

The reason for red streaks on dermoscopy in the distal part of a subungual hemorrhage

Toshitsugu Sato¹, Masaru Tanaka²

¹ Sato Dermatology Clinic, Tokyo, Japan

² Department of Dermatology, Tokyo Women's Medical University Medical Center East, Tokyo, Japan

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Corresponding author: Toshitsugu Sato, M.D., Sato Dermatology Clinic, 1-7-3 Kami-Ogi, Suginami-ku, Tokyo 167-0043, Japan. Tel: +81 3 5397 3663. Fax: +81 3 5397 3663. E-mail: sato3663@gmail.com

Introduction

Ronger et al. [1] reported in their study that dermoscopy of a subungual hemorrhage reveals round structures in the proximal edge of the lesion, and a somewhat linear distribution in the distal portion. Dermoscopic examination of a subungual

hemorrhage generally demonstrates well-circumscribed reddish dots and lacunas, or a homogeneous area in the proximal area of the nail, and streak-like structures and linear pattern in the distal edge, depending on the time, location, and volume of bleeding (Figure 1A, B). Here, we discuss the reasons for the streak-like structures and linear patterns on

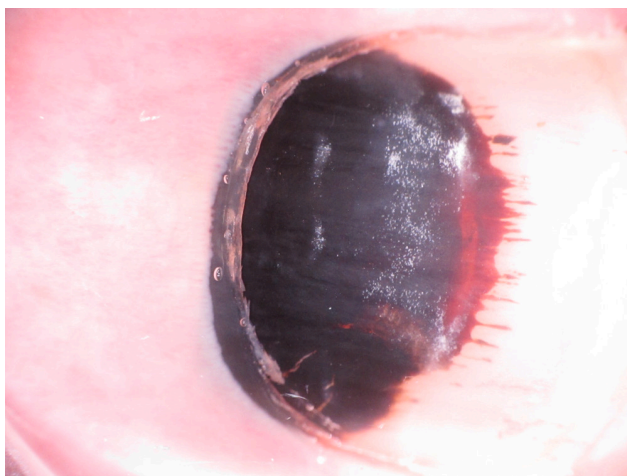


Figure 1. (A) Dermoscopy of a subungual hemorrhage revealed that the proximal end of the hemorrhage is round, whereas the distal end is characterized by a streaks-like or filamentous pattern. (B) Dermoscopy revealed numerous splinter hemorrhages in a case of chronic/minor trauma caused by walking. [Copyright: ©2014 Sato et al.]



Figure 2. Clinical picture of a nail avulsion injury. The lunula and nail bed were exposed; the lunula was pinkish-white in color with a smooth surface. The nail bed was bright red in color and revealed a pattern of longitudinal dermal ridges stretching from the lunula to the distal groove. [Copyright: ©2014 Sato et al.]

dermoscopy and report on a case involving an accidental nail avulsion injury of the big toe.

Case description

A 50-year-old Japanese male reported a nail avulsion injury caused by catching his right big toe nail at the edge of a carpet. He presented at the Sato Dermatology Clinic. On examination, the right big toenail was completely removed from the nail bed. The lunula and the nail bed were clearly observed at the site of the wound. The lunula was homogeneously pinkish-white in color with a smooth surface. The nail bed was bright red in color and revealed a parallel pattern of longitudinal fissures and ridges, which began at the

distal end of the lunula and ended at the distal groove. The numerous dermal papillae seemed to run in parallel to each other (Figure 2). The wound was treated by application of a sheet of artificial dermis.

Results and discussion

The removed nail plate was stained with Parker Quink Permanent Blue-Black ink for the purpose of structural observation. A picture of the ventral surface of the nail was taken, and a high dynamic range (HDR) image conversion [2] was performed (Figure 3A, B). The ventral surface of the nail plate was stained well, and the lunula, the nail bed, the hyponychium, and the free edge were sharply distinguished. The lunula showed a structureless flat area, and the nail bed demonstrated numerous longitudinal parallel fissures and ridges, forming parallel lines. The hyponychium showed less prominent longitudinal lines, and the free edge of the nail demonstrated narrower, dense lines. These findings were consistent with those of Berker et al [3]. In the transverse (sagittal) section of adult fingers at the nail bed, a tongue-and-groove arrangement of papillary dermal papillae and epidermal rete ridges can be observed microscopically [4], and these complementary structures correspond to a serrated interdigitation of the ventral surface of the nail plate and nail bed [4]. Hasegawa et al. [5] and Sangiorgi et al. [6,7] studied the microvasculature under the nail plate using corrosion casting, stereoscopic microscopy, and scanning electron microscopy, and found no capillary loops at the nail matrix region. Instead, a single, layered, rectangular plexus of capillaries under the plane of the nail matrix was observed. In the nail bed, they observed numerous capillary loops arising from a deeper regular arrangement of sagittally aligned, parallel rows of vessels. We have tried to describe the anatomy of the microvasculature under the nail plate based on the observa-

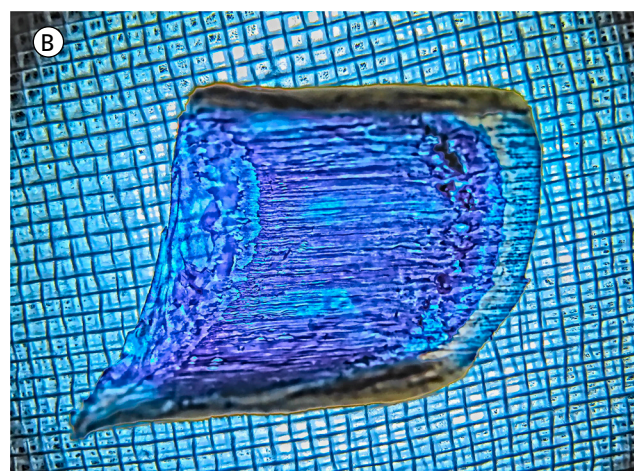
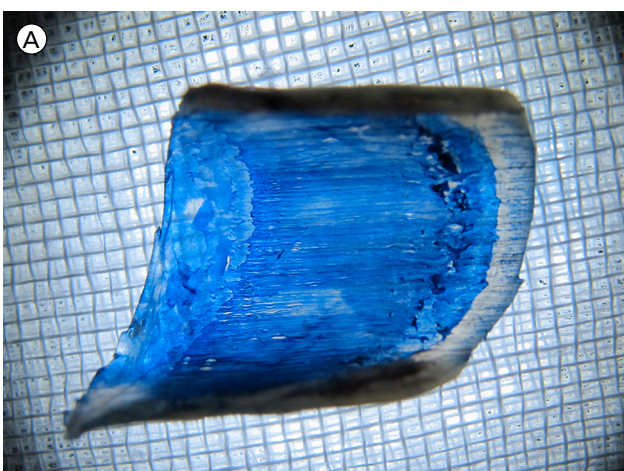


Figure 3. (A) The ventral surface of the removed nail plate was stained with Parker Quink Permanent Blue-Black ink. The area of the lunula, the nail bed, the hyponychium, and free edge of the ventral surface of the nail plate are clearly seen.

(B) High dynamic range image conversion was performed for the image of the ventral surface of the nail, and the differences between the nail parts were more clearly recognized. [Copyright: ©2014 Sato et al.]

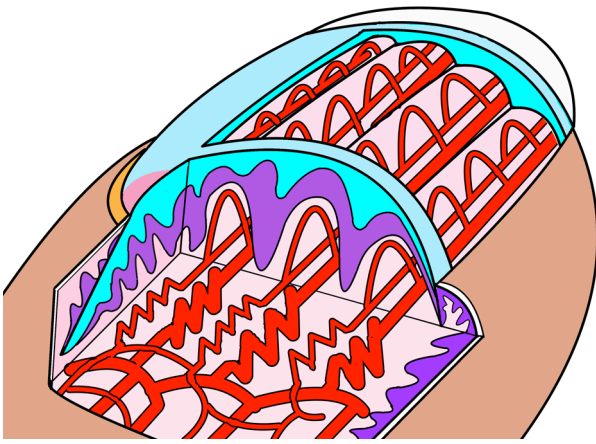


Figure 4. Anatomical illustration of the microvasculature under the nail plate. No capillary loops are present at the nail matrix region. A single, layered, rectangular plexus of capillaries can be found under the plane of the nail matrix. In the nail bed, numerous capillary loops are observed arising from a deeper regular arrangement of sagittally aligned, parallel rows of vessels. [Copyright: ©2014 Sato et al.]

tions described in these three papers (Figure 4). Subungual hemorrhage occurs due to ruptures of the capillaries under the lunula and/or the nail bed by external force to the nail plate. As the surface of the lunula is flat, the hemorrhage around the lunula becomes a round lacunas or homogeneous area because of the surface tension of blood. When a certain amount of blood reaches the nail bed, the proximal end of the blood lagoon is still round, but the distal end of it shows

a streaks-like, linear, or filamentous pattern, due to the longitudinal ridges of the papillary dermal structure. When the amount of bleeding is very small due to chronic trauma, splinter hemorrhages might occur from the rupture of the microvasculature at the longitudinal ridges at the nail bed. In summary, the dermoscopy findings of subungual hemorrhage are influenced by the differences in the papillary anatomic structures of subungual microvasculature, both in the nail matrix and in the nail bed.

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