



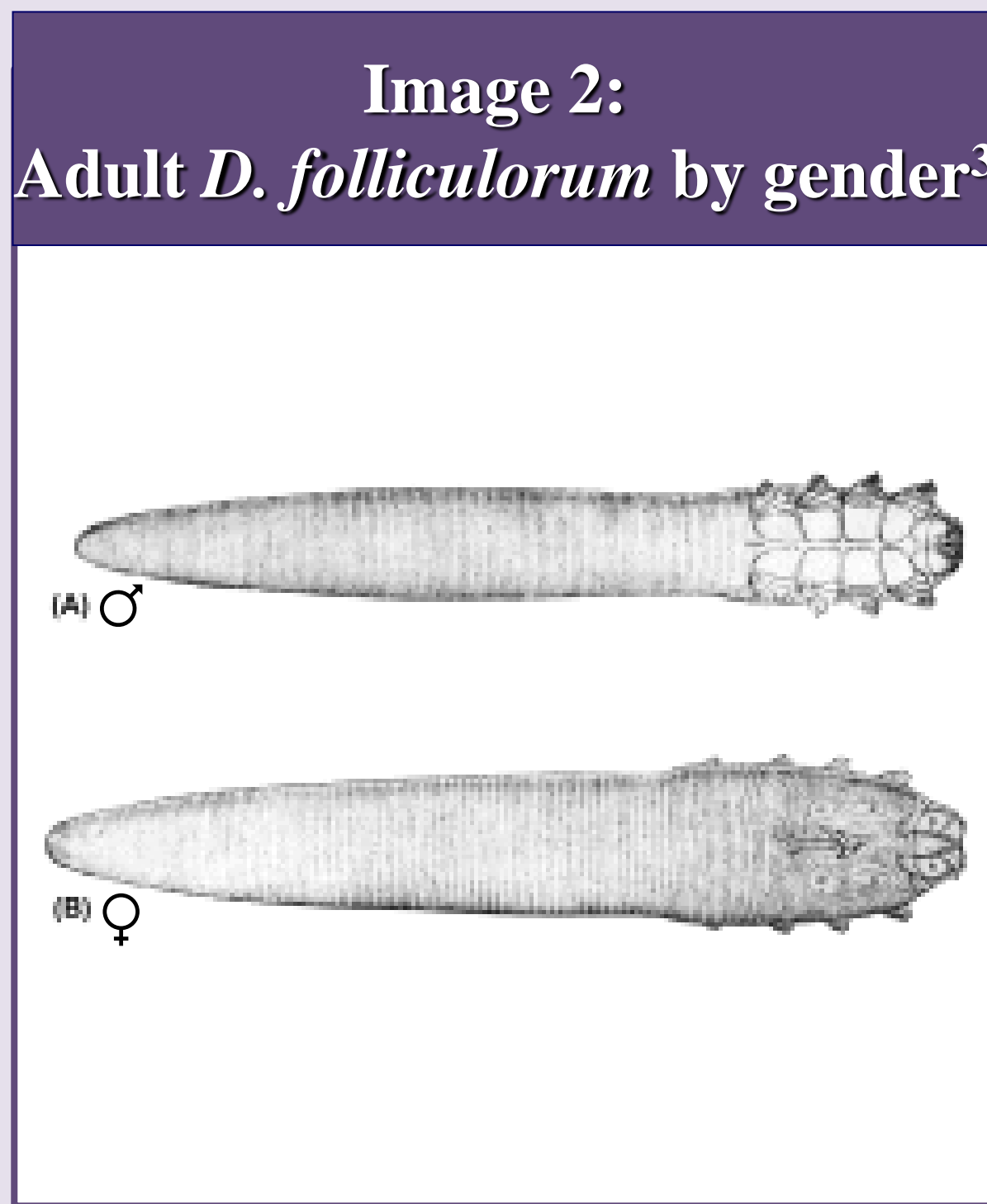
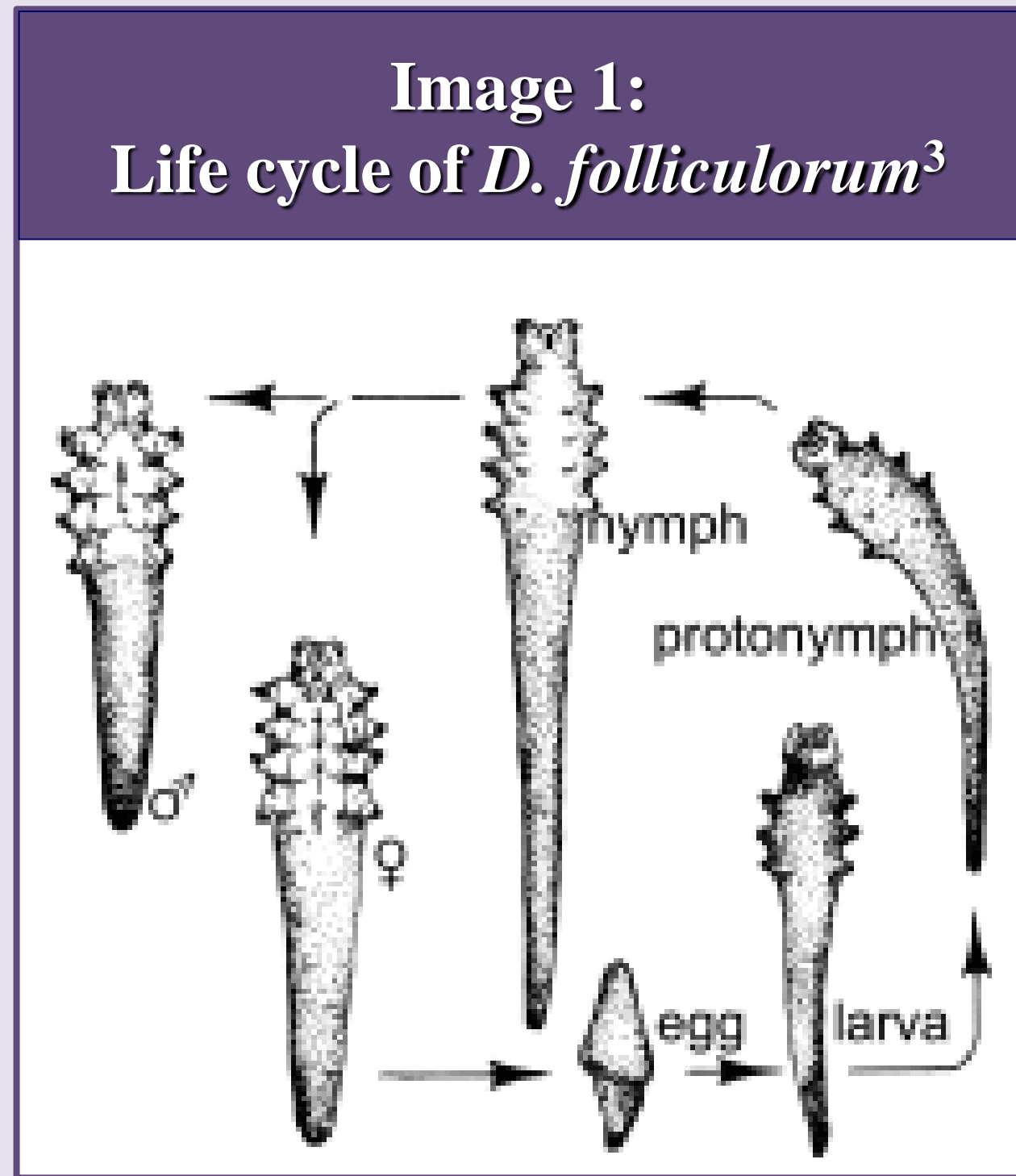
Demodex folliculorum Infestation Mimicking Paget Disease of the Breast

Erin Schirra, PA-S, Cindy Rossi, MHS, PA-C
Quinnipiac University Physician Assistant Program



Introduction

- Demodex folliculorum* is an ectoparasite found within the skin of most human beings.¹
- D. folliculorum* inhabits hair follicles of humans over time and is not present at birth. As individuals age, prevalence increases. After the sixth decade of life, prevalence plateaus.¹
- D. folliculorum* is more prevalent in males than females and is primarily found on facial sites.¹
- The life cycle of *D. folliculorum* progresses from ovum, to larva, to protonymph, and then to nymph. The nymph develops into a male or female mite.² This is detailed in Image 1.³
- A fully formed *D. folliculorum* has eight legs, each with tarsal claws. Males and females have spinal projections in the medial and lateral aspects. There are transverse striae across the mite.² Image 2 represents adult *D. folliculorum*.³
- D. folliculorum* position within follicles to feed. When microscopically examined, they arrange their mouths towards the fundus of the follicle in order to allow for cellular consumption.²
- Human hosts are impacted by mite feeding, resulting in metaplastic changes in follicular epithelium. Additionally, *D. folliculorum* can distend the infiltrated follicle if more than six mites inhabit it.²
- In the setting of concomitant bacterial infection, which is common in *D. folliculorum*, a host inflammatory response can be elicited, as measured by antigen concentration. Distention of follicular walls allows for antigen release. This stimulates an extrafollicular response.⁴
- D. folliculorum* does not always cause irritation to its host. When dermatologic symptoms occur secondary to *D. folliculorum*, the diagnosis is called demodicosis.⁵
- Demodicosis can cause erythema, xerosis, scaling, pruritis, papules, and vesicles within and around the infested follicles.⁶
- Infested follicles can be inflamed, dilated, and infiltrated by neutrophil-dense lymphohistiocytic material.^{1,5,7}



Case Description

History

- 39-year-old Caucasian female smoker presented for breast specialist consultation regarding localized right nipple pruritis and skin sloughing. She denied provoking factors, admitted to mild relief with moisturizer cream
- Medical history included thyroid nodule, endometriosis, anxiety, and bipolar type two
- Surgical history revealed breast reduction and uterine exploratory laparoscopy
- OB/GYN history was significant for menarche at 13 years old, first childbirth at 16 years old. Patient denied breastfeeding
- Medications included aripiprazole, methylphenidate, buspirone, and eszopiclone
- Allergic to morphine
- Family history was significant of mother, deceased at 43 years old to advanced inflammatory breast cancer, father alive with prostate cancer, and sister alive with cervical cancer. Uterine, ovarian, and lung cancer present in second degree relatives
- ROS unremarkable. Patient denied weight loss, fatigue, shortness of breath, bowel changes, urinary changes, myalgias, or other skin rashes

Physical Exam

- General: well-developed, well-nourished adult female in no acute distress. Vital signs stable
- Heart, lung, abdomen, and musculoskeletal exams within normal limits
- Right breast: erythematous, desquamated lesion with mild excoriation, presented on the entire surface of the nipple. The areola was free of lesions or redness. No breast masses, skin dimpling, nipple discharge or inversion was appreciated. No axillary lymphadenopathy
- Left breast exam showed normal findings

Differential Diagnosis

- Paget disease of the breast
- Ductal carcinoma in situ
- Nipple adenoma
- Atopic dermatitis
- Seborrheic dermatitis

Diagnostic Results

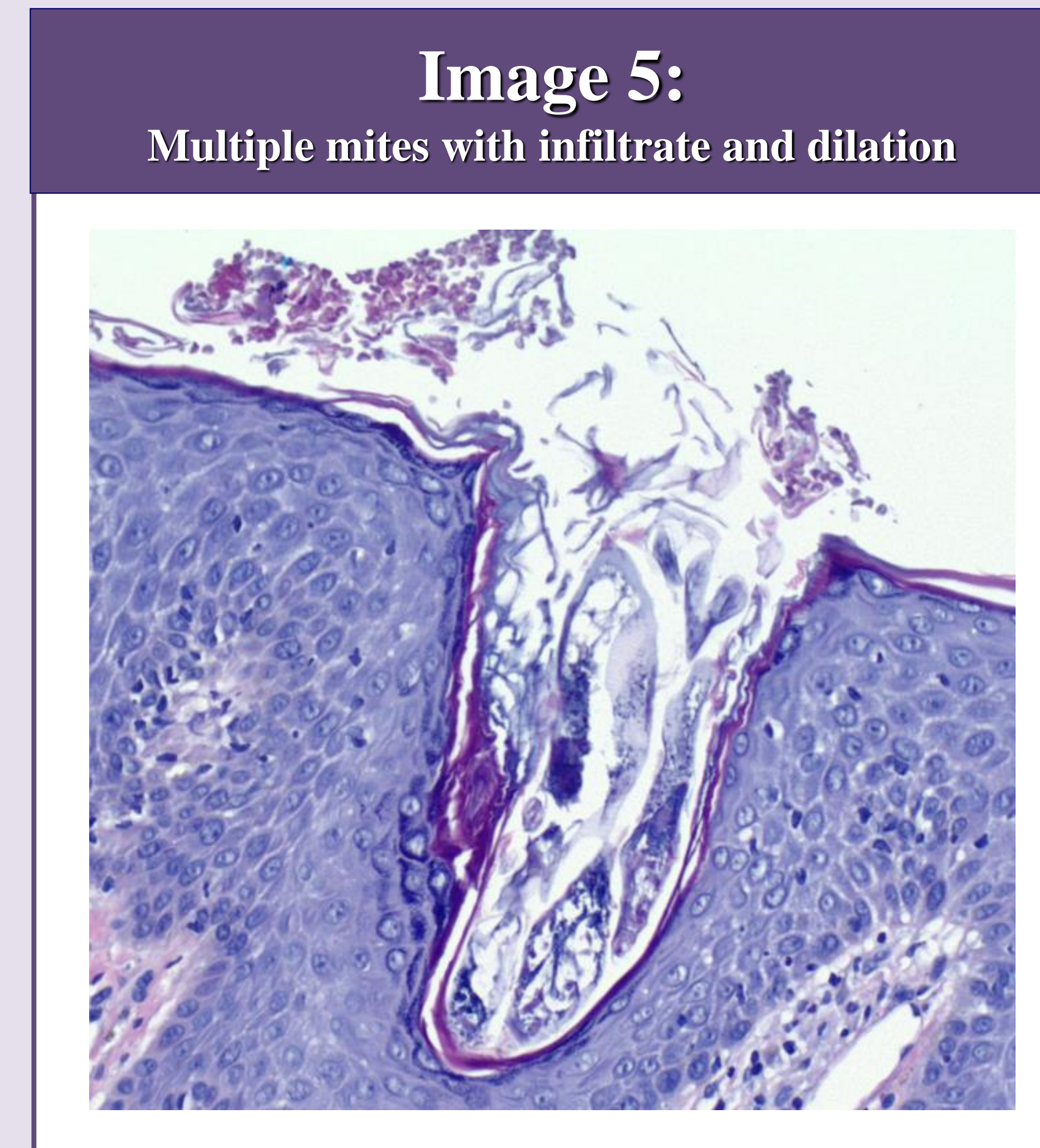
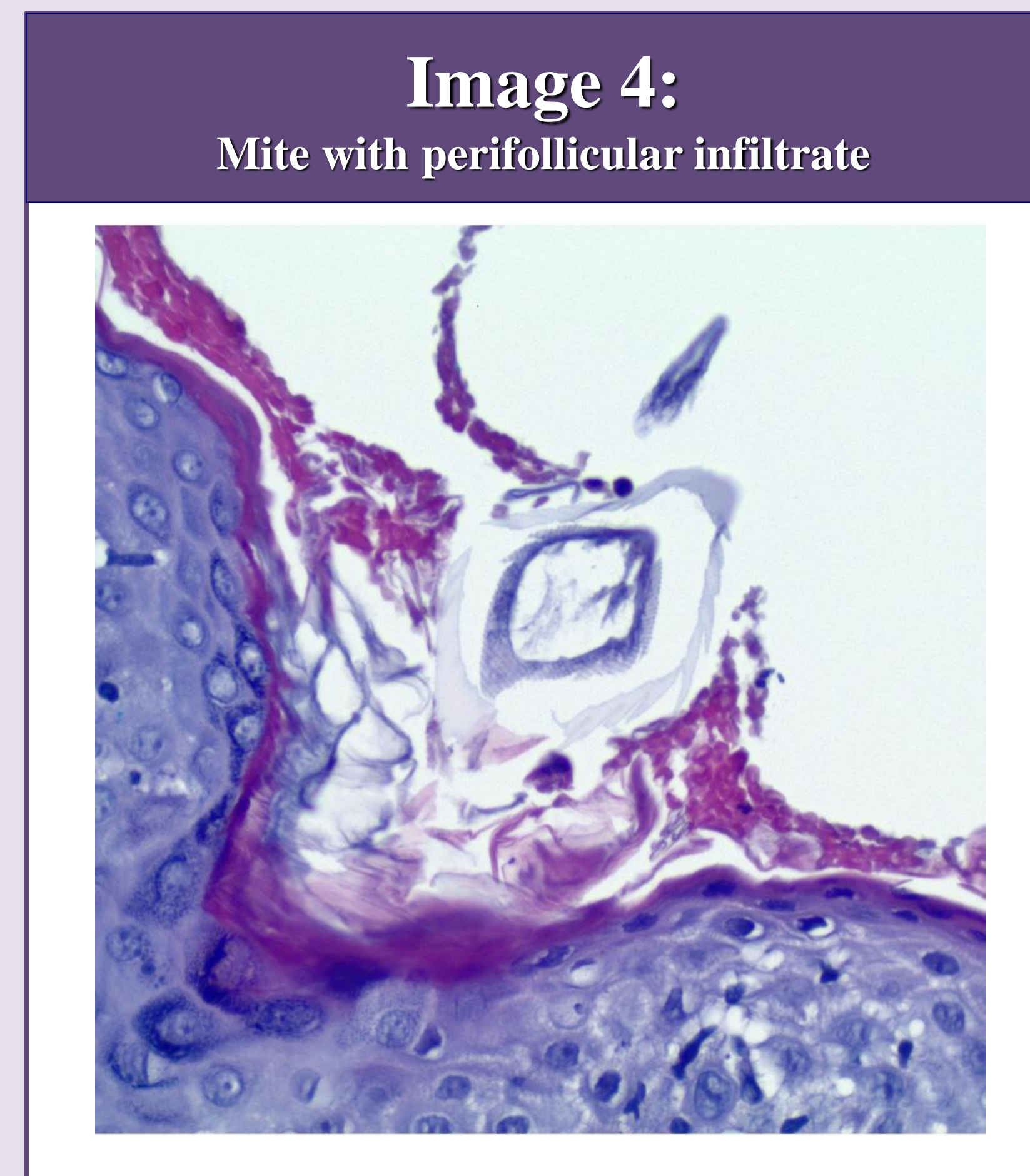
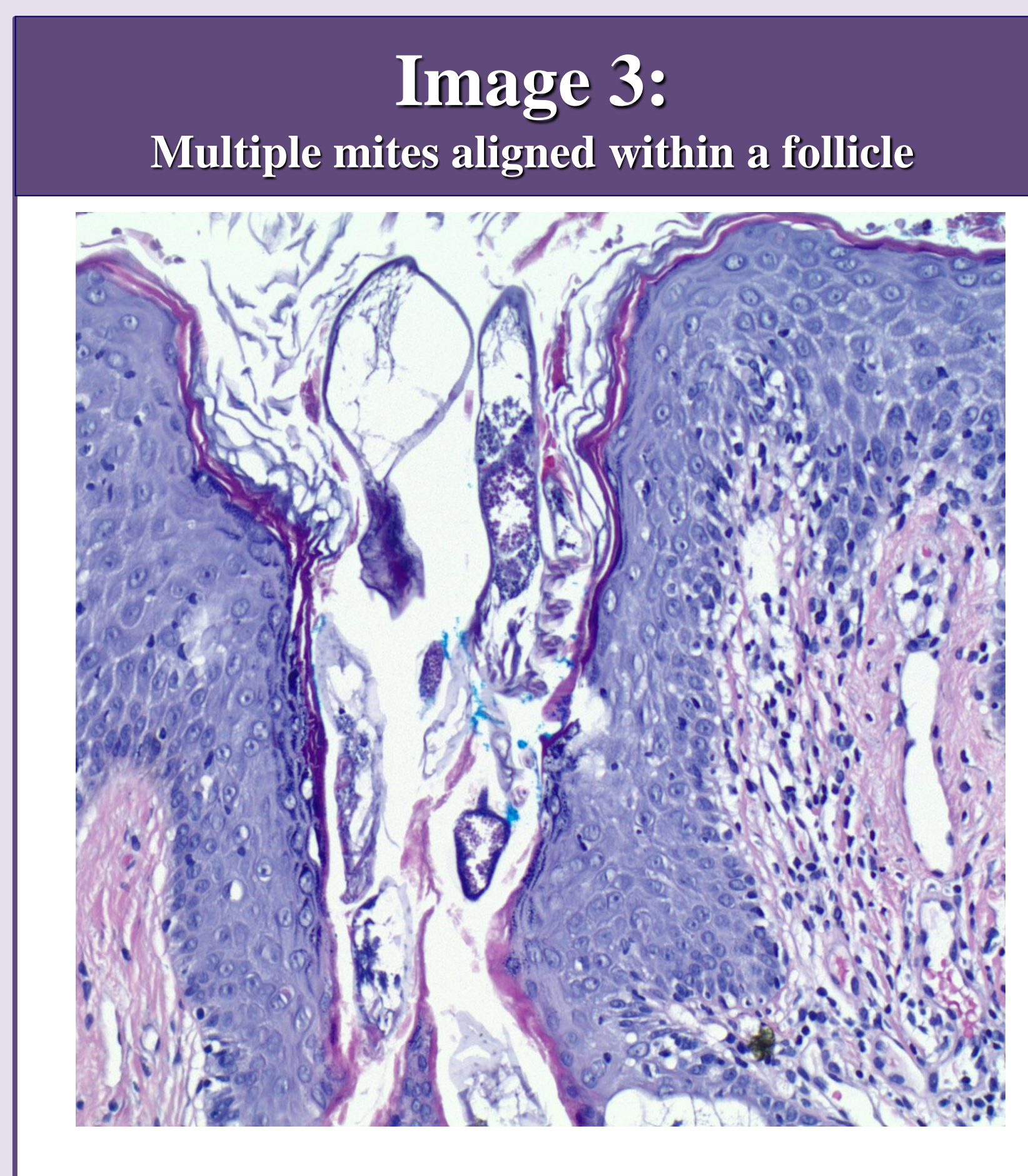
- Right subareolar nerve block performed with wedge shaped incisional biopsy of the right nipple, sent for histopathology assessment
- Biopsy revealed *D. folliculorum* mites present within tissue. Images 3, 4, and 5 represent pathology stains with infested hair follicles
- No presence of intraepithelial adenocarcinoma present on report

Diagnosis

- The increased number of *D. folliculorum*, with inflammatory response on pathology resulted in a diagnosis of demodex dermatitis

Management and Outcome

- The course of this case remained in outpatient care
- On follow-up with patient, the patient was educated on her diagnosis and biopsy site was assessed for healing
- Treatment recommendation of an over-the-counter cream consisting of tea tree, neem, and lemongrass oils
- Due to her family history of breast cancer, the patient was encouraged to return for screening and remain aware of changes in nipple structure or irritation
- Smoking cessation was encouraged
- Further assessments were deferred to her primary care physician for follow-up



Discussion

- Paget disease of the breast presents as eczematous skin changes that involve the central nipple with variable extension into the areola. This clinical finding yields a high index of suspicion for breast carcinomas that are associated with Paget disease.⁸
- Paget cells range in shape, with an increase in the nuclei size and amount of chromatin, and inconspicuous nucleoli.⁸
- Although *D. folliculorum* is primarily found on the face and nasolabial areas, the mite has been found in sebaceous glands of the nipple. There was no documented pathophysiological changes associated with these findings, and the mites were not found in the central, superficial nipple.⁹
- Immunogenicity of the host is questioned to be directly impacted by the mites, or to allow for adequate replication and infestation to cause signs and symptoms. Studies have proven that mites cause local immunosuppression, decreasing the efficiency of the hosts immune response. The dampened ability to kill the mites allows for symptomatic infestation.^{4,6}
- The medical literature reports that oral or topical metronidazole formulations and metronidazole-ivermectin combined therapies are the most safe and efficacious.¹⁰

Conclusions

- Demodicosis is the proper nomenclature for pathophysiological changes related to infestation by *Demodex* species.
- D. folliculorum* is a common ectoparasite that does not always cause dermatologic changes or symptoms.
- Symptomatic infestation of the central nipple is uncommon.
- Given the similar presentation of Paget disease of the breast and demodicosis of the nipple, a biopsy is critical to rule out malignancy.

References

- Aylesworth R, Vance JC. *Demodex folliculorum* and *Demodex brevis* in cutaneous biopsies. *J Am Acad Dermatol*. 1982;7(5):583-589. doi: S0190-9622(82)70137-9.
- Desch C, Nutting WB. *Demodex folliculorum* (Simon) and *D. brevis* Akbulatova of man: redescription and reevaluation. *J Parasitol*. 1972;58(1):169-177. doi: 10.2307/3278267.
- Adler PH, Barker CM, Brenner RJ, et al. Mites (Acari). In: Mullen GR, Durden LA. Medical and Veterinary Entomology 3rd ed. London, United Kingdom: Elsevier; 2019:533-602. <https://doi.org/10.1016/B978-0-12-814043-7.00026-1>; Accessed November 30, 2019.
- Lacey N, Delaney S, Kavanagh K, Powell FC. Mite-related bacterial antigens stimulate inflammatory cells in rosacea. *Br J Dermatol*. 2007;157(3):474-481. doi: 10.1111/j.1365-2133.2007.08028.x.
- Hsu CK, Hsu MM, Lee JY. Demodicosis: a clinicopathological study. *J Am Acad Dermatol*. 2009;60(3):453-462. doi: 10.1016/j.jaad.2008.10.058.
- Akilov OE, Mumcuoglu KY. Immune response in demodicosis. *J Eur Acad Dermatol Venereol*. 2004;18(4):440-444. doi: 10.1111/j.1468-3083.2004.00964.x.
- Roibu T, Kariniemi AL. Demodex mites in acne rosacea. *J Cutan Pathol*. 1998;25(10):550-552. doi: 10.1111/j.1600-0560.1998.tb01739.x.
- Gupta RK, Simpson J, Dowle C. The role of cytology in the diagnosis of Paget's disease of the nipple. *Pathology*. 1996;28(3):248-250. doi: 10.1080/00130299600169084.
- Breckenridge RL. Infestation of the skin with *Demodex folliculorum*. *Am J Clin Pathol*. 1953;23(4):348-352. doi: 10.1093/ajcp/23.4.348.
- Jacob S, VanDaele MA, Brown JN. Treatment of demodex-associated inflammatory skin conditions: a systematic review. *Dermatol Ther*. 2019:e13103. doi: 10.1111/dth.13103.