Examining the Fingernails

Mark E. Williams, M.D.
University of Virginia
School of Medicine
PreTest 1

• What disease would most likely produce these nails?
  – Diabetes mellitus
  – Congestive heart failure
  – Hypothyroidism
  – Liver disease
  – Renal disease
  – SLE
• What disease would most likely produce these nails?
  – Diabetes mellitus
  – Congestive heart failure
  – Hypothyroidism
  – Liver disease
  – Renal disease
  – SLE
PreTest 3

• What disease would most likely produce these nails?
  – Diabetes mellitus
  – Congestive heart failure
  – Hypothyroidism
  – Liver disease
  – Renal disease
  – SLE
What information is available from examining the fingernails?

- Overall vitality
- Inner emotional state
- Cerebral dominance
- Occupations and hobbies
- Past medical history
- Nutritional status
- Cardiovascular function
- Rheumatic conditions
- Dermatological problems
Sequence of the Examination

- Check the nail shape
- Examine the nail color
- Survey processes around the nails
- Compare hands
- Note skin conditions
Observing the Nail Shape
Normal Nail Findings

- Softness and flexibility of free edge
- Shape and color
- Quality of paronychial tissue
- Growth rate
  - Six months from cuticle to free edge
  - Time of events can be estimated from location
- Nail polish
  - Distance from base and line of polish gives approximate date of application (nails grow 0.1mm/day)
  - Toenail polish suggests unusual flexibility, a friendly helper, or pedicure
Clubbed fingernails

• 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!
Schamroth’s sign

Purpose
- to determine if nails are clubbed

Method
- have patient place both forefinger nails together and look between them. If you can see a small diamond space between them (Schamroth’s window) then the nails are not clubbed
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)

Koilonchychia comes from the Greek words for “spoon” and “nail”.
Beau’s Lines

- Caused by growth arrest
- Sign of significant illness
- Temporal relationships (location of the line tells when the illness was experienced)

The location half way up the nail suggests illness 3 months ago.

Note the 2 Beau’s lines:
- About 2 months apart.
Thin Brittle Nails

- Metabolic bone disease
  - Nail thinness is correlated with osteopenia
- Thyroid disorder
- Systemic amyloidosis
  - Yellow waxy flaking
- Severe malnutrition

Systemic Amyloidosis

Note the thin nails in this woman with severe osteopenia
Central Nail Ridge

• Causes
  – Iron deficiency
  – Folic acid deficiency
  – Protein deficiency
Central Nail Canal (Median Nail Dystrophy)

- “Heller’s fir tree deformity”
- Cuticle is usually normal
- Associations
  - Severe arterial disease
  - Severe malnutrition
  - Repetitive trauma
Nail Pitting

- Cause is nail matrix inflammation
- Conditions
  - Psoriasis (random appearance of pits)
  - Alopecia areata (geometric rippled grid)
  - Eczema
  - Lichen planus

Images courtesy of www.dermnet.com
Used with permission
Nail Beading

• Beads seem to drip down the nail like wax

• Associated with endocrine conditions
  – Diabetes mellitus
  – Thyroid disorders
  – Addison’s disease

Image courtesy of www.dermnet.com
Used with permission
Rough Nail Surface

- Nails look sandpapered and dull
- Consider:
  - autoimmune disease
  - Psoriasis
  - Chemical exposure
  - Lichen planus
Nail Thickening

• Slow nail growth produces the thickness

• Consider:
  – Onychomycosis
  – Chronic eczema
  – Peripheral vascular disease
  – Yellow nail syndrome
  – Psoriasis
Separation of the Nail Plate (Onycholysis)

- Caused by lifting of the nail plate
- Associations
  - Thyrotoxicosis
  - Psoriasis
  - Trauma
  - Contact dermatitis
  - Toxic exposures (solvents)
  - Porphyria cutanea tarda (onycholysis and blistering of sun exposed skin)

Traumatic onycholysis (Only involving one nail)

Psoriasis
Note the jagged border
Severe Curvature

• Curved or beaked nails
  – Caused by resorption of distal digit
  – Consider
    • Hyperparathyroidism
    • Renal failure
    • Psoriasis
    • Systemic sclerosis
Complete Nail Destruction

Local mechanisms:
- Trauma
- Paronychia

Generalized conditions:
- Toxic epidermal necrolysis
- Chemotherapy
- Bullous diseases
- Vasculitis
Observing Nail Color
Abnormalities of the Lunula

- Absent
  - Anemia
  - Malnutrition
- Pyramidal
  - Excessive manicure
  - Trauma
- Red Discoloration
  - Cardiovascular disease
  - Collagen vascular disease
  - Hematological malignancy
  - Others
Focal Discolorations of the Nail Plate
Transverse White Lines

- **Mee’s lines**
  - Can time the event from location on nail
  - Significant illness
  - Heavy metal toxicity
  - Chemotherapy

- **Muehrcke’s lines**
  - Parallel white irregular lines
  - Caused by edema to nail plate
  - Sign of hypoalbuminemia
  - Lines do not migrate and disappear when albumin increases
White Splotches

- Leukonychia striae
- Caused by minor trauma to the nail matrix
- Timing can be determined by the location on the nail
Longitudinal Brown Lines

• Mechanism
  – Increased melanin production by nail matrix melanocytes

• Associations
  – Addison’s disease
  – Nevus at nail base
  – Breast cancer
  – Melanoma (check for periungual pigmentation)
  – Trauma

Image courtesy of www.dermnet.com
Used with permission
Splinter Hemorrhages

• Caused by hemorrhage of distal capillary loops
• Note thickness
• Associations
  – SBE
  – SLE
  – Trichinosis
  – Pityriasis rubra pilaris
  – Psoriasis
  – Renal failure

Splinter hemorrhages tend to be fat.
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)

Lower Image courtesy of www.dermnet.com used with permission
Generalized Discolorations of the Nail Plate
White Nails

- Caused by anemia, edema or vascular conditions
- Consider:
  - Anemia
  - Renal failure
  - Cirrhosis
  - Diabetes mellitus
  - Chemotherapy
  - Hereditary (rare)
Pink or Red Nails

• Consider:
  – Polycythemia (dark)
  – SLE
  – Carbon monoxide (cherry red)
  – Angioma
  – Malnutrition
Brown Grey Nails

• Consider:
  – Cardiovascular disease
  – Diabetes mellitus
  – Vitamin B12 deficiency
  – Breast cancer
  – Malignant melanoma
  – Lichen planus
  – Syphilis
  – Topical agents
Yellow Nails

• Consider:
  – Amyloidosis
  – Lymphedema and bronchiectasis (yellow nail syndrome)
  – Median/Ulnar nerve injury
  – Thermal injury
  – Jaundice
  – Diabetes mellitus
Green or Black Nails

- Topical preparations
- Chronic Pseudomonas infection
- Trauma
Processes Around the Nail
Processes Around the Nail

- Chronic paronychial inflammation
  - Swelling
  - Scaling
  - Nail separation
Periungual telangeictasia

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

Image courtesy of www.dermnet.com
Used with permission
Swelling Around the Nail

• Mucus cyst
• Fibroma
• Malignant melanoma
Masses

- Pyogenic granuloma
- Warts
- Fibroma
- Malignant melanoma
• What disease would most likely produce these nails?
  – Diabetes mellitus
  – Congestive heart failure
  – Hypothyroidism
  – Liver disease
  – Renal disease
  – SLE
PreTest 1  Diabetes Mellitus

- What disease would most likely produce these nails?
  - Diabetes mellitus
  - Yellow nails and longitudinal ridging
PreTest 2

• What disease would most likely produce these nails?
  – Diabetes mellitus
  – Congestive heart failure
  – Hypothyroidism
  – Liver disease
  – Renal disease
  – SLE
PreTest 2  Liver Disease

• What disease would most likely produce these nails?
  – Terry’s half and half nails suggest
    • Liver disease or
    • Renal disease
  – No convincing brown line at the junction of the erythema and free edge suggests liver disease
What disease would most likely produce these nails?
- Diabetes mellitus
- Congestive heart failure
- Hypothyroidism
- Liver disease
- Renal disease
- SLE
• What disease would most likely produce these nails?
  – SLE
  – Note the fat splinter hemorrhage and the periungal telangeictasia
Summary

• Considerable useful information is available from careful examination of the nails
• Starting with the nail examination immediately communicates a sense of diligence and thoroughness
• Remain attentive and continually add to your diagnostic repertoire
Post Test 1

• 71 year old man with lethargy, fatigue, and anorexia

• What is your diagnosis and the evidence that supports it?
Renal Failure with hyperparathyroidism

- Terry’s half and half nails imply liver or renal disease
- Brown distal coloration suggests renal disease
- Nail curvature implies resorption of distal phalange from PTH
• 66 year man with fatigue, hypotension and an increased sense of smell
Addison’s disease

• Note longitudinal dark brown line and beading
• No cuticular nevus or mass to suggest melanoma
Post Test 3

- 78 year old with diabetes mellitus, anemia, congestive heart failure and peripheral vascular insufficiency
- What is the evidence?
Post Test 3

- Red lunula can imply CHF
- Heller’s line suggests peripheral vascular disease
- Ridging suggests diabetes or another endocrine condition
- Overall pallor suggests anemia
Post Test 4

• 84 year old man with a painful ankle. Name 5 likely diseases on his problem list
• Gout (tophi)
• CHF (red lunula)
• Anemia (pallor)
• Peripheral arterial disease (longitudinal red line)
• Chronic kidney disease (distal brown pigmentation)
Post Test 5

• 68 year old man with weight loss and dysphagia
Esophageal Cancer

- Extreme nail beaking implies resorption of distal digit
- In this case due to PTH like hormone produced by the malignancy
- Loss of lunula implies malnutrition or anemia
• 62 year old woman with proximal muscle weakness, dysphagia and weight loss
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.
Case 7

• 78 year old man with first degree heart block, periorbital purpura, and an enlarged liver
Case 7  Systemic Amyloidosis

- Thinned, ragged edges
- Yellow discoloration
- Ridging
Case 8

- 70 year old man with depression, fatigue, weight loss and irritability
- No history of trauma
- No evidence of Psoriasis on exam
Case 8  Thyrotoxicosis

• Nails show significant onycholysis
• Pallor and loss of lunula suggests malnutrition
Case 9

• 60 year old with painful fingers
Case 9: Psoriasis

- Onycholysis
- Splitting of nail plate
- Salmon patch
- Chronic paronychia
- Nail disease is associated with psoriatic arthritis
Case 10

- 75 year old man with weight loss and shortness of breath
Case 10 Lung cancer

- Significant clubbing
- Nicotine staining from cigarette smoking
Case 11

- Ill appearing 60 year old man with fever, malaise, weight loss and painful testicles
Case 11 Polyarteritis Nodosa

- Splitting
- Thinning
- Ridging
- Nail plate infarction
- Periungual telangiectasia
Case 12

- 55 year old woman with fatigue, muscle pain and pleuritic chest pain
Case 12  Systemic Lupus

- Periungual telangiectasis and cuticular atrophy suggest collagen vascular disease
- Rash tends to spare the knuckle
Case 13

- 55 year old man with hyperpigmentation of his face, increased facial hair and dark urine
Case 13  Porphyria Cutanea Tarda

- Onycholysis and blistering
- Due to defective liver uroporphyrinogen decarboxylase
- Urine has coral pink fluorescence under a Wood's lamp
Acknowledgements

• The UVA GME Office for funding support
• Dr. Vladimir Goodkovski for technical assistance
• Dr. Jim Thomas of www.Dermnet.com for permission to use images from their extensive dermatological atlas
• Internal Medicine residents at UVA for pre-testing and helpful feedback