Laser Therapy for UK Veterinary Professionals

A guide to understanding laser therapy (PMB), building confident clinical use, and evaluating devices

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This guide was written by Avant. We manufacture PBM devices. We have obvious commercial interests, and you should read this document with that in mind. We have made our best effort to present the published evidence objectively, including evidence that supports a variety of device Classes. Every clinical claim is referenced. Commercial observations are drawn from Avant's experience of the UK veterinary market.

Introduction

This guide takes about an hour to read. It is written for UK veterinary professionals and teams at any stage of PBM adoption: deciding whether PBM deserves a place in your practice, evaluating a first device, expanding an existing service, or building more confident and consistent use.

The information landscape is poor. Manufacturers contradict each other, the literature is large but difficult to interrogate quickly, and colleagues often speak from the narrow perspective of the device they use. This guide exists to help with the whole process: what PBM is actually good for, what matters in a device, what is evidence-based and what is "marketing", and how confident use develops over time.

This is a clinician's guide, not a literature review. It uses the published evidence as one source of validation, but not the only one. The literature is strongest as a credibility anchor for parameter-related guidance. Many of the practical insights, particularly around workflow, device selection, and manufacturer evaluation, draw on clinical experience across the PBM industry. Where this guide is informed by the literature, you will find references. Where it draws on experience, the reasoning is presented on its own terms. Section 1.2 explains why this distinction matters.

You can read straight through, or jump to what matters most: Section 1 for the evidence framework, Section 0 for practice-type fit, Section 3 for marketing claims, Section 4 for device evaluation criteria, or Appendix A to score specific devices.

One finding in this guide may surprise you. Laser Class matters less than you might think. Section 1.5 explains why.

Is PBM Right for Your Practice?

Almost certainly yes.

PBM has a favourable safety profile relative to most clinical interventions. The few contraindications are straightforward and are listed in Section 0. The cost of getting the device choice wrong is a suboptimal purchase, not a clinical disaster.

The genuine reasons to hesitate are practical, not clinical: budget constraints, whether the practice will commit to the learning curve, whether the device will actually be used, and whether the combination of caseload, treatment volume, and charging structure makes the investment commercially sensible. These are honest reasons, and this guide addresses each of them. "Right for your practice" means both clinically and commercially. Clinical usefulness alone is not enough if the device will sit unused; commercial attractiveness alone is not enough if the modality does not add meaningful clinical value. If you can afford the investment, have cases where PBM genuinely belongs, and will commit to using the device consistently for the first few months, you will see results.

PBM devices are inexpensive to operate. There are no drugs, no disposable applicators, no reagents. The main consumable is electricity, at pennies per treatment. Solid-state laser devices generally have no regular maintenance schedule beyond cleaning and periodic eyewear replacement. As an example, a device costing around £8,000, used around 10 times per week over a conservative five-year lifespan (most devices last longer), works out to around £4 per treatment including occasional consumables such as safety eyewear. Practices typically charge £25 to £40 per PBM session. That does not make the decision for you, but it does clarify it: the commercial question is usually not whether PBM is expensive to deliver, but whether the device will be used often enough, in the right cases, by the right people, to justify owning it.

1. Understanding PBM Before You Evaluate Devices

1.1 PBM Is an Adjunct to What You Already Do

The answer to "how do I use laser therapy?" is: easily. Do exactly what you would normally do for the patient - then add PBM to enhance the clinical outcome. Post-operative pain managed with NSAIDs and rest? Continue, and add PBM. Wound managed with debridement, dressing, and antimicrobials? Continue, and add PBM. Osteoarthritis managed with weight management, exercise, and analgesia? Continue, and add PBM.

This applies regardless of practice type. PBM does not replace clinical judgment or existing treatment plans. It enhances the outcomes those plans produce. A single post-operative PBM session, delivered immediately after surgery, has been shown to reduce pain scores and improve early recovery in dogs [1].

In canine osteoarthritis, combining PBM with intra-articular platelet-rich plasma has also produced greater and longer-lasting improvements than either modality alone [2].

Results will vary between practitioners, and that variation reflects the quality of the underlying clinical practice more than the choice of device. A well-constructed treatment plan gets more from PBM than a hasty one. If results disappoint, the places to look are the treatment plan the laser was added to, the laser treatment strategy (frequency, duration, application site), and the device itself.

This framing simplifies the purchasing decision. **You are not choosing a device to treat specific conditions. You are choosing a device to enhance the outcomes of your existing clinical practice.** The question is not "what can this device treat?" but "will this device integrate effectively into what I already do?"

1.2 The Evidence Base

Over 4,000 laboratory studies and more than 400 randomised, double-blind, placebo-controlled clinical trials have been published on photobiomodulation therapy (PBM), previously known as low-level laser therapy (LLLT) [3]. These span multiple independent research groups, countries, institutions, device types, and clinical conditions. The aggregate body of evidence is large, diverse, and frequently reports positive clinical outcomes across a wide range of parameters [4].

The veterinary PBM literature is smaller than the human literature but growing. Recent randomised controlled trials in dogs have demonstrated positive outcomes in osteoarthritis pain management [5], post-surgical recovery [1], and reduction of NSAID requirements [6]. The underlying photobiology is shared across mammals, so this guide also draws on the broader human evidence base where veterinary-specific data is insufficient.

Academic study design seeks to isolate the effect of a single intervention. This is sound methodology: to know what PBM does, you need to separate it from everything else. But as Section 1.1 describes, PBM is an adjunct. Its primary mechanisms (increased ATP production, modulation of reactive oxygen species, resolution of inflammation) support whatever repair and recovery processes are already underway. Therefore, studies of PBM as a monotherapy will tend to underestimate effect sizes compared to what is commonly observed in clinical practice, where it is used alongside other interventions.

1.3 How to Read the Literature

The published literature is largely retrospective in its focus. Researchers study what has already been observed to work clinically. Newer approaches and parameters are under-represented simply because they have not yet attracted research attention.

Academic publishing rewards novelty. Citations come from findings that are surprising, contradictory, or have profound impact. Nobody publishes a paper confirming that a well-

established parameter set produces the expected result. The literature therefore under-represents not only what is new but much of what is already known to work.

Not all of it is good. As with any mature field, the sheer volume means there are weak studies, poorly controlled trials, and papers with undeclared conflicts of interest. This volume makes cherry-picking easy.

Even where a study does exist, its conclusions are narrower than they appear. A study demonstrating a positive outcome for a specific set of parameters says exactly that. It does not say those parameters are the only, best, or preferred approach. Studies comparing one parameter set against another are rare. Most compare a single set against sham: enough to confirm it works, silent on whether something else works equally well.

None of this means the literature is useless as a guide. It means it is incomplete. It is still more than sufficient to identify claims that contradict the weight of evidence, and that is the basis for the analysis in Section 3.

1.4 Why PBM Feels Different in Practice

Clinicians are trained in modalities with precise dosing per kilogram, specific contraindications, known drug interactions, and defined toxicity thresholds. PBM has a much wider margin for error and far fewer rigid constraints than most clinical interventions. This is a genuine property of the modality, not a gap in the evidence.

The best characterised mechanism involves absorption by cytochrome c oxidase (CCO) in the mitochondrial electron transport chain, increasing ATP production [7]. Other pathways, including light-sensitive ion channels, have been identified [8] [9]. The multiplicity of pathways is part of why PBM produces effects across such a broad range of conditions.

Additionally, these effects propagate beyond the treatment site. Systemic responses, including measurable effects at distant sites and reduced inflammatory markers, are well documented [10] [11]. Clinical outcomes frequently exceed what a purely local mechanism would predict. There is also a growing body of evidence for PBM in neurological conditions in the human literature [12].

Multiple pathways and systemic propagation together explain why PBM enhances such a wide range of clinical outcomes. It supports the body's broader healing and regulatory processes, not just the tissue being irradiated.

1.5 The Broad Therapeutic Window

Positive clinical outcomes have been reported across an enormous range of device parameters [4] [13]. Devices operating at single-digit milliwatts and devices operating at multiple watts have both produced statistically significant results in controlled trials. Energy densities from below 1 J/cm² to above 50 J/cm² appear in positive-outcome studies. Treatment times from seconds to 20 minutes per point are represented.

There is no precise dose-response curve in the pharmacological sense. There is no narrow therapeutic index.

There is no single "correct" set of device parameters. A device operating within the evidence-supported wavelength bands, at a reasonable power output, delivering an adequate dose, is operating within the range that has produced positive outcomes across the literature. The most common mode of failure is not selecting wrong parameters. It is insufficient treatment frequency, or not maintaining treatment long enough for cumulative effects to develop.

It would simplify every purchasing decision in the field if the literature showed a clear advantage for one device Class over the other. It does not. Class 3B and Class 4 devices both produce positive PBM outcomes across a large body of published studies [14]. No

amount of sub-analysis, stratification, or re-examination produces a statistically significant difference favouring either Class. The literature has been asked the question repeatedly, from multiple angles, and it gives the same answer every time: no difference. This is not an absence of evidence on the question. It is the finding.

1.6 Wavelength: The Parameter That Matters Most

Different wavelengths of light interact with different cellular targets. The choice of wavelength determines what biological response is triggered. This is the one device specification that the literature most consistently links to clinical outcomes. The following bands have robust support across multiple independent research groups, clinical conditions, and study designs:

Wavelength Band	Proposed Mechanism	Evidence Summary
630–670 nm (Red)	Cytochrome c oxidase (visible-light absorption peak)	Strong evidence across wound healing, dermatological applications, and pain [4]. Particularly well-documented in oral mucositis, with international clinical practice guidelines supporting its use [15].
780–860 nm (Near-infrared)	Cytochrome c oxidase (NIR absorption peak), ion channels	The most-studied wavelength band. 810 nm is the single most frequently reported wavelength in the published literature [16]. Dominant in musculoskeletal, neurological, and pain applications.
904 nm (Super Pulsed, Near-infrared)	Cytochrome c oxidase	Commercially available and studied for decades. Gallium arsenide (GaAs) diodes at this wavelength are inherently pulsed (nanosecond pulses). Represented in musculoskeletal and wound healing literature.
405–450 nm (Violet to Blue)	Porphyrins, flavins, opsins	Antimicrobial activity concentrates at the violet end of this range (~405 nm), where endogenous porphyrins absorb strongly. Efficacy decreases toward 450 nm. Antimicrobial efficacy reviewed across 79 studies [17]. Narrower use case than red/NIR. Relevant for wound and surgical focus. Relatively recent.

Dual-wavelength devices combining a red wavelength (630–670 nm) with a near-infrared wavelength (780–860 nm) cover the broadest portion of the evidence base with a single device. This is a practical advantage for practices treating a diverse case mix.

The proposed mechanisms listed above reflect current scientific understanding. The clinical evidence supporting these wavelength bands does not depend on the mechanistic explanation being complete or correct.

1.7 Power: A Means, Not an End

Wavelength has mechanistic specificity: specific chromophores absorb specific wavelength bands. Power has no equivalent anchor. There is no cellular target that responds to a specific wattage. What matters to the tissue is dose, measured in Joules: the product of power and time. Positive outcomes have been reported across an enormous power range, from single-digit milliwatts to multi-watt devices [4]. The literature does not converge on an optimal power level because power is a means of delivering dose, not a therapeutic variable in its own right.

2. Where PBM Fits in UK Veterinary Practice

Your practice type determines how a PBM device needs to fit into your daily workflow. The following profiles describe typical UK veterinary contexts and the practical considerations each brings to a purchasing decision. The indications discussed across these profiles are drawn from published veterinary reviews covering musculoskeletal conditions, wound healing, neurological rehabilitation, and pain [18] [19] [20].

These are not rigid categories. Many practices span more than one. The purpose is to help you identify which practical factors apply to your situation.

2.1 First Opinion / General Practice

The most common prospective buyer. PBM will typically enhance existing management of post-operative pain, chronic osteoarthritis in geriatric patients, acute soft tissue injuries, wound management, and otitis. Patient species are predominantly canine and feline, with a wide size range.

Treatments need to fit within a busy appointment schedule. The device needs to be usable by trained veterinary nurses (VNs) working under appropriate veterinary direction. Ease of use, clear initial protocols, and a short learning curve affect whether the device becomes a daily-use tool or sits unused.

2.2 Referral Rehabilitation and Physiotherapy

PBM enhances post-surgical orthopaedic rehabilitation: cruciate ligament repairs (TPLO, TTA), femoral head and neck excision (FHO), and fracture repair. It also supports neurological rehabilitation, including recovery from intervertebral disc disease (IVDD) and fibrocartilaginous embolism (FCE), as well as chronic degenerative conditions and working or sport dog conditioning.

Rehabilitation appointments are typically longer than general practice consultations, and PBM treatment is often directed at multiple sites as part of a structured recovery programme. The device needs to integrate smoothly into sessions that already include hydrotherapy, therapeutic exercise, electrotherapy, or manual therapy.

2.3 Equine Practice

PBM enhances existing management of tendon and ligament injuries, wounds, back and sacroiliac pain, and joint conditions. Patients are large, and treatments frequently occur in field conditions (yards, stables).

Field conditions benefit from cordless, handheld devices. Battery life and on-the-go recharge options need to be sufficient for your rounds.

2.4 Referral Surgery / Specialist Practice should this be 2.2?

PBM enhances perioperative care. A single treatment delivered immediately after surgery has been shown to reduce pain scores and improve early recovery in dogs [1].

PBM in this context is used selectively rather than as a scheduled service, which affects expected treatment volume and per-treatment economics. The device needs to be straightforward to deploy when indicated and easy to train theatre or ward staff to use.

Practices with a surgical wound focus may find relevance in devices offering shorter wavelengths in the violet range (~405 nm), which have demonstrated localised antimicrobial effects in the literature [17].

2.5 Exotic and Small Animal Specialist

Exotic patients are very small (rabbits, small mammals, birds, reptiles), and even modest power output delivers substantial energy relative to tissue volume. The veterinary PBM literature for exotic species is extremely limited; treatment approaches are extrapolated from small animal and human evidence.

These patients require precise applicator positioning on very small treatment areas. Devices with configurable power output allow the practitioner to dial down to appropriate levels, and offer more flexibility as experience grows and PBM use expands across species.

3. Marketing Stories vs. Published Evidence

The PBM device market contains manufacturers making strong claims about why their parameters are superior. Some of these claims contradict each other. Understanding the most common stories, and why each conflicts with the published evidence, is preparation you need before engaging with any sales process.

3.1 “Only low power works; higher power is dangerous”

Photothermal effects do increase with power density, and this relationship is well characterised in the literature [4]. Misuse of higher-power devices can produce unwanted heating. The claim that power levels above a few milliwatts will cause thermal tissue harm under normal clinical use is false. Positive outcomes have been reported across a wide power range without thermal harm [4].

3.2 “Only high power works; lower-powered devices are ineffective”

The assertion that lower-powered devices cannot produce meaningful clinical outcomes is contradicted by both the literature and clinical experience.

The literature demonstrates that Class 3B and Class 4 devices produced positive outcomes in controlled trials across musculoskeletal, neurological, wound healing, and pain applications. The claim that lower-powered devices are ineffective is simply false.

There is a narrow use case where high power has a unique advantage. While this mechanism is not PBM, it is noted here because it has clinical relevance. Higher power delivers localised energy at depth, producing controlled tissue heating analogous to therapeutic ultrasound but with fewer contraindications. This has real clinical utility for deep tissue conditions.

3.3 “Higher power reduces treatment time”

True, but not in the way the claim implies.

Higher power does not let you rush a localised treatment site. PBM acts through temporal cellular processes that require a minimum exposure time. Studies comparing identical doses delivered at different irradiances to the same site show that faster delivery can produce worse outcomes, and in some cases eliminates the therapeutic effect entirely [4]. The biology cannot be hurried.

Higher power does save time when it is necessary to treat a larger area. A device scanning across a broad area can maintain appropriate irradiance at each point while completing the session faster than a lower-power device covering the same area. This use case is infrequent in the practice types described in Section 0.

The distinction matters. **"Higher power reduces treatment time" is true when the treatment area is large. It is false when used to justify delivering the same dose to the same site in less time.**

3.4 “Super Pulse”

Gallium arsenide (GaAs) diodes at 904 nm are inherently pulsed. Nanosecond pulsing is a technical requirement of the semiconductor material, not a design innovation. This is decades-old diode technology. The peak power figures are technically accurate but misleading: the average power output, which determines actual dose, is typically in the milliwatt range.

Devices using 904 nm GaAs diodes are frequently marketed as “super pulsed” with prominently featured peak power specifications in the tens of watts. The implication is a device that is simultaneously Class 4 and Class 2. The IEC classification system does not work that way.

Treatment protocols in the literature express dose in Joules, calculated from average power and treatment time. A device that **does not clearly state its average power output** makes it difficult to follow published protocols, create reproducible treatment notes, or transfer clinical learning from one device to another.

Some manufacturers of super pulsed devices honestly state the average power. However, few can resist also stating the peak power figure. Ask any super pulsed device manufacturer for the average power specification. How they respond will tell you what you need to know.

3.5 "The Arndt-Schulz sweet spot"

The Arndt-Schulz principle of treatment states that too little produces no effect, too much causes harm, with a sweet spot between the two. Some manufacturers invoke this to position their device neatly in the middle: not too much, not too little, just right.

The principle exists. But the therapeutic window for PBM is orders of magnitude wide, and there is no consensus on what constitutes too little or too much. Furthermore, the principle relates to dose, which in PBM is the product of power and time. Not power alone.

A manufacturer citing Arndt-Schulz to justify a specific power level capability is using a real principle to make an unsupported claim.

3.6 "Supported by the literature"

As noted in Section 1.2, the volume of the published literature makes selective citation easy.

A Class 4 manufacturer can assemble a compelling, literature-backed case that Class 4 is the only way to go. A Class 3B manufacturer can do the same for Class 3B. A Class 2 manufacturer can do the same for Class 2. A sceptical insurer or practice group could assemble a credible case that PBM evidence is inconclusive. All of them can cite real, published studies.

"Supported by literature" is not the same as "supported by the literature **as a whole**." When any manufacturer presents evidence, ask whether it represents the weight of the evidence or a selection from it.

3.7 The Common Pattern

These stories differ in their specifics but share a structure. Each starts with something real: a genuine trial result, a valid physical principle, a legitimate regulatory conformity marking. Each then uses that real foundation to imply something broader than it demonstrates.

A regulatory approval proves a device is superior to sham. It does not prove that nothing else works. A published study proves that specific parameters produced a positive outcome. It does not prove that other parameters cannot. A physical principle like Arndt-Schulz describes a real phenomenon. It does not specify where the boundaries fall for PBM, or justify a particular device specification. A collection of favourable citations proves that

someone is good at searching the literature. It does not prove that the literature as a whole agrees.

The pattern to recognise is not dishonesty. Most of these claims contain a true core. The pattern is overreach: using evidence to say something the evidence does not say.

When any manufacturer makes claims that contradict the cumulative weight of the published literature, ask them to explain, and to provide independent evidence. The explanation reveals whether this is a company that engages honestly with the evidence, or one that uses its own data to say something broader than the data supports. The burden of proof is on the company.

The published evidence shows no outcome difference between Class 3B and Class 4 devices [14]. Outside the specific use cases in Sections 3.2 and 3.3, device Class is therefore not a clinical differentiator. It is a practical one: cost, form factor, safety and regulatory burden, and suitability for delegation. Once you have confirmed that a device falls inside the evidence-supported parameter range (Section 4 provides a simple table to check), the remaining question is which practical factors matter most to your practice.

Your job is to evaluate the device on its merits, not the manufacturer's opinion of everyone else. This guide identifies those merits, relates them to your practice, and provides an objective basis for comparison. That is what the rest of this document equips you to do.

4. Evaluating Devices for Real-World Clinical Use

4.1 Is This Device Within the Evidence-Supported Range?

The following parameter ranges encompass the vast majority of positive-outcome PBM studies. A device whose specifications fall within these ranges is supported by the evidence base. A device outside all of these ranges warrants careful scrutiny.

Device Parameter	Evidence-Supported Range	Notes
Wavelength	630–670 nm and/or 780–860 nm and/or 904 nm	Dual-wavelength (red + NIR) provides broadest coverage. Violet (~405 nm) adds antimicrobial capability for wound-focused practices.
Output power	5 mW to several watts	The positive-outcome literature spans this range. The largest volume of evidence is built on Class 3B devices. See Section 4.2.4 on IEC classification for how Class relates to device power.
Energy density	Below 1 to above 50 J/cm² at tissue surface	The literature contains positive outcomes across this full range. Most published protocols cluster between 1 and 50 J/cm². Energy density alone is an incomplete descriptor of dose.
Mode	Continuous wave or pulsed	Both produce positive outcomes. Pulse frequency influences the biological response [21], but the clinical literature has not converged on a preferred mode or frequency [22].

If a device falls within these ranges, the serious decision is no longer whether PBM can work. It is whether this is the device your team will use confidently, consistently, and well.

4.2 Practical Fit in Daily Practice

The single greatest risk to your PBM investment is not choosing the wrong parameters. It is choosing a device that does not get used. Clinical value depends on consistent use. Consistent use depends on how easily the device fits into your daily workflow, how quickly

your team builds confidence, and how little friction exists around deciding to treat. Every evaluation criterion in this section serves that chain.

4.2.1 Device usability and design

The meaningful distinctions are: cordless vs tethered; fixed vs variable spot size; and whether the device is small and light enough to keep readily at hand.

Cordless devices have no cables, optical fibres, or connectors to wear out or fail. A device that is genuinely pocket-sized is one you reach for every day. The trade-off is that cordless devices are typically limited to a few watts of output power.

In equine practice, using a cordless device is also a safety consideration. Horses are prey animals, highly sensitive to tactile stimuli across their skin. A cable or tether dragging across the coat during treatment can provoke flinching or startle responses, creating a safety risk for patient, handler, and operator. A cordless device eliminates this hazard.

Variable spot size allows the practitioner to choose between a focused beam for targeted treatment and a broader, divergent beam for larger areas. A divergent beam covers a larger area in the same time, or enables hands-free treatment of a recovering patient.

The nominal ocular hazard distance (NOHD) is the distance beyond which the beam can no longer injure the eye. A device with a short NOHD and appropriate energy density can be positioned on a stand to deliver a timed dose to an immobilised patient, for example during post-anaesthetic recovery. The device does not need to contact the skin.

4.2.2 Built-in protocols

Different clinical applications require different doses, and a device with adjustable power output lets you match the dose to the application. Better still, a device with preset protocols that encode dose, power, and treatment time for common conditions takes the calculation out of your hands entirely. Many devices have this capability.

4.2.3 Power output and patient size

A common misconception is that large patients require proportionally larger or more powerful devices. PBM initiates a biological response at the point of application; it does not fill the body with photons proportional to mass. The device does not need to match the size of the patient.

Devices with configurable power output offer flexibility across species and patient sizes.

4.2.4 IEC laser classification and device power

A common misunderstanding is that IEC class maps directly to therapeutic power output. It does not. IEC 60825 [23] classifies laser products primarily by the risk of eye injury: how much energy can enter the eye through a 7 mm limiting aperture under reasonably foreseeable conditions. This is not the same as total device output power.

A Class 3B device with multiple emitters or divergent beams can exceed 500 mW of total output power. A Class 4 device may operate at comparable therapeutic power levels during treatment but carries a higher classification because of its single-aperture emission profile. Buyers should look at the total power output on the spec sheet and the IEC class label separately, understanding that the relationship between them depends on the device’s optical design.

4.2.5 Safety and Regulatory Requirements

Clinical contraindications

The North American Association for Laser Therapy consensus on safety (2010) identifies four contraindications [3]. Do not aim laser beams into the eyes; appropriate safety eyewear is required for all present. Do not treat over the site of a known primary carcinoma or secondary metastasis, except during chemotherapy where PBM can reduce side effects such as mucositis, or in terminally ill patients for palliative relief. Do not treat directly over the developing fetus. Be aware that low-frequency pulsed visible light (below 30 Hz) might trigger a seizure in photosensitive epileptic patients.

The adverse effects of PBM reported in controlled trials have been no different from those reported by patients exposed to placebo devices [3]. Veterinary sources also advise caution with active haemorrhage, patients on photosensitising drugs or immunosuppressant medications, and irradiation over open growth plates in skeletally immature animals. The limited animal data on this last point is equivocal, but the precaution is widely observed, particularly when using Class 4 devices.

Operational requirements by Class

Laser safety classification under IEC 60825 [23] determines the operational requirements for your practice.

Class 2 and Class 3R devices have fewer operational requirements but are few in the PBM market and are not as well supported in the literature.

Class 3B devices require a risk assessment, appropriate laser safety eyewear for the operator and anyone in the treatment area, and training for all users.

Class 4 devices typically add to the operational burden: a designated laser safety officer, controlled access to the treatment area, warning signage, key switch control, and more stringent protocols. The specific requirements depend on the setting and local risk management, but the general direction is clear: Class 4 carries more operational overhead than Class 3B.

UK regulatory status

In the UK, verify that any device you are evaluating carries appropriate regulatory marking (CE or UKCA) for the UK market at the time of purchase. The requirements for medical device marking have changed several times and may change again; consult current MHRA guidance for the position at the time you are buying. Note that UK medical device regulations define “medical device” primarily around human intended use; the regulatory status of veterinary-only devices is less clearly defined. This guide does not constitute legal or regulatory advice.

4.2.6 Suitability for delegation

Under RCVS guidance, registered veterinary nurses may carry out medical treatments including PBM under veterinary direction, provided this falls within their competence and the requirements of Schedule 3 of the Veterinary Surgeons Act [24]. If VN-delivered PBM is part of your service model, evaluate the device from the VN’s perspective: is the interface intuitive, are the protocols clear, and can a trained VN deliver treatment confidently without veterinary supervision of every session?

4.3 Clinical Support, Onboarding, and Confidence Building

This is the factor that most commonly determines whether a PBM device becomes a daily-use clinical tool or ends up in a cupboard.

PBM is unlike other modalities. The therapeutic window is wide. For a clinician accustomed to precise dosing tables and defined protocols, this absence of rigidity creates uncertainty. Uncertainty kills adoption.

Good clinical support bridges this gap. Expect to follow structured treatment protocols initially (essentially a cookbook) that provide confidence during the first weeks of use. As experience builds, you will find that deviations from the book still produce results. That is the moment you begin to understand how forgiving the modality truly is. Within a few months, the cookbook should be a reference you consult occasionally, not a script you follow.

The manufacturer's clinical support offering should match this trajectory: intensive and accessible early on, responsive as you build confidence, and available but rarely needed once PBM is integrated into your clinical reasoning.

Two patterns should concern you. A manufacturer whose support model assumes permanent dependence on their proprietary protocols is creating a customer, not a competent clinician. A manufacturer who offers no meaningful clinical support beyond an instruction manual is leaving you to fail alone.

Before purchasing, ask to speak with a clinical support person (not a sales representative). Ask what onboarding looks like at week 1, month 1, and month 3. Ask for references from UK veterinary practices of a similar type to yours. Listen for whether the support philosophy is "follow our protocol" or "we'll help you build your confidence."

4.4 Total Cost of Ownership

The purchase price is one component of cost.

Cost Component	What to Assess
Device acquisition	Outright purchase vs lease vs hire purchase. VAT treatment.
Training	Included or additional cost? Training format? Covers VNs or clinician only? On-site or remote?
Clinical support	Included for how long? Ongoing cost after initial period?
Consumables	Laser safety eyewear, disposable tips or barriers.
Service and repair	UK-based service? Turnaround time? Loan device during repair? Self-contained cordless devices eliminate cable and connector wear as a maintenance factor. Expected diode lifespan and replacement cost?
Warranty	Duration, scope, exclusions. Are replacement parts priced transparently? Is service a revenue stream or a support function? Ask about caps on out-of-warranty repair charges.
Per-treatment economics	Amortise total cost over realistic treatment volume. Compare with intended charging structure.

Conclusion

If PBM is not yet part of your practice

You are looking at a modality with over four decades of research, thousands of published studies, and a mechanism that enhances what you already do well. PBM does not replace your clinical judgment; it amplifies the outcomes your existing skills produce. The question is not whether PBM belongs. It is whether your practice is ready to choose a device and use it consistently enough to benefit from it.

If you are buying your first device

The devices on the market today overwhelmingly operate within the parameter range that produces positive outcomes. The literature shows no outcome difference between device Classes. Your purchasing decision is not about finding the one device with the right numbers or the right Class. It is about practical fit: will it integrate into your workflow, will your team use it confidently, and will the manufacturer support you beyond the sale? Use the scorecard in Appendix A for each device you are seriously considering. Before you buy, ask to speak with a clinical support person, not a sales representative. Ask for UK veterinary references you can contact directly. How the manufacturer responds tells you what you need to know.

If you already own a device and want to do more with it

Good. You have the hardest part behind you. The evidence supports broader clinical use than most practices realise, and the cases where PBM makes a visible difference will surprise you once you start looking for them. If your device has been sitting unused, that is a workflow problem, not an evidence problem. Appendix B shows you how to use AI tools to build confidence case by case. Start using it again tomorrow. Consistent use is what turns a purchase into a clinical tool.

If you are replacing or adding a device

You have direct experience, and that is valuable. But it may also be narrow. If your first device shaped how you think about PBM, this guide may broaden that perspective. The evidence base, the marketing analysis, and the practice profiles in Section 0 cover ground that day-to-day use of a single device does not. The scorecard in Appendix A is still useful for side-by-side comparison, but read Section 1 first. You may find that what you want from your next device is different from what you thought.

If you came here to understand the field

PBM is real, it is well-studied, and it is poorly marketed. The evidence base is large and legitimate. The marketing environment around it is not. Manufacturers on every side of the power debate use real evidence to make claims the evidence does not support. This guide exists to separate the evidence from the marketing claims. Once you can recognise the pattern, no sales pitch will land the same way again.

References

[1] J. Alves, A. Filipe and A. Santos, “Post-surgical photobiomodulation therapy improves outcomes following elective gastropexy in dogs,” *Lasers in Medical Science,* vol. 39, no. 1, p. 211, 2024.

[2] J. Alves, A. Santos and L. Carreira, “The combined application of intra-articular platelet-rich plasma injections and photobiomodulation improves clinical outcomes in dogs with osteoarthritis: results of a long-term, double-blinded, crossover study,” *Veterinary Sciences,* vol. 12, no. 11, p. 1025, 2025.

[3] H. Cotler, “The use of low level laser therapy (LLLT) for musculoskeletal pain,” *MOJ Orthopedics & Rheumatology,* vol. 2, no. 5, p. 00068, 2015.

[4] H. Chung, T. Dai, S. Sharma, Y. Huang, J. Carroll and M. Hamblin, “The nuts and bolts of low-level laser (light) therapy,” *Annals of Biomedical Engineering,* vol. 40, no. 2, pp. 516-533, 2012.

[5] J. Alves, A. Santos, P. Jorge and L. Carreira, “A randomized double-blinded controlled trial on the effects of photobiomodulation therapy in dogs with osteoarthritis,” *American Journal of Veterinary Research,* vol. 83, no. 8, p. ajvr.22.03.0036, 2022.

[6] A. Looney, J. Huntingford, L. Blaeser and S. Mann, “A randomized blind placebo-controlled trial investigating the effects of photobiomodulation therapy (PBMT) on canine elbow osteoarthritis,” *Canadian Veterinary Journal,* vol. 59, no. 9, pp. 959-966, 2018.

[7] M. Hamblin, “Mechanisms and mitochondrial redox signaling in photobiomodulation,” *Photochemistry and Photobiology,* vol. 94, no. 2, pp. 199-212, 2018.

[8] A. Liebert, “Photophysical mechanisms of photobiomodulation therapy as precision medicine,” *Biomedicines,* vol. 11, no. 2, p. 237, 2023.

[9] P. Lima, “Photobiomodulation enhancement of cell proliferation at 660 nm does not require cytochrome c oxidase,” *Journal of Photochemistry and Photobiology B,* vol. 194, pp. 71-75, 2019.

[10] T. Malavazzi, K. Fernandes, T. Lopez, M. Rodrigues, A. Horliana, S. Bussadori and R. Mesquita-Ferrari, “Effects of the invasive and non-invasive systemic photobiomodulation using low-level laser in experimental models: a systematic review,” *Lasers in Medical Science,* vol. 38, no. 1, p. 137, 2023.

[11] M. Hamblin, “Mechanisms and applications of the anti-inflammatory effects of photobiomodulation,” *AIMS Biophysics,* vol. 4, no. 3, pp. 337-361, 2017.

[12] F. Salehpour, J. Mahmoudi, F. Kamari, S. Sadigh-Eteghad, S. Rasta and M. Hamblin, “Brain photobiomodulation therapy: a narrative review,” *Molecular Neurobiology,* vol. 55, no. 8, pp. 6601-6636, 2018.

[13] R. Zein, W. Selting and M. Hamblin, “Review of light parameters and photobiomodulation efficacy: dive into complexity,” *Journal of Biomedical Optics,* vol. 23, no. 12, p. 120901, 2018.

[14] A. Saleh, E. Youssef, Y. Aneis, H. Emam and W. El-Sayed, “High-intensity versus low-level laser therapy in the management of musculoskeletal disorders: a systematic review and meta-analysis,” *Lasers in Medical Science,* vol. 39, no. 1, p. 196, 2024.

[15] Y. Zadik, P. Arany, E. Fregnani, P. Bossi, H. Antunes and R. Bensadoun, “Systematic review of photobiomodulation for the management of oral mucositis in cancer patients and clinical practice guidelines,” *Supportive Care in Cancer,* vol. 27, no. 10, pp. 3969-3983, 2019.

[16] D. Gendron and M. Hamblin, “Applications of photobiomodulation therapy to musculoskeletal disorders and osteoarthritis with particular relevance to Canada,” *Photobiomodulation, Photomedicine, and Laser Surgery,* vol. 37, no. 7, pp. 408-420, 2019.

[17] R. Tomb, T. White, J. Coia, J. Anderson, S. MacGregor and M. Maclean, “Review of the comparative susceptibility of microbial species to photoinactivation using 380-480 nm violet-blue light,” *Photochemistry and Photobiology,* vol. 94, no. 3, pp. 445-458, 2018.

[18] L. Hochman, “Photobiomodulation therapy in veterinary medicine: a review,” *Topics in Companion Animal Medicine,* vol. 33, no. 3, pp. 83-88, 2018.

[19] D. Millis and A. Bergh, “A systematic literature review of complementary and alternative veterinary medicine: laser therapy,” *Animals,* vol. 13, no. 4, p. 667, 2023.

[20] D. Bunch, “Photobiomodulation (therapeutic lasers): an update and review of current literature,” *Veterinary Clinics of North America: Small Animal Practice,* vol. 53, no. 4, pp. 783-799, 2023.

[21] T. Karu, “Cellular and molecular mechanisms of photobiomodulation (low-power laser therapy),” *IEEE Journal of Selected Topics in Quantum Electronics,* vol. 20, no. 2, pp. 143-148, 2014.

[22] J. Hashmi, “Effect of pulsing in low-level light therapy,” *Lasers in Surgery and Medicine,* vol. 42, no. 6, pp. 450-466, 2010.

[23] British Standards Institution, “BS EN 60825-1:2014+A11:2021. Safety of laser products, Part 1: Equipment classification and requirements,” 2021.

[24] Royal College of Veterinary Surgeons, “Code of Professional Conduct for Veterinary Surgeons, Section 18: Delegation to veterinary nurses,” 2024. [Online]. Available: https://www.rcvs.org.uk/veterinary-professionals/conduct-and-guidance/code-of-professional-conduct-for-veterinary-surgeons/18-delegation-to-veterinary-nurses/.

Appendix A

This scorecard assumes you have already decided that PBM deserves a place in your practice. Its purpose is to help you decide which device deserves that place.

Complete one copy for each device you are seriously considering, then compare the completed sheets side by side.

Your Practice Profile

Complete this section once. It applies to all devices under consideration.

Question	Your Answer
Practice type (first opinion / referral rehab / equine / specialist / mixed)	
Primary species treated	
What existing treatments do you expect PBM to enhance?	
Estimated PBM treatments per week (realistic, not aspirational)	
Who will deliver treatments? (vet only / VN / both / therapist)	
Treatment environment (dedicated room / consult room / field / ward)	
Budget range (acquisition)	

Device Evaluation

Complete this section separately for each device under consideration.

Device: _____ Manufacturer: _____

EVIDENCE-SUPPORTED RANGE		
Criterion	**Response**	**Notes**
Wavelength(s) within evidence-supported bands (630–670 / 780–860 / 904 nm)?	Yes / No / Partial	
Power output within evidence-supported range?	Yes / No	
For pulsed or superpulsed devices, is average power clearly stated?	Yes / No / N/A	
Manufacturer claims consistent with the literature? No exclusionary claims?	Yes / Concerns / No	
When asked to explain claims and provide independent evidence, was the response credible?	Yes / No / Not asked	
PRACTICAL FIT		
Criterion	**Response**	**Notes**
Cordless and self-contained?	Yes / No (Tethered)	
Small and light enough to keep readily at hand?	1–5	

Variable spot size (focused and divergent)?	Yes / No	
Configurable power output?	Yes / No	
Interface usable ~~by VNs~~ after initial training?	1–5	
Safety class and operational requirements manageable in your environment?	1–5	
UK regulatory status confirmed (CE/UKCA marked, or equivalent for veterinary devices)?	Yes / No / Unclear	
CLINICAL SUPPORT		
Criterion	**Response**	**Notes**
Spoke with a clinical support person (not sales) before purchase?	Yes / No	
Structured onboarding programme described?	Yes / No	
Ongoing clinical support available beyond onboarding?	Yes / No / Paid	
Support philosophy: builds independence vs creates dependency?	Indep. / Dep. / Unclear	
UK veterinary references provided and contactable?	Yes / No	
COST		
Criterion	**Response**	**Notes**
Acquisition cost	£_____	
Training cost (if separate)	£_____	
Annual service / support cost	£_____	
Estimated per-treatment cost (amortised over realistic volume)	£_____	
YOUR ASSESSMENT		
Criterion	**Response**	**Notes**
Would you be confident handing this device to your VN after initial training?	Yes / No / Unsure	
Does this manufacturer seem honest?	Yes / No / Unsure	
Feedback from practices you contacted directly	Pos. / Mixed / Neg. / None	

Appendix B

Using AI to Interrogate Claims and Compare Devices

AI can be useful in this process as a fast, structured critic. It can read brochures, manuals, spec sheets, protocol libraries, website copy, and references side by side, then show where a claim is supported, limited, contradicted, or impossible to assess from the material provided.

Its job is not to choose the device for you. Its job is to make you harder to mislead.

The best use of AI here is not to ask whether a device is “good.” It is to identify what the manufacturer is asking you to believe, what evidence actually supports that belief, and what questions still need to be answered before you buy.

What to give it

For a useful answer, provide the same material you would want a careful colleague to review: the manufacturer’s brochure or product sheet, the full technical specification sheet, the user manual, any protocol library or preset-treatment guide, relevant website or sales copy, and any references the manufacturer uses to support its claims. If you want the analysis tied directly to this guide, include Appendix A as well.

If your AI tool cannot reliably search the literature, upload the key papers yourself and tell it to work from the uploaded material first. It should say clearly when a claim cannot be verified from the material provided.

Do not upload patient-identifiable information.

How to use it

Use AI in three steps.

1. Establish what the device actually is.
Before judging claims, ask the model to extract the objective information from the device materials: wavelength or wavelengths, total output power, average power, pulse mode, beam profile (shape), spot size, contact versus non-contact use, dosing method, preset protocols, safety requirements, portability, warranty, servicing, and any market-status or compliance claims.

A useful prompt is:

Using only the uploaded device documents, extract the stated technical and operational specifications of this PBM device. Create a table covering wavelength(s), total output power, average power, pulse mode, beam profile, spot size, contact/non-contact use, dosing method, preset protocols, safety requirements, portability, service terms, warranty, and market-status or compliance claims. Mark anything that is missing, unclear, internally inconsistent, or described only in marketing language. Do not infer missing values.

2. Interrogate the claims.
Once the device is clearly described, ask what the manufacturer is explicitly or implicitly claiming, and whether the evidence actually supports those claims.

A useful prompt is:

Using the uploaded manufacturer material and any uploaded references, list the manufacturer’s explicit and implicit claims about this PBM device. For each claim, provide: the exact wording, whether support is direct, indirect, absent, or contradictory, the strongest supporting source, the main limitation of that support, any key technical detail that is missing, and the single best follow-up question to ask the manufacturer. Distinguish clearly between PBM effects and thermal effects. Treat wavelength, total power, average power, pulse

characteristics, beam profile, and laser Class as separate variables. Do not assume missing specifications.

3. Turn the result into a buying decision.
The final step is not more analysis. It is turning that analysis into a cleaner comparison.

A useful prompt is:

Use Appendix A as the scoring framework. For each criterion, state whether the uploaded material provides enough information to score it confidently. If not, say exactly what is missing. Then list the most important questions I should ask the manufacturer before making a purchase decision.

If you are comparing more than one device, use:

Compare Device A and Device B using the criteria in Appendix A. For each criterion, identify which device appears stronger, whether the difference is clinically meaningful or mainly operational, and whether the conclusion depends on missing or vague information.

What AI is especially good at finding

AI is particularly useful for spotting recurring patterns in sales material: unsupported superiority claims, confusion between laser Class and therapeutic effect, pulsed or superpulsed claims without clear average-power reporting, emphasis on peak power while obscuring clinically relevant output, vague regulatory language, references that support PBM in general but not the specific claim being made, and protocol libraries that look impressive on paper but may be awkward in real workflow.

Those are not minor issues. They often determine whether a device becomes a useful clinical tool or an expensive underused purchase.

What to demand from the output

A good AI answer should separate what is known, what is claimed, what is missing, and what cannot be determined. If it does not quote the manufacturer's wording, identify the evidence it relied on, or acknowledge uncertainty where information is missing, it is not yet doing the job you need.

A table is often the most useful format, with these columns: manufacturer claim, exact wording, evidence that supports it, evidence that limits or contradicts it, missing information, and best follow-up question.

Final note

Appendix A helps you compare devices in a disciplined way. Appendix B helps you arrive at that comparison with cleaner inputs.

Used well, AI does not replace comparative judgment. It sharpens it.

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