


Use of PHOVIa Fluorescent Light Energy in veterinary dermatology



Anthony Yu DVM, MS, DACVD
Veterinary Allergy Dermatology & Ear Referral (VADER) Clinic
www.vaderclinic.ca

1

WHAT IS PHOVIa?

Faster skin recovery by light

- The kit from Vetoquinol consists of:
 - Blue light emitting diode (LED) lamp
 - Simple use; timed exposure; battery operated
 - 55-129 mW/cm² at 5cm over 50cm² area
 - Individually packaged chromophore & gel
 - Sterile wooden tongue depressors to mix
 - Single use; mixed gel OK for use up to 7 days when stored properly
 - Safety goggles
 - Group 1 - low risk - no retinal damage when used as directed

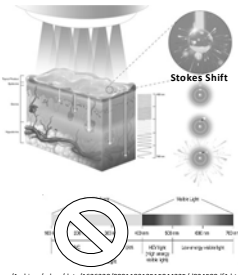


2

PHOVIa - Fluorescent Light Energy

Faster skin recovery by light

- PHOVIa is a topical two-part polychromatic form of PHOTobiomodulation VIA Fluorescent Light Energy
- Blue light penetrates to 1mm
 - Antibacterial and anti-inflammatory
- Green light penetrates 0.5-2mm
 - Stimulates fibroblast and keratinocyte proliferation
 - Improving wound healing
- Yellow/Orange light penetrates 1-2mm
 - Targets dermal blood vessels boosting circulation
 - Decreases inflammation
- Red light penetrates 1-6mm
 - Decreases inflammation
 - Promotes angiogenesis
 - Stimulates balanced collagen production
- NO ultraviolet light activity
 - Should not worsen photoaggravated immune-mediated disease
 - Should not cause cancer

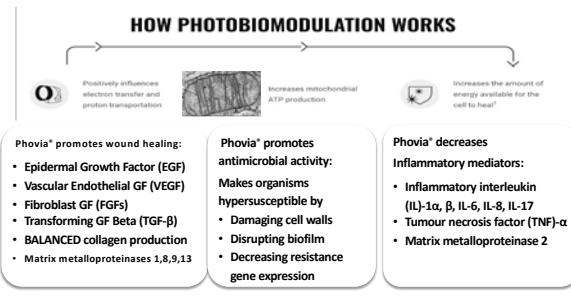


<https://www.sec.gov/Archives/edgar/data/1626220/000119312515044235/0824599df1.htm>

3

Phovia® - Training (MOA)

HOW PHOTOBIBIOMODULATION WORKS




- Phovia® promotes wound healing:
 - Epidermal Growth Factor (EGF)
 - Vascular Endothelial GF (VEGF)
 - Fibroblast GF (FGFs)
 - Transforming GF Beta (TGF-β)
 - BALANCED collagen production
 - Matrix metalloproteinases 1,8,9,13
- Phovia® promotes antimicrobial activity:
 - Makes organisms hypersusceptible by
 - Damaging cell walls
 - Disrupting biofilm
 - Decreasing resistance gene expression
- Phovia® decreases Inflammatory mediators:
 - Inflammatory interleukin (IL)-1α, β, IL-6, IL-8, IL-17
 - Tumour necrosis factor (TNF)-α
 - Matrix metalloproteinase 2

4


Application and Light Therapy (summary)

- Apply an even layer (approximately 2mm thick) of the gel to the lesion(s)
- Ensure everyone in the room is wearing the supplied safety goggles and cover the patient's eyes if working around the head
- Place the lamp close to the skin & press the button to turn the lamp on
 - The lamp will automatically turn off once the session is complete.
 - Countdown indicator located at the top of unit
 - Repeat until all affected areas have been treated
- Once lesion(s) have been treated, wipe the gel off with a clean gauze square. Then remove the excessive gel with a sterile saline-soaked gauze and/or Prevall™/Rescue™ wipes to remove residual pink/orange colour if it persists.



5

Implementing Phovia®

1ST PHOVIa® TREATMENT <ul style="list-style-type: none"> 20min (more time to explain + prepare site) Depending on training of staff – Vet still in room 	
FURTHER PHOVIa® TREATMENTS <ul style="list-style-type: none"> 15min for back-to-back treatments per site 	
IF MULTIPLE SITES <ul style="list-style-type: none"> Schedule longer times OR Use multiple lamps to shorten treatment time 	
DISCUSSION POINTS <ul style="list-style-type: none"> May need sedation with some patients – is it worth it? Always identify & address potential underlying cause 	

6

LOCALIZED Hot Spots

PATIENT DESCRIPTION: 5 years-old Labrador with atopic dermatitis currently treated with **ivermectin** and **oclacitinib**

MAIN REASON OF CONSULTATION: Recurrent and relapsing acute pyotraumatic dermatitis (**topical antimicrobial and anti-inflammatory treatment are not well tolerated**)

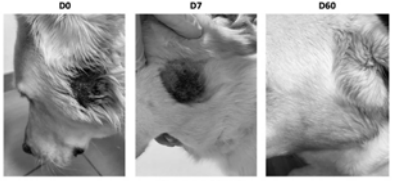
TREATMENT: PHOVIA (2 consecutive applications once a week)

LENGTH OF TREATMENT: 2 weeks

→ **No relapse in 2 months**

Alternative LOCALIZED treatment for LOCALIZED infection and inflammation

- Avoid topical and systemic medications that are not well tolerated
- Provides anti-inflammatory activity that Apoquel and Cytopoint do not offer



Credit Photos: Dr. Elizabeth Falcus

13

Acral Lick Dermatitis

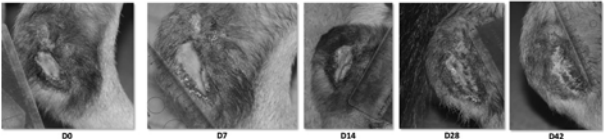
PATIENT DESCRIPTION: Chronic infected acral lick dermatitis

MAIN REASON FOR CONSULTATION: Partially responding to antiseptic, topical and systemic antibiotics. Systemic antibiotic were stopped prior Phovia treatment due to **poor owner compliance**

TREATMENT: Phovia (2 consecutive applications once a week) + antiseptic shampoo

→ **Fast clinical improvement after 7 days and 50% reduction at week 1**

Credit Photos: Dr. Piro, Dr. Mosca



HIGH OWNER COMPLIANCE; THERAPEUTIC VACATION for owner

14

LOCALIZED Hock (and Elbow) Callus Dermatitis

PATIENT DESCRIPTION: 6-year-old Mongrel dog with chronic callus pyoderma

MAIN REASON FOR CONSULTATION: **Recurrent** **chronic pyoderma** on the right hocks responding partially to previous treatments.

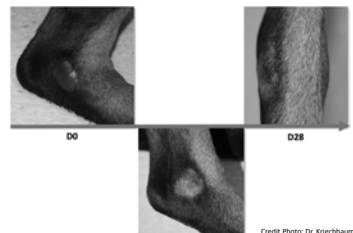
Cytology examination showed a pyogranulomatous inflammatory infiltrates with cocci

TREATMENT: Phovia (two consecutive applications twice a week)

LENGTH OF TREATMENT: 4 weeks

→ **After 2 week the lesions were clearly improved with closure of fistulous tracts. At week 3, the skin were completely healed.**

Localized treatment over flexural surfaces - Balanced wound healing
Minimize topical and systemic medications e.g. Pentoxifylline, Flamazine or Mupirocin BID


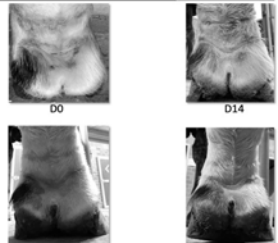


Credit Photo: Dr. Kirchbauer

15

Equine Pastern Leukocytoclastic Vasculitis

History
5-year-old Hanoverian gelding with chronic and recurrent pastern dermatitis "mud fever" on his left hind pastern

LENGTH OF TREATMENT: 5 weeks
The treatment continued for another 2 weeks at the request of the owners (7 weeks total). The final result was already achieved after 5 weeks of treatment with PHOVIA.


Housing conditions were not changed during the treatment. The patient was housed on shavings and the bedding was changed daily.

Photos ©: Dr. Valermans

PHOVIA in "photoaggravated" immune-mediated conditions? Visible (Phovia) vs Ultraviolet light (Sun)
Weight independent-treatment (cost effective); minimal side effects; no concerns regarding drug testing

16

Treating perianal fistulae and interdigital furunculosis with



PHOVIA Lightlight

17


Fluorescent Light Energy and FURUNCULOSIS:

Incompletely responsive perianal fistulae (N=4)

- Phovia = 75% improvement wounds+discomfort @4wks
- N=3 stopped FLE at 6wks; N=1 needed 13 weeks
- 6-month follow-up without relapse
- Management of canine perianal fistula with fluorescence light energy: Preliminary findings. Marchegiani A., et al. Vet. Dermatol. 2020;31:460-e122.

Interdigital furunculosis (N=36)

- Dec time to resolution - 3.5wks FLE/ABx vs 10wks ABx
- Start FLE earlier → better chance of resolution
- Fluorescence biomodulation in the management of canine interdigital pyoderma cases: a prospective, single-blinded, randomized and controlled clinical study. Marchegiani A., et al. Vet Dermatol. 2019 Oct;30(5):371-e109.
- Fluorescence Biomodulation for Canine Interdigital Furunculosis: Updates for Once-Weekly Schedule. Marchegiani A., et al Front. Vet. Sci. 2022;9:880349.



PHOVIA Lightlight

18

Canine Perianal Fistulation

PATIENT DESCRIPTION: 5 years-old German Shepherd dog with chronic digestive disorders and perianal fistula

MAIN REASON FOR CONSULTATION: chronic perianal fistula responding partially to cyclosporin, tacrolimus, antiseptic and hypoallergenic diet

PHOVIA: 2 consecutive applications once a week + cyclosporine (8mg/kg/d) and tacrolimus

LENGTH OF TREATMENT: 5 weeks

At the end of the 5 weeks the dog was completely healed. Moreover cyclosporine was only administered only twice weekly.

CONCLUSION: Phovia could be used as a complementary treatment to SOC and it allows to reduce other drugs administration

PAF - address potential underlying etiologies e.g., food allergies
PAF treatments - Tacrolimus, cyclosporine, immunosuppressives
PHOVIA adjunct to taper medications +/- monotherapy if EARLY LOCALIZED treatment for LOCALIZED disease
Improved Quality of Life - decreased straining, discomfort, pain

Credit Photo: Dr Arnaud Müller

19

Interdigital furunculosis (Ollie)

PATIENT DESCRIPTION: 2 years-old French Bulldog with severe atopic dermatitis currently treated with prednisolone, shampoo and allergen specific immunotherapy

MAIN REASON FOR CONSULTATION: Interdigital furunculosis with severe pruritus involving for 2 weeks

TREATMENT: Phovia + antiseptic shampoos

FREQUENCY: 2 consecutive applications once a week

LENGTH OF TREATMENT: 4 weeks

PHOVIA decreases inflammation
PHOVIA improves wound healing
PHOVIA improves Quality of Life
4-week course = minimum for most skin conditions

Credit Photo: Dr Giuseppe 16

20

Interdigital Furunculosis - Mastiff

PATIENT DESCRIPTION: 2 years-old Bull Mastiff with pododermatitis involving for 3 weeks

MAIN REASON FOR CONSULTATION: Chronic interdigital furunculosis partially responding to systemic antibiotic, topical antiseptic, steroids and colistinib. Bacterial culture of furuncles revealed a *Staphylococcus aureus*

TREATMENT: Phovia + antiseptic shampoos

FREQUENCY: 2 consecutive applications once a week

LENGTH OF TREATMENT: 4 weeks

Weight-independent dosing - Phovia more cost effective than oral medications for larger patients

Credit Photo: Dr Giuseppe 14

21

Interdigital furunculosis (Jake)

7y, MN, English Bulldog

- Chronic pododermatitis
- Muzzle and facial fold dermatitis

Diagnosis:

- Food + environmental allergies.
- Euthyroid

Treatment:

- Analgogenic, Preval wipies, Simplece
- Phovia 2X/week for 8 weeks
- Extended to 12 weeks
- Follow-up - 3 mos doing well - diet/wipes

Not all cases respond 100%
8 week max? → Residual effects of PHOVIA
Consider "PULSE" monthly therapy?

Day 0 - Phovia interdigital furunculosis

12 weeks of Phovia - 8-week study + 4 weeks extended

22

Healing Wounds with

PHOVIA
Photobiomodulation

23

Fluorescent Light Energy and WOUND HEALING in VETERINARY MEDICINE:

Surgical wound: 50% FLE; 50% saline q3d X 5
Prospective, blinded, controlled clinical trial
Healthy dogs undergoing orthopedic surgery (n = 10)

FLE - complete re-epithelialization, less inflammation, and positive collagen deposition
IHC - increased expression of factor VIII, EGF, decorin, collagen III, and Ki67
Effect of the topical Kiox fluorescence biomodulation system on the healing of canine surgical wounds. Salvaggio A, et al. Vet. Surg. 2020;49:719-727

Fluorescent Light Energy significantly improved wounds versus control (N=14)

- Non-blinded, non-randomized - deep pyoderma w/2+ lesions - cefadroxil only vs cefadroxil + FLE
- Less inflammation, complete re-epithelialization, and neoangiogenesis
- Increase number (89.31% vs 12.09%; p< 0.0001) + 10X size of mitochondria (90.15% vs. 9.09%; p< 0.0001)
- More elongated and ovoid with clearly defined cristae

Management of all three phases of wound healing through the induction of fluorescence biomodulation using fluorescence light energy. Scapagnini G, et al. Proc. SPIE 10863, Photonic Diagnosis and Treatment of Infections and Inflammatory Diseases II, 108630W (7 March 2019); doi: 10.1117/12.2508066

PHOVIA
Photobiomodulation

24

Fluorescence biomodulation in the management of acute traumatic wounds in two aged dogs.

Marchegiani A., et al. Vet. Med. 2020;65:215-220.

Fluorescent Light Energy and WOUND HEALING IN VET MEDICINE

N=2 elderly patients 17 and 15 years (traffic accident; bite wound)
FLE - 9 and 16 weeks + amoxiclav + carprofen

Figure 1. The 17-year-old male mixed breed dog before the FLE (photobiomodulation) treatment (A), after 4 weeks (B) and at the end of the FLE management (C) (6 weeks).

Figure 2. The 15-year-old female mixed breed dog before the FLE (photobiomodulation) treatment (A), after 4 weeks (B) and at the end of the FLE management (C) (16 weeks).

PHOVIA
Photobiomodulation

25

Wound Healing

Cheddar – 5y, MN, Cornish Rex

- Overgrooming caudal-ventral abdomen and tip of tail for several years managed with prednisolone.
- IIBD managed on diet and steroids.
- 12/2021 – hospitalized
 - lethargy, vomiting, diarrhea, anorexia
 - Multiple IV catheterization
 - Swelling of all catheterized sites: limbs & paws
 - Hocks – swollen and effusive (espec left)
 - Vasculitis of his ear margins as well.
- All lesions resolved except ulcer on point of L hock
 - Bed of granulation tissue where ulcerated area had been, but wound is not healing
- 2/2022 – Started Phovia – prednisolone → Atopic

PHOVIA
Photobiomodulation

26

Cheddar - one-month post-Phovia follow-up

May 24/22:

- Cheddar is doing awesome. There is a scar on his leg but he's back to being fluffier than I've ever seen him assume due to his new diet and medication, so I don't think he minds his beauty mark.
- He is running around like a kitten, you'd never know there was ever anything wrong with him.
- He definitely does not miss wearing the onesie.

So grateful you took him on as a patient.
Thanks
Helga

Improved Quality of Life for both the PET AND OWNER
PHOVIA ideal for wounds or articulated areas →
Balanced wound healing (Collagen III → Collagen I)

PHOVIA
Photobiomodulation

27

Treating Multi-Drug Resistant Bacteria with

PHOVIA
Photobiomodulation

28

Fluorescent Light Energy in the Management of Multi Drug Resistant (MDR) Canine Pyoderma:

Marchegiani A, et al. Pathogens. 2022; 11(10):1197

N=16 Client owned dogs with MDR bacteria

- N=5 interdigital furunculosis
- N=11 deep pyoderma
- MDR bacteria - S. pseudintermedius (8); S. aureus (8)
- Other bacteria - Strep (6), Enterococcus (3), Bacillus (1), Proteus (1)
- FLE applications 2X/week with OUT antibiotics

Time to achieve complete resolution significantly reduced:

- Interdigital Furunculosis = 5.20 ± 3.56 weeks (median 3 weeks)
- Deep Pyoderma = 4.18 ± 1.47 weeks (median 4 weeks)

FLE dec'd lesion scores + resolution of MDR with OUT adjunctive therapy

FLE renders bacteria hypersusceptible

- cell wall damage in microbes → enhance the penetration of antibiotics
- induced disruption of biofilm protective matrix
- Oxidative stress-induced under-expression of drug resistance genes

Decreased antibiotic use → fewer side effects; antibiotic stewardship

BECOME AN ANTIBIOTIC GUARDIAN
PHOVIA
Photobiomodulation

29

Wound Healing + MRSP

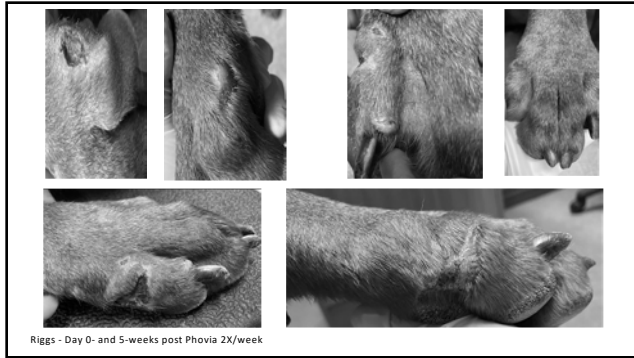
Riggs – 6y, MN, Doberman Pinscher

- 7/2018 - Hypothyroidism
 - Well supplemented
- Environmental allergies
 - Stable on immunotherapy
- 3/2022 - Non-healing wounds
 - Right front paw
 - Culture - MRSP
 - Phovia + Mupirocin

Able to avoid systemic antibiotics with severe side effects
e.g., Chloramphenicol (neuropathy/anemia)
Rifampin (hepatotoxicity), Amikacin (nephrotoxicity)

PHOVIA
Photobiomodulation

30



Riggs - Day 0- and 5-weeks post Phovia 2X/week

31



4/05/2023 - 1-year post-Phovia

32

When Phovia doesn't seem to help

PHOTObiomodulation VIA Fluorescent LIGHT ENERGY
Chromophore gel-assisted phototherapy



33

Interdigital furunculosis - case study

George – 5y, M, English Bulldog
Chronic pododermatitis
Thyroid panel - WNL
Environmental +/- food allergies
ASIT worsened symptoms


- client d/c ASIT 6 months in
- Symptomatic - Atopica/ketoconazole

12 weeks of Phovia

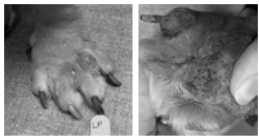

- 8 weeks - study + 4 weeks - extended

Recommend 8 weeks; re-evaluate after 8 weeks
Phovia has residual effects that may last for months

Day 0 - Phovia interdigital furunculosis



12 weeks of Phovia - 8-week study + 4 weeks extended

34

Interdigital furunculosis - case study


George

- Only mild improvement
- Asking too much
 - Pathology of Interdigital furunculosis


CO2 LASER to debulk major lesions
Add Phovia

- improved healing of CO2 LASER sites
- address minor interdigital lesions

*****START EARLIER in General Practice*****
Better responses
Avoid CO2 LASER surgery!!



Jason Pieper - Aesculight Webinar 26OCT2022



35

Chronic Fold Dermatitis (Intertrigo)

Nova – 5y, FS, German Shepherd
Erythema, ulceration, inflammation of perivulvar region
12/2020 - Vulvoplasty

- No improvement


Patient difficult to clean and treat topically

Phovia


- 1X/week w/2treatments X 8 weeks
- Incomplete response???
- *** Checked thyroid status due to lack of response to Phovia → Dx: HYPOTHYROIDISM
- Started thyroid supplementation
- Extended treatment for another 4 weeks

Lack of response → check for underlying etiology



Day 0



8 weeks**



12 weeks

36

Feline Atypical Mycobacterial dermatitis
Miss Money Penny – 9y, FS, DSH

3/2019 - right hip lesion after cat bite abscess

3/25/2021 Granulomatous lesions on R lateral thorax
• Mycobacterial panniculitis (Bx + culture *M. fortuitum*)

4/2021 - started Zeniquin + Clarithromycin

6/2021 – clinical remission

7/2021 - relapse 10 days post-D/C Abs
• right ventro-lateral thorax → Antibiotics restarted

9/2021 - incomplete response to Abs
• Marbofloxacin and Clarithromycin continued

10/2021 - added Phovia as an adjunct

12/2021 - Great response - lesion resolved
• Antibiotics discontinued at last Phovia session.

10/2021 - Day 0 Phovia
12/2021 - Phovia week 8

PHOVIA Enhanced

37

Feline Atypical Mycobacterial dermatitis

3/02/2022 - new lesion behind right shoulder
• Restarted Phovia w/out Abs

3/9/2022 - Draining track developed and ADR
• Restarted Marbofloxacin and Clarithromycin
• Continue Phovia

4/23/2022 - Draining track resolved but lesion unchanged
• Client opted not to complete second extended session due to lack of notable response and patient hiding more when trying to retrieve for weekly visits.

Hopefully residual effect of Phovia will help
Travelling Phovia Technician - in-home therapy?

Is there a way to potentiate Phovia therapy?

Round 2 - Phovia Week 2
Round 2 - Phovia Week 8

PHOVIA Enhanced

38

Photoinactivation of mycobacteria to combat infection diseases: current state and perspectives

Margarita Shleeva¹ · Alexander Savitsky¹ · Arseny Kapolyants¹

5-aminolevulinic acid (ALA; precursor of porphyrin synthesis)

- Uroporphyrin III and coproporphyrin III and their methylesters
- Cytoplasmic and membrane localisation
- Intravenous injection, oral administration, inhalation and topical
- Sensitive to blue & red light (405-635 nm)

Mycobacteria	Wave length	Efficiency	Reference
<i>Mycobacterium chelonae</i> subsp. <i>abscessus</i> , <i>Mycobacterium goodii</i> , <i>Mycobacterium goodii</i> , <i>Mycobacterium fortuitum</i> , <i>Mycobacterium fortuitum</i> , <i>Mycobacterium fortuitum</i> phages	Red light LED	High	(Sun et al. 2017)
<i>Mycobacterium fortuitum</i> , <i>Mycobacterium fortuitum</i> , <i>Mycobacterium fortuitum</i>	635 nm laser	High	(Kang et al. 2016)
<i>Mycobacterium fortuitum</i> (nose injury)	630 nm LED	High	(Kang et al. 2016)
<i>Mycobacterium fortuitum</i>	Blue light, red light	High	(Kang et al. 2016)
<i>Mycobacterium fortuitum</i>	560 nm LED	High	This work
<i>Mycobacterium fortuitum</i>	512 nm	2.5 light	(Shleeva et al. 2020)

ALA-PDI + Abs → no recurrence + reduction in time to cure
Up to 100% inhibition of growth
Effective in dormant and MDR mycobacteria

PHOVIA Enhanced

39

INITIAL VISIT FEBRUARY 28th 2021

Initial attempt at doing Phovia treatment **failed**. T-21 was not able to remain focussed for the timed length of one treatment. After several attempts, it was decided that he would be lifted from the shallow pool and dry-docked for treatment on a comfortable padded mat.

40

Week 0 **Week 2** **Week 6**

Week 8 **Week 12**

41

Week 0 **Week 0** **Week 12**


Week 12

PHOVIA to help minimize need for medication in a weight-independent manner

Consider adding 5-ALA to enhance response especially in Atypical mycobacterial cases.

42

Benefits of Fluorescent Light Energy (FLE)



- 1) Proven efficacy in both human and veterinary medicine
- 2) Reduced use of antibiotics; decreased chance of resistance
Renders bacteria "hypersusceptible" to antibiotics
- 3) Pre-and post-elaborate surgical treatment
e.g. TPLO to minimize bacterial infections
- 4) Reduced risk of interference with other treatment modalities
- 5) Weight-independent dosing
Greater cost efficacy the larger the individual e.g., Mastiff or horse
- 6) Prevention of systemic side effects
MRSP drugs - Rifampin - hepatotoxic; Chloramphenicol - neuropathic, anemia; Amikacin - nephrotoxic
- 7) Precise targeting of localized skin lesions
- 8) Free from most LLLT side effects (skin redness, itching, edema, small bruises, burns)
- 9) Cost efficacious, quick learning curve, safe and easy to use
- 10) Improved wound healing - faster and "balanced collagen"
Consider post-CO2 LASER (hyperplastic otitis, fusion podoplasty), spays and neuters (Day 0 & Day 7)

PHOVIA
highlight

43

Questions



vetdermboston.com

Celebrate WCVD's 35th Anniversary In person + 30 hours of virtual content

Welcome to the 10th World Congress of Veterinary Dermatology
July 25-29, 2024 | Boston, Massachusetts, USA

6 Themes

- Atopic Disease and Allergy
- Dermatology and One Health
- Immunodermatology
- Innovations in Dermatology
- Otolaryngology
- Skin Biology in Health and Disease

We invite you to join us!

WAVD
WORLD ASSOCIATION FOR VETERINARY DERMATOLOGY

PHOVIA
highlight

44