

The Abnormal Nail

Learn about abnormal nails and how to properly care for them.

By Doug Schoon, M.S.

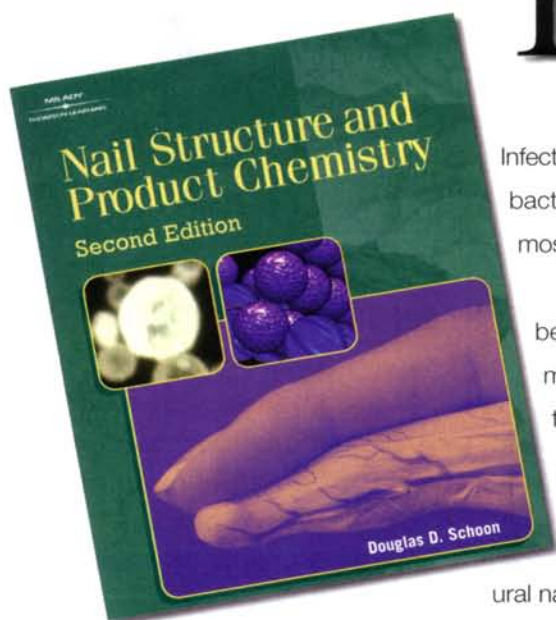
This is an excerpt from "The Abnormal Nail," Chapter 5 of *Nail Structure & Product Chemistry, Second Edition*, by Doug Schoon, Master of Science, to be published in March by Thomson/Delmar Learning.

Nail Plate Infections: The Real Story

Infections found on the surface of the nail plate are almost always caused by bacteria. Bacteria are one-celled, living organisms. Bacterial infections are most often green in color due to the waste products created by the bacteria.

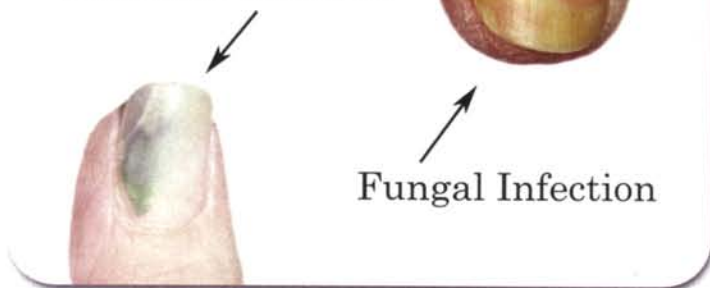
Bacterial infections result when large numbers of bacteria are trapped between a nail coating and the nail plate. The coating causes oil and moisture to build up under the nail plate. The extra moisture and oil allow the bacteria to thrive and multiply, since bacteria feed on the oil and need water to live. This type of infection can occur if the nail plate is not properly cleansed and prepared before the nail enhancement is applied. Bacterial infections can also occur under nail polish with natural nails, but not as commonly.

As a bacterial colony grows, the bacteria produce extremely dark stains that should not be removed by filing. These stains resist fading and can last for months after the infection is gone. This can fool nail technicians and clients into thinking the infection is still active.



1

Bacterial Infection



Fungal Infection

plate is to obtain a culture of the infection and submit it to a laboratory for proper analysis. Photo 1 shows a typical fungal infection of the nail plate.

Preventing and dealing with nail infections is a very important topic and is vital to your professional success.

Infections can grow under the nail plate if it separates from the nail bed. Once a separation occurs, bacteria can infect the delicate tissues. These are more serious infections and usually require a doctor's care. If the infection is creating redness, swelling or significant pain or is discharging fluid, no nail services should be provided until a doctor has examined the nails. An example of a bacterial nail infection is shown in Photo 1 above.

Infections inside the nail plate are usually caused by a fungus. Fungi are not the same as bacteria; in fact, the fungi that cause skin and nail infections are parasitic, plantlike organisms related to mushrooms and yeast. Fungal infections are relatively rare on fingernails and are most often found on the toenails, since shoes provide the ideal growth environment for fungi. Fungi prefer the dark and love warmth and moisture, so feet and shoes provide an ideal home. Unlike bacteria, fungi eat the keratin which makes up the nail plate. They can digest both skin and nail plate. When this happens, the nail plate will break apart and swell, especially when exposed to moisture.

Overall, the vast majority of nail infections seen in the salon are caused by bacteria—possibly as much as 95%. Dermatologists report that roughly half of the infections they see are fungal, but dermatologists see the most difficult cases that don't go away on their own. Most clients never see a doctor for bacterial infections of the nail plate, since they usually go away on their own or grow off with the nail. The only way for a doctor to determine if a fungal infection exists on the nail

Warts Will Love You for Cutting

Damaged tissue creates an open window of skin, allowing pathogens (disease-causing microscopic organisms) to enter the damaged tissue and begin to multiply. Photo 2 on the next page shows the finger of a small child who persistently chewed his finger. Eventually, the broken skin became infected with a virus that causes warts. Some organisms, especially those that cause skin infections such as warts, are opportunistic pathogens. This means they take advantage of damaged, broken, irritated or abraded tissue. Normally, the pathogen would not cause an infection, but damaged skin loses much of its ability to ward off infection—another good reason to keep skin healthy! Similar infections can occur when the living tissue around the nail plate is intentionally cut.

Each time you cut the eponychium (part of the guardian seal) it will cause the living tissue to grow back thicker and harder. If you stop, the tissue will return to normal in a month or so. Clients don't realize that cutting the living tissue creates the hard skin. Instead of cutting, keep the eponychium softened with high-quality oil or lotion. This will restore the damaged skin to health and provide maximum protection. Cutting living tissue creates the same damage as biting and can allow viral warts to invade the skin. Clients want the best for their nails, so if they insist on cutting away this tissue, explain the risks and show them the benefits of keeping the skin around the nails healthy and intact. In short, it's fine to carefully trim a

little tag of dead skin, but never rip or cut into living tissue. This is what state boards are trying to tell you when they ban cutting of the so-called cuticle. Some boards may use the wrong terminology, but even so, avoid cutting living tissue!

The same caution applies to foot or hand calluses, even though they consist of dead skin. Calluses are designed to protect the underlying living tissue from repeated friction or pressure. A callus should never be removed, only smoothed down. Removing them can cause skin blisters and potentially may lead to more serious problems.

Will the Real Pterygium Please Stand Up?

Pterygium (ter-RIJ-ee-um) is not the cuticle and they have nothing in common. Unlike the cuticle, pterygium is living tissue. Pterygium is defined in medical books as any abnormal, winglike structure of skin. According to Godfrey Mix, a well-known podiatrist and author, "Pterygium as it relates to the nail is the abnormal adherence of normal skin to the nail plate and is usually caused by injury." Sometimes the term "true pterygium" is

Beware of Antifungal Claims

Over-the-counter topical antifungal medications are only effective on soft tissue and have virtually no effect on nail plate infections. These medications easily penetrate the skin but can't penetrate the nail plate or get into the matrix. The nail plate is much denser and much more difficult to penetrate than the skin. This explains why the FDA forbids companies from claiming that nonprescription antifungal treatments can be used for the nail plate. Some companies avoid the FDA ruling and get away with selling bogus treatments by carefully instructing users to apply the product to the skin surrounding the nail plate. Don't be fooled! These products won't work for clients with a true fungal infection.

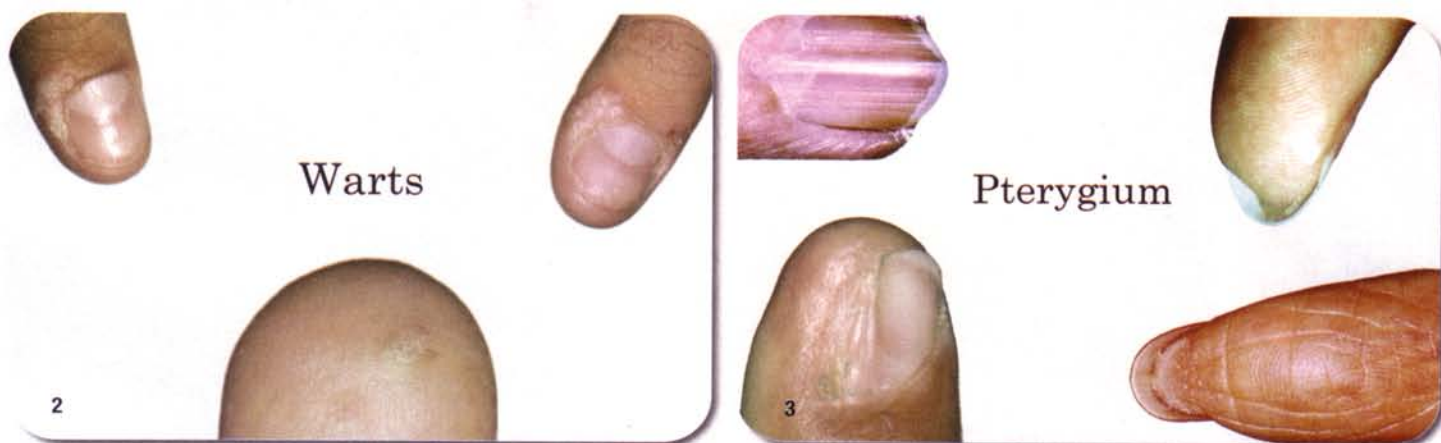


Photo 2. Warts around the nail plate and on the fingertip. Photo 3. Pterygium is an abnormal winglike growth of skin; the term pterygium should never be used to describe the cuticle or any other normal growth of skin.

used, suggesting that there is another kind of pterygium, but there is only one kind, so adding the word "true" is unnecessary.

Pterygium can be found in many places on the body, including the eyes. It is seen on the nail plate, but only as an abnormal condition. When the eponychium or hyponychium becomes severely injured or damaged, pterygium may develop. Never confuse pterygium with the cuticle—they are very different.

There are two types of nail pterygium: inverse pterygium and dorsal pterygium. The inverse type of pterygium is shown underneath the free edge of the nail plate as shown in the bottom-right corner of Photo 3.

This condition is seen when skin on the tip of the finger remains attached to the underside of the nail plate. As the plate grows away from the fingertip, the attached skin is stretched and pulled, and when cut, pain and bleeding can result. The condition can be inherited, but it is almost always a result of trauma or an allergic reaction. Slamming fingers in a car door or aggressively cleaning or manicuring under the nail plate are examples of trauma that can cause this disorder. Allergic reactions to formaldehyde-containing nail hardeners can also cause pterygium, as can repeated applications of monomer liquids, UV gels or acid-based nail primers to the skin near the underside of the nail plate.

Pterygium on the top surface of the plate is called dorsal pterygium. Dorsal means "top side"—that's why the fin on a dolphin's back is called the dorsal fin. This type of pterygium can be inherited, but rarely is. The dorsal type is more likely to be caused by severe trauma, such as warts, burns, lichen planus (LYE-kin PLAY-nus)—the most common cause—and blood circulation disorders. Lichen planus is a recurring skin inflammation that forms small, itchy lesions on the wrists, arms and elsewhere. Experts believe this condition causes the underside of the eponychium to become fused to the matrix. This prevents normal nail plate growth. The skin is slowly stretched and dragged along the bed, as shown in Photo 3.

A client with either type of pterygium should talk to her doctor. In the case

of inverse pterygium, avoid exposing the client's skin to monomer and discontinue the use of formaldehyde-containing nail hardeners until the condition is resolved. ↓

Doug Schoon has more than 30 years of scientific experience and a master's degree in organic chemistry. He is considered to be a leading research scientist in his field. His unique expertise focuses on the science



of both natural nails and enhancements. He is a well-known and respected author, as well as an internationally renowned lecturer and educator. Schoon is also a strong advocate for salon safety. As co-chair of the Nail Manufacturers Council, he frequently represents the entire nail industry on scientific and technical issues in Europe, Canada and the United States, and is often called upon to serve as an expert witness in legal cases involving cosmetic safety and health.

Additionally, dermatologists frequently call Schoon to assist them in writing books and scientific papers concerning fingernails. For the last 16 years he has led the scientific research team for Creative Nail Design, and presently serves as the company's vice president of science and technology. He currently resides in Dana Point, California.

To purchase Nail Structure & Product Chemistry, Second Edition, by Doug Schoon, M.S., to be published in March by Thomson/Delmar Learning, log on to www.milady.com.

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