Fingernails – a window into the world of disease

If our eyes are the windows into our soul, our fingernails can be viewed as windows into our health. The finger nail plate and its surrounding supporting structures (the fingernail unit) (Fig. 1) is an often overlooked resource for gauging one's health status.

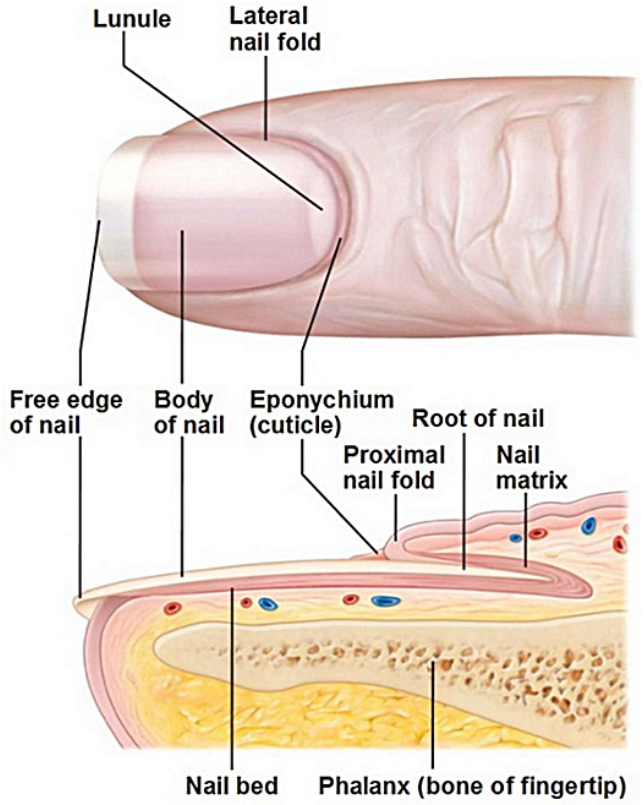

Fig. 1. An illustration of the human finger nail unit. Image source: http://diagrampic.com/fingernail-anatomy/

Changes in the fingernail plate and its underlying support structure, the nailbed, can be seen in number of human illnesses. By simply looking at one's fingernails, one can find evidence of potentially life-threatening medial conditions. Examples include a form of crippling arthritis caused by psoriasis, thyroid gland diseases, kidney diseases, liver diseases, iron deficient anemia, heart valve infections, malignant melanoma and chronic arsenic poisoning. Even more information about internal illnesses can be gained from visible changes occurring in the cuticle (eponychium) and the living skin tissue including small blood vessels in the proximal nail fold.

Dermatomyositis and systemic sclerosis (syn. scleroderma) are two systemic autoimmune disorders that can attack one's skin and internal vital organs resulting in disease, disability and

sometimes death. It is very important to recognize and treat these diseases as early as possible before permanent, irreversible damage to vital internal organs has occurred.

In both of these diseases the smallest blood vessels in our bodies, the capillaries, are among the earliest targets of autoimmune injury. Visual recognition of the highly-characteristic changes in the capillaries of the proximal finger nail fold can facilitate early diagnosis of these diseases and thereby provide better treatment options for patients.

The capillaries in the proximal nail fold are oriented differently from other areas of the skin. This difference allows them to be conveniently examined by bed-side optical techniques such as the dermoscopy. Dermoscopy requires only a commercially-available handheld dermatoscope that most American dermatologists currently use daily in their practices. With a dermatoscope the hairpin-shaped capillary loops of the proximal nail fold can be examined in real time under polarized light at 10x magnification.

In a normal individual, the numerous hairpin capillary loops arranged in a parallel fashion are barely visible under 10x dermatoscope observation. However, the giant, torturous damaged capillaries seen in dermatomyositis and systemic sclerosis patients are readily visible (indicated in Figure 2 by arrowheads).

The damaged walls of the capillaries in dermatomyositis and systemic sclerosis allow blood to leak out into the skin tissue resulting in “microhemorrhages” adjacent to the capillaries. Our studies have shown that the previously-uncharacterized dark deposits in the finger nail cuticle seen by dermoscopy in dermatomyositis and systemic sclerosis patients (indicated in Figure 2 by arrows) contain hemosiderin, a breakdown deposit of red blood cells.

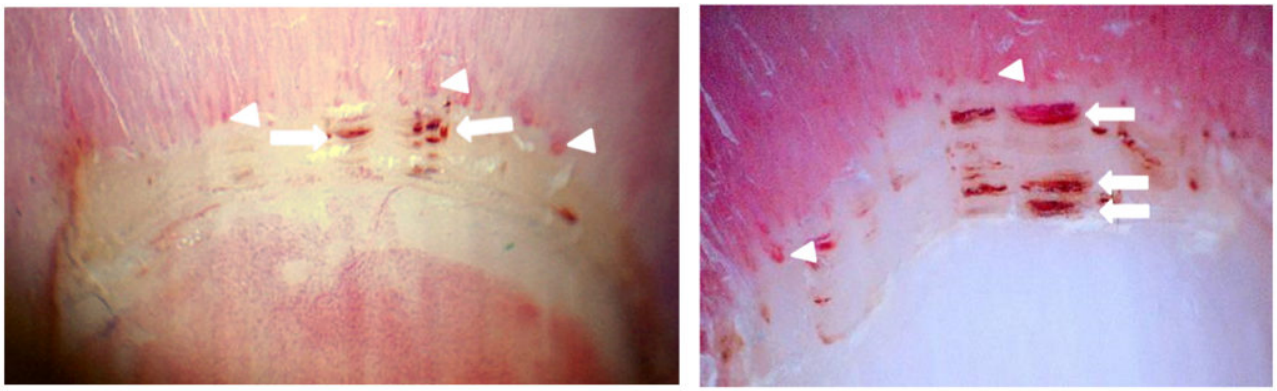

Fig. 2. Digital photographs of the proximal nail fold microvascular and cuticular changes observed in a dermatomyositis patient. The white arrowheads in both images indicate dilated proximal nail fold capillaries. The white arrows in both images indicate cuticular (eponychial) hemosiderin deposits. These result from red blood cell maturational changes following discrete bleeding events in the more proximal damaged capillaries. These 10X magnified images were taken with a digital camera paired with a Dermlite DL100 dermatoscope.

Our findings lend support to the hypothesis that the red blood cells present in nail fold microhemorrhages enter the avascular finger nail cuticle over time and become visible as cuticular dark deposits. We have suggested that the following more-precise designation be used for these cuticular dark deposits – “cuticular (eponychial) hemosiderin deposits” (CEHD). We feel that CEHD can be viewed as an integration over time of earlier discrete capillary bleeding events in the proximal nail fold. Thus, CEHD appear to be an additional unique clinical marker of finger nail fold capillary damage in dermatomyositis and systemic sclerosis patients.

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Publication

Proximal nailfold microhemorrhage events are manifested as distal cuticular (eponychial) hemosiderin-containing deposits (CEHD) (syn. Maricq sign) and can aid in the diagnosis of dermatomyositis and systemic sclerosis.
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