

SIX-PART SERIES EXCERPTED

NAIL STRUCTURE & PRODUCT CHEMISTRY

DON'T RUB ME WRONG

Over-filing is one of the most common causes of nail damage in the salon. Even though there are a little more than one million nail cells in your pinkie, it is only 100 cell layers thick. A heavy-hand with a coarse abrasive (60-120 grit) or an electric file can quickly remove half the layers. This leaves the nail plate overly thin and weak, creating many additional problems for both clients and nail technicians. For example, using electric files on the natural nail plate can overly thin the nail plate, if used incorrectly. Ideally, nail techs should use 180-240 grit abrasives. But remember, in careless hands even a 180 grit file can create considerable damage to the nail plate. Using even coarser files on the natural nail is unwise and potentially dangerous to the nail. A good rule to remember: **The lower the grit, the easier it is to create serious damage.** Heavy abrasives and electric files should be used cautiously and with a light touch. Thin nail plates are too flexible. This can have a negative effect on adhesion – for both nail polish and artificial enhancements. Nail treatments like polish, base coats and top coats don't adhere well to these types of nails. Thin nail plates also allow some ingredients to pass more easily through the nail plate. You'll learn later that this can contribute to allergic reactions or lead to other serious nail problems. In general, nail professionals tend to over-file the nail plate. The old myth is that you need to 'really rough up the nail to make the product stick'. This sounds reasonable, but is it and what are the consequences? After all, we sand wood to make paint stick. But, who would strip away half of the wood? No one, of course! We only remove the topmost surface. So why strip away many layers of the natural nail? Early nail products had poor adhesion and lifting was far more common. Today's advanced products are designed specifically for improved keratin adhesion; so heavy filing is no longer needed or desired! A better way is to remove only the top few layers of cells, then thoroughly clean the nail plate – taking the time to use proper preparation procedures. This will keep the nail thicker and in the long run, healthier. Only the 'shine' needs to be filed away. Oils saturate the upper-most surface of the nail and cause the surface to reflect light or 'shine'. One of the most important things you can learn as a nail tech is – only the very topmost 4-5 layers need be removed to create good product adhesion. This is about 5% of the plate's thickness. This will leave 95% of the thickness of the nail plate intact. If the nail is visibly thinned, i.e. a ledge exists between the filed plate and new growth, then over-filing has probably occurred. After 24-hours, clients shouldn't even notice that their nails are thinner after artificial nail products are removed. If the plates are thinner, it is due to over-filing. However, the nail plate can be seriously damaged in other ways.

PINCHING

When properly applied artificial nails do not harm the natural nail surface. But if improperly applied, damage may occur. To improve the natural curvature (C curve) of the nail plate,

techs sometimes 'pinch in the sidewalls' of the artificial nail before the product is fully hardened or cured. This technique alters the curvature, but the process can cause serious nail damage. As the sidewalls are pushed inward, the centre portion of the artificial nail pushes upward. This pushes upward on the centre of the plate's free edge. This constant upward force can rip and tear the seal between the nail plate and nail bed, causing them to separate. The pinching force can also damage a surface of the natural nail as seen in figure 4.1. Notice the white spots that appear under the nail plate; they show where the nail bed is separating.

The pinching technique started in artificial nail competitions. However, competition nails are not designed to meet real-world demands and generally are removed (or break) in a few days. But, when this technique is used on client's nails, serious problems can occur. Never pinch or force the nail plate into a more dramatic curvature. It is much better to build the curvature with a wooden dowel or sculptured nail form during product application. This will avoid putting excessive stress on the nail plate and bed.

Injured Matrix



PERMANENT SPLIT CAUSED BY DAMAGE IN THE MATRIX AREA – FIGURE 4.2



DAMAGE CREATED BY PINCHING ARTIFICIAL NAILS INTO DRAMATIC CURVATURES BEFORE THEY ARE FULLY HARDENED/CURED – FIGURE 4.1

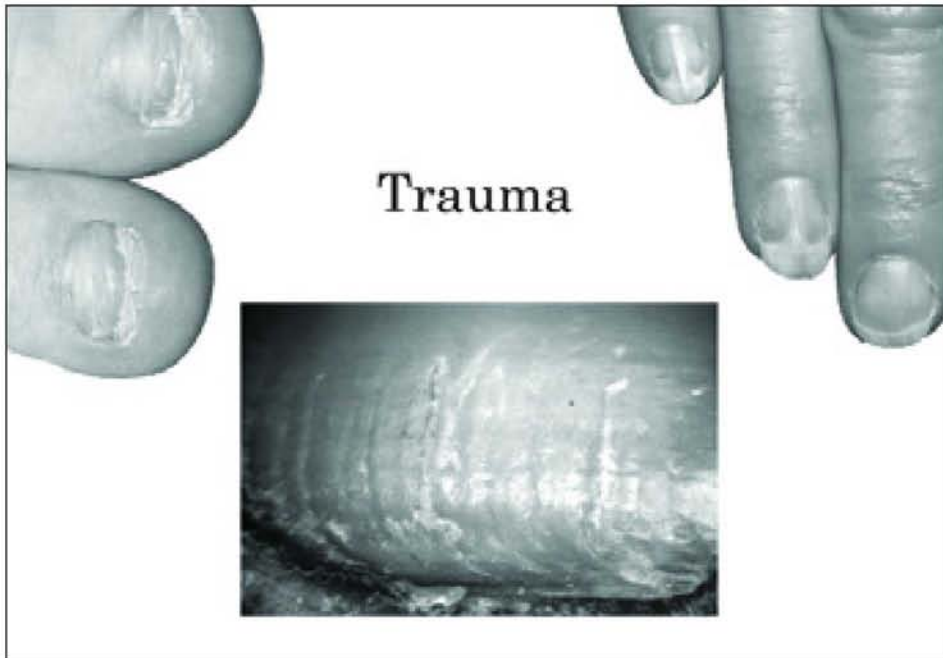
IMPACT

Sudden impacts or jams are another leading type of nail damage. If the injury is in the matrix area, serious or permanent damage can result. If the injury destroys part of the matrix, keratin will not grow. This will have a visible effect on nail plate growth, as you can see in Fig. 4.2.

If a small part of the matrix stops growing new nail cells, the keratin plate will develop a thinner area as it grows out. This can create a groove in the plate. The greater the damage, the wider or deeper the groove will be. Often, the groove widens as it grows towards the end of the plate.

TRAUMA DRAMA

Each of the conditions seen in figure 4.3 were caused by some type of physical trauma. Upper left – The toenails were damaged by a shoe that was too tight. The pressure on the toe caused the nail plate to separate from the bed followed by a minor infection under the plate. How does this occur? After the plate lifts, common bacteria or fungus inside the shoe can get into the soft tissue under the plate and create an infection. Improperly fitted shoes can exert enough pressure to cause such injuries. Runners and long distance walkers/hikers often forget that their feet can swell two or three sizes. Feet also swell from standing all day on a hard floor. Whenever shoes are worn under conditions where swelling may be an issue, always allow extra room in the toe area.



THREE EXAMPLES OF TRAUMA INDUCED INJURY – FIGURE 4.3

Upper Right – There are other ways that pressure can cause damage. The medical term for this condition is onycholysis. The first half of this word 'onycho' is the Latin term for 'nail'. So, any words containing this term probably have something to do with finger or toenails. Onycholysis is commonly caused by trauma or abuse to the nail. It is often seen in nail salons as a result of aggressive filing techniques, although other types of trauma can cause this problem. People who use their nails as tools have high incidences of onycholysis. In this condition, the nail plate and bed become detached and separate to form a small space under the nail plate.

To review what you have learned so far, there is a system of rails and grooves that allows the nail plate to slide across the nail bed. The rails, attached to the underside of the plate, are made of a specialised tissue called bed epithelium. Any trauma that causes damage to the soft tissue under the free edge can break the hyponychium, one of the four guardian seals. When the hyponychium is broken, a small tear is created in the bed epithelium. Once the seal is broken, this delicate tissue is easily torn.

If the nail is snagged on a piece of clothing or some other objects, the tear can spread further. The zipper-like tearing effect enlarges the gap under the nail plate. Further trauma will prevent re-healing, so keep the nails short in length to prevent accidents. The condition will not go away quickly nor will the plate just stick back to the nail bed. The nail must grow out normally over time. Tell the client to keep the area clean, dry and to avoid putting unnecessary upward pressure on the lifting fingernail, to prevent further separation. Also, warn them not to stick any objects under the nail when cleaning. A pharmacist can recommend an ointment to coat the underside of the nails to block out contaminants and help

prevent infection. As new plate grows, the open gap will grow smaller until the plate and bed are rejoined.

Lower – Habit tic is caused by the nervous, habitual rubbing of the nail plate. This plate was deformed by a plumber who constantly rubbed at the corner of his nail. This constant and repeated pressure can distort the surface of the nail plate. Previously you learned that the nail plate is not completely solid. It is actually a 'flowable' solid; much like a glacier is a flowable sheet of ice. The 'waves' in the nail as seen in this example show how easily the plate is permanently deformed under constant pressure. Usually, people with this condition have an uncontrollable urge to 'flick' or stroke the nail plate with their other fingers. The surface waviness shows how the plate flows under repeated or constant force.

Upper Left – Is another example of how the nail plate flows and deforms under pressure. This runner wore shoes that were too tight and pushed against the toenails.

Photo credits:

Figure 4.1 – Credit: Creative Nail Design, Inc., Vista, California

Figure 4.2 – Dr Nancy Satur, Carlsbad, California

Figure 4.3 – Dr Nancy Satur (upper two images), Doug Schoon M.S. (lower one)

Doug's portrait – courtesy Paul Rollins, Laguna Hills, California

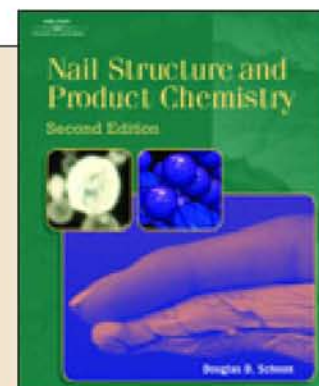


DOUG SCHOON, M.S.

Doug Schoon has over 30 years of scientific experience, a Master's degree in Organic Chemistry and is considered to be the leading research scientist in his field. His unique expertise focuses on the science of both the natural and artificial nail. He is a well-known and respected author, as well as an internationally renowned lecturer and educator.

Mr Schoon is 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 USA and is often called to serve as an expert witness in legal cases involving cosmetic safety and health.

Additionally, dermatologists frequently call Mr Schoon to assist in writing books and scientific papers concerning fingernails. For the last 16 years he has led the scientific research team for Creative Nail Design, Inc. and presently serves as its vice president of Science and Technology. He currently resides in Dana Point, California.



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PART 4 IN SCRATCH JANUARY

PERFORMANCE THROUGH
CONSISTENCY AND CONTROL