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A dermoscope allowing the use of surgical light as illumination

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In dermoscopic examination, lighting of high quality and high intensity is needed to obtain accurate color reproducibility and correct microstructural identification of the target skin lesion. However, ordinary built-in illumination systems may be not sufficient to fulfill the requirement. To overcome this problem, we designed a dermoscope that allows the use of surgical light as illumination. Even lighting of high quality and high intensity could be obtained using a large surgical light device such as a ceiling-suspended surgical light.

Our dermoscope is a modularly structured dermoscope composed of three parts: (1) a video or still digital camera with high-power zoom ability used for monitoring and recording images of the skin lesion; (2) a macro conversion lens used to enable macrophotography; and (3) a self-made transparent spacer used to allow external light to pass through and to keep a precise distance between the tip of the macro conversion lens and the skin surface (Figure 1).

Dermoscopic examination is performed with a gel applied to the skin surface under surgical light illumination from an oblique direction (Figure 2).

Figure 3 shows the typical structure of the dermoscope composed of a digital camera (COOLPIX P7700; Nikon, Japan), a macro conversion lens (MNS-202; Raynox, Japan), and a self-made transparent spacer. The macro conversion lens is mounted on the camera through a 40.5-37 mm step down

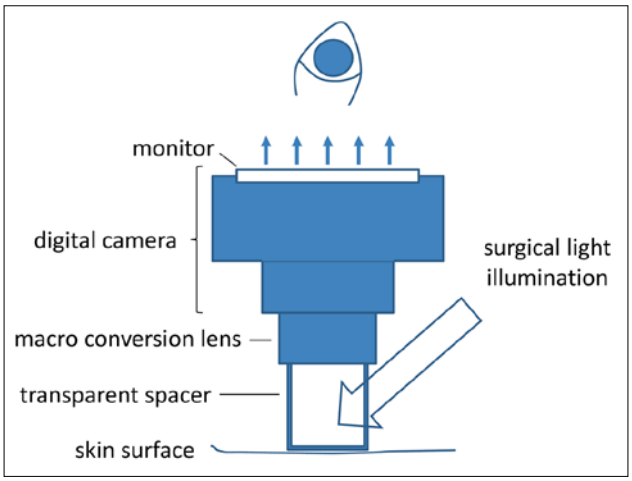

Figure 1. Our dermoscope is a modularly structured dermoscope composed of three parts: (1) a video or still digital camera with high-power zoom ability used for monitoring and recording images of the skin lesion; (2) a macro conversion lens used to enable macrophotography; and (3) a self-made transparent spacer used to allow external light to pass through and to keep a precise distance between the tip of the macro conversion lens and the skin surface. [Copyright: ©2014 Sakai et al.]

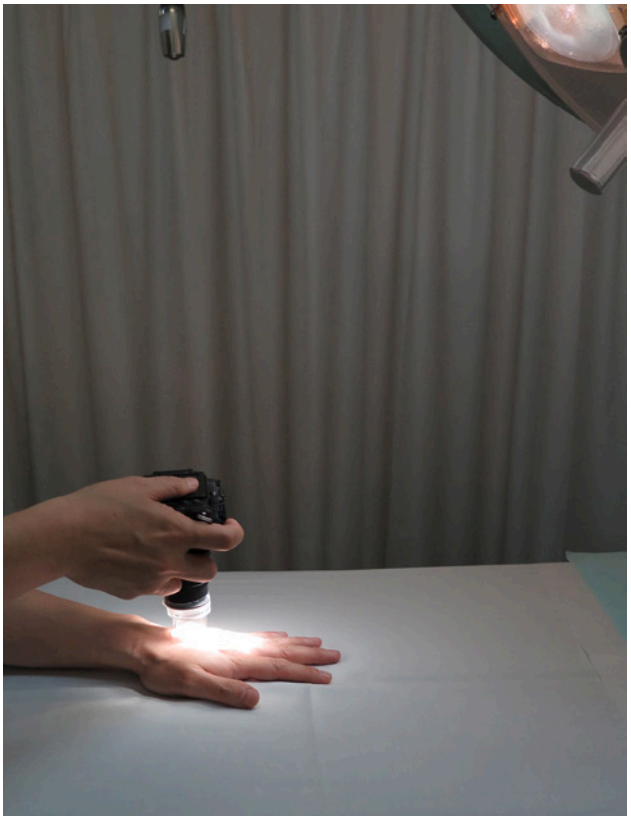

Figure 2. Dermoscopic examination is performed with a gel applied to the skin surface under surgical light illumination from an oblique direction. [Copyright: ©2014 Sakai et al.]

Figure 3. The typical structure of the dermoscope composed of a digital camera (COOLPIX P7700; Nikon, Japan), a macro conversion lens (MNS-202; Raynox, Japan), and a self-made transparent spacer. The macro conversion lens is mounted on the camera through a 40.5-37 mm step down ring (C-B-405a; Hassendo, Japan). The transparent spacer is taped to the tip of the conversion lens. [Copyright: ©2014 Sakai et al.]

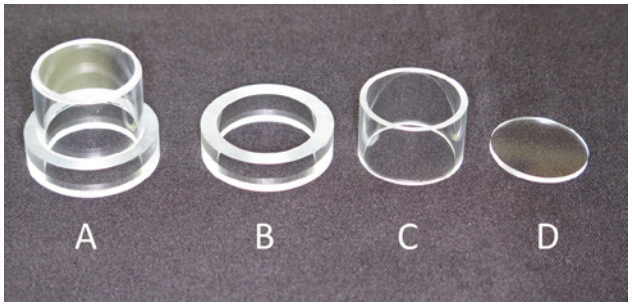

Figure 4. The transparent spacer (A) consists of three acrylic parts: a larger tube (B), a smaller tube (C), a disk (D) bound together with adhesive. (B) The larger transparent acrylic tube has a 40 mm outer diameter, 30 mm inner diameter, and 10 mm length. (C) The smaller transparent acrylic tube has a 32 mm outer diameter, 28 mm inner diameter, and 20 mm length. (D) The transparent acrylic disk has a 30 mm diameter, and 2 mm thickness. [Copyright: ©2014 Sakai et al.]

ring (C-B-405a; Hassendo, Japan). The transparent spacer is taped to the tip of the conversion lens. The transparent spacer consists of three acrylic parts: a larger tube, a smaller tube, a disk, bound together with adhesive. (Figure 4A). The larger transparent acrylic tube has a 40 mm outer diameter, 30 mm inner diameter, and 10 mm length (Figure 4B). The smaller transparent acrylic tube has a 32 mm outer diameter, 28 mm inner diameter, and 20 mm length (Figure 4C) The transparent acrylic disk has a 30 mm diameter, and 2 mm thickness (Figure 4D).

This dermoscope has potential advantages. In practical use, surgical light illumination improves the visual recognition of the skin lesion, especially at high-power fields. In research use, this dermoscope provides high flexibility in the selection of the light source, camera, macro conversion lens, and the design of the transparent spacer. The easy exchangeability of the tip part is considered favorable from the viewpoint of hygiene.

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