



Nails—They Mean More Than You Think!—Part 2

Here's how to nail down a good examination!

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Objectives and Goals

1) To reframe the importance of nail pathology in clinical practice.

2) To appreciate the diagnostic opportunities available through a good history and physical in a patient with nail disease.

3) To be able to create an astute differential diagnosis through careful investigation of nail pathology.

4) To understand the significance of proper diagnosis and treatment of nail disorders.

5) To be able to identify medical conditions and co-morbidities that accompany different nail conditions.

6) To define the parameters of the decision-making process of treating diseased toenails in clinical practice.

7) To empower the podiatric physician to consider the whole patient when developing a treatment plan for diseased toenails.

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Following this article, an answer sheet and full set of instructions are provided (pg. 164).—Editor

The toenails, like the fingernails, reflect the balances and imbalances present in the body, and therefore the condition of the nails mirrors the condition of the body. Conversely, medical problems are commonly revealed through nail pa-

thology, and therefore can be used as trusted markers for a myriad of medical problems. If we understand the language of the toenail, we would appreciate its profound importance in diagnosis and treatment. This paper attempts to give us this insight.

Part I took us through the history

part of the examination. Different diseases were discussed in relation to its impact on nail health. Part II will complete the history-taking narrative and delve into the sometimes indistinct borders of diagnostic categories. The journey concludes with

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a suggested protocol to be used on patients with nail disease.

Besides diseases that impart their signature features to the nails, there are other conditions that lend their impact as well.

These are conditions such as poisoning, effects of medications, nutritional and vitamin deficiencies, and normal aging. They will be discussed here.

I. Conditions Affecting Nail Health

1) Poisoning

The most common poisons ingested that affect the nails involve heavy metal poisoning. Arsenic causes the nails to develop horizontal ridges, white lines and Mees' lines (Figure 1), representing white bands of arsenic deposits across the nail bed, which can be present several weeks to months after the acute poisoning event. Clubbing of the nails can be caused not only by arsenic but also by phosphorous, alcohol, mercury, beryllium, and vinyl chloride.

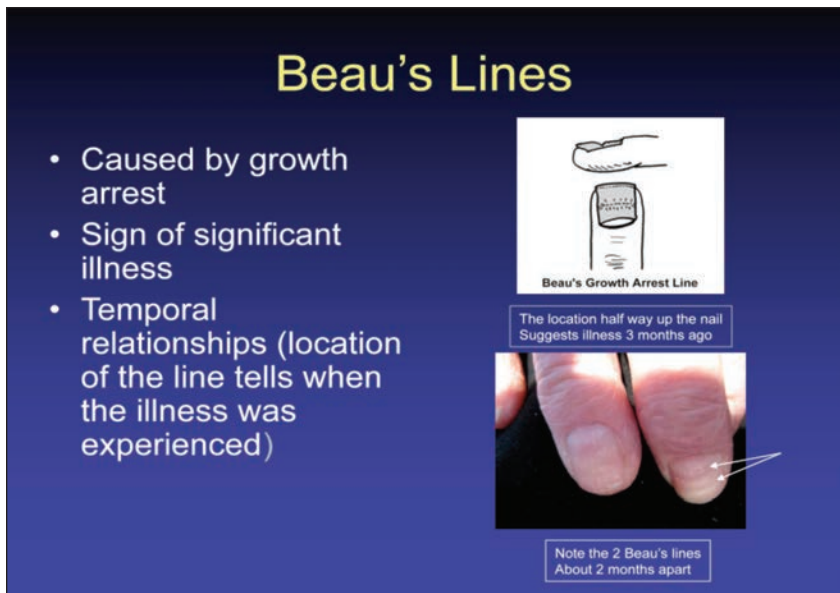


Figure 2: Beau's Lines: Courtesy of Mark Williams M.D. University of Virginia. Transverse depressed ridges seen in severe infection, MI, hypotension/shock, hypocalcemia, post-surgical, malnutrition and with certain chemotherapy.

2) Medications

The most consistently harmful impact on the nails is through the cancer drugs. These side-effects are in direct proportion to the dose and the combination of drugs being used, and are

very individual in nature, depending on the condition of the patient. The most offensive of these drugs are the biological therapy drugs comprising the chemotherapy. The way these side-effects show up in the nails is that they become brittle, dry, thin, and slow growing, sometimes with ridging, dark lines, or white discolorations. The nails may become darker in color or loose, to the point of even falling off. Beau's lines (Figure 2), onychomadesis (transverse whole thickness sulci which divide the nail in half), and true transverse leukonychia can occur in association with cancer chemotherapy and reflect the toxicity of these substances on actively dividing tissues; and is a symptom of transient impairment of nail matrix keratinization. Although any chemotherapeutic medications can be responsible for these adverse effects on the nails, cyclophosphamide, doxorubicin, and vincristine are more likely to cause leukonychia.

Other drugs, such as antibiotics and retinoids can cause nail disease by interfering with normal keratinization of the nail matrix, frequently causing Beau's lines, onychomadesis and onycholysis. In the case of retinoids, drug-induced formation of granulation tissue and nail brittleness can lead to the development of pyo-

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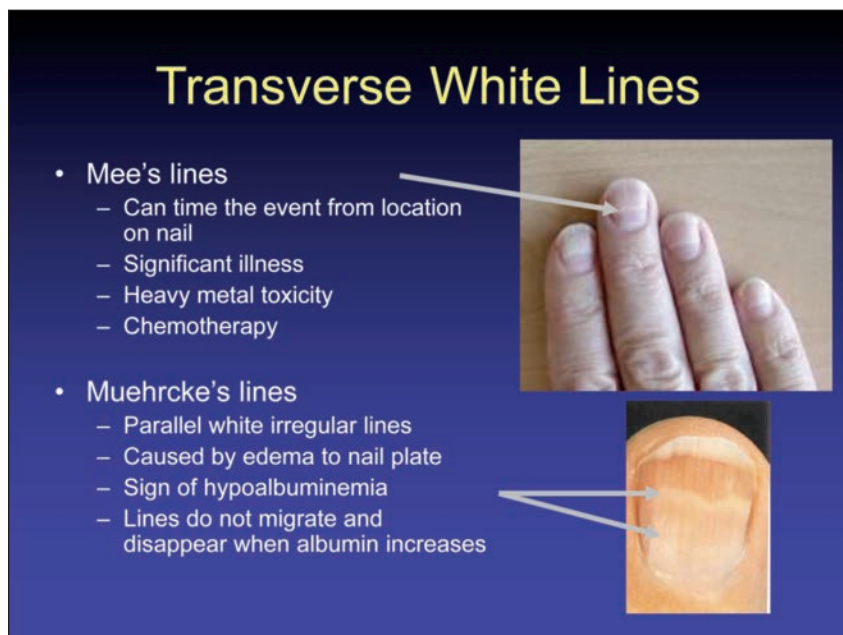


Figure 1: Courtesy of Mark Williams M.D. University of Virginia: Mees' Lines are transverse white lines (usually one per nail, no depressions) that often disappear if pressure is placed over the line. It is strongly associated with arsenic poisoning, thallium poisoning and to a lesser extent other heavy metal poisoning, chemotherapy or illness and can time the event from the location on the nail.

Muehrcke's Lines (Leukonychia striata): Narrow white transverse lines (not depressed, compared to Beau's lines). Usually 2 or more lines on one nail. Seen in states of decreased protein synthesis or increased protein loss such as with hypoalbuminemia (usually less than < 2.2 g/dL), certain chemotherapy and nephrotic syndrome.

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genic granulomas and ingrown nails with hypertrophic unguilabia.

Drug-induced onycholysis can result from damage to the nail bed epithelium with loss of nail plate adhesion, which can follow complete destruction of the nail bed epithelium with conse-

Drug-induced paronychia on one or more nails usually develops soon after the administration of the offending medication, commonly methotrexate, retinoids, and in HIV-infected patients receiving multiple-drug therapy, including the nucleoside analogue lamivudine and/or the protease inhibitor indinavir.

coloration is associated with antimalarial agents. The skin, sclera and mucous membranes can also be affected with minocycline and anti-malarials. Nail discoloration sometimes persists unchanged for years after discontinuing the drug; however, more often than not, these conditions regress spontaneously when the medications are discontinued.

Drug-induced nail changes are quite widespread. In addition to the well-recognized causative agents, numerous other drugs have occasionally been associated with the development of nail abnormalities. Knowing these side-effects and their cause is important in preventing these sometimes devastating outcomes.

The most common poisons ingested that affect the nails involve heavy metals.

quent hemorrhagic bullae. A number of drugs can cause this destruction, including cancer chemotherapeutic agents, retinoids, psoralens, and gold.

Photo-onycholysis

A condition called photo-onycholysis results from a photo-mediated allergic or toxic reaction to the nails and surrounding skin. Prevention of this condition involves avoiding exposure to sunlight while taking the drugs, as with tetracycline.

These drugs can also indirectly cause nail damage by damaging the blood vessels to the nail unit and impairing its circulation, thereby causing necrosis of the nail apparatus. This manifests as splinter hemorrhages or subungual hematomas. Drug-induced problems of the nails are more likely to be caused in those toenails which receive a lot of trauma or pressure from shoes.

Bleomycin, an anti-cancer chemotherapy drug, is associated with Raynaud's phenomenon in up to 37% of patients. This and other drugs, including beta-blockers, can also cause digital gangrene. With beta-blockers, however, this side-effect is most common in patients who already have peripheral vascular disease. It is thought to result from decreased cardiac output that is not efficiently balanced by peripheral vasodilation, particularly with non-cardioselective agents, which then leads to impaired distal perfusion. Symptoms are not always reversible when the drug is discontinued and amputation of the digit or limb is often needed.

Excretion or deposition of the drug in the nail plate causing discoloration is a common consequence of various medications. Yellow discoloration is caused by tetracycline or gold salts. Dark-brown discoloration is common after using clofazimine; blue-grey discoloration is a result of using minocycline; and blue, brown or grey dis-

3) Nutritional and Vitamin Deficiency

Nails are important cosmetically, but they also reflect a person's health, body chemistry, and nutritional status.

It can be said that almost any nutritional deficiency can produce changes in the nail plate and sometimes in the nail bed.

Poor food and water intake, especially in the elderly, are responsible for brittle nails. Brittle nails are also commonly seen in patients with anorexia nervosa.

Malnutrition can be associated with nails that are soft and thin, as well as longitudinal melanychia. Muehrcke's lines (Figure 1) are commonly associated with hypoalbuminemia. This type of leukonychia can either be apparent leukonychia: white transverse bands that reflect abnormal nail bed circulation that fades on pressure; or true leuconychia that reflects an abnormal nail plate. Terry's nails, although classically associated with liver disease, can be a manifestation of malnutrition as well (Figure 3).

Beau's lines are among the most common of nail signs of nutritional deficiencies, including protein deficiency and the general malnourished state associated with chronic alcoholism. Protein deficiencies are also associated with dystrophic nails that undergo onycholysis, onychoschizia and onychomadesis with a resultant peculiar, triangular residual nail plate (Figure 4).

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Figure 3: Terry's Nails (White Nails)



Figure 4: Triangular Residual Nail Plate with absence of lunula associated with protein deficiency, anemia and malnutrition

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Koilonychia (Figure 5), an abnormality in the curvature of the nail, is a classic sign of iron-deficiency anemia. Iron deficiency can also result in brittle nails, onycholysis and onychorrhexis (longitudinal splitting of the nails).

A central nail ridge is usually caused by folic acid deficiency, protein deficiency, or iron deficiency. Iodine deficiency can also result in clubbing of the nails.

Hypocalcemia can result in brittle nails, transverse leuconychia, onychomadesis (complete nail shedding starting from the proximal attachment of the nail), longitudinal splitting of the nails (onychorrhexis), longitudinal striations, and soft nails (hapalonychia), which are common in other nutritional abnormalities, as well.

Zinc deficiency is associated with brittle nails, onychorrhexis, white spots on the nails, ridging, and Beau's lines.

Prolonged total parenteral nutrition (TPN) is a risk factor for selenium deficiency, which results in generalized leuconychia.

Persons with magnesium deficiency develop soft, flaky nails that are inclined to break and split.

Nail changes in vitamin deficiencies should also be considered. Hapalonychia (soft nails) has been associated with deficiencies of both vitamin A and vitamin D, which also causes longitudinal melanonychia. If the parathyroid gland is underactive, there is a functional Vitamin D deficiency that causes brittle nails.

It is interesting to note that correcting the nutritional deficiencies often reverse the adverse nail effects.

Vitamin B deficiencies can manifest in a wide variety of nail abnormalities such as:

- Transverse leuconychia
- Beau's lines
- Onycholysis
- Half and half nails
- Hapalonychia
- Dystrophic nails
- Onychoschizia
- Nail discolorations are actually abnormalities of melanogenesis and show up as:
 - Longitudinal leuconychia
 - Diffuse bluish discoloration or
 - Reticulate pigmentation.

Spooned nails (Koilonychia)

Water drop test

- Imagine placing a drop of water on the nail with a medicine dropper. If a drop of water would not roll off the nail, it is spooned

Causes

- iron deficiency
- diabetes mellitus
- Protein deficiency especially in sulfur-containing amino acids (cysteine or methionine)



Koilonychia comes from the Greek words for "spoon" and "nail".

Figure 5: Courtesy of Mark Williams M.D. University of Virginia: Spooned nails or Koilonychia

Vitamin C deficiency is associated with koilonychia (Figure 5) and hapalonychia. Exhaustive studies have been done on the role of vitamin supplementation for the improvement of nail health in a well-nourished healthy person. There is no evidence that supplements are effective in this

nail plate occur, therefore changing the consistency and surface of the nails. As part of normal aging, therefore, non-pathological changes that occur in the nails are changes in color (becoming dull, yellow, and opaque), increased dryness and brittleness, longitudinal lines on the nail plate, on-

In onychomadesis, the transverse whole thickness sulci divides the nail in half.

regard. Brittle nail syndrome can, however, benefit from high dose biotin or silicon. Adequate intake of essential vitamins and minerals facilitates nail health.

4) Normal Aging

Normal aging is associated with many health-related factors including:

- Changing hormonal status
- Changes in cardiovascular and venous status
 - Problems with dehydration
 - Changes in protein metabolism
 - Changes in nutritional status
 - Dermatologic changes
 - Arthritic changes

In general, with advancing age, normal characteristic changes in the growth rate and morphology of the

ychoclavus (a corn at the end of the nail plate) and onychauxis (thickening of the toenails). There may be onychomycosis, onychocryptosis, subungual hematomas, and paronychia.

These common nail changes in the elderly, although for the most part non-pathologic, can be painful, of cosmetic concern, and may affect mobility, daily activities, and lifestyle. As such, it is important to consider their prevention and treatment, rendering the ravages of aging less formidable.

II. Examining the Patient

The same professional process of examination should be in place, whether the patient's chief complaint deals with nail problems, or with

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any other seemingly more important complaints; as the nails can be reflection of many disorders that, without this important marker, might other-

nail pathology in any portion of the nail apparatus is essential in making a correct diagnosis of a nail disorder. Important findings relate to:

- 1) Nail plate size
- 2) Abnormalities of nail shape

Some of the more common nail conditions referred to, or discussed so far in this paper, which necessitate inclusion not only in the history portion of the exam but the physical and podiatric exam as well, include the following:

Drug-induced paronychia on one or more nails usually develops soon after the administration of the offending medication.

wise present a diagnostic nightmare. Through evaluation of the nails on the hands and feet, the astute examiner of the nails would appreciate the opportunity to uncover contextual background information regarding the patient, affording a diagnostic advantage to the investigator. This would include findings such as:

- Overall vitality
- Inner emotional state
- Cerebral dominance
- Occupations and hobbies
- Past medical history
- Nutritional status
- Cardiovascular function
- Rheumatic conditions
- Dermatologic problems

As with other vital portions of the physical exam, recognizing signs of

- 3) Abnormalities of nail color
- 4) Abnormalities of the nail surface and texture
- 5) Abnormalities of the nail bed, folds, and lunula
- 6) Other processes around the nails, such as infectious or dermatologic conditions (Figure 8)
- 7) Comparison of right side vs. left, and hands and fingernails vs. feet and toenails

Abnormal or diseased finger and toenails should be looked for in the examination part as well as in the history part of the H&P. A previous or current diagnosis of nail disease can be very revealing in the history part of the exam, not only to facilitate the treatment of the nail problem itself, but also to assist in the diagnosis of associated medical conditions. It is interesting to note, if not obvious, that nail disease will affect both the hands and the feet, but may be more clinically visible in either.

Before discussing further pathology, the reader must be reminded of what to look for in a normal nail. Considerations include: the softness and flexibility of the free edge, the shape and color, the quality of paronychial tissues, and the growth rate, which should be about six months from cuticle to free edge.

Clubbing of the Nails

Clubbing of the nails is an enlargement of the transverse and longitudinal arc of the nails with hypertrophy of the underlying soft tissues; whereby the tips of the fingers enlarge and the nails curve around the fingertips, usually over the course of years (Figure 6).

This condition can be classified into three types:

- 1) Acquired
- 2) Hereditary/congenital and
- 3) Idiopathic

The acquired form is the most common cause of clubbing. Thoracic problems account for about 80% of cases and gastrointestinal problems account for about 5% of nail clubbing; however, it is most commonly the result of low oxygen in the blood and could be a sign of various types of lung disease, including lung cancer, lung abscess, bronchiectasis, and cystic fibrosis. Nail clubbing is also associated with inflammatory bowel disease, such as Crohn's disease and ulcerative colitis, celiac disease, asbestosis, liver cirrhosis and thyrotoxicosis, cardiovascular and cyanotic congenital heart disease, liver disease, and AIDS.

Yellow nail syndrome may be associated with respiratory disease, such as chronic bronchitis, bronchiectasis, and pleural effusion. There is also an association with Hodgkin's lymphoma, thyroid disease, diabetes mellitus, psoriasis, uterine cancer, malignant melanoma, lymphoma, and lymphedema.

Inflammation of the nail folds or fluffy nail folds may be caused by a connective tissue disorder such as systemic lupus erythematosus or bacterial and fungal infections.

"Half and half" nails (Figure 7) with the proximal part of the nail white to pink and the distal half of the nail red to brown may be caused by chronic renal failure and cirrhosis

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Causes of clubbing (not exhaustive)

- Pulmonary and Cardiovascular causes (80%)
 - Lung cancer, pulmonic abscess, interstitial pulmonary fibrosis, sarcoidosis, beryllium poisoning, pulmonary arteriovenous fistula, subacute bacterial endocarditis, infected arterial grafts, aortic aneurysm
- Gastrointestinal causes (about 5%)
 - Inflammatory bowel disease, sprue, neoplasms (esophagus, liver, bowel)
- Hyperthyroidism (about 1%)
- Note: Chronic Obstructive Pulmonary Disease does not cause clubbing!



Figure 6: Clubbing of the Toenails

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and vitamin B deficiency.


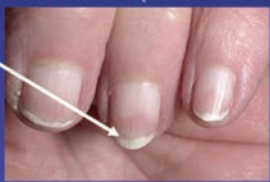
Pitting of the nails or rippling of the nails show up as small depressions in the nail plate or ripples on the nail plate (Figure 9). Although nail pitting and rippling can be seen in about two thirds of healthy patients, these conditions are more pronounced in people who have psoriasis, inflammatory or rheumatoid arthritis, and connective tissue collagen disorders such as Reiter's syndrome and Alopecia areata, an autoimmune

disease that causes hair loss, as well as systemic lupus erythematosus. Discoloration of the nail is commonly associated with pitting, as well as the nail bed turning reddish-brown.

Spoon nails (koilonychia) (Figure 5) are soft nails that look scooped out like a spoon. The crater is usually able to hold a drop of liquid. If a drop of water cannot roll off the nail, it is spooned. Often, spoon nails are a sign of iron deficiency anemia, kidney disease, or a liver condition known

Terry's Half and Half Nails

- Proximal portion is white (edema and anemia) and the distal portion is dark
- These nails imply either renal or liver disease
- In renal disease there is a brown band at the junction of the erythema and the free edge

Liver disease (no brown line)
Renal disease (brown line)

Figure 7: Terry's Half and Half Nails. Courtesy of Mark Williams, MD University of Virginia

as hemochromatosis. Spoon nails can also be associated with heart disease and hypothyroidism.


Terry's nails (Figure 3) are sometimes referred to as white nails syndrome or leukonychia. The nails turn

a white color and the normal pink color and the tip of each nail develop a dark band. Sometimes, this can be attributed to aging. In other cases, it can be a sign of a serious underlying

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Periungual telangiectasia

- Dilated capillary loops and atrophy of cuticle
- Strongly associated with collagen vascular disease
 - SLE
 - Dermatomyositis
 - Scleroderma




Swelling Around the Nail

- Mucus cyst
- Fibroma
- Malignant melanoma



Masses

- Pyogenic granuloma
- Warts
- Fibroma
- Malignant melanoma



Processes Around The Nail

Courtesy of Mark Williams, M.D. University of Virginia

Figure 8: Processes around the nail: Swelling, Masses, Periungual Telangiectasia

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condition, such as cirrhosis, heart disease such as congestive heart failure, diabetes, renal failure, arsenic poisoning, malnutrition, pneumonia, hypoalbuminemia and actinic keratosis.

Beau's lines are depressions that run across the nails (Figure 2). These indentations could indicate areas of retarded growth or can appear when the nail matrix and therefore nail growth is affected by injury or severe illness. Conditions associated with Beau's lines include kidney disease, uncontrolled diabetes, and peripheral vascular disease, as well as illnesses associated with a high fever, such as scarlet fever, measles, mumps, and pneumonia. Beau's lines can occur during or after chemotherapy or as a cause of a nutritional deficit such as zinc deficiency.

Onychomycosis

Onychomycosis or fungal nail infection is often associated with the elderly or people with underlying disease states such as peripheral vascular disease, diabetes, immune system problems such as HIV infection, immunosuppressive medications, or cancer. Tinea pedis is considered a high risk factor for mycotic toenails. In healthy people, fungal nails are most commonly contracted through moist wet areas such as communal showers at the gymnasium, or swimming pools. In addition, artificial nails can lead to fungus of the toenails.

Cracked, dry, peeling and splitting nails are often associated with long-term exposure to moisture, nail polish, and nutritional and dietary deficiencies. These nails have also been linked to thyroid disease. If the nails have a yellowish tint, they may be onychomycotic.

Pale nails is a condition where the nail beds have lost their healthy pink luster associated with good circulation. This often indicates the presence of a condition such as anemia, congestive heart failure, liver disease, or malnutrition.

Bluish nails is a condition where the nail beds are not getting sufficient circulation and are becoming cyanotic. This is often a sign of lung disease, such as chronic obstructive pulmo-

nary disease or emphysema; or heart problems.

Black, brown or dark lines under the nail (Figure 10) are sometimes caused by malignant melanoma. Extreme caution should be under taken when this finding is present. The term melanichia is used to describe a discoloration under the nail caused by melanin-derived brown-to-black nail pigmentation. Melanichia most often occurs due to benign etiologies

Subungual Melanoma

Because subungual melanoma is such a critical and life-threatening finding, more detail is warranted in this discussion regarding the examination of this entity.

Examining Subungual Melanoma

What does melanoma of the nail unit look like (Figure 10)?

Subungual melanoma can present in a variety of ways. It can start out

The risk of metastasis and death from subungual melanoma is proportional to the thickness of the melanoma and the completeness of excision.

such as activation, hyperplasia, or infection of the melanocytes associated with the nail unit. The most serious disease, however, that presents with melanichia is subungual melanoma. This can have various presentations, but in clinical practice and in practicality, if the discoloration of the nail extends proximally into the skin fold, there should be a high index of suspicion of subungual melanoma. Also, Addison's disease can cause longitudinal brown lines in the nail apparatus. Otherwise, the discoloration under the nail is usually caused by a benign event, such as trauma resulting in dry blood or subungual hematoma.

appearing as a paronychia, an indented nail, or a dark streak. It usually starts out as a pigment band visible the length of the nail plate. As the disease progresses over the weeks and months, this pigment band gets wider, especially at its most proximal end and the cuticle. It becomes more variegated in color from light to dark brown. Ulcerations, nodules, subungual bleeding, and/or nail dystrophy may develop.

It is important to note that up to half of all cases of subungual melanoma are amelanotic (Figure 10), and can present as a nodule under the nail plate, onycholysis, or verrucous.

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Figure 9: Nail Pitting

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Subungual melanoma is usually painless unless the tumor involves the underlying bone, causing severe pain.

It is important to note that diagnosis is confirmed by biopsy; and the melanoma must be removed surgically.

The risk of metastasis and death is proportional to the thickness of the melanoma and the completeness of excision. Delay in the diagnosis and treatment is a risk factor for the tumors spreading at the time of diagnosis. The quicker and more complete the treatment, the better the survival rate, which, according to some experts, approaches 87%.

Onycholysis

Onycholysis is a condition that describes the painless separation of the nail plate from the nail bed starting distally. It is commonly associated with hyper- and hypothyroidism. When present, it affects the fourth finger most often, followed by the fifth finger, remaining fingers, the thumb, and any or all of the toenails. This condition is associated with alopecia universalis as an early marker of amyloidosis and multiple myeloma. It

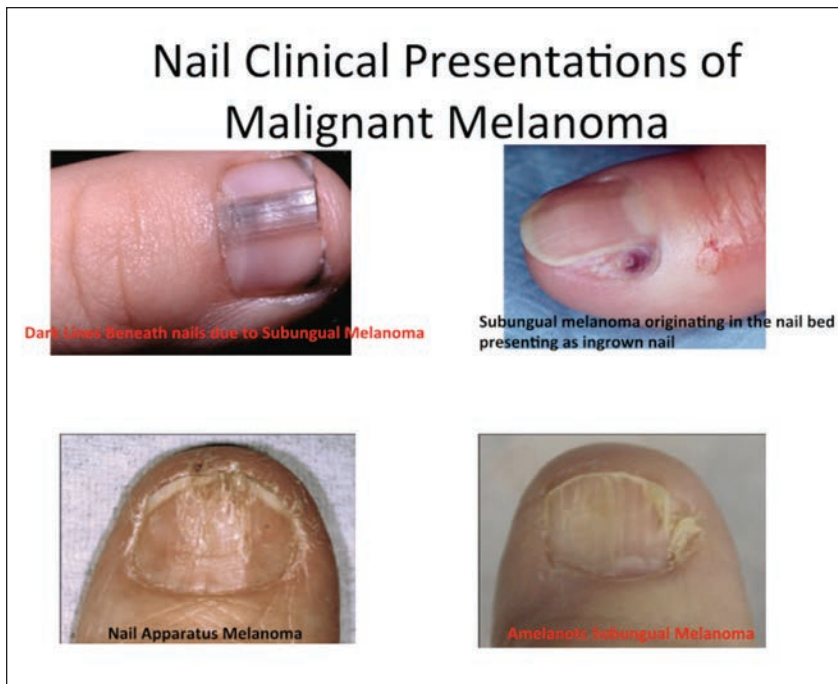


Figure 10: Different Presentations of Malignant Melanoma in the Nail

can show up commonly in Raynaud's disease and diabetes mellitus.

Gnawed Nails

Gnawed Nails (Figure 1, Part I) are the result of a person biting their nails. This condition is often associat-

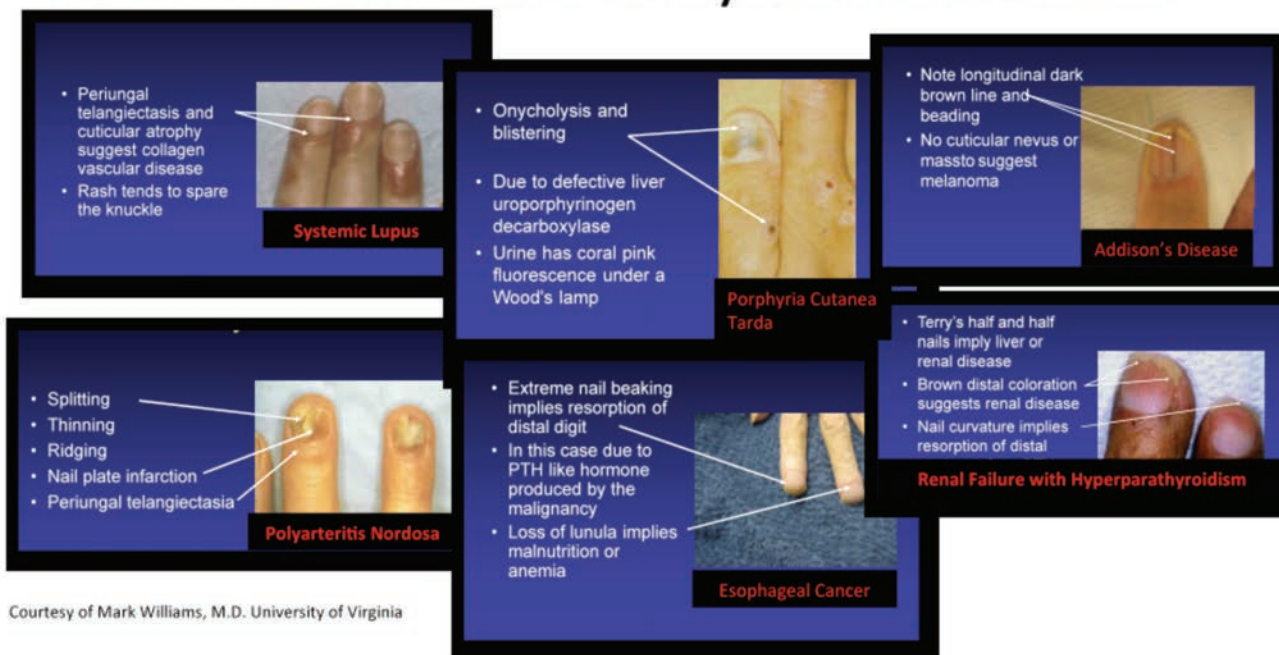
ed with anxiety or obsessive-compulsive disorder.

Splinter Hemorrhages

Splinter hemorrhages (Figure 5, Part I) describe a condition that re-

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Nail Presentations of Systemic Disease



Courtesy of Mark Williams, M.D. University of Virginia

Figure 11: Nail Presentations of Systemic Disease

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flects the hemorrhaging of the distal capillary loops of the nail bed. It can be caused by trauma or by systemic disease. Most commonly (41%), it is associated with cardiovascular disease, renal failure (12%), diabetes mellitus (10%), or pulmonary pathology (10%). Otherwise (27%), it can be associated with sub-acute bacterial endocarditis, renal sarcoidosis, rheumatoid arthritis, scurvy, severe anemia, systemic lupus erythematosus, psoriasis, pityriasis rubra pilaris, and trichinosis.

A final note on the physical exam as it relates to a chief complaint relating to the nails: it is not only prudent but essential to also evaluate the skin, hair, and mucous membranes so that findings can be put in better perspective.

Abnormalities of the Lunula

There are three common abnormalities of the lunula. First, there

is the complete absence (Figure 4), usually caused by anemia, or malnutrition. Secondly, there is a pyramid-shaped lunula, normally caused by some type of trauma, including over-aggressive manicures or pedicures. Thirdly, a red discoloration

ment. Making a diagnosis requires careful thinking. Now, we can order diagnostic tests to confirm our working diagnosis to arrive at our definitive diagnosis. The choice of diagnostic tests to confirm our working diagnosis (or diagnoses)

“Half and half” nails are characterized by the proximal part white to pink, and distal nail red to brown.

of the lunula heralds cardiovascular disease, collagen vascular disease, or hematological malignancy.

III. Making the Diagnosis: Putting It All Together

After the history and physical exam is completed and we have valuable clinical information, the physician’s job is to put all the information together and make a careful judg-

ment. Making a diagnosis requires careful thinking. Now, we can order diagnostic tests to confirm our working diagnosis to arrive at our definitive diagnosis. The choice of diagnostic tests to confirm our working diagnosis (or diagnoses)

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Nail Presentations of Systemic Disease

Dermatomyositis

- Cuticular atrophy and periungual telangiectasias suggest collagen vascular disease
- Gottron’s papules over the knuckles imply dermatomyositis

Systemic lupus affecting the skin over the hands tends to spare the knuckles while Dermatomyositis tends to involve the knuckles

Psoriasis

- Onycholysis
- Splitting of nail plate
- Salmon patch
- Chronic paronychia
- Nail disease is associated with psoriatic arthritis

Systemic Amyloidosis

- Thinned, ragged edges
- Yellow discoloration
- Ridging

Thyrotoxicosis

- Nails show significant onycholysis
- Pallor and loss of lunula suggests malnutrition

Lung Cancer

- Significant clubbing
- Nicotine staining from cigarette smoking

Courtesy of Mark Williams, M.D. University of Virginia

Figure 1 | A: Nail Presentations of Systemic Disease

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profile are perhaps among the most rewarding things in the practice of medicine.

IV. Creating the Treatment Plan: Don't Forget About Prevention!

The Ten Top Toenail Principles

After a definitive diagnosis is made, a treatment plan can be devised.

I. Be sure to discuss the diagnosis or diagnoses, pathology, treatment plans, indications, risks, benefits, alternatives, and costs involved with the patient and the family present, if applicable.

II. Any underlying medical or vascular conditions should be addressed, referred out, treated, and controlled, if possible.

III. The nails, both fingernails and toenails, should be debrided in length and thickness. There is an abundance of evidence that supports periodic debridement of a thickened nail plate as the preferred initial therapy. This should be in addition to excision of any ingrown nails, debridement of any associated hyperkeratotic tissue, hypertrophic cuticle, and incision and drainage of any paronychia.

IV. If there's any bony involvement as detected by the imaging studies, this has to be addressed. Spur formation can be conservatively or surgically treated. Osteomyelitis, as diagnosed through imaging studies, blood tests, and bone cultures/biopsies, can be treated with excision of the infected bone, and/or the appropriate antibiotic(s).

V. The nails, as well as the skin on the foot and around the nails must be treated with the correct oral or topical antibiotic, antifungal and/or topical skin and nail products that condition and moisturize the skin, nails, and cuticles, as well as decrease the fungal and bacterial load and optimize the pH. Often, it is advisable to soak the foot in a saline or salt-water solution to accomplish maximum skin and nail health.

VI. The biomechanics of the foot and the areas of abnormal pressure should be addressed with the appropriate orthotic devices and shoes. It is important that there should be ample

room in the shoe, especially after putting in the foot insert, that the toes are not squeezed and there is no undue pressure on the toes.

VII. Identify and remove substances, chemicals, cosmetics, soaps, or socks that are toxic, irritating, or inflammatory to the skin and nails.

VIII. Address the overall dietary and lifestyle concerns.

IX. It is important to engage the patient in his or her own care and offer the appropriate education, counseling, and coordination of care.

X. Hygiene, moisture control, and decreasing fungal load from shoes, socks, and floor surfaces, are especially important in medically or immunologically compromised patients.

This panoramic approach serves the patient by not only affording good treatment but much needed prevention as well.

Finally, the practitioner should treat the nail problem with the same deference, regard, and concern they would use for any other medical or surgical problem.

The nails, much like the skin, provide a looking glass into the patient's total health and well-being. The information is here for the taking, as long as the physician can decipher the code through reconciling the nail pathology with the systemic significance of the podiatric clinical presentation.

This discourse was by no means exhaustive. A careful observer would notice many gaps to be filled. If, however, the practitioner is motivated to treat nails in a new paradigm, the goals of this paper were met. **PM**

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SEE ANSWER SHEET ON PAGE 165.

- 1) What conditions do the toenails have in common with the fingernails?
 - A) They reflect the balances and imbalances in the body.
 - B) They both are markers for many medical conditions.
 - C) They are likely to display the same pathology.
 - D) All of above.
- 2) Besides diseases, the following conditions will commonly manifest in the toenails and fingers at the same time:
 - A) Poisoning, medications, vitamin deficiency, and aging
 - B) Athletic injuries, toxic cosmetic effects, lack of hygiene
 - C) Effects of the sun, carcinoma, emotional difficulties
 - D) Urinary problems, intestinal flora imbalances, dehydration
- 3) The most common poisons ingested that affect the nails involve:
 - A) Phosphorous
 - B) Heavy metals
 - C) Alcohol
 - D) Vinyl chloride
- 4) Arsenic normally causes the nails to develop:
 - A) Muehrke's lines
 - B) Vertical ridges
 - C) Mees' lines
 - D) Beau's lines
- 5) Common causes of clubbing of the nails include:
 - A) Vincristine
 - B) Cyclophosphamide
 - C) Chronic obstructive pulmonary disease
 - D) Other pulmonary and cardiovascular disorders
- 6) Antibiotics and retinoids can cause nail disease by the following mechanism:
 - A) Interference with normal keratinization of the matrix
 - B) Allergic and anaphylactic reactions
 - C) Eosinophilia
 - D) Septic shock
- 7) The term onychomadesis refers to the:
 - A) True transverse leukonychia
 - B) Transverse whole thickness sulci dividing the nail in half
 - C) Uplifting of the nail plate from the nail bed
 - D) Complete destruction of the nail bed epithelium
- 8) Drug-induced paronychia most commonly develops:
 - A) After chronic use of the medication.
 - B) After a delayed hypersensitivity reaction.
 - C) Soon after the administration of the offending medication.
 - D) In response to shoe pressure and subsequent ingrown nails.
- 9) Digital gangrene is commonly associated with the following medication(s):
 - A) Lamivudine
 - B) Indinavar
 - C) Methotrexate
 - D) Beta-blockers
- 10) Malnutrition can be associated with the following nail disorders:
 - A) Nails that are soft and thin
 - B) Nails that are triangular in shape
 - C) Koilonychia
 - D) Yellow nail syndrome
- 11) Pale nails are due to poor:
 - A) hygiene.
 - B) circulation.
 - C) innervation.
 - D) biomechanics.
- 12) "Half and half" nails are characterized by the following features:
 - A) Proximal half of the nail bluish and distal part yellow
 - B) Oversized lunula with distal onychomycosis
 - C) Proximal part white to pink, and distal nail red to brown
 - D) The nail plate resembling the color of café au lait
- 13) Subungual melanoma is most likely to start out in the following way:
 - A) A brown spot at the most distal part of the nail plate
 - B) Horizontal white spots with indentations at the distal part of the nail plate
 - C) With a subungual hematoma
 - D) As a pigment band visible the length of the nail plate
- 14) Up to half of all cases of subungual melanoma
 - A) Are amelanotic and can present as a nodule or verruca
 - B) Are extremely painful except until the tumor penetrates the underlying bone
 - C) Are usually confirmed before biopsy
 - D) Will resolve spontaneously

Continued on page 164

- 15) In the case of subungual melanoma, the risk of death is:
- A) Linked to the color of the tumor.
 - B) Proportional to the thickness of the melanoma and completeness of excision.
 - C) Approaching 87% in the best scenario.
 - D) Higher in darker skinned persons.
- 16) Gnawed nails are almost always due to:
- A) Mixed collagen disease.
 - B) Psoriatic arthritis in the distal phalynx of the toes or fingers.
 - C) Associated with anxiety or obsessive-compulsive disorder.
 - D) Amyloidosis.
- 17) The following information can be ascertained from examining the nails:
- A) The age of the patient
 - B) The intelligence of the person
 - C) Racial heritage
 - D) Inner emotional state
- 18) When examining the nails, the most important findings relate to:
- A) Abnormalities of the nail surface and texture.
 - B) The amount of subungual debris.
 - C) The amount of hypertrophy of the nail bed.
 - D) How often the nails are debrided.
- 19) A normal nail will have the following characteristic(s):
- A) An extremely small or absent lunula
 - B) A soft and flexible free edge
 - C) A white nail plate
 - D) Nail growth rate of 18 months from cuticle to free edge
- 20) A successful treatment program for diseased nails should include the following:
- A) Addressing or ruling out underlying medical or vascular conditions
 - B) Education, counseling, and discussion of care with the patient
 - C) Proper debridement in length and thickness
 - D) All of the above

SEE ANSWER SHEET ON PAGE 165.

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