nail infections that affect the nail root or matrix, oral treatments will often be required.

Safety: *Because they absorb systemically through the body, oral treatments can interact with other medications, and can be toxic to the liver, so liver function needs to be monitored while taking oral antifungal medications.*

Product options include Lamisil (terbinafine) or Sporanox (itraconazole).

Lamisil (terbinafine) has been available in Canada since 1993. It is an oral antifungal medication in the form of a 250mg tablet. Lamisil is a prescription medicine used to treat fungal infections of the nail (toes, fingers).

Common side effects: Headache, nausea, mild abdominal pain, heartburn, diarrhea, swelling or bloating of the abdomen, loss of appetite, skin rashes, joint and muscle pain, mood disorders, loss or disturbance of taste, dizziness, eye disorder and tiredness.

Rarely, Lamisil tablets can cause liver problems, in very rare cases the liver problems can be serious such as liver failure, some leading to death or liver transplant. Stop taking Lamisil tablets and consult your doctor immediately should you develop jaundice (yellowness of skin and/or eyes).

Drug interactions: The following are some, but not all of the medications that may interact with Lamisil (this is not a complete list):

- Some antibiotics
- Some antidepressants (such as tricyclic antidepressants, selective serotonin reuptake inhibitors including class 1A, 1B and 1C, monoamine oxidase inhibitors Type B, and desipramine)
- Some medicines used to treat irregular heart rhythm called antiarrhythmics (such as propafenone and amiodarone)
- Some medicines used to treat high blood pressure (such as beta-blockers such as metoprolol)
- Theophylline, used to relieve bronchospasm in asthma
- Some medicines used to treat cough (such as dextromethorphan)
- Cyclosporine, used to control the immune system, used to prevent transplant rejection
- St. John's wort [*Hypericum perforatum*], a herbal medicine used to treat depression

Sporanox (itraconazole) is an oral antifungal medication available as 100mg capsules. Sporanox®, available in Canada since 1993 is a prescription medicine used to treat fungal infections of the nails.



Common side effects: Skin rash, high triglyceride and liver tests, nausea, bloating, diarrhea, upset stomach, vomiting, abdominal pain, and constipation or excess gas in stomach, altered voice, inflammation of the sinuses, inflammation of the nose, upper respiratory tract infection, headache, dizziness, menstrual disorders, erectile dysfunction, confusion, tremor, sleepiness, fatigue, chills, muscle weakness or pain, painful joints, pain, chest pain, swelling, generalized swelling, unpleasant taste, hair loss, inflammation of the pancreas, fever or excessive sweating.

Uncommon, but possible side effects:

- Liver toxicity
- Cardiac toxicity

Drug interactions: A wide variety of drugs may interact with Sporanox® capsules. Never take Sporanox capsules if you are taking any of the following medications:

- Methadone, quinidine, dofetilide, levavetylmethadol (levomethadyl), cisapride, disopyramide, dronedarone, pimozide and ranolazine which could result in dangerous or even life-threatening abnormal heartbeats
- HMG-CoA reductase inhibitors such as lovastatin and simvastatin which could result in potentially serious breakdown of muscle tissue
- Triazolam and midazolam (oral) which may worsen or prolong drowsiness
- Ergot alkaloids such as dihydroergotamine, ergotamine, ergometrine (ergonovine) and methylergonovine) which could result in a serious or life-threatening decrease in blood flow to the brain and/or limbs (ischemia)
- Eletripan, a migraine medication, which could result in serious side effects
- Felodipine, eplerenone and nisoldipine medicines for angina (crushing chest pain) or high blood pressure
- Irinotecan, an anti-cancer drug
- Lurasidone, an antipsychotic drug
- Colchine, a medicine to treat gout, when used in subjects with kidney or liver impairment.



Laser and Physical Treatments

Laser Treatment

Lasers, photodynamic therapy, and diode lasers are a relatively new area where there may be potential for treating fungal infections. Light therapies are performed at a medical clinic and can be fairly expensive treatment options. At this time, medical evidence suggests that laser treatment alone is not very effective in treating fungal nail infections. Speak with your doctor to discuss if this option is best for you.

Physical Treatment

In some cases a part of or the whole infected nail may need to be removed. The procedure can be done in the physician's office and is relatively painless. By itself, physical therapy will not kill the fungus or remove it from the nail. It is often done so that topical treatments can be applied directly to the affected part of the nail or the nail bed.



WHAT SHOULD I EXPECT FROM TREATMENT?



Treating toenail fungus infections can be challenging. Having patience and realistic treatment expectations are very important. Make sure to speak with your physician and pharmacist about what you should expect in terms of the outcome, duration and possible side effects of your treatment. Unrealistic expectations often lead to dissatisfaction, poor compliance, or failure to continue treatment and, as a result, increasing the potential for recurrence and the risk of transmitting the infection to others.

Treatment Length

The appearance of the damaged nail will not change until the damaged nail grows out and is replaced by a healthy one. It can take toenails anywhere between 12 and 18 months to grow out and be replaced by healthy nail. Typically, topical treatments are prescribed for a year and oral treatments require several months before your nails begin to return to normal.

If you begin taking medication for TFI, it will take some time before you will notice a difference. Follow your doctor's instructions and let him/her know if you have any questions or concerns about the results you are seeing.

Treatment Results

While the cure rate for fungal nail infection treatments is not 100% and recurrence is not uncommon, your physician will be able to monitor your progress and modify your treatment regimen if required.

HOW CAN I TAKE CONTROL OF MY TOENAIL FUNGUS INFECTION?

Hopefully, this booklet has answered most of your questions about toenail fungus infections (TFI) and has helped provide you with enough information to understand your condition and feel comfortable talking to your physician.

While you're likely to start by seeing your family doctor or a general practitioner, you may be referred to someone who specializes in foot care (podiatrist, chiropodist, foot care nurse) or skincare (dermatologist). Here are some pointers to help you prepare for your appointment.

- **Write down your symptoms**, including any that may seem unrelated to your nail condition as this may affect your doctor's treatment choices.
- **Write down key personal information**, including any allergies, or other health problems you may have. Conditions like cancer, diabetes, HIV/AIDS and psoriasis can make you more vulnerable to infection or could rule out certain treatment options.
- **Make a list of all medications**, vitamins, creams or supplements you're taking or have used in the past and try to be as specific as possible.
- **Take a family member or friend along**, if possible. Sometimes it can be difficult to take in all the information provided to you during an appointment. Someone who accompanies you may remember something you missed or forgot.
- **Write down questions** to ask your doctor.

If you've scheduled an appointment with your doctor to talk about a possible TFI, rest assured he or she will be able to find a treatment plan that is right for you.



WHAT QUESTIONS SHOULD I ASK MY DOCTOR?

Preparing a list of questions will help you make the most of your time with your doctor. Some basic questions to ask about toenail fungus infections (TFI) include:

- What is likely causing my symptoms or condition?
- Is it normal that my TFI is impacting my self-confidence and overall happiness?
- What kinds of diagnostic tests do I need, if any?
- What are my treatment options?
- If the first treatment I try isn't effective, what will we try next?
- How much will treatment improve my physical signs and symptoms?
- Will I need to be treated long term?
- What are the possible side effects of the medications you're recommending?
- How will you monitor my response to treatment over time?
- I have these other health conditions. How can I best manage them together?
- Are there any restrictions I need to follow?
- Should I see a specialist? (If applicable)
- What websites or resources can you recommend for additional information?

Don't hesitate to ask your doctor any other questions you have about your condition.

HELPFUL RESOURCES

Here are a few other resources that you may find helpful in your search for information on toenail fungus infections (toenail onychomycosis) or additional skin care-related resources:

- The Canadian Nail Fungus Resource: www.nailfungus.ca
- Skin Care Guide: www.skincareguide.ca
- Canadian Dermatology Association: www.dermatology.ca
- Canadian Skin Patient Alliance (CSPA): www.canadianskin.ca
- Toenail Fungus Infections Program (TIP) e-newsletter.
Sign up at Nailfungus.ca

FREQUENTLY ASKED QUESTIONS

1. Who gets nail fungus?

Anyone can become infected with toenail fungus. It is less common in children, and becomes more common as we age due to weakening immune systems and diminished blood circulation, which make the body more susceptible to fungal infections. In particular, patients who have suffered a nail injury, or who have diabetes or psoriasis are at greater risk.

2. How do you prevent nail fungus?

Fungi are everywhere, so it isn't possible to completely eliminate the possibility of infection, but there are steps that can be taken to reduce your chances of infection.

- Don't share nail care tools such as nail clippers or nail brushes
- Avoid footwear that is too tight or does not allow for air circulation
- Wear slippers or flip flops in high risk areas like communal showers, public pools, spas and saunas
- Wash your hands and feet often, especially after sports
- Take extra precaution if you have diabetes or psoriasis
- Keep the feet clean and dry

3. Can you catch nail fungus from others?

Yes, you can catch the infection from others. Sharing nail clippers or nail cosmetics are one way of passing the fungal infection to others. Similarly, public swimming pools are a common place to catch a fungal infection.

4. Why do I keep getting fungal infections while others never seem to get them?

There can be a number of reasons, but it is likely that you are naturally more susceptible to fungal infections. In addition to genetic susceptibility or

a generally weaker immune system, you may be exposing yourself to places where fungi thrive, like swimming pools or public gyms. Athletes are often exposed to conditions where fungal infection is more likely. Some patients with other medical conditions such as diabetes, psoriasis, or a weakened immune system, are more likely to be vulnerable to nail infections.

5. Can I ignore the nail fungus if it's not painful?

If you suspect that you have a nail infection, visit a doctor and have it properly diagnosed. Although serious complications arising from nail fungus infections are rare, it should be treated quickly to avoid permanent damage to the nail and its spread to other toenails. Also, it is better to treat an infection early before it becomes severe and harder to treat.

6. Why won't the immune system kill the fungus?

Your immune system often will kill the fungus, but it is not perfect. The toenails in particular are a common site of infection as blood circulation is very limited there, and it is more difficult for the immune system to detect the infection.

7. What are the possible complications of nail fungus?

Nail infections progress slowly, and the condition will become increasingly difficult to treat. Serious complications are rare except in patients who have weakened immune systems due to HIV infection/AIDS or the use of immunosuppressant medication. However, if the infection progresses and the nails get thicker it could become painful to walk and wear shoes.

8. How effective are nail fungus treatments?

Most prescribed treatments are effective, but it takes time to cure nail infections. Nail fungus will not clear until a new healthy nail, which is fungus free, replaces the damaged nail. As nails grow slowly, it can take

12 to 18 months for toenails to become clear, even when the medication is working. The recurrence rate is unfortunately quite high with nail fungus infections. If you get recurring nail fungus infections, it could be a sign that you are susceptible to nail infections.

9. Does it help to keep the fingernails short?

Yes, it can help. Long fingernails can provide more opportunity for fungus to hide underneath the nails. It is just as important, however, to keep the nails dry. This is especially the case for toenails, which are more likely to be in a moist environment.

10. How can I prevent fungal nail infections from coming back?

You should fully complete the treatment regimen that your doctor has prescribed and make sure that the infection is cured and your nail is clear before stopping treatment. Change your socks frequently to help keep your feet clean and dry. Shoes that were used when your nail was infected should be sterilized or thrown away. If you also suffer from Athlete's foot, it should be treated so it does not spread to the nails. Finally, wear sandals or flip flops at public gym showers and pools where fungi thrive, to minimize your chances of coming into contact with fungi.

11. Who should I see to treat my toenail fungus infection?

Your family physician, dermatologist and podiatrist are the medical professionals that are best able to provide the counseling, diagnosis and treatment you will require. They are also up to date on onychomycosis research. Depending on the severity of your condition, your access to healthcare services and the province in which you live, you may be referred to a dermatologist who specializes in conditions of the skin, hair and nails. Your podiatrist specializes in conditions affecting the feet.

Your Complete Guide to Toenail Fungus Infections is part of the Toenail Fungus Information Program (TIP). It has been made available as a resource to enhance knowledge and information on toenail fungus infection, thanks to an educational grant from Valeant Canada.



Your Complete Guide to Toenail Fungus Infections has been endorsed by the Canadian Skin Patient Alliance

