Dermatology Practical & Conceptual

Application of Machine Learning Technologies to Improve the Diagnostic Value of Dermatoscopy, Combined with Digital Photo-fixation of Skin Neoplasms

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Introduction

Many of us who use the phone camera in professional practice have repeatedly encountered a situation where the visible image differs from the image obtained through the eyepiece of the dermatoscope.

I would like to bring to your attention in order to compare several clinical cases that have been refined in the Pixelmator Pro program with the ML Enhance tool. It is based on the use of machine learning technology to achieve the highest quality presentation of photographic material.

Case Presentation

Patient A (56 years old) has an area of redness with scaling on the surface in the area of projection of the left chin bone (Figure 1A). The picture is typical for actinic keratosis Grade 2 (AK) [1]. The symptom of "strawberry" is present, there are isolated areas of doubtful delicate pigmentation, the vessels are not clearly visualized (Figure 1B). In the same photo after improving the image with ML Enhance there are clearly visible pigment deposits that limit the follicular openings, a pronounced symptom of "strawberry", linear slightly branched vessels are traced over a longer period including outside the visual boundaries of the formation (Figure 1C). Photo processing optimizes the picture of pigmented AK. The extent of the lesion is slightly larger (1-2 mm), and the accumulation of melanin imposes certain restrictions on the use of photodynamic therapy as a treatment option.

Patient B (62 years old) has a papular element in the forehead on the right, dark in color, with keratin masses and peeling in the center (Figure 2A). During dermatoscopy,

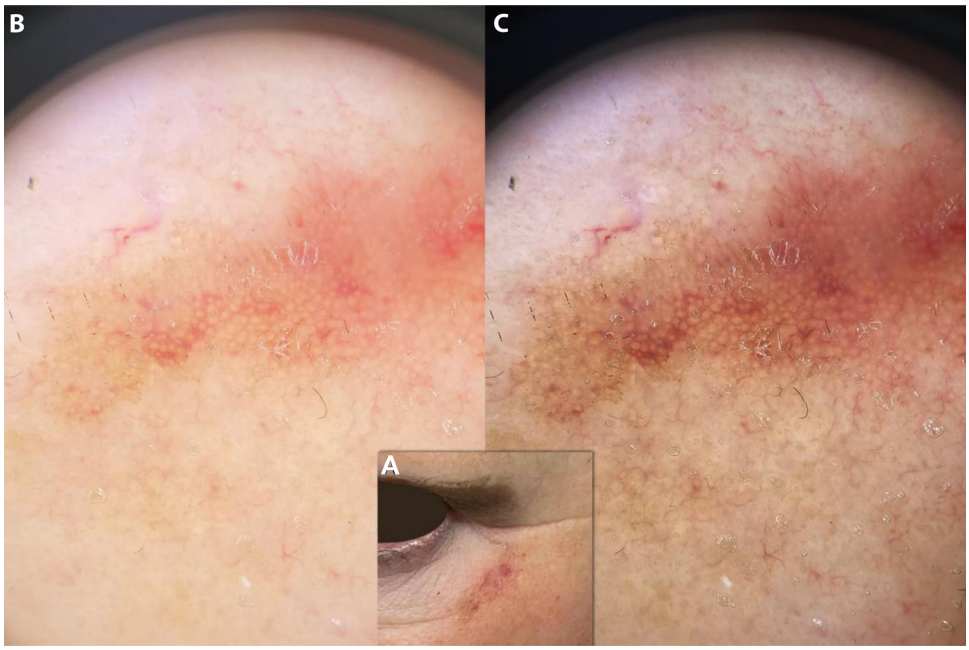

Figure 1. Patient A. Pigmented actinic keratosis, photofixation with the iPhone 11 Pro camera. (A) Macrophoto. (B) Microphoto without the use of ML Enhance. (C) Microphoto after application of ML Enhance.

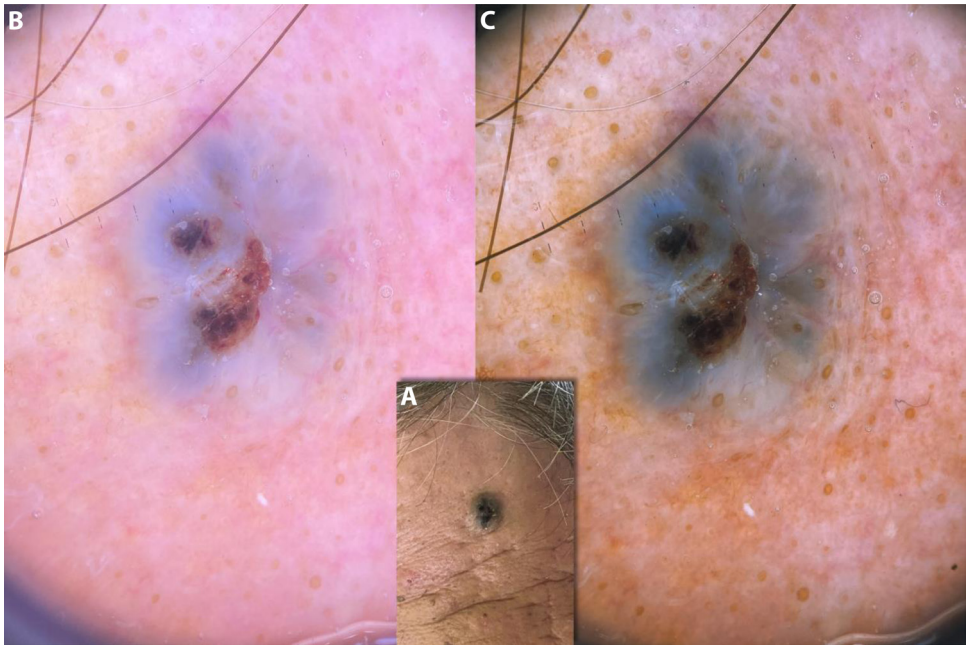

Figure 2. Patient B. Nodular melanoma, photofixation with iPhone 11 Pro camera. (A) Macrophoto. (B) Microphoto without the use of ML Enhance. (C) Microphoto after application of ML Enhance.

the obtained image shows different sizes of blue and purple globules, single linear blood vessels in the thickness of the formation, and weak erythema of the surrounding tissues. The center is occupied by dark horny masses, there is a radiance that becomes lighter to the periphery (Figure 2B). This tends to consider this formation as a pigmented form of nodular basal cell carcinoma [2]. After photo processing, the deep occurrence of melanocyte structures of gray-blue color, multiple sparsely branched blood vessels, larger in the center and smaller - to the periphery of the formation, interspersed with white and radial lines, is clearly visualized. The visual size of the formation expands after photo processing mainly due to perifocal erythema. Such changes are more typical of nodular melanoma. Surgical excision was performed and the diagnosis of melanoma was confirmed.

Conclusions

Judging by the presented photos, the use of digital filters based on machine learning technology, in particular ML Enhance from the Pixelmator Pro package, in certain situations allows the dermatologist to improve the visualization of

changes in vascular pattern elements and pigment structures, which, in turn, facilitates the work of the doctor.

I would like to note that the use of the above tool in no way leads to the emergence of new elements of the dermoscopic picture. All of them are available for control during direct inspection through the eyepiece of the device, but are lost during photofixation, and become inaccessible during dynamic observation.

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