

# Practical use of handheld ultraviolet flashlights for detection of fungal reservoirs in a patient with *Microsporum canis* dermatophytosis with similar efficacies to Wood's lamp

Rungsima Kiratiwongwan MD,  
Sumanas Bunyaratavej MD,  
Charussri Leeyaphan MD.

## ABSTRACT:

KIRATIWONGWAN R, BUNYARATAVEJ S, LEEYAPHAN C. PRACTICAL USE OF HANDHELD ULTRAVIOLET FLASHLIGHTS FOR DETECTION OF FUNGAL RESERVOIRS IN A PATIENT WITH *MICROSPORUM CANIS* DERMATOPHYTOSIS WITH SIMILAR EFFICACIES TO WOOD'S LAMP. THAI J DERMATOL 2022;38:94-8.

DEPARTMENT OF DERMATOLOGY, FACULTY OF MEDICINE SIRIRAJ HOSPITAL, MAHIDOL UNIVERSITY, BANGKOK, THAILAND.

Reinfection is the common problem in patients with dermatophytosis. Disinfection of pets is important prevention for reinfection in patients with zoonophilic dermatophytosis. A Wood's lamp can be used to detect infected pets which have superficial fungal infections, especially *Microsporum canis*. However, the

From: Department of Dermatology, Faculty of Medicine Siriraj Hospital, Mahidol University, Bangkok, Thailand.

Corresponding author: Sumanas Bunyaratavej MD, email: consulskin@yahoo.com

device is expensive, bulky and not readily available at every clinic. We reported a 49-year-old woman with *M. canis* dermatophytosis on the left arm and abdomen. Her asymptomatic cat showed no abnormal lesions; however, a standard Wood's lamp and two handheld ultraviolet (UV) flashlights on the hair revealed areas of fluorescence. The affected hair under a handheld UV flashlight was collected for potassium hydroxide examination and fungal culture which yielded positive results. In summary, the handheld UV flashlights can detect *M. canis* infection in pets with similar efficacy to that of the original Wood's lamp.

**Key words:** Handheld ultraviolet flashlights, Wood's lamp, Zoophilic dermatophytosis, Fluorescent, *Microsporum canis*

### Case report

A 49-year-old woman with thyrotoxicosis was presented to the Outpatient Department, Department of Dermatology, Faculty of Medicine Siriraj Hospital, Mahidol University, Bangkok, Thailand with a history of erythematous rashes on the left arm and abdomen for two months. She had three asymptomatic cats and was in constant contact with. This patient was previously treated with unknown over-the-counter topical medications for two weeks; however, the rash did not subside. A physical examination demonstrated multiple discrete and small round-shaped scaly erythematous plaques on the left hand, left forearm and abdomen (Figure 1). Lesions on left hand were scraped and sent for potassium hydroxide examination which revealed branching septate hyphae with arthrospore. A fungal culture from the same area revealed *Microsporum canis*.



**Figure 1** Scaly and round-shaped erythematous plaques on left hand

Besides receiving routine treatment, the patient was advised to bring the cat she was most in contact with to our clinic for further examination in case treatment by veterinarians was required. The cat underwent a normal examination. No abnormal lesions or loss of cat hair was found. A standard Wood's lamp and two handheld ultraviolet (UV) flashlights were used and revealed fluorescence of cat hair.

Furthermore, we also collected fluorescent cat hair under a handheld UV flashlight (Figure 2) for potassium hydroxide examination and fungal culturing and the results were the same as our patient.



**Figure 2** Using forceps to collect fluorescent cat hair (\*) under a handheld ultraviolet flashlight (#)

In the same visit, we compared the efficacy of two handheld UV flashlights (No. 1: AloneFire G700 LED UV Light Zoom Flashlight, Shenzhen Shiwang Lighting Co. Ltd., Shenzhen, China; and No. 2: AloneFire SK68uv LED UV Flashlight, Shenzhen Shiwang Lighting Co. Ltd., Shenzhen, China) with the Wood's lamp (Diagnosis Light DHL 109 M, Herbert Waldmann GmbH & Co. KG, Villingen-Schwenningen, Germany). Points for comparison were their wavelength range, weight and price, energy output and their fluorescence detection capabilities in pets infected with *M. canis*. To compare the output of each device, the Variocontrol (Herbert Waldmann GmbH & Co. KG, Villingen-Schwenningen, Germany) was used. The characteristics of the standard Wood's lamp and the two UV flashlights are detailed in Table 1.

**Table 1:** Comparison of characteristics of a standard Wood's lamp and two handheld ultraviolet flashlights

Characteristics	Standard Wood's lamp	Handheld ultraviolet flashlight No. 1	Handheld ultraviolet flashlight No. 2
Wavelength (nm)	350–400	365 and 395	365
Weight (g)	700	152	85
Price (US dollars)	1,000	7	4
Energy output (mW/cm <sup>2</sup> )			
1 cm	18.22	10.56	5.64
2 cm	13.29	6.05	3.68
5 cm	4.98	2.04	1.26
10 cm	2.08	0.71	0.51

As results of a potassium hydroxide examination and fungal culture from the cats were the same as those from our patient, she was advised to remove reservoirs of infection by having veterinarians treated her cats to prevent reinfection. After the patient was given 200 mg/day of oral fluconazole weekly for six weeks, all rashes subsided.

### Discussion

Reinfection is the main problem in patients with zoophilic dermatophytes<sup>1</sup>. Since pets are the main reservoirs of zoophilic dermatophytes<sup>2</sup>, contact between humans and pets is the main cause of zoophilic dermatophytosis. However, infected pets may be asymptomatic<sup>1,3</sup>. A Wood's lamp can be used to detect infected pets who have superficial fungal infections, especially *M. canis*. A bright-green fluorescence is characteristic of *M. canis* infection<sup>4,5</sup>. Diagnosis by the lamp can lead to disinfection and prevent reinfection<sup>1,4,5</sup>. Nevertheless, a Wood's lamp is expensive and bulky and not readily available at every clinic. An earlier study found that a handheld UV flashlight available online was as effective as a Wood's lamp in detecting the accentuation of vitiligo lesions in humans<sup>6</sup>.

Zoophilic dermatophytes commonly infect pets and animals as well as humans. The prevalence of dermatophytosis from *M. canis*, a common zoophilic species, varied from 1.5% to

90.4% of dermatophytosis worldwide, depending on the geographical region<sup>7</sup>. Clinical manifestations of superficial dermatophytosis from zoophilic dermatophytes are more inflammatory than those from anthropophilic species<sup>8,9</sup>. A previous study reported that half of all patients with superficial dermatophytosis from zoophilic species visited clinics or hospitals within two weeks and almost all went to see doctors within one month. As the patient in our report was partially treated with unknown topical over-the-counter medications, her lesions did not provide the typical clinical signs of superficial cutaneous dermatophytosis. Standard treatment of zoophilic dermatophytosis includes systemic antifungal use for two to four weeks.<sup>10</sup> Furthermore, recurrent infections from zoophilic species was noted in 8% of patients with zoophilic dermatophytosis<sup>9</sup>.

*M. canis* dermatophytosis can be detected under fluorescence in both symptomatic and asymptomatic pets (cats, dogs, and rodents)<sup>10</sup>. Wood's lamp is not widely available in all settings, so this report demonstrates how to use handheld UV flashlights to detect *M. canis* infection. All lesions in pets can be detected at an energy of  $\geq 2$  mW/cm<sup>2</sup>. To ensure effective detection, it is recommended that the Wood's lamp be held approximately 10 cm from the specimen, a distance at which an energy level of 2.08 mW/cm<sup>2</sup> is emitted. However, UV flashlights

should be held less than 2–5 cm from the area of interest to obtain peak efficacy. Our results were similar to a previous report<sup>5</sup>.

In conclusion, it may be difficult to cure patients with zoophilic dermatophyte if we are unable to get rid of the source of infection. The handheld UV flashlights can detect *M. canis* infection in both asymptomatic and symptomatic pets with efficacies similar to that of the original Wood's lamp. The UV flashlights cost less, are more readily available, and more convenient to carry. However, to increase the precision of detecting and collecting fluorescent specimens, dermatologists and general practitioners should hold the UV flashlights closer than 2–5 cm to the area of interest.

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