

integrity of the data and the accuracy of the data analysis. *Study concept and design:* Wang and Burnett. *Acquisition of data:* Wang and Burnett. *Analysis and interpretation of data:* Burnett and Lim. *Drafting of the manuscript:* Wang and Burnett. *Critical revision of the manuscript for important intellectual content:* Wang, Burnett, and Lim. *Statistical analysis:* Lim. *Study supervision:* Wang and Lim. **Financial Disclosure:** None reported.

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Open Pores With Plugs in Porokeratosis Clearly Visualized With the Dermoscopic Furrow Ink Test: Report of 3 Cases

Porokeratosis is an autosomal dominantly inherited disorder characterized by brown annular lesions with scaling ridges, which histopathologically corresponds to the cornoid lamella. Several dermoscopic findings of porokeratosis have been reported, including a whitish peripheral rim, brown glob-

ules and/or dots, red dots and/or red lines, and scarlike structures in the center of the lesions.¹ Herein, we report 3 cases of porokeratosis of Mibelli dermoscopically clearly showing multiple pores.

Report of 3 Cases. *Case 1.* An 88-year-old man presented with a 30-year history of multiple brown plaques. No family history of porokeratosis was reported. Clinical examination revealed that brown, round, sharply demarcated annular plaques up to 3 cm in size were widespread on the trunk and extremities (**Figure 1**). Dermoscopic evaluation of the lesions showed a brown rim along on periphery of the lesions (**Figure 2A**). The fine pigment network, dots and/or globules, and the small shining white or brown spots were mainly observed within the brown band.

Staining of the skin surface with whiteboard marker (the *furrow ink test*) clearly revealed the rims along the inside and outside of the peripheral band and multiple open pores with keratotic plugs (Figure 2B). Furthermore, the furrow ink test highlighted the differences in texture on the skin surface in some lesions. The texture was diminished and flattened in the periphery and finer in the central portion of the lesions compared with normal skin. Some pores corresponded to hair openings, which were confirmed pathologically (**Figure 3** and **Figure 4**). Although the pores were observed in almost all lesions, the number and distribution varied in each lesion.

Case 2. An 89-year-old man presented with a 2-year history of multiple brown plaques. Clinical examination revealed brown, sharply demarcated annular plaques up to 2 cm in size on the extremities. Dermoscopically, the multiple small brown spots were observed in the central area. Pathologic findings showed a column of compact hyperkeratosis with parakeratosis in the part corresponding to acrosyringium as well as typical cornoid lamella in the periphery of the lesion.

Case 3. A 52-year-old man presented with a 1-year history of multiple brown plaques. Clinical examination revealed light-brown, round, sharply demarcated plaques on the extremities. Dermoscopic findings were similar to those in cases 1 and 2, except with fewer pores.

Comment. Dermoscopic examination in our cases showed that the multiple pores seemed to correspond to hair openings and sweat pores. Porokeratosis of Mibelli was originally believed to involve columns of parakeratosis, the cornoid lamella, emerging only from the ostia of eccrine ducts. However, Reed and Leone² later proposed that the cornoid lamella did not originate from the ostia of ec-



Figure 1. Case 1. Brown, round, sharply demarcated plaques on the leg.

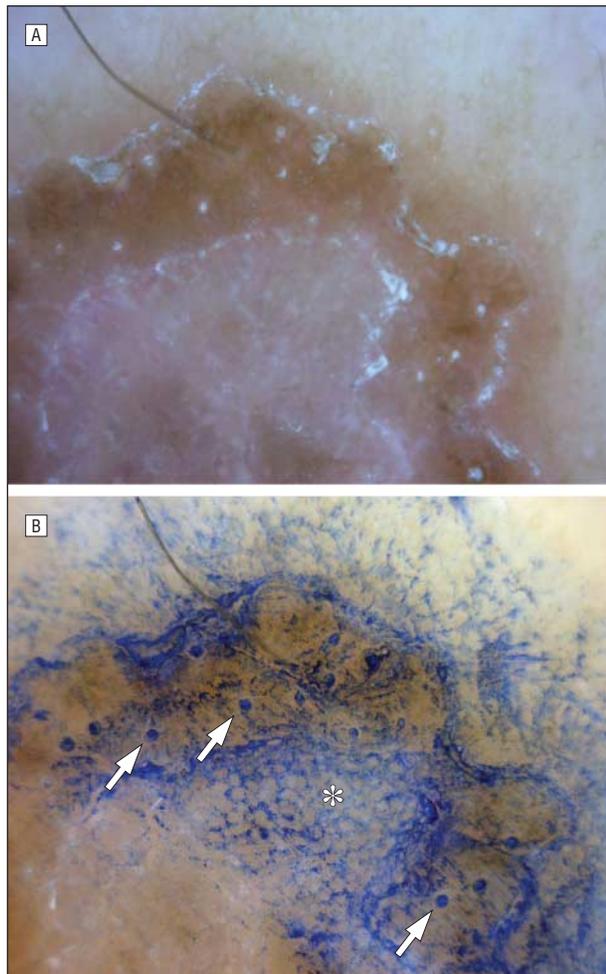


Figure 2. Case 1. A, Under dermoscopy, the broad brown band is visible in the periphery with white rims along the inside and outside of the band. The fine pigment network, dots and/or globules, and the small shining white spots in the brown band are also visible. B, With the furrow ink test, pores are visible in the peripheral brown area (arrows) as is the fine texture in the central portion of the lesion (asterisk).

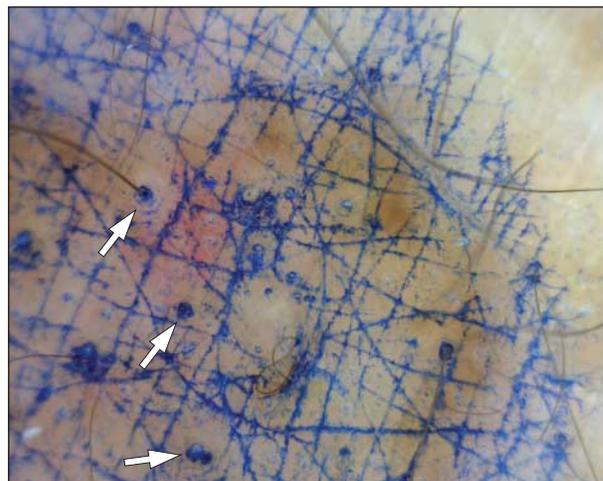


Figure 3. Furrow ink test in case 1. Large pores are seen at regular intervals, some of which correspond to hairs (arrows).

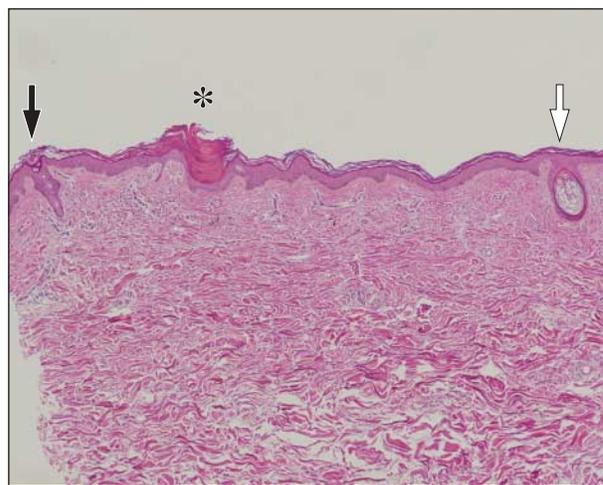


Figure 4. Pathologic findings in case 1 (hematoxylin-eosin, original magnification $\times 40$). Visible are the cornoid lamella (asterisk) and cornoid plugs corresponding to a hair (white arrow) and a sweat pore (black arrow).

crine ducts and that porokeratosis was a clonal disease of the epidermal keratinocytes. However, in actuality, the cornoid lamellae seem to be associated with appendages. Reed and Leone² also reported that cornoid lamellae was observed in hair follicles in the center of the lesions in 18 of 35 cases and sweat ducts in 4 of 35 cases. Recently, Minami-Hori et al³ reported that the cornoid lamella was observed in the follicular infundibulum in about half of 73 cases and in the acrosyringium in one-third of 73 cases, without any regard to the subtype. They proposed that there might be putative stem cells of the appendages on the portion lower than the follicular infundibulum and acrosyringium if cornoid lamellae are assumed to be formed at the boundary between normal and abnormal clones.

In this study, the staining by whiteboard marker, or furrow ink test, clearly revealed the peripheral rim, open pores, and surface textures. These findings seem to reflect pathologic changes in the epidermis during each inflammatory phase. The whiteboard marker pen used in this study contains colorants, alcohol, and binder resin. Once this combination is transferred to a whiteboard, the

alcohol evaporates, leaving the binder resin and colorant as a friable film loosely adhering to the board. It can therefore be removed easily from the smooth surface, but it adheres to any scratches on the surface. This characteristic is appropriate for our purpose, which is staining only the furrows of the skin.⁴ The furrow ink test was first reported as a method that helped distinguish the pigmented lesions on acral volar skin.^{4,5} This method could be an additional tool for the dermoscopic diagnosis of skin disorders that involve changes in skin texture.

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Author Contributions: Dr Uhara had full access to all of the data in the study and takes responsibility for the integrity of the data and the accuracy of the data analysis. **Study concept and design:** Uhara. **Acquisition of data:** Uhara and Kamijo. **Analysis and interpretation of data:** Uhara, Okuyama, and Saida. **Drafting of the manuscript:** Uhara and Saida. **Critical revision of the manuscript for important intellectual content:** Uhara, Kamijo, Okuyama, and Saida. **Statistical analysis:** Uhara. **Obtained funding:** Uhara. **Administrative, technical, and material support:** Uhara and Kamijo. **Study supervision:** Uhara, Okuyama, and Saida. **Financial Disclosure:** None reported.

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VIGNETTES

Fibrous Mass in the Chin Due to a Unique Cause

Report of a Case. A 16-year-old boy presented with a history of a mass in his chin that was gradually increasing in size over the last few years. There was no history of trauma in this area. He was not taking any medication. A physical examination showed a nontender skin-colored mass on the left side of chin that measured about 2.0 cm across and was soft to palpation (**Figure 1**). There was no cervical lymphadenopathy, and a detailed examination of the head and neck area showed no abnormalities.



Figure 1. A skin-colored mass located on the left side of the chin.

A computed tomographic analysis revealed a subcutaneous soft-tissue mass with ill-defined margins (**Figure 2**). The mass was completely excised. A histologic examination showed hypertrophy of the dermal connective tissue (**Figure 3**). Although the individual collagen fibers were markedly thickened, no mitotic activity was noted in the tissue. No cellular changes were observed in the epidermis. The mass on this patient's chin was considered a hyperplasia of collagen fibers, and intermittent pressure and friction continuing for long periods were suspected to be the cause of the fibrosis. Based on a detailed interview about the patient's lifestyle, it became clear that he had a habit of sitting with his chin

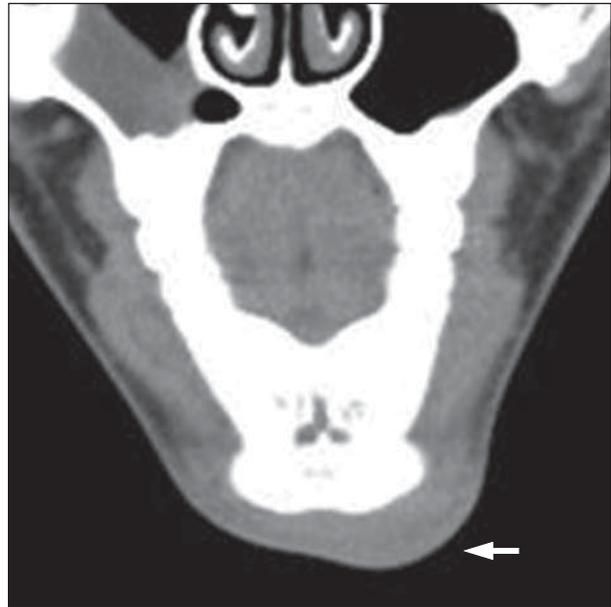


Figure 2. The preoperative computed tomographic scan suggests a subcutaneous soft-tissue mass of ill-defined margins (arrow).

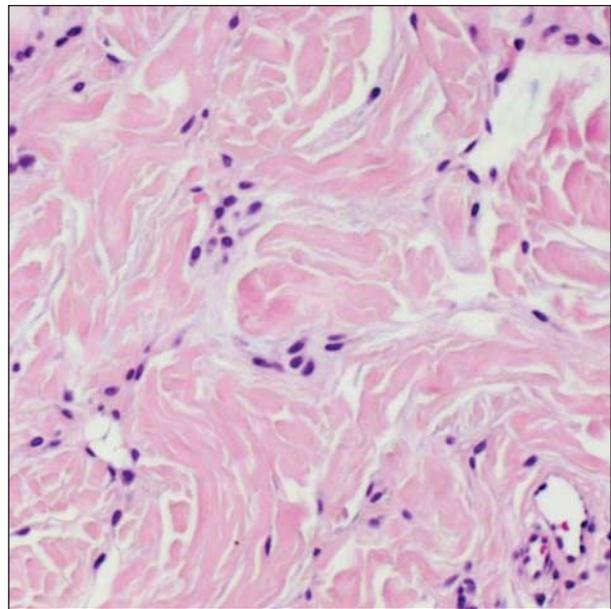


Figure 3. Histopathologic examination. Note the severe fibrosis in the dermis. No hyperkeratosis of the epidermis was observed (hematoxylin-eosin, original magnification $\times 100$).