Common nail changes and disorders in older people

Diagnosis and management

Lina Abdullah RN **Ossama Abbas** MD

Abstract

Objective To present family physicians with common nail alterations and disorders occurring in the elderly population and their management options.

Quality of evidence The evidence relating to different nail conditions is mostly derived from randomized controlled trials, meta-analyses, and review articles. However, given the scarcity of evidence on some conditions, articles with weaker levels of evidence were also included in our review.

Main message Given the growing elderly population and the associated demographic changes and longer lifespans, geriatric care is becoming more of a complicated and multidisciplinary effort in which the role of the family physician is increasingly important. Although common among the elderly, nail changes are often not brought to the attention of primary caregivers and are thus overlooked. These nail changes can affect various components of the nail unit and might represent normal age-related nail alterations or nail abnormalities that require immediate intervention. Knowledge and familiarity with these common nail abnormalities and their underlying causes is important for the family practitioner in order to effectively reach an accurate diagnosis and provide better care of this large and growing elderly population.

Conclusion Nail changes are common in the elderly, and family physicians are best placed to diagnose and treat these common problems. It is important that family physicians also recognize less common but more serious nail problems that require immediate treatment.

Résumé

Objectif Rappeler au médecin de famille les changements et problèmes unguéaux fréquents qui surviennent chez les personnes âgées ainsi que les options de traitement.

Qualité des preuves Les preuves concernant les diverses conditions unguéales proviennent principalement d'essais cliniques randomisés, de méta-analyses et d'articles de revue. Toutefois, vu le peu de données sur certaines conditions, nous avons inclus dans notre revue des articles basés sur des preuves plus faibles.

Principal message Compte tenu du vieillissement de la population avec les changements démographiques et le prolongement de la longévité qui l'accompagnent, les soins gériatriques ressemblent davantage à un effort compliqué et multidisciplinaire dans lequel le rôle du médecin est de plus en plus important. Même s'ils sont fréquents chez les personnes âgées, les changements unguéaux ne sont pas toujours rapportés aux soignants de première ligne, et demeurent ainsi ignorés. Ces changements unguéaux peuvent toucher différentes composantes de l'ongle et ils pourraient représenter des modifications normales pour l'âge ou des anomalies qui exigent une intervention immédiate. Il importe que le médecin de famille ait une très bonne connaissance de ces anomalies unguéales fréquentes et de leurs causes sous-jacentes afin de pouvoir poser un diagnostic précis et de mieux traiter cette population âgée toujours plus grande.

Conclusion Les changements unguéaux sont fréquents chez les personnes âgées, et le médecin de famille est le mieux placé pour en faire le diagnostic et le traitement. Il doit aussi être en mesure de reconnaître les problèmes unguéaux moins fréquents mais plus graves, qui exigent un traitement immédiat.

KEY POINTS Nail changes are common among the elderly; however, they are often not brought to the attention of primary caregivers and are thus overlooked. Nail changes among the elderly can either cause serious symptoms, impairing the daily activities of this older population whose activities might already be restricted, or be asymptomatic but associated with substantial cosmetic problems, leading to negative psychological effects. It is important that family physicians are knowledgeable about and familiar with common nail abnormalities and their underlying causes in order to effectively reach an accurate diagnosis and provide better care.

POINTS DE REPÈRE Il y a beaucoup de changements unguéaux chez les personnes âgées, mais ils sont fréquemment ignorés parce qu'ils ne sont pas portés à l'attention des soignants de première ligne. Les changements causent parfois des symptômes sévères qui nuisent aux activités de la vie quotidienne de personnes souvent déjà restreintes dans leurs activités, ou alors, ils demeurent asymptomatiques mais sont responsables d'importants problèmes cosmétiques qui ont des effets psychologiques négatifs. Il importe que le médecin de famille ait une très bonne connaissance des problèmes unguéaux pour être en mesure de poser un diagnostic précis et de prodiguer de meilleurs soins.

This article has been peer reviewed.
Cet article a fait l'objet d'une révision par des pairs.
Can Fam Physician 2011;57:173-81

Older people are at an increased risk of nail alterations, including normal age-related changes and disorders that more commonly affect this specific population. Secondary factors are important contributors to pathologic nail changes, including impaired circulation at the distal extremities, faulty biomechanics, infections, neoplasms, and skin or systemic diseases with nail manifestations.[1,2] These factors can affect primarily the nail plate or involve other components of the nail unit such as the matrix, nail bed, hyponychium, or nail folds (**Figure 1**), with secondary abnormalities in the nail plate. These nail changes can either cause serious symptoms, impairing the daily activities of this older population whose activities might already be restricted, or be asymptomatic but associated with substantial cosmetic problems, leading to negative psychological effects. A primary care physician who is knowledgable about and familiar with these age-related nail alterations and disorders will be able to recognize and manage common pathologic changes, as well as refer patients for more specialized care, if needed.

Quality of evidence

Using a literature search and cross-referencing, we identified articles published before September 2009 that were relevant to the topic. In September 2009, we performed a MEDLINE search using MeSH terms *nails diseases* and *aged* with key words relevant to each specific age-related nail change and disorder. We identified 2496 articles, 32 of which were selected. We mainly chose randomized controlled trials, meta-analyses, and review articles, when available, on each specific nail entity, especially those concerned with elderly patients. When such strong evidence was not available, which was the case for some conditions such as scabies involving the nail unit, case reports or series were chosen. We selected only those articles written in English. Using the 3-point grading classification system of evidence-based medicine and given the paucity of evidence on some of the conditions, articles with different levels of evidence (I, II, or III) were included in our review.

Age-related nail changes

With advancing age, normal characteristic changes in the growth rate and morphology of the nail plate occur.[1,2] The underlying mechanisms for these changes are still not completely understood but might be related to dysfunctional blood circulation at the distal extremities or to the effects of ultraviolet radiation.

Nail plate growth rates of fingernails and toenails normally average 3.0 and 1.0 mm/mo, respectively. With advancing age, starting at the age of 25 years, this rate tends to decrease by approximately 0.5% per year.[1,2]

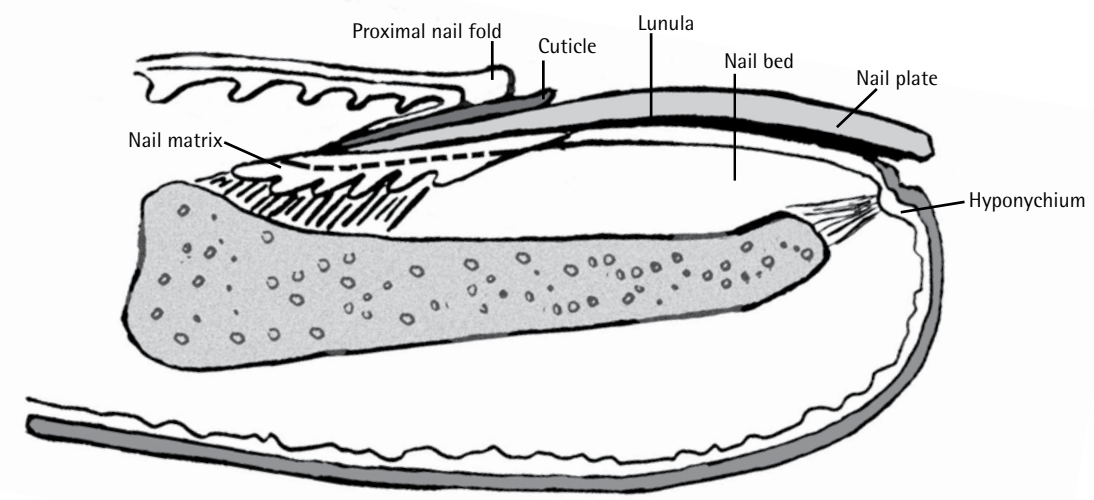
Levels of evidence

Level I: At least one properly conducted randomized controlled trial, systematic review, or meta-analysis

Level II: Other comparison trials, non-randomized, cohort, case-control, or epidemiologic studies, and preferably more than one study

Level III: Expert opinion or consensus statements

Figure 1. Anatomy of a nail unit



Age-related changes in the morphology of the nail plate include alterations in its thickness, contour, surface, and colour.[1,2] Men generally have thicker nail plates than women do; the normal average thickness of fingernails and toenails is 0.5 and 1.38 mm in women and 0.6 and 1.65 mm in men, respectively. With advancing age, various changes in nail plate thickness might occur, becoming thicker, thinner, or remaining the same.[1,2] A decrease in the longitudinal curvature and an increase in the transverse convexity characterize senile changes in the contour of the nail plate.[1,2] As for texture, there is usually a tendency of the normally smooth nail plate texture to become progressively more friable with increasing age, resulting in fissuring, splitting, and longitudinal superficial or deep striations.[1,2] Among nail plate colour changes in elderly people, the most commonly observed alteration is a yellow to gray discoloration with dull, pale, or opaque appearance. A peculiar discoloration observed in around one-fifth of people older than 70 years of age is "Neapolitan nail," which is characterized by an absent lunula in addition to 3 horizontal bands of white (proximal), pink (middle), and opaque (distal) discolorations.[1] One study found that osteoporosis and thin skin were significantly associated with this peculiar nail alteration ($P<.01$) and suggested collagen abnormality as the cause of these changes in nail bed, bone, and skin.[3] Terry nail, an apparent leukonychia characterized by a proximal white band and distal transverse pink band, is usually seen in liver cirrhosis and chronic congestive heart failure, but recently it has been observed as a nonpathologic change of the normal aging process.[4]

Age-related nail dystrophies

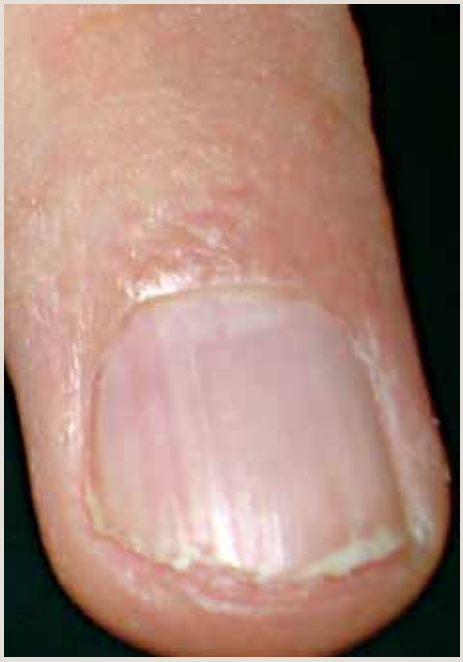
Many nail disorders (**Table 1**)[1,2,5-18] affect the population in general; however, they might appear with increasing frequency with advancing age and include brittle nails, onychauxis, onychocryptosis, infections (especially onychomycosis), onychoclavus, subungual hematoma, splinter hemorrhages, and malignancies of the nail apparatus.[1,2,5-27]

Brittle nails (fragilitas unguium)

Brittle nail disorder is considered a polymorphic abnormality characterized by increased fragility of the nail plate (**Figure 2**). It affects around 20% of the population, with increased incidence in women and in older people.[5] It manifests clinically with varying severity of onychoschizia or onychorrhexis.[5] Onychoschizia is usually caused by impairment of intercellular adhesion between the corneocytes that make up the nail plate. This results in transverse splitting due to breakage of the lateral edges of the nail plate and in lamellar splitting of the free edge and distal portion of the nail plate. Exogenous factors (eg, repetitive cycles of wetting and drying, trauma, and fungal proteolytic products) and chemicals or cosmetics (eg, cuticle removers, nail enamel solvents, and nail hardeners) are among the underlying causes. Onychorrhexis, on the other hand, frequently manifests as nail plate splitting or ridging, longitudinal thickening, or multiple splits leading to triangular fragments at the free edge. It is usually the result of nail matrix involvement leading to abnormalities in epithelial growth and keratinization. Among the various factors causing onychorrhexis are abnormalities of vascularization and oxygenation (such as anemia or arteriosclerosis), as well as systemic (metabolic, endocrine, etc) and dermatologic diseases (disorders of cornification and inflammatory diseases).

Management of brittle nail disorder might not be as easy or simple as would be expected.[5] Determination of the predominance of either onychoschizia or onychorrhexis should be the initial step, followed by an effort to identify and, if possible, correct any of the underlying factors. General and specific therapeutic measures might then be followed. This includes nail hydration with daily 15-minute soaks using emollients rich in phospholipids (level III evidence).[5] Application of nail hardeners containing formaldehyde can be used to strengthen the nail plate (level III evidence)[5]; nevertheless, caution should be entertained when using these products, as they might cause brittleness, subungual hyperkeratosis, or onycholysis (ie, separation of the nail plate from the underlying nail bed). Mechanical nail plate protection and fracture filling can be accomplished using enamel; however, considerable dehydration might occur when

Figure 2. Mild brittle nails with mild longitudinal ridging and mild distal lamellar splitting



it is removed afterward. Several studies have shown a daily oral intake of 2.5 mg of biotin for 1.5 to 15 months to be of some benefit; however, these studies were not large or double-blind, placebo-controlled trials (level II evidence).[5-7] Finally, one study showed that a daily dose of 10 mg of silicon, in the form of choline-stabilized orthosilicic acid, might be beneficial for treating brittle nail syndrome (level III evidence).[8]

Onychauxis

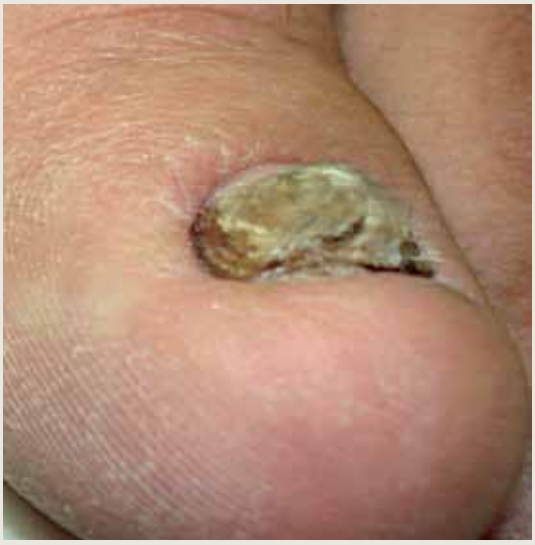
Localized hypertrophy of the nail plate (**Figure 3**), also known as onychauxis, commonly manifests clinically as

Table 1. Common nail conditions in older people

CONDITION	CLINICAL PRESENTATION	MANAGEMENT	UNDERLYING FACTORS
Brittle nail syndrome[5-8]	Onychoschizia • transverse splitting and lamellar splitting of the free edge and distal nail plate portion Onychorrhexis • nail plate splitting or ridging • triangular fragments at the free edge • longitudinal thickening	Identify and correct any underlying factors Recommend • nail hydration • oral biotin	Repetitive wetting and drying cycles, trauma, cosmetics, systemic and dermatologic diseases
Onychauxis[1,2,9]	Discoloration, loss of nail plate translucency, subungual hyperkeratosis	Periodic debridement	Advancing age, faulty biomechanics
Onychoclavus[1,2]	Tender dark area usually under the distal nail plate of the great toe	Surgical removal of hyperkeratotic tissue Correct any underlying bony abnormality	Chronic minor trauma, bony abnormalities
Onychomycosis[1,2,10-16]	DLSO • subungual hyperkeratosis • onycholysis • nail thickening and discoloration Superficial onychomycosis • patchy nail plate discoloration PSO • white area under the lunula that progresses distally TDO • progressive nail plate destruction with thickened nail bed	Recommend • antifungal agents, • mechanical or chemical treatments, or • oral terbinafine (appears to be most effective) Generally, low success rate in the elderly	Dermatophytes, yeasts, or nondermatophyte molds
Paronychia[1,2,17]	Acute • tender erythematous nail fold swelling Chronic • red swollen nail folds, cuticle loss, secondary nail plate changes	Acute • warm saline soaks • abscess drainage • antibiotics Chronic • drying the nail fold • topical antifungals or antiseptics	Acute • *Staphylococcus aureus* Chronic • *Candida* species or Gram-negative bacteria
Onychocryptosis[1,2,18]	Lateral nail fold inflammation, granulation tissue, secondary infection	Conservative management Partial nail avulsion and lateral matricectomy	Improper nail cutting, prominent nail folds, inappropriate shoes, bony abnormalities
Subungual hematomas[1,2]	Painful red to bluish subungual discoloration that tends to move forward	Rule out melanoma Observation In acute painful cases, drill a hole in the nail plate	Usually trauma

DLSO—distal and lateral subungual onychomycosis, PSO—proximal subungual onychomycosis, TDO—total dystrophic onychomycosis.

Figure 3. Onychauxis: *Localized hypertrophy of the nail plate with discoloration and loss of nail plate translucency.*



loss of nail plate translucency, discoloration, and often subungual hyperkeratosis. It might be associated with pain, and with time can become complicated by distal onycholysis, subungual hemorrhage, subungual ulceration, or increased risk of onychomycosis.[1,2] Advancing age or faulty biomechanics, which are usually more common in the elderly population (eg, overlapping and underlapping toes; foot-to-shoe incompatibility; or digiti flexi characterized by contracted toes secondary to buckling of toes induced by shortening of the controlling muscles), might be contributing factors.

Periodic debridement of the thickened nail plate, either partially or totally, is the preferred initial therapy (level III evidence).[1,2,9] Other treatment options that might be of benefit include electric drills, nail avulsion, or 40% or higher urea pastes (level III evidence).[1,2,9] Chemical or surgical matricectomy might be used as a last resort in complicated cases or those with recurrences in order to achieve permanent ablation of the involved nail plate.

Onychoclavus (subungual corn)

Onychoclavus is another hyperkeratotic process commonly observed in the elderly. It is typically located under the distal nail plate margins (most commonly the great toenail), presents as a tender dark area, and can be easily confused with benign or malignant subungual melanocytic lesions.[1,2] Underlying causes include chronic minor trauma and persistent localized pressure secondary to bony abnormalities such as foot-to-shoe incompatibility, digiti flexi, rotated fifth toes, or hallux valgus (ie, the great toe rotates toward the second toe).[1,2] Treatment includes surgical removal of the hyperkeratotic tissue, as well as correcting any underlying bony abnormality (level III evidence).[1,2]

Infections

Different pathogens (fungal, bacterial, or even parasitic) can infect the nail plate either primarily or through involvement of structures such as the nail folds, with secondary extension to affect the nail plate.[1,2,10]

Onychomycosis is a fungal (dermatophytes, yeasts, or nondermatophyte molds) infection of the toenails or fingernails. It is by far the most common nail infection, representing around half of all nail diseases and affecting 10% to 20% of adults, particularly the elderly.[10,11] Increased risk of onychomycosis is associated with multiple factors, including male sex, old age, smoking, underlying medical diseases (eg, peripheral arterial disease, diabetes, and immunodeficiency), and predisposing genetic factors.[10-13] Dermatophytes, mostly *Trichophyton rubrum* and *Trichophyton mentagrophytes,* cause more than 90% of onychomycosis cases, while yeasts such as *Candida* and nondermatophyte molds such as *Scopulariopsis brevicaulis* are responsible for the remaining cases.[10]

Clinically different subtypes of onychomycosis are recognized, among which distal and lateral subungual onychomycosis is the most common (**Figure 4**).[10,11] This subtype of onychomycosis, usually caused by *T rubrum*, presents with onycholysis, subungual hyperkeratosis, nail thickening, and discoloration, and is caused by fungal invasion that starts initially at the hyponychium, with progressive proximal spread along the nail bed. Another subtype is superficial onychomycosis (**Figure 5**), which presents as black (caused by dematiaceous fungi)

Figure 4. Distal and lateral subungual onychomycosis: *Onycholysis, subungual hyperkeratosis, as well as nail thickening and discoloration.*

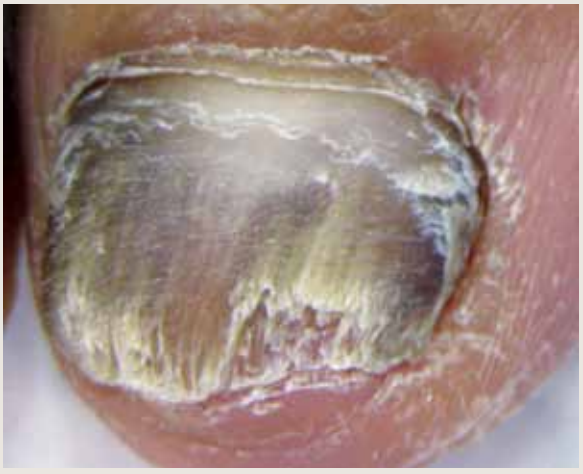
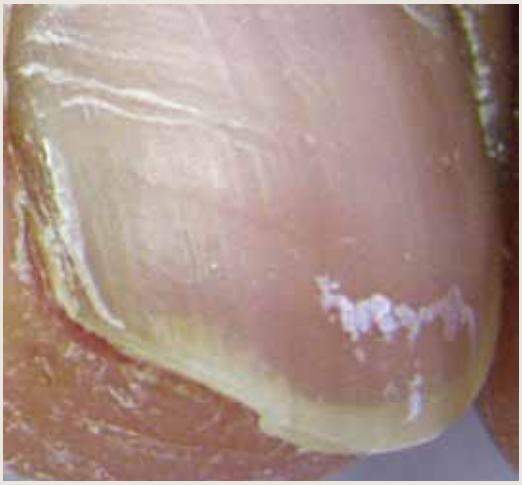


Figure 5. Superficial onychomycosis: *White patchy discoloration of the dorsum of the nail plate.*



or white (caused by *T mentagrophytes*) patchy discoloration of the nail plate secondary to fungal invasion of the dorsal surface of the nail plate.[10] Proximal subungual onychomycosis, usually caused by *T rubrum*, clinically manifests as a white area under the lunula that progresses distally; it is an important subtype to recognize, as it commonly affects immunocompromised individuals and can be a clue to HIV infection.[10-12] It results from fungal invasion of the proximal nail fold with secondary extension to the nail plate. Total dystrophic onychomycosis is also a subtype of onychomycosis and might be observed in immunodeficient patients, including patients with HIV and those with chronic mucocutaneous candidiasis.[10,13] It is an advanced form characterized by progressive destruction of the nail plate, leading to the exposure of an abnormally thickened nail bed, and it might be fairly acute or progressive, simply representing an end stage of other forms of onychomycosis.

Effective onychomycosis treatment requires reaching an accurate diagnosis with identification of the underlying pathogen.[10,14] Several diagnostic methods such as histopathology with periodic acid-Schiff, KOH-based microscopy, and fungal cultures can be used alone or in combination; the former being the most sensitive, with sensitivity reaching 98.8% (level I evidence).[10,14] Therapies include antifungal agents (topical or oral), mechanical or chemical treatments, or a combination of these; the choice of which should be individualized depending on multiple factors such as number of nails involved, severity of onychomycosis, causative agents, drug side effects, potential for drug interactions (especially in older persons who are usually already on multiple medications), and cost.[15] Terbinafine, whether in continuous or intermittent regimens, currently appears to be most effective among oral agents for treating onychomycosis caused by dermatophytes (level I evidence), especially in older patients, owing to its fungicidal effect, safety, and low potential for drug interaction.[15,16] The azoles (fluconazole, ketoconazole, itraconazole) can also be used but, given their fungistatic effect, are generally less effective than terbinafine.[15]

Paronychia, seen infrequently in older persons, is an acute or chronic nail fold infection that might result in secondary nail plate changes.[1,2,17] Acute paronychia, typically induced by trauma, most commonly presents as tender erythematous nail fold swelling of one finger and is usually caused by *Staphylococcus aureus*. Warm saline soaks, abscess drainage, or topical or systemic antibiotics are usually used in its management (level II evidence).[1,2,17] Chronic paronychia, on the other hand, manifests as erythematous and swollen nail folds with cuticle loss and secondary changes in the nail plate in the form of multiple transverse ridges (**Figure 6**). *Candida* species or Gram-negative bacteria are the usual pathogens. Management includes keeping the nail fold dry in addition to the use of topical antifungal or antiseptic agents (level II evidence).[1,2,17]

Figure 6. Chronic paronychia: *Red and swollen nail folds, cuticle loss, and secondary nail plate changes.*

Sarcoptes scabiei infestation in specific populations such as infants, immunosuppressed patients, and older people might have peculiar, uncommon presentations including nail involvement.[1,2,19] Through inhabiting and persisting in subungual hyperkeratotic debris, the mite can cause prolonged infestations, which might lead to epidemics in nursing homes among elderly patients and those caring for them.[1,2,19] Management includes the use of an antiscabetic treatment coupled with nail cutting and brushing nail tips with a scabicide (level III evidence).[1,2,19]

Onychocryptosis (ingrown toenail)

Onychocryptosis occurs when the nail plate penetrates into the adjacent lateral nail fold secondary to nail plate overcurvature, subcutaneous in-growing toenail, or lateral nail fold hypertrophy. It manifests clinically with inflammation of the lateral nail fold, which might be associated with granulation tissue and secondary infection. Although more common in young adults, onychocryptosis might infrequently be encountered in older persons, resulting in substantial pain, walking difficulties, and disability.[1,2,18] Underlying causative factors include inappropriate nail cutting, long toes, prominent nail folds, ill-fitting or high-heeled shoes, hyperhidrosis, and bony abnormalities.

Management should address the acute signs and symptoms, as well as correct any underlying predisposing factors.[1,2] Conservative management includes soaking the foot in warm water and placing cotton wisps under the ingrown edge of the nail plate. Complete cure can best be accomplished by partial nail avulsion and lateral matricectomy, using phenolization or direct surgical excision of the nail matrix (level I evidence).[1,2,18,21]

Vandenbos and Bowers, who believe that ingrown toenails might be caused by overgrowth of surrounding skin rather than nail abnormality, performed a procedure (known as *Vandenbos procedure*) that was based on excising and removing an adequate amount of soft tissue from around the nail plate.[22,23] However, this procedure, reported as not having any associated recurrence or osteomyelitis, is not recommended for elderly patients who commonly have associated dystrophic, thick, discoloured, or curling nails or fungal infections.[22,23] Postoperative complications include nail bed infection, recurrence, or poor cosmetic outcome. Noël[18] described surgical decompression of the ingrown toenail (by removing a large volume of soft tissue around the nail plate and relieving the inflammation) without matricectomy as very effective (level III evidence).[21] Using this method, complete preservation of nail anatomy and function can be achieved with excellent therapeutic and cosmetic results.

Subungual hematomas

Subungual hematomas (**Figure 7**) are commonly observed in elderly people. Subungual hematomas initially present as painful, red, subungual discolorations that move forward and tend to become bluish and less tender with time. Occasionally, distal onycholysis with subsequent spontaneous avulsion of the nail plate can occur as a late consequence. It is in fact this forward and distal movement of the discoloration under the nail plate that can be a very helpful clinical clue, distinguishing this lesion from melanocytic lesions such as nevi and melanomas. In difficult situations in which an evident history of trauma is not present, a urinalysis reagent strip can be a noninvasive and very efficient method of diagnosing blood under a nail[24]; however, it should be kept in mind that blood presence under the nail plate does not rule out a concomitant neoplasm completely, as subungual tumours might spontaneously bleed or might be preceded by or first recognized only after a minor trauma.[25] The condition is most commonly caused by trauma, which results in nail bed laceration followed by accumulation of blood in the nail plate.[1,2] Other less common causes include diabetes mellitus, amyloidosis, or anticoagulant therapy. Management mainly centres on reassurance and observation of the nail; however, in acute, tender cases, relieving pressure might be accomplished by drilling a hole through the nail plate. After ruling out melanoma, chronic cases are best observed for spontaneous healing to occur.

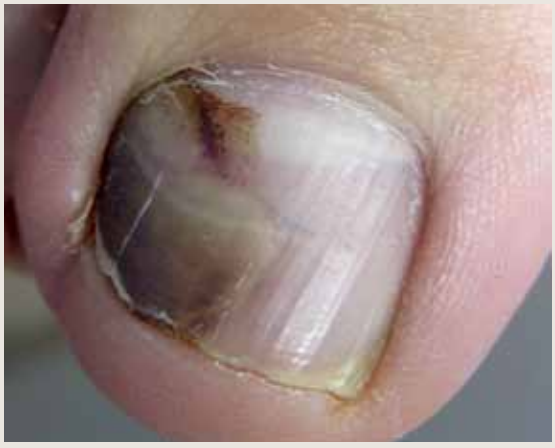
Splinter hemorrhages

Splinter hemorrhages usually present as linear discolorations under the nail plate, progressing from an early red to a dark-brown or black colour in a period of a few days.[1,2] Splinter hemorrhage location under the nail plate might be a clue to the underlying cause, as those located in the middle or distal third of the nail plate are typically trauma-induced, while proximal location is usually associated with systemic diseases such as cholesterol emboli, connective tissue disorders, or infective endocarditis. The latter proximal type is generally more common among young adults and requires treatment of the underlying systemic disorder, whereas the former trauma-associated distal type is observed more frequently in the elderly population and commonly resolves spontaneously.

Malignancies of the nail apparatus

The incidence of common nail apparatus malignancies such as Bowen disease and melanoma tends to increase with advancing age and is usually highest in the elderly population.

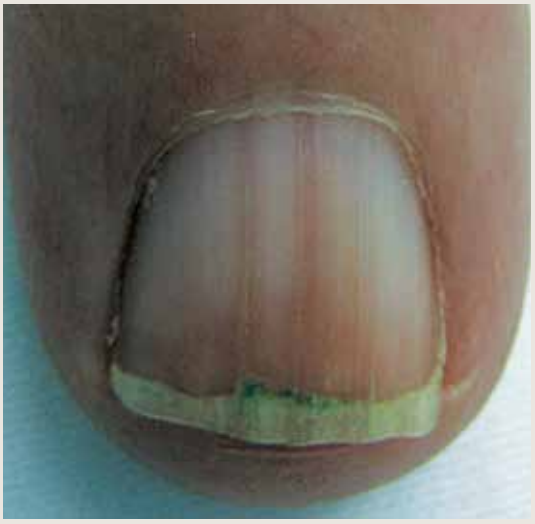
Figure 7. Subungual hematomas: *Red to bluish subungual discoloration.*



Bowen disease of the nail unit usually originates from the nail fold epithelium, and multiple factors have been implicated in its pathogenesis, including trauma, arsenic, x-ray exposure, chronic paronychia, and human papillomavirus infection (especially human papillomavirus 16, 34, and 35).[26] It commonly affects the fingers, particularly the thumb. While its usual presentation is as a periungual or subungual ulcerated hyperkeratotic lesion that might be associated with onycholysis, other less common manifestations include longitudinal melanonychia (**Figure 8**) or erythronychia (**Figure 9**).[26] Local invasion with underlying bone involvement occurs in less than 20% of patients, and the rate of distant metastasis is usually much lower. The treatment of choice for this condition is Mohs micrographic surgery.[26]

Figure 8. Longitudinal melanonychia: *A longitudinal dark band can be a manifestation of melanocytic lesions, drugs, or Bowen disease, among other causes.*

Figure 9. Longitudinal erythronychia: *A longitudinal red band can rarely be a manifestation of Bowen disease.*



Nail apparatus melanoma (NAM) usually affects Japanese and African Americans and classically presents as a solitary longitudinal melanonychia of the big toe, thumb, or index finger.[27] Hutchinson sign, which is characterized by pigment extension from the nail bed and matrix to the surrounding tissues and which accounts for the radial growth phase of this melanoma, might also be present. Delay in the diagnosis of NAM might account for its relatively worse prognosis compared with its cutaneous counterpart. Initial management starts with a high index of suspicion, especially when confronted with an elderly patient presenting with an isolated longitudinal melanonychia.[27] After histologic confirmation of NAM, treatment is then customized based on the melanoma stage.

Other nail conditions

Several other conditions should be considered when evaluating an elderly patient with nail changes, including those changes associated with cutaneous inflammatory disorders (such as psoriasis),[28] nail cosmetics,[29,30] systemic disorders (such as renal disease),[31] or medications (such as anticoagulants or β-blockers).[32] A brief summary of common nail changes associated with cutaneous disorders, nail cosmetics, and systemic disorders has been provided in **Tables 2, 3,** and **4**, respectively.

Conclusion

Elderly patients might complain of common nail changes and dystrophies that cause pain, affect daily activities, are of cosmetic concern, or are even malignant. Awareness of these conditions is

Table 2. Nail changes due to common skin diseases

CONDITION	CHARACTERISTIC NAIL CHANGES
Psoriasis	Irregular large and deep nail pits Salmon patches (oil-drop sign) of the nail bed (yellow–orange discoloration) Onycholysis Might also have subungual hyperkeratosis, nail plate thickening, and splinter hemorrhages
Lichen planus	Nail thinning, ridging, and fissuring Dorsal pterygium (adhesion of the proximal nail fold to the nail bed)
Alopecia areata	Geometric small, superficial, and regularly distributed nail pits Erythema of the lunula
Darier disease	Longitudinal erythronychia Distal V-shaped nail plate nicking
Trachyonychia	Twenty-nail dystrophy Nail roughness and excessive longitudinal ridging Idiopathic but might be a manifestation of alopecia areata, psoriasis, or lichen planus

Table 3. Nail changes due to cosmetic material and procedures

FACTORS	ASSOCIATED NAIL ADVERSE EFFECTS
Cosmetic material	Irritant and allergic contact dermatitis Nail plate staining
Cosmetic procedures	Trauma and mechanical damage Infections

Table 4. Selected important nail signs of systemic disease

NAIL SIGN	COMMONLY ASSOCIATED SYSTEMIC DISEASE
Koilonychia (flat- and spoon-shaped nail plate)	Severe iron deficiency anemia
Proximal splinter hemorrhages	Bacterial endocarditis Antiphospholipid syndrome Arterial emboli Thrombocytopenia Vasculitis Trichinosis
Apparent leukonychia (white nails, the colour of which fades with pressure)	Half and half nails (white proximal half) • renal disorders Terry nails • hepatic disorders, • chronic congestive heart failure, and • adult-onset diabetes mellitus Muehrcke lines (multiple transverse whitish bands) • systemic chemotherapy and • hypoalbuminemia
Ventral pterygium (adhesion of the distal nail plate to the hyponychium)	Scleroderma
Clubbing (enlarged and excessively curved nail plate, causing more than 180° widening of the angle between the proximal nail fold and the nail plate)	If unilateral, neurologic (hemiplegia) and vascular disorders If bilateral, pulmonary, cardiac, gastrointestinal, infectious, and endocrine diseases
Nail fold capillary abnormalities (reduced capillary density and avascular areas alternating with dilated capillary loops)	Dermatomyositis Scleroderma

essential for family practitioners, as well as other specialists, to reach an accurate diagnosis and provide optimal management.

Ms Abdullah was a registered nurse in the Department of Nursing at the American University of Beirut in Lebanon when this review was written and submitted. **Dr Abbas** is Assistant Professor of Clinical Dermatology in the Dermatology Department at the American University of Beirut.

Contributors
Both authors contributed to the literature search and preparation of the article for submission.

Competing interests
None declared

Correspondence
Dr Ossama Abbas, Department of Dermatology, American University of Beirut Medical Centre, PO Box 11-0236, Riad El Solh/Beirut 1107 2020 Lebanon; telephone 961 1 350000, extension 7915; fax 961 1 745320; e-mail **ossamaabbas2003@yahoo.com**

References

1. Cohen PR, Scher RK. Geriatric nail disorders: diagnosis and treatment. *J Am Acad Dermatol* 1992;26(4):521-31.
2. Singh G, Haneef NS, Uday A. Nail changes and disorders among the elderly. *Indian J Dermatol Venereol Leprol* 2005;71(6):386-92.
3. Horan MA, Puxty JA, Fox RA. The white nails of old age (Neapolitan nails). *J Am Geriatr Soc* 1982;30(12):734-7.
4. Saraya T, Ariga M, Kurai D, Takeshita N, Honda K, Goto H. Terry's nails as a part of aging. *Intern Med* 2008;47(6):567-8. Epub 2008 Mar 17.
5. Van de Kerkhof PC, Pasch MC, Scher RK, Kerscher M, Gieler U, Haneke E, et al. Brittle nail syndrome: a pathogenesis-based approach with a proposed grading system. *J Am Acad Dermatol* 2005;53(4):644-51.
6. Colombo VE, Gerber F, Bronhofer M, Floersheim GL. Treatment of brittle fingernails and onychoschizia with biotin: scanning electron microscopy. *J Am Acad Dermatol* 1990;23(6 Pt 1):1127-32.
7. Hochman LG, Scher RK, Meyerson MS. Brittle nails: response to daily biotin supplementation. *Cutis* 1993;51(4):303-5.
8. Scheinfeld N, Dahdah MJ, Scher R. Vitamins and minerals: their role in nail health and disease. *J Drugs Dermatol* 2007;6(8):782-7.
9. Bartolomei FJ. Onychauxis. Surgical and nonsurgical treatment. *Clin Podiatr Med Surg* 1995;12(2):215-20.
10. Gupta AK, Ricci MJ. Diagnosing onychomycosis. *Dermatol Clin* 2006;24(3):365-9.
11. De Berker D. Clinical practice. Fungal nail disease. *N Engl J Med* 2009;360(20):2108-16.
12. Gupta AK, Taborda P, Taborda V, Gilmour J, Rachlis A, Salit I, et al. Epidemiology and prevalence of onychomycosis in HIV-positive individuals. *Int J Dermatol* 2000;39(10):746-53.
13. Surjushe A, Kamath R, Oberai C, Saple D, Thakre M, Dharmshale S, et al. A clinical and mycological study of onychomycosis in HIV infection. *Indian J Dermatol Venereol Leprol* 2007;73(6):397-401.
14. Lilly KK, Koshnick RL, Grill JP, Khalil ZM, Nelson DB, Warshaw EM. Cost-effectiveness of diagnostic tests for toenail onychomycosis: a repeated-measure, single-blinded, cross-sectional evaluation of 7 diagnostic tests. *J Am Acad Dermatol* 2006;55(4):620-6. Epub 2006 Jun 13.
15. Gupta AK, Tu LQ. Therapies for onychomycosis: a review. *Dermatol Clin* 2006;24(3):375-9.
16. Gupta AK, Poulin Y, Lynde CW. Canadian perspectives on antifungal treatment for onychomycosis. *J Cutan Med Surg* 2006;10(Suppl 2):S34-8.
17. Rigopoulos D, Larios G, Gregoriou S, Alevizos A. Acute and chronic paronychia. *Am Fam Physician* 2008;77(3):339-46.
18. Noël B. Surgical treatment of ingrown toenail without matricectomy. *Dermatol Surg* 2008;34(1):79-83. Epub 2007 Dec 5.
19. Witkowski JA, Parish LC. Scabies. Subungual areas harbor mites. *JAMA* 1984;252(10):1318-9.
20. Gupta AK, Lynch LE, Kogan N, Cooper EA. The use of an intermittent terbinafine regimen for the treatment of dermatophyte toenail onychomycosis. *J Eur Acad Dermatol Venereol* 2009;23(3):256-62.
21. Heidelbaugh JJ, Lee H. Management of the ingrown toenail. *Am Fam Physician* 2009;79(4):303-8.
22. Vandenbos KQ, Bowers WF. Ingrown toenail: a result of weight bearing on soft tissue. *U S Armed Forces Med J* 1959;10(10):1168-73.
23. Chapeskie H. Ingrown toenail or overgrown toe skin? Alternative treatment for onychocryptosis. *Can Fam Physician* 2008;54:1561-2. Available from: **www.cfp.ca/cgi/reprint/54/11/1561**. Accessed 2010 Sep 17.
24. Huang YH, Ohara K. Medical pearl: subungual hematoma: a simple and quick method for diagnosis. *J Am Acad Dermatol* 2006;54(5):877-8.
25. Daniel CR 3rd, Jellinek NJ. Subungual blood is not always a reassuring sign. *J Am Acad Dermatol* 2007;57(1):176.
26. Baran R, Richert B. Common nail tumors. *Dermatol Clin* 2006;24(3):297-311.
27. André J, Lateur N. Pigmented nail disorders. *Dermatol Clin* 2006;24(3):329-39.
28. Holzberg M. Common nail disorders. *Dermatol Clin* 2006;24(3):349-54.
29. Dahdah MJ, Scher RK. Nail diseases related to nail cosmetics. *Dermatol Clin* 2006;24(2):233-9.
30. Rich P. Nail cosmetics. *Dermatol Clin* 2006;24(3):393-9.
31. Tosti A, Iorizzo M, Piraccini BM, Starace M. The nail in systemic diseases. *Dermatol Clin* 2006;24(3):341-7.
32. Piraccini BM, Iorizzo M, Starace M, Tosti A. Drug-induced nail diseases. *Dermatol Clin* 2006;24(3):387-91.