

A case of onycholysis

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Onycholysis can be either primary (idiopathic) or secondary. Trauma, psoriasis and dermatophyte infection are the most common causes, with drug reactions, allergies, lichen planus and systemic diseases numbering among the less common causes. Treatment options for onycholysis include avoidance of trauma and specific treatment, such as with antifungal agents or corticosteroids.

MedicineToday 2012; 13(4): 75-79

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CASE SCENARIO

A 39-year-old woman presented with an eight-month history of 'lifting fingernails'. The left thumbnail was the first affected, and gradually more nails had become involved. The distal part of the affected nail plates had a yellow discoloration and these nails were not attached to the distal nail bed (Figures 1a and b). The nail plates were of normal thickness and did not appear to be brittle. Apart from the annoyance of the nails being more easily caught on things, they were asymptomatic. She was scared to cut the affected nails so left them longer. Her toenails were normal.

There was no history suggesting inflammation of the distal fingers and she was otherwise well, with no past history of other skin diseases. She had otherwise normal skin. Her father had moderately active psoriasis not affecting his nails or joints. She denied manicuring her nails and she did not often have her hands in water. Her GP ordered two sets of nail clippings for fungal culture; there was no growth on the first occasion and a light growth of *Candida albicans* on the second set of clippings. She had been taking no medications.

Diagnosis

A diagnosis of onycholysis, possibly psoriatic, was reached.

Treatment

General treatment measures were recommended to the patient. These included explaining to her that the problem would be helped, not aggravated, by keeping the affected nails cut as short as practicable. The patient was asked to firstly apply clotrimazole cream twice daily for two weeks to treat the candidal infection (the nozzle is applied under the tip of the affected nails so the liquid is sucked under the lifted nail by capillary action; the process is aided by pressing on the nail plate a few times).

For the following three months, the patient was treated as if the nail dystrophy was psoriatic onycholysis with a combination of mometasone furoate 0.1% lotion and calcipotriol 0.005% solution, applied at the same time twice daily to the nail bed. On review, there had been partial reattachment of some of the nails but treatment for an additional few months achieved no more improvement and so was stopped. The patient was then lost to follow up.

COMMENTARY

Onycholysis is a distinctive nail disorder in which the nail plate fails to attach to the nail bed and thus lifts away from the bed. It may affect the nails of one or multiple fingers or toes. The nail plate is formed largely by a unique form of cornification in the nail matrix – the thin



Figures 1a and b. Onycholysis of both thumbnails (a, left) and fourth fingernails (b, above). Note the otherwise normal nail plates and that the patient allowed the affected fingernails to grow longer. The fourth fingernail on the left hand had recently broken.

strip of specialised skin hidden under the proximal nail fold. As the nail grows forward it interacts with the nail bed, which forms minute longitudinal furrows that increase the surface area and thus the strength of the attachment of the plate to the bed. It is uncertain whether, and if so how much, the nail bed contributes to the formation of the nail plate.

In most cases of onycholysis, the problem resides simply with the attachment of an otherwise apparently normal nail plate to the nail bed; the nail plates are not dystrophic (thickened, thinned or malformed). However, diseases that cause nail dystrophy (such as tinea or psoriasis) can also lead to onycholysis if the dystrophy is severe enough to disrupt attachment of the nail to the nail bed.

Clinically, the affected part of the lifted nail is pale yellow to white in colour. Onycholysis usually affects the distal part of the nail and extends proximally for a variable distance. The condition usually does not extend to the proximal nail fold unless induced by trauma. Onychomadesis is an uncommon form of onycholysis that is seen most often in psoriasis and in which separation of the nail plate begins at the proximal nail and extends distally. Rare cases only

involve the lateral parts of the nail plate.

Onycholysis usually affects the more distal part of the nail plate, presumably because ageing of the nail as it slowly grows reduces its ability to attach to the bed (fingernails grow from 2 to 3 mm per month and toenails about 1 mm per month). Onycholytic nails may suddenly turn green – sometimes such a deep green they appear black. This is usually a sign of infection with *Pseudomonas aeruginosa* (previously called *P. pyocyanea*), which produces a green dye, pyocyanin. *P. aeruginosa* and the other common subungual micro-organism *C. albicans* occur particularly in the moist environment of water trapped under the lifted nail plate. Both are most likely a result rather than a cause of onycholysis, although *C. albicans* infection is also listed as a potential cause of onycholysis.

COMMON CAUSES OF ONYCHOLYSIS

Although dermatologists commonly see patients presenting with onycholysis, there are no reliable statistics on its frequency. Onycholysis mainly affects adults, being more common in women than in men, but the condition can occur in children. The cause of onycholysis can be either primary (idiopathic) or secondary.

Primary onycholysis

The idiopathic form of onycholysis is particularly common in women and it may not be idiopathic. It can be due to excessive manicure of the hyponychium (the thin band of keratinised skin under the nail plate where it leaves the nail bed distally). This band protects the nail bed from water and chemical irritants. If the hyponychium is broken by trauma, which can include excessive manicuring, it allows water and other irritants such as detergents, food juices or solvents (including those found in nail cosmetics) to enter the nail bed – all proposed mechanisms that induce onycholysis.

Primary onycholysis is thought to be more common in people whose hands are often in water, either occupationally or domestically. The lifted nails caused by onycholysis are prone to trapping dirt and the condition may be perpetuated by attempts to clean under the lifted nails with various instruments. Primary onycholysis may also be more common in people who allow their nails to grow longer, thus increasing the risk of trauma that can lift the nail sufficiently to break the hyponychium or perpetuating pre-existing onycholysis.

An onycholytic nail may spontaneously

heal, particularly early after the disorder develops. If onycholysis persists, however, keratinisation or scarring of the nail bed may prevent later re-attachment of the nail plate to the nail bed.

Secondary onycholysis

There are many potential causes of secondary onycholysis, the most common being trauma, psoriasis and dermatophyte infections. Traumatic onycholysis is easy to understand – for example, crushing a finger in a door, dropping a heavy object on a toe or repetitive trauma, such as from jogging with ill-fitting shoes. In cases of traumatic onycholysis there will often be a history of the event(s), a subungual haematoma may have formed and only one or a few nails will be affected. Jogging- or sport-induced onycholysis normally affects the longer great or second toenails or the lateral fifth nails. Depending on the site of the injury, the onycholysis will be proximal, distal or total. If the injury is sufficient to scar the nail bed, the prognosis for ultimate reattachment is low.

Dermatophyte infection is an uncommon cause of onycholysis if the nail plate is not dystrophic. However, if the nail plate is dystrophic then tinea is a more likely cause, although other common nail diseases, such as psoriasis, can be a causative factor. Clues to onychomycosis (also known as ‘dermatophytic onychomycosis’) include small spears of yellowish dystrophy at the distal end of the nail and extending proximally into a more normal appearing nail or a broader yellowish thickening of the nail (the latter is less specific). There is also a less common, predominantly proximal form of onychomycosis, in which nail plate separation may begin at the proximal nail and extend to the free edge.

When diagnosing dermatophytic onycholysis, signs of tinea elsewhere on the feet, hands or groin should be sought – especially those of interdigital scaling, diffuse red scaling on the soles and sides of

the feet (moccasin pattern tinea pedis), asymmetrical involvement of the hands or feet or the so-called ‘two feet, one hand’ pattern of scaly skin. Fungal culture of nail clippings and, if indicated, skin scrapings from other sites should be routinely ordered to rule out tinea infection.

Psoriatic onycholysis

Psoriasis is a well-recognised cause of onycholysis. Psoriasis is a common T-cell-mediated condition with a significant genetic component. The epidermal turnover rate in individuals with psoriasis is significantly elevated, leading to abnormally formed skin and/or nails. The reported frequency of psoriatic nail disease varies enormously, but a large German study found 41% of psoriasis patients had nail disease, with men more commonly affected.¹

If the nail matrix is affected mildly, surface pits form on the nail plate. Sometimes matrix involvement leads to leukonychia (white nail plate). In severe cases, the nail plate becomes thickened, dystrophic and discoloured and the patient may have onychomadesis. If the nail bed is only mildly affected, then a variably sized light yellowish-brown discolouration of the nail bed is seen through the nail plate (the ‘oil spot sign’). If the bed is more severely affected by psoriasis, onycholysis occurs, sometimes with additional subungual hyperkeratosis. Multiple nails may be involved with any or a combination of the above main signs of psoriasis.

A diagnostic challenge for recognising psoriatic onycholysis comes from the finding that nail changes typical of psoriasis occur in 1 to 5% of people who show no other cutaneous signs or symptoms of psoriasis.² In this case, the patient’s family history of psoriasis suggests a diagnosis of possible psoriatic onycholysis. Depending on the study, psoriatic arthritis affects from 5 to 30% of patients with psoriasis. Nail psoriasis is more common in patients who have, or later

develop, psoriatic arthritis (particularly enthesitis and distal interphalangeal joint involvement), compared with those with cutaneous psoriasis not affecting the nails.¹

Psoriatic onycholysis is associated with psoriatic arthritis, particularly of the small joints, more often than are other forms of nail psoriasis.³ It is not known what proportion of patients with onycholysis ultimately develop psoriatic arthritis. People with nail psoriasis are more likely to have psoriasis affecting the skin of the hands or feet.

Acrodermatitis continua is an uncommon form of psoriasis manifesting with repeated episodes of sterile pustules, scaly erythema and crusting of the distal fingers, sometimes the toes, often with lifting or shedding of the nail plates.⁴ Acrodermatitis continua can transform into other forms of psoriasis and can be associated with geographic tongue. The condition often starts on the nail folds and involves the nail bed and nail matrix. It slowly spreads proximally. Severe involvement of the nails leads to permanent nail shedding (anonychia).

Reactive arthritis, including Reiter’s syndrome, is often set off by infections such as those caused by *Chlamydia trachomatis*, *Shigella*, *Campylobacter*, *Salmonella* and *Yersinia*. Such infections can lead to inflammatory oligoarthritis, enthesitis and extra-articular manifestations including genitourinary inflammation (urethritis), psoriasis-like skin changes, inflammatory bowel and eye diseases or carditis. The psoriasis-like skin changes include circinate balanitis, a variant of palmoplantar pustulosis (keratoderma blenorrhagicum) and nail changes including onycholysis.

A rare subset of psoriatic arthritis is psoriatic onychopachydermo periostitis. This condition is characterised by psoriatic onychodystrophy (including onycholysis), connective tissue thickening above the distal phalanx and a periosteal reaction, which presents as swelling of the distal phalanx.⁵

UNCOMMON CAUSES OF ONYCHOLYSIS

Uncommon causes of onycholysis include drugs, allergic contact dermatitis, tumours of the nail bed, skin diseases and systemic diseases.

Drugs

Photo-onycholysis requires a drug plus sunlight to cause the onycholysis. It is usually due to tetracyclines, especially doxycycline, but it has been reported to occur with minocycline.^{6,7} Photo-onycholysis can also occur with fluoroquinolone antibiotics (e.g. sparfloxacin), thiazide diuretics (e.g. indapamide), atypical antipsychotics (e.g. olanzapine and aripiprazole), immune suppressants (e.g. sirolimus) and photodynamic therapy.⁸⁻¹² Although melanocytes can be identified in the nail matrix and nail bed, they usually do not form much melanin and the nail bed is prone to damage from long wavelength ultraviolet (UV) light, which penetrates the nail plate more easily than shorter wavelength UV light. Long wavelength UV light plus drugs such as doxycycline generate destructive free radicals. The resultant cell damage to the nail resembles a sunburn, and can be bad enough to lead to onycholysis.

In addition to the combination of certain drugs and sunlight causing photo-onycholysis, some drug reactions can also lead to onycholysis, in particular reactions to taxane chemotherapy agents, such as docetaxel and paclitaxel.¹³ Other chemotherapy agents, such as bleomycin, doxorubicin and 5-fluorouracil, as well as drugs such as mycophenolate mofetil and isotretinoin can also be causative factors in onycholysis.¹⁴⁻¹⁷

Allergic contact dermatitis

Several chemicals have been reported to cause allergic contact dermatitis-induced onycholysis. These include formaldehyde in nail hardeners and acrylic chemicals used to make artificial nails.^{18,19} For example, a case of onycholysis affecting 10 fingernails was recently seen by the author

in a patient attending a nail salon. The onycholysis was found to be caused by a contact allergy to UV-cured acrylics used to make the patient's artificial nails. Patch testing confirmed allergies to multiple acrylic chemicals – these most likely penetrated the nail plate causing dermatitis of the nail bed.

Onycholysis has also been reported from allergic contact dermatitis due to acrylic chemicals in industrial anaerobic sealants.²⁰ In addition, onycholysis can also occur as a result of other forms of dermatitis, particularly pompholyx.

Tumours of the nail bed

The most common type of nail bed tumours are viral warts, which can grow subungually and can be a challenge to treat. Digital fibrokeratomas are benign and grow from the periunguim, especially the proximal matrix, forming a groove in the nail plate. If the tumours extend laterally, the adjacent nail will lift. Tumours of the nail bed are usually solitary, but multiple lesions known as Koenen's tumours are a feature of tuberous sclerosis. Digital mucous cysts often disrupt fingernail growth and can resemble fibrokeratomas. Subungual exostosis is a benign growth of trabecular bone confirmed on x-ray – this is a small nodule that causes local onycholysis.

The most common types of malignant nail bed tumours are squamous cell carcinomas (SCC) and its variants and melanoma. Nail bed SCC may be invasive or in situ (Bowen's disease). The features depend on the part of the nail unit affected; if the nail bed is affected it can cause onycholysis and a friable or warty nail bed and has a tendency to affect more than one digit.

Melanoma of the nail unit may or may not be pigmented but is more often amelanotic (about 25% of cases)²¹ compared with melanoma of the skin. If the melanoma is pigmented, a clinical feature may be pigmentation of the proximal or lateral nail folds (Hutchinson's sign),

which can be useful in distinguishing melanoma from the much more common benign longitudinal melanonychia (a pigmented streak of the nail plate). Similar to SCC, nail unit melanomas can disrupt nail growth causing nail plate dystrophy, nail loss or onycholysis.

Other skin diseases

Other skin diseases, such as lichen planus, herpetic whitlows (herpes simplex affecting a finger), pemphigus vulgaris, pellagra, leprosy, syphilis and severe cutaneous porphyrias, are occasional-to-rare causes of onycholysis.²²

Onycholysis can also be a feature of the rare nail disease yellow nail syndrome. Here the nails grow very slowly, become thickened and yellow, occasionally also with onycholysis. Yellow nail syndrome is usually linked to lymphoedema and sometimes associated with respiratory diseases.

Systemic diseases

Onycholysis can be a feature of systemic diseases, including hypothyroidism and hyperthyroidism.²¹ 'Plummer's nails' are nails with a concave contour and distal onycholysis thought to be a feature of hyperthyroidism, although they are rarely seen in clinical practice. Onycholysis is also described in conditions such as scleroderma, peripheral vascular disease and Raynaud's phenomenon.

TREATMENT

Treatment of onycholysis is divided into general and specific measures – the latter dependent on a cause being identifiable.

General treatment

General treatment measures include avoidance of both trauma and manicuring of the affected nails and keeping the nails short by regular clipping. Exposure to water, solvents and other irritants should be minimised, including the use of gloves for 'wet' work. If the hands cannot be kept dry, a hair dryer held a distance

from the nails and the finger pads pulled down will help dry the subungual space.

Subungual infection with *P. aeruginosa* is treated with simple measures such as application of diluted white vinegar (1:4 to 1:10 vinegar in water) applied with an eyedropper up to four times per day for a few weeks. Treatment with 2.5% benzoyl peroxide gel twice weekly can also be used.

Onycholysis due to infection with *C. albicans* can be treated with azole anti-fungal lotions (e.g. clotrimazole or miconazole) twice daily for a few weeks.

Specific treatment

If a dermatophyte is proved to be the cause of the onycholysis then the condition is best treated orally with terbinafine 250 mg daily (three months for fingernails or six months for toenails). Alternative and cheaper options for treating fingernails are itraconazole 400 mg daily for one week each month for a total of three or more months, or griseofulvin 500 to 750 mg daily for three to six months.

Psoriatic onycholysis can respond to treatment with topical corticosteroids and may be helped by additional calcipotriol therapy, as was outlined in the case report. Psoriatic onycholysis is usually slow to respond to treatment, which is why a three-month trial was recommended for this patient. Treatment resistant cases can be treated with intralesional corticosteroids – for example, triamcinolone acetonide 2.5 to 5 mg/mL diluted in saline and injected into the nail bed with a 29G insulin syringe, with a prior ring block of the finger for anaesthesia. The injections are repeated every four to six weeks for two to three treatments. The same procedure performed in the proximal nail fold can be effective for psoriatic nail dystrophy. There is also a report of oral psoralen plus UVA (PUVA) being effective for psoriatic onycholysis treatment, but the same therapy can also be a causative factor for onycholysis.^{12,23} The various systemic treatments for psoriasis may be effective for psoriatic nail disease but there

is little literature on this topic. Drug-induced onycholysis will usually resolve with drug withdrawal. **MT**

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COMPETING INTERESTS: None.

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