

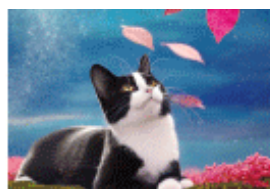


Improve
Veterinary Education

Diagnostic Imaging
Postgraduate Certificate
Programme



FIND OUT MORE



Applications of photobiomodulation — looking beyond the orthopaedic cases



Photobiomodulation therapy should be considered part of the treatment protocol, especially in dentistry and gastroenterology, where it can play a key role in tissue healing, analgesia and inflammation reduction



by João Alves
21 April 2023



6 min read

ARTICLE SPONSORED BY



VISIT HUB

Your favourite columns

Animal welfare

Cardiology

Dermatology

Gastroenterology

PUBLISHED

**IN: DENTISTRY DOG GASTROENTEROLOGY NURSING
PAIN MANAGEMENT SMALL ANIMAL VET**

**Laboratories and
diagnostics**

Mental health

Neurology

Nutrition

Parasites

**Practice
management**

RCVS Knowledge

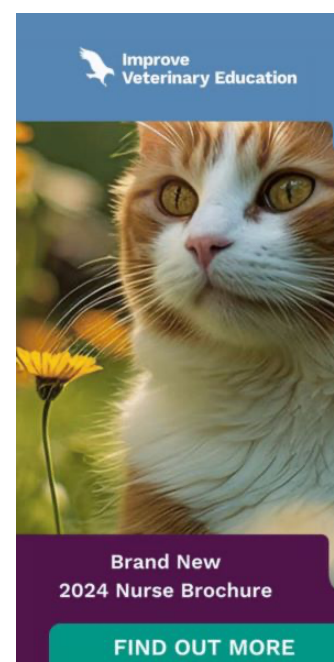
What is photobiomodulation therapy?

Photobiomodulation therapy (PBMT) uses red/near-infrared light to produce a clinical effect through the non-thermal interaction of monochromatic radiation with a target site. PBMT helps to modulate cellular functions, upregulating the production of adenosine triphosphate (ATP), nitric oxide (NO) and reactive oxygen species within cells. This can alter gene transcription and increase cell proliferation, cellular motility and growth factor production. A wide range of effects are attributed to PBMT, including stimulating tissue healing, analgesia and reduced inflammation. Additionally, it has a non-invasive nature combined with a lack of adverse effects.

Historically, PBMT has also been referred to as cold lasers or low-level laser therapy, to contrast with surgical lasers. Currently applied Class IV therapy lasers, also called high-power laser therapy, allow the delivery of between 500mW and 60W, which permits targeting deeper tissues, expanding the range of possibilities for this therapy. A consensus was then formed around the term PBMT, which better encompasses the complex mechanisms involved.

Applications of photobiomodulation

The role of PBMT in orthopaedics, rehabilitation



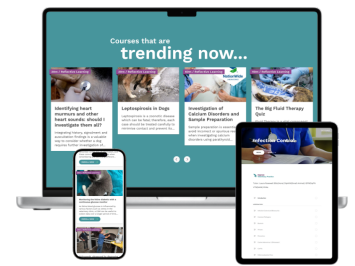
and sports medicine is well established. In dogs, it has been described in the management of canine elbow osteoarthritis or during the recovery period after spinal decompression surgery. There are, however, many potential applications of PBMT in other areas of medicine, from surgery to dermatology, wound healing, cardiology, oncology and aesthetic procedures.

This potential, represented by the increasing number of reports on the potential uses of PBMT, indicates that there are many conditions in which vets should consider using it as a treatment or as a part of the treatment protocol. In addition to providing a better service to patients and improving treatment outcomes, including PBMT in an expanded range of interventions allows for a better return on investment in laser equipment.

There are many conditions in which vets should consider using it [PBMT] as a treatment or as part of the treatment protocol

However, calculating and selecting proper treatment parameters for specific conditions can be challenging, particularly when presented with a wide range of patient sizes, body conditions, coats and colours. Although it can be done, having software such as the Companion SmartCoat assisting in setting adequate treatment parameters is invaluable.

Case studies



Have you heard about our IVP Membership?

A wide range of veterinary CPD and resources by leading veterinary professionals.

Stress-free CPD tracking and certification, you'll wonder how you coped without it.

**DISCOVER
MORE**

The author's practice exclusively serves a large population of police working dogs. Unsurprisingly, the majority of the work is sports medicine and rehabilitation-related and this was the initial motivation for acquiring laser equipment.

However, working dogs are still dogs, and all other diseases and conditions also occur. The laser equipment comes with several pre-programmed treatment protocols, and by exploring them, the practice has expanded its possible uses of PBMT. The laser is currently the most used equipment in the practice – PBMT is used as the single treatment or part of the treatment protocol for managing diarrhoea, gingivitis, wounds, otitis, aural haematoma and lick granuloma, and for pain management, particularly post-surgical pain.

Management of chronic idiopathic large bowel diarrhoea

The practice set up a couple of studies to assess the impact of PBMT in treatments, beyond the positive empirical effect that was observed. The first case study evaluated the use of PBMT in the management of chronic idiopathic large bowel diarrhoea compared to a control group (receiving psyllium husk) (Alves *et al.*, 2022). Although PBMT has been described as having a significant positive effect on disease progression in mice with induced colitis, its influence in cases of naturally occurring disease was still not determined (Zigmond *et al.*, 2014).

Chronic inflammatory enteropathies are considered the most common cause of chronic gastrointestinal disorders in dogs. Chronic idiopathic large bowel diarrhoea may occur in dogs without any evidence of inflammation and is frequently observed in

working and sporting dogs; it may be linked to their high drive, excitable nature and stressful or competition events. The clinical signs that were considered were low body weight, a body condition score (BCS) less than four, a frequency of defecation of more than three times a day, soft or liquid stool, excess faecal mucus and difficulty maintaining a good body condition score, either continuously or intermittently. Patients with other illnesses were excluded.

Although an improvement was observed in both groups, animals treated with PBMT showed greater improvements in body weight and body condition scores

After selection, 15 dogs were assigned to a control group (CG) and 15 to a treatment group (TG).

Patients in the CG received four tablespoons/day of psyllium husk for one month. They were

submitted to a sham laser therapy session on the

Newsletter | Sign up | Log in

Membership InFocus News Official Vet

 Search

Small animal Farm animal Equine Exotics Nursing Practice management

Opinion

days, patients were weighed. A daily faecal scoring log using the Bristol scoring system was maintained throughout the 30 days (Alves *et al.*,

2022).

On day
0, 14
dogs

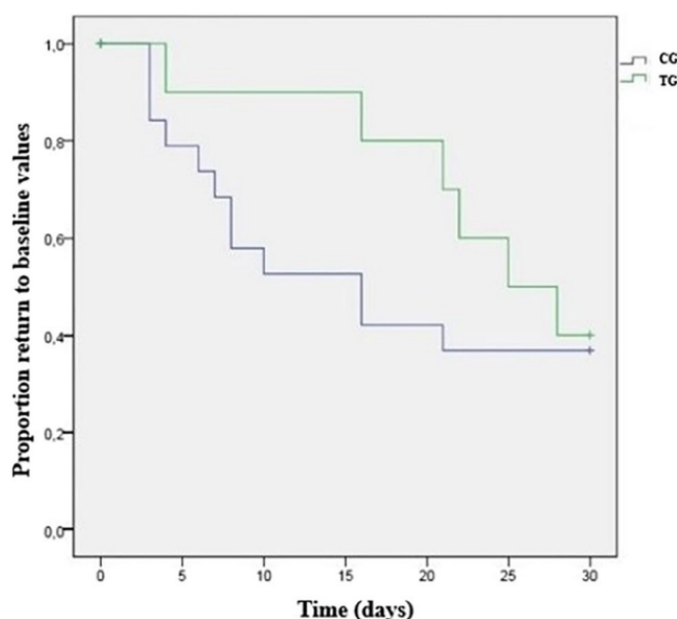


FIGURE (1) Kaplan–Meier curve demonstrating a significant difference between the control group (CG) and treatment group (TG) in time for the appearance of the second episode of diarrhoea (Alves *et al.*, 2022)

defecated more than three times a day, 15 had a Bristol stool score corresponding to diarrhoea and 23 had a low BCS (of less than four), with no significant differences being observed between groups. While there were no significant differences in the appearance of a first episode of diarrhoea (12.6 days for CG and 12.3 days for TG), an increased time of appearance of the second episode of diarrhoea was observed (16.6 days for CG versus 23.6 days for TG) (**Figure 1**). The Cox regression results showed that treatment significantly influenced the appearance of diarrhoea episodes, with the CG showing a 4.5-fold probability of experiencing the event compared to the TG. In addition, although an improvement was observed in both groups, animals treated with PBMT showed greater improvements in body weight and body condition

scores. PBMT significantly improved clinical signs of chronic inflammatory large bowel diarrhoea and frequency of diarrhoea episodes.

Reduction in gingivitis

In the second study, the effectiveness of PBMT in reducing gingivitis following a professional dental prophylaxis was studied. Forty-seven dogs were included in this study, with a periodontal disease grade of one or two, after screening our population of police working dogs (Alves *et al.*, 2023). Dental prophylaxis and grading on day 0 were conducted under general anaesthesia. Each patient's mouth was divided into left and right halves and graded individually for gingivitis and calculus. The left side was treated with dental prophylaxis only and served as a control group (CG).

In addition to dental prophylaxis, the right side received a single session of PBMT (PG). Follow-up observations were conducted on days 1, 3, 8 and 15 to determine a gingivitis index. While no differences were observed on treatment day between halves, the side treated with PBMT showed significantly lower gingivitis scores from day 1 to day 15 (Alves *et al.*, 2023).

Although it was not evaluated, as a known effect of PBMT is analgesia, it was assumed that PBMT also improved patient comfort. Further, although not tested in this study, PBMT is used to treat higher grades of periodontal disease and other oral treatments, as it promotes tissue healing and oral comfort.

Conclusion

From a clinician’s perspective, laser equipment should be incorporated into your practice for several reasons:

- PBMT has a wide range of effects, including the stimulation of tissue healing, analgesia and reduced inflammation
- It is a non-invasive procedure, with a lack of adverse effects and very few absolute contraindications
- By expanding the number of procedures in which the laser equipment is used, an increase in return on investment is evidenced
- The Companion SmartCoat software is invaluable in setting adequate treatment parameters, particularly in new procedures. The newer laser models even include demonstration videos on how to conduct specific treatments (treatment area, treatment head and technique)
- By including PBMT in your treatment procedures, a better service to patients and improving outcomes can be evidenced

Share this    

References		X
Alves, J. C., Jorge, P. and Santos, A.	2022	The effect of photobiomodulation therapy on the management of chronic idiopathic large-bowel diarrhoea in dogs. <i>Lasers in Medical Science</i>, 37,

Alves, J. C., Jorge, P. and Santos, A.	2023	The effect of photobiomodulation therapy on inflammation following dental prophylaxis. <i>Journal of Veterinary Dentistry</i> , 0
Zigmond, E., Varol, C., Kaplan, M., Shapira, O. and Melzer, E.	2014	Low-level light therapy induces mucosal healing in a murine model of dextran-sodium-sulfate induced colitis. <i>Photomedicine and Laser Surgery</i> , 32 , 450-457.



João Alves

Dr João Alves, DVM, PhD, DECVSMR, graduated from the Technical University of Lisbon, Portugal, in 2012. Since then, he has been working with the Guarda Nacional Republicana (National Republican Guard), specialising in sports medicine and rehabilitation of their working dog population. Dr Alves is a speaker in multiple training courses for canine handlers, instructors, veterinary technicians and nurses. His research focuses primarily on the clinical aspects of canine sports medicine and rehabilitation, from physical conditioning to lesion prevention and treatment.

MORE FROM THIS AUTHOR

More articles like this

16 August 2024

Principles of small animal geriatric anaesthesia: anaesthesia guidelines and recovery



18 July 2024

Myofascial pain in small animals



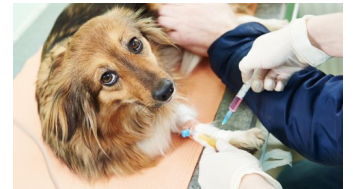
16 July 2024

Epidural injection of methylprednisolone acetate in dogs: an update on treatment of lumbosacral stenosis



12 July 2024

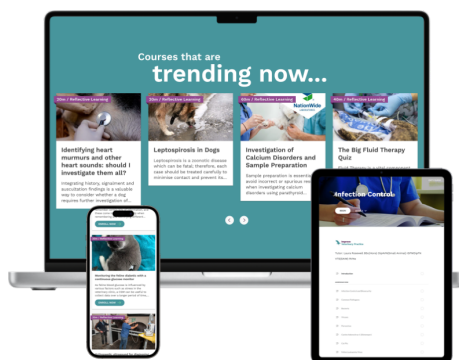
Principles of small animal geriatric anaesthesia: physiological age-related changes



Have you heard about our IVP Membership?

A wide range of veterinary CPD and resources by leading veterinary professionals.

Stress-free CPD tracking and certification, you'll wonder how you coped without it.



[DISCOVER MORE](#)

[Membership
Resources](#)

[InFocus
Jobs](#)

[News
Clinical Skills](#)

[Official Vet](#)

[Expert Forums](#)

[About us](#)

[Contact our team](#)

[Advertise with us](#)

[Books](#)

[T&Cs](#)

[Privacy Policy](#)



© 2024 - Improve International, Alexandra House, Whittingham Drive, Wroughton, Swindon, Wiltshire SN4 0QJ, England.

No part of this site may be reproduced without permission. Co. Registration 3568194 VAT No. 349 7028 73