The nails can be used to monitor toxicity, help evaluate nutrient status, and give insight into systemic imbalances caused by disease. The diet and disease processes play roles in the content, strength, shape, and surface of the nail. Growth of the hard, strong, and flexible nail plate requires adequate keratins and cysteine-rich, high-sulfur proteins. Flexibility is influenced by and improves with increased water content.

The nail is approximately 5% fat, mostly cholesterol, with essential fatty acids mainly affecting processes at the corneoform layer. Glycoproteins compose the base of the nail, minerals add strength and help with the normal formation of the nail, and vitamins and phytonutrients aid in the oxidative balance of the cuticle and nail bed. All of these components are essential for fingernail and toenail health.

Most nutritional deficiencies will present on the nail before they show up in other clinical or laboratory findings. Even in the case of autoimmune or systemic diseases, symptoms will often show up first as nail changes. Findings that can help direct you to nutritional imbalances are noted in the table below. For more information refer to the Nails Companion Guide.

### Points of Connection—Nail Patterns of Nutrient Deficiency or Insufficiency

<table>
<thead>
<tr>
<th>Nutrient</th>
<th>Nail Findings with Associated Nutrient Deficiency (or excess if noted)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Macronutrients</strong></td>
<td></td>
</tr>
</tbody>
</table>
| **Protein** | Shape: beaked nails, clubbing, koilonychia, parrot-beaked nails  
Color: Terry’s nails, Muehrcke lines, absence lunula, leukonychia punctate and striata, melanonychia, longitudinal melanonychia  
Texture/Strength: brittle nails, weak brittle nails with ragged cuticles, soft nails (hapalonychia), fragile nails  
Surface changes: longitudinal or vertical ridging, onychorrhexis, central ridging, transverse ridging or grooves, Beau’s lines, trachyonychia, dull or lackluster |
| **Fats** | Texture/Strength: brittle nails: weak, thin, bend easily, frequently crack or chip  
Surface changes: longitudinal or vertical ridging  
Processes around the nails: cracks on the fingertips |
| **Carbohydrate** | Texture/Strength: brittle nails (high simple carbohydrate, low-protein intake) |
| **Micronutrients** | |
| **Minerals** | |
| **Boron** | Texture/Strength: weak, brittle nails with ragged cuticles |
| **Calcium** | Color: leukonychia punctatae and striata  
Texture/Strength: brittle nails; thin, fragile, brittle or soft nails; weak/thin, bend easily, frequently crack or chip  
Surface Changes: onychorrhexis, onychomadesis, Beau’s lines, trachyonychia |
| **Chromium** | Shape: koilonychia |
| **Copper** | Shape: koilonychia  
Color: Terry’s nails, blue nails (excess), azure lunula (excess) |
| **Iron** | Shape: clubbing  
Texture/Strength: brittle nails; weak, brittle nails with ragged cuticles; soft nails  
Surface changes: longitudinal or vertical ridging, onychorrhexis, Beau’s lines, central ridging, onycholyisis, dull, lackluster  
Processes around the nails: pale nail beds |
| **Magnesium** | Texture/Strength: brittle nails |
Points of Connection—Nail Patterns of Nutrient Deficiency or Insufficiency (cont.)

<table>
<thead>
<tr>
<th>Nutrient</th>
<th>Nail Findings with Associated Nutrient Deficiency (or excess if noted)</th>
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<tbody>
<tr>
<td><strong>Micronutrients</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Minerals (cont.)</strong></td>
<td></td>
</tr>
</tbody>
</table>
| Selenium | **Shape:** koilonychia  
**Color:** white nails, leukonychia punctatae and leukonychia striata (both deficiency and excess)  
**Texture/Strength:** nail thickening with discoloration, brittle nails (both with excess)  
**Process around the nails:** pale nail beds (excess) |
| Silica | **Texture/Strength:** brittle nails, weak brittle nails, ragged cuticles |
| Sulfur | **Texture/Strength:** thin, fragile, brittle or soft nails |
| Zinc | **Shape:** koilonychia  
**Color:** white nails, Terry’s nails, Lindsey half and half nails, Muehrcke lines, Mees lines  
**Texture/Strength:** brittle nails: weak, thin, bend easily, frequently crack or chip  
**Surface changes:** onychorrhexis, transverse ridging or grooves, Beau’s lines, paryonychia |
| **Vitamins** | |
| Vitamin A | **Shape:** clubbing (excess)  
**Texture/Strength:** brittle (deficiency or excess); thin, fragile, brittle or soft nails; eggshell nails; soft nails (nupalonychia)  
**Surface changes:** Beau’s lines, trachyonychia (excess)  
**Processes around the nails:** pale, mottled, poor blanching |
| Beta Carotene | **Color:** yellow nails (excess) |
| Vitamin D | **Color:** yellow nails, melanonychia stria  
**Texture/Strength:** Brittle nails, soft nails (nupalonychia) |
| Thiamine (B1) | **Surface Changes:** longitudinal or vertical ridging  
**Processes under the nails:** Quincke pulsation |
| Riboflavin (B2) | **Shape:** koilonychia  
**Surface changes:** longitudinal or vertical ridging  
**Processes around the nails:** pale nail beds |
| Niacin (B3) | **Shape:** koilonychia  
**Color:** Terry’s nails, Lindsay half and half nails, leukonychia punctatae  
**Surface changes:** longitudinal or vertical ridging, Beau’s lines, onycholysis |
| Pyridoxine (B6) | **Texture/Strength:** thin, fragile, brittle nails, soft nails (nupalonychia)  
**Surface changes:** longitudinal or vertical ridging, trachyonychia |
| Biotin (B7) | **Texture/Strength:** brittle nails, fragility  
**Surface changes:** onychoschizia, trachyonychia |
| Folate (B9) | **Color:** melanonychia striata  
**Surface changes:** longitudinal or vertical ridging, central ridging |
| Cobalamin (B12) | **Color:** brown-gray nails, melanonychia striata  
**Processes under the nails:** pale nail beds |
| Vitamin C | **Shape:** koilonychia  
**Texture/Strength:** thin, fragile, brittle nails, soft nails (nupalonychia)  
**Surface changes:** Beau’s lines, trachyonychia  
**Processes around the nails:** onychorrhexis, periungual telangiectasias, pale, mottled, poor blanching  
**Processes under the nails:** splinter hemorrhages |
| **Phytonutrients** | |
| Carotenoids | **Texture/Strength:** brittle nails |

For more information, watch the free videos at nsight.org and see the Functional Nutrition Evaluation: Clinical Indicators: Nails Exam Companion Guide

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