Diseases and Deformities of the Nail

Diseases and deformities of the toenails are among the most common foot problems.

A nail is a made up of keratin, a hardened layer of the outer cells of the skin. Trauma, infection, improper foot gear, abnormal growth of the small bones beneath the toenail, improper trimming of the nails, improper foot mechanics and systemic stresses and medical problems such as peripheral vascular disease, diabetes, thyroid disorders and others can result in diseases and deformities of the nail that require medical specilaty care.

Common Nail Disorders include

paronychia - inflammation of tissues around the nail; an infection often accompanied by pus, if left untreated the infection may spread to the underlying tissues and create a cellulitis in which the infection spreads into tissue spaces with redness, swelling, heat and pain; treatment requires physician performed incision and drainage and prescribed antibiotics to contain and resolve the infection

onychocryptosis- occurs when the free edge of the nail becomes incurvated and embedded in the soft tissues. Secondary infection may occur. This condition may become chronic and require a surgical procedure known as a onychoplasty, performed under local anesthesia on an outpatient basis to remove the embedded portion with cautery (chemical or electrical destruction) of the nail root

onychogryphosis- a deformity of the nail accompanied by abnormal thickening of the nail. Surgery debridement (removal of contaminated tissue) under aseptic (sterile) conditions or surgical removal may be necessary to alleviate the problem.

onychomycosis - an infection of the nail caused by a variety of fungi, molds or yeasts. These organisms can live on the nail bed (the soft skin that lies beneath the nail) and the nail plate. Like many organisms that cause disease they grow where there is a warm, moist, protected environment. The nail provides a well protected place for fungus to grow and thrive. Nail fungus is more likely to occur if the nail has been injured leaving a break through which fungi can enter the nail bed. Long term conditions that effect the immune system, diabetes or compromised circulation in the lower extremity can make you more susceptible to

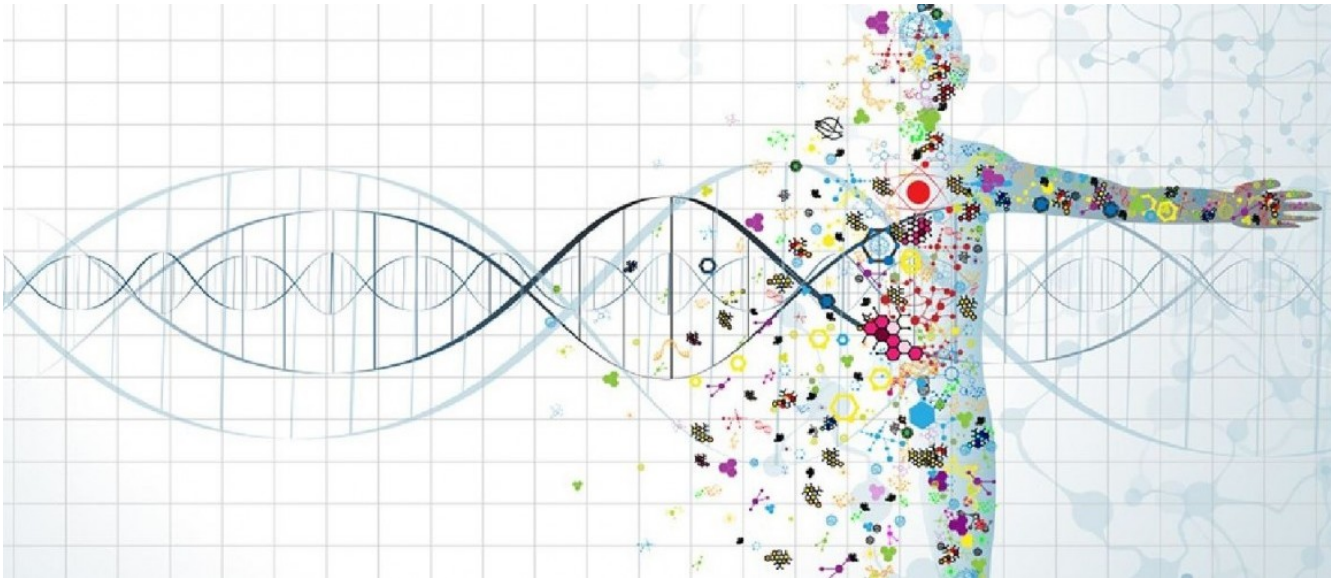
fungal infections. Untreated athlete's foot also can lead to toenail fungal infections. Nail fungus is more than a cosmetic problem. Infected nails change in color, texture and shape. They may make activity painful. Left untreated the infection can spread and may lead to the development of a more serious bacterial infection.This can lead to even more pain and serious complications.

A well performed physician culture examined by an experienced pathology lab can be invaluable in determining the existence and identification of a nail fungus. Early and effective treatment is necessary. Treatment options include both topical and oral medications and nail debridement (removal of contaminated tissue by your podiatric physician).

Topical medications may not be indicated in some cases because they may not penetrate the nail to stop the infection. Several new oral medications are now available to treat nail fungus. However as they are prescription drugs they require close monitoring by your podiatric physician and may not be indicated in all cases.

The treatment of onychomycosis can be difficult for a variety of reasons. Fungal infections can be resistant to treatment by their very nature. Patient compliance is not consistent. Patient's do not take the medication properly and consistently or discontinue use too early. Some types of treatment require 12 or more weeks with a repeated trial. Patients may have unrealistic expectations because it can take several months for a healthy nail to grow out. Patients may need to make changes in their personal habits to avoid re-infection. A patient's overall health may affect the efficacy of the treatment. In some cases the extent and severity of the fungal infection may require surgical intervention with removal of the nail, nail bed and cautery of the matrix or growth area.

***State of the Art* Molecular Testing for Nail Fungus.**



New DNA Testing for Nail Fungus Yields Improved Outcomes

Onychomycosis (fungus infection of the nail) causes almost half of all nail deformities. It is important to identify the cause of the nail deformation and determine a proper treatment plan as the clinical features of onychomycosis can mimic a large number of other nail disorders including psoriasis, lichen planus (an inflammatory rash causing grooves or ridges in nail plate) and malignant melanoma.

At first, onychomycosis may only be a cosmetic concern as patients notice their nails have become thickened, discolored, misshapen and brittle. Functional complaints include problems with physical agility (walking, exercising), pain and paresthesia (a sensation of pricking, tingling, or creeping on the skin having no objective cause and usually associated with injury or irritation of a nerve) and occupational limitations.

Onychomycosis as an infection requires proper and specific diagnosis and treatment. Left to linger it may lead to other serious infections that spread beyond your feet and permanent scarring of the nail matrix (where the nail starts and nail cells multiple and harden to form the nail). Diabetes, poor peripheral circulation, peripheral neuropathy (sensory loss in the lower extremities) and a suppressed immune system put you at a greater risk of developing a serious bacterial skin infection (cellulitis).

Because of the prevalence of fungal infections of the nail and the belief that due to appearance these infections are relatively superficial, self-care and OTC topical treatments are chosen to control the problem. Typically they do not. This is because the nail unit is relatively impenetrable and there are many species of fungi that can affect nails. Even clinically managed cases yield poor results due to ambiguous test outcomes and non-targeted treatment with millions of dollars spent annually.

The success of treatment for onychomycotic nails depends on the proper and specific diagnosis and sampling technique used by the physician so that the specific infective organisms can be identified. Self-diagnosis and misdiagnosis can lead to inadequate treatment, allowing the infection to worsen with extended time. Additionally, this can lead to poor efficacy, unnecessary exposure to medications and increased risk of side effects.

Patients should inquire about the diagnostic options for treatment of onychymycosis including histopathological tests to detect location of the disease within the nail and polymerase chain reaction (PCR) assays developed to detect

fungal DNA from infected nails. Conventional laboratory diagnosis of onychomycosis routinely involved only direct microscopic examination (KOH preparation) of the clinical specimen to rule out the presence of fungi however this does not provide genus or species identification and cannot identify the specific pathogen (disease causing fungus) or differentiate between yeasts and molds. Optimal therapy varies with the pathogen identified. Given the cost associated with current treatments it is important to diagnose and identify the infection as accurately as possible to ensure better, timelier and the most cost effective health care for patients.

The advent of molecular technology has enabled the development of techniques like polymerase chain reaction (PCR), which is a highly sensitive and specific test and can be used for diagnosis of various microorganisms including fungal pathogens. PCR has been used to improve sensitivity in detecting the causative fungi in nail specimens from patients with suspected onychomycosis. A small (2mm) biopsy of the nail is taken and sent to the laboratory for processing. With more specificity regarding the infective organism (PCR can differentiate to species, strain and subtype) physicians can then determine the best treatment plan.