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A Case of Subungual Melanoma with Tumor Invasion Sparing the Nail Matrix Dermis

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Dear Editor:

The nail unit is one of the most specialized organs in the body and composed of specialized epithelial tissue, which includes the nail matrix, nail bed, nail plate, and specialized mesenchymal tissue. The nail plate mainly originates from the nail matrix and is firmly attached to the nail bed, which may contribute to formation of the nail plate¹. The specialized nail mesenchyme—onychodermis—is located below the nail matrix and nail bed and differs from the skin dermis².

Subungual melanoma (SUM) is an uncommon variant of melanoma that occurs in the nail unit. It usually arises from the nail matrix but may involve other components of the nail unit, such as the proximal nail fold, nail matrix, nail bed, and hyponychium³. As SUM progresses in the nail unit, it tends to spread into the nail bed, hyponychium, and proximal nail fold, with the clinical presentation of Hutchinson's sign⁴. Previously, Izumi et al.⁴ reported that in early SUM proliferation, atypical melanocytes are more prominent in the hyponychium than in the nail bed or nail matrix. However, the frequency of dermal invasion in each part of the nail unit and progression

pattern of SUM is not yet known. Here, we report a case of SUM showing tumor invasion with sparing of the nail matrix dermis.

A 51-year-old man presented with a pigmented lesion on his finger, which persisted for 8 years. Skin examination showed total melanonychia with dark brown macules around the 4th fingernail (Fig. 1A). Although we recommended biopsy, the patient did not comply with it. Approximately 6 months later, he returned to our department with a large tumor on the 4th finger (Fig. 1B). However, the nail deformity was not apparent even with the presence of a large tumor with black pigmentation and smaller tumors on the skin of the 4th finger. Punch biopsy from the tumor revealed invasive melanoma. The patient was transferred to the Department of Plastic Surgery, and the finger was amputated. Subsequently, several sections were taken for evaluation of the finger specimen. Transverse sections on the proximal nail matrix showed melanoma *in situ* without dermal invasion (Fig. 1C, D). A transverse section through the nail plate showed melanoma *in situ* on the nail bed and large invasive melanoma on the lateral side of the finger (Fig. 1E).

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Fig. 1. (A) The patient presents with total melanonychia and dark brown macules around the 4th fingernail. (B) Six and a half months later, he shows a large tumor on the 4th finger without any definite nail deformity. Line C and line E indicate each section orientations of (C) and (E). (C) Transverse section on the proximal nail matrix shows melanoma *in situ* without dermal invasion. (D) High-power view of the boxed portion of (C). (E) Transverse section through the nail plate shows melanoma *in situ* on the nail bed and large invasive melanoma on the lateral side of the finger.

Clinically, SUM presents as melanonychia in the early stages, but may be associated with nail deformity in the later stages⁵. In our case, the nail deformity was not clinically definite, even with the presence of a large tumor on the skin around the nail. Histopathologically, dermal invasion in the nail matrix area was not noted despite the presence of a protruding large invasive melanoma on the lateral side of the finger. The nail matrix is a germinative and proliferative compartment, and its cells have the property of upward growth to produce the nail plate, making invasion of the matrix difficult. This may explain the absence of dermal invasion in the nail matrix area in our case.

Our findings suggests that dermal invasion of SUM in the nail matrix area may be much less or occur later as compared to that in other areas of the nail unit. A previous study on SUM reported a case in which the nail matrix was spared in dermal invasion⁴. In our case, the absence

of dermal invasion in the nail matrix area and nail bed may be related to the presence of onychodermis (specialized nail mesenchyme) below the nail matrix and nail bed in the nail unit. Further studies are needed to clarify the progression of SUM in association with dermal invasion.

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Treatment with the Pinhole Technique Using Erbium-Doped Yttrium Aluminium Garnet Laser for a Café au Lait Macule and Carbon Dioxide Laser for Facial Telangiectasia

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Dear Editor:

Café au lait macules (CALMs) are benign epidermal pigmented lesions that can be idiopathic or associated with neurocutaneous syndromes, whereas facial telangiectasia is characterized by small dilated vessels that are visible on the surface of the skin.

A 15-year-old boy presented with a CALM on his cheek (Fig. 1A). We performed 6 sessions of pinhole treatment every 4 weeks using erbium : YAG laser (Er : YAG Action; Lutronic, Goyang, Korea) set to a continuous wave mode with a spot size of 1 mm and a fluence of 0.2 mJ/cm². The lesion showed marked improvement with mild erythema, and there was no recurrence at the 12-month follow-up (Fig. 1B).

A 55-year-old female presented with a 10-year history of telangiectasia on the right cheek (Fig. 2A). The telangiectasia was treated using the pinhole method using a CO₂ laser (UM-L25; Union Medical Engineering, Uijeongbu, Korea) in continuous wave mode; the parameters were 1-mm spot size and 1.0-W output power. Multiple small holes, measuring 1 mm in diameter, were made down to the papillary dermis. These holes were made approximately 3 mm apart all over the telangiectasia area (Fig. 2B). The telangiectasia showed significant improvement after 1 treatment session (Fig. 2C). No recurrence was noted at the 3-month follow-up.

We used 2 different ablative lasers, erbium : YAG and CO₂ laser in the treatment of CALM and telangiectasia.

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