

## **Nails**

### **Introduction**

Nails are specialised protective plates of hard keratin (protein that helps form the nail plate) that develop from the epidermis (outermost layer of the skin) overlying the small bones at the ends of the fingers and toes. The keratinocytes (surface skin cells) are the main cell of the epidermis (see Skin structure and function)

Nails grow continuously. Fingernails take about 6 months to grow from the cuticle to the tip (3 mm per month). Toenails grow more slowly (1 mm/month). It can take 12 months for a toenail to regrow after being removed. Toenails become thicker as they grow out. It is believed that repeated minor pressure from footwear while walking causes this thickening.

### **What are the parts that make up the nail?**

The nail unit is made up of several components which form, support, protect and frame the nail itself. These include the nail matrix, nail plate, cuticle, nail bed and nail folds. The nail unit protects fingertips, enhances fine touch and is important as a cosmetic structure.

### **What causes nail changes or abnormalities to nails?**

Age, medications and diseases may influence the growth rate of nails. Changes in the nail may be caused by an injury, fungal disease or other skin conditions such as psoriasis or eczema. Some diseases affect all parts of the nail unit and other conditions affect only one area. The following information explains the most common nail abnormalities.

### **Common nail abnormalities**

#### **Lifting of the nail plate (onycholysis)**

A normal nail is translucent and its pink colour comes from vessels in the specialised skin (nail bed) underneath. The end of the nail appears white because of the air beneath it. If the nail plate becomes separated from the nail bed, the white colour will extend down the nail. Excessive cleaning under the free edge of the nail can create this problem. Nail cosmetics, particularly nail hardeners containing formalin, and the application of artificial nails, can cause separation of the nail plate from the nail bed. Some antibiotics may cause onycholysis if the nails are exposed to the sun. Chronic eczema of the fingers can cause a build-up of scale under the free edge of the nails along with onycholysis.

#### **Ridging of the nail**

Ridging in nails can be either along (longitudinal) or across (transverse) the nail. Longitudinal ridging normally becomes more prominent with age but can also be associated with medical conditions such as rheumatoid arthritis, lichen planus and injury to the nail. Transverse depressions often appear some weeks after an illness or fever and grow out with the nail. They can also be caused by long-standing or severe eczema around the nail fold or trauma from pushing back the cuticle.

### **Transverse layering or nail splitting (onychoschizia)**

In this condition there is splitting of the free end of the nail into layers. It is most commonly seen in people who frequently immerse their hands in water as part of their work or home duties.

### **Thickening of the nail**

Thickening of the nail can occur as a result of dermatological or general medical disease. It is most frequently seen in the toenails of the elderly and often results from long-term use of ill-fitting footwear and neglect of the nails.

Psoriasis and a number of other skin conditions can affect the nail, often leading to thickening of the nail. A fungal nail infection can also lead to thickening of the nail plate. If a fungal nail infection is suspected, your medical practitioner may suggest taking a sample of the thickened nail to be analysed by a laboratory. If a fungal infection is confirmed as the cause of thickened nails, oral treatment may be required particularly if the nail shape is distorted and interferes with wearing footwear.

### **Discolouration**

Individuals with darker coloured skin may see one or more longitudinal bands of pigment extending the whole length of the nail. This can vary in colour and width. If there is only a single band on one nail, it may be necessary to do a biopsy to exclude melanoma (a form of skin cancer) of the nail bed. Drugs and other diseases may also cause multiple bands of discolouration.

Medications, chemicals from hair dyes and nail varnish, nicotine and creams such as dithranol (a medication used to treat psoriasis) can cause discolouration of the nail.

Antibiotics can cause nail lifting and brownish discolouration of the nail plate. Anti-malarial medications and agents used in chemotherapy may also cause discolouration.

### **Inflammation of the nail fold (paronychia)**

Inflammation of the nail fold (paronychia) can be acute or chronic. Most paronychia inflammation is seen in combination with dermatitis/eczema of the hands – the cuticle is destroyed and a groove forms where the skin and nail meet. Water from showering, frequent hand washing or wet work accumulates in the groove and moisture-loving bacteria (*pseudomonas*) or yeast organisms often colonise this area and aggravate the eczema and cause inflammation in the nail fold. All nail folds may be involved. This inflammation is commonly seen in nurses, hospitality workers, mothers with small children and anyone involved in activities where nails are frequently immersed in water for periods of time.

Damage to the cuticle from over-zealous manicuring can also predispose a person to develop this form of inflammation.

Bacterial infection of the nail fold may occur after an injury to this area as a result of staphylococcal or streptococcal infection. It causes redness, swelling, tenderness and pain of the lateral or proximal nail fold (see diagram), sometimes with pus formation. This form of paronychia does not occur as frequently as the more chronic paronychia associated with eczema.

### **Traumatic nail injuries**

Nail biting is associated with paronychia around the nail folds and leads to deformity of the nail plate. Wart infections around and under the nail are more frequent in nail biters. Constant pressure on one area of the nails can produce a longitudinal or a thickened depression along the nail. Adhesives used to attach artificial nails can be associated with nail and skin inflammation.

A blow to a nail may cause bleeding under the nail. If this causes a lot of pain, a hole may be made in the nail plate to drain the blood (known as a subungual haematoma).

### **Skin diseases with nail involvement**

Many nail abnormalities stem from skin diseases which need to be treated to enable the nails to return to normal. Some common examples include:

#### **Psoriasis**

Psoriasis can cause small pinhead pits in the nail plate, separation of the nail plate from the nail bed (onycholysis) and thickening of the nail. Psoriasis of the toenails can not be easily distinguished from a fungal infection.

#### **Eczema/dermatitis**

When the fingertips and surrounding skin are affected by eczema, swelling and inflammation of the nail fold tissues (paronychia) may develop. This may be made worse if a secondary yeast infection develops. A build-up of skin cells (scaling) may occur under the free edge of the nail plate.

Paronychia may develop in infants who suck their thumbs/fingers. If the eczema is ongoing for some months, horizontal ridging of the nail plate may occur.

#### **Fungal nail infections**

Nails can be infected by fungi. The nail plate becomes thickened, crumbly and discoloured. Nail infection occurs most commonly in the big toenail.

Injury, psoriasis and some inherited disorders may produce similar changes in the nail. If there is no history of these conditions and a clinical examination is not conclusive, then a fungal culture from the affected nail(s) will need to be taken. Nail clippings and samples of the debris under the nail will be collected and sent to the laboratory to confirm the diagnosis and identify the causative fungus.

Oral antifungal medication may be required to treat the infection.

Affected people often have frequent recurrent infections. Observing the following simple precautions will reduce the frequency of recurrent infections:

Wear thongs/sandals in communal showers.

Dry feet thoroughly.

Go barefoot whenever practical, except in communal areas such as gyms or around swimming pools.

Wear moisture absorbent socks. Thick wool and synthetic materials tend to wick away moisture from the skin keeping it drier. Wet cotton socks thick or thin, do not have this wicking effect and may lead to maceration of the skin.

Keep nails clipped.

Change shoes regularly. "Air" them in the sun.

### **Alopecia Areata**

Alopecia areata can be associated with a very regular geometric pitting of the nail plate. Occasionally the entire surface of the nail becomes rough with marked longitudinal ridging of the nail (trachyonychia). This is most commonly seen in children.

### **Lumps and bumps which may affect the nail**

Viral warts may occur in, around, or under the nail plate and may result in nail deformity. Mucous cysts (they are usually seen in association with arthritis of the finger joints) can occur towards the end of the finger and this can lead to a longitudinal depression (like a gutter) developing in the nail plate. In rare cases skin cancers can occur in the nail plate area and any non-healing, growing, bleeding or discoloured area should be checked your doctor.

### **What should you do if you have a nail problem?**

Discuss nail problems with your general practitioner. A referral to a dermatologist may be needed.