

Why photobiomodulation is relevant in multimorphic cancer pain management?

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What is photobiomodulation?

- Photobiomodulation (PBM) is a form of light therapy that utilizes non-ionizing forms of light sources, including laser diodes (LD), light-emitting diodes (LEDs), and broadband light, in the visible and infrared spectrum.
- PBM provokes a nonthermal process whereby endogenous chromophores elicit photophysical and photochemical events at diverse biological levels.
- This process results in positive therapeutic outcomes including the stimulation of tissue regeneration and wound healing, the reduction of inflammation and pain, and immunomodulation

1 PBM has no side effect and enables treatments optimization

- No side effect when professionally used
- No interaction
- PBM makes it possible to avoid initiating medications with potential side effects
- PBM can help us decrementing medications such as opioids, antineuropathic, or psychoactive drugs with potential side effects including addiction/misuse

PBM can reverse mechanisms responsible for pain and... prevent it!

- PBM can prevent cancer treatments side-effects (mucositis, radiodermitis,
- etc.): early implementation is required! PBM can directly reverse/act on mechanisms responsible for pain and more (Chemothrapy Induced Peripheral Neurobathy)
- PBM can treat symptoms that medications can't (chemobrain, dysgueusia, voice changes etc.)
- PBM can accelerate recovery, treating pain in the meantime (wounds healing)

Cancer pain has changed : multimorphism at the heart of the global analgesic strategy

- From an etymological point of view, the term multimorphic refers to the possibility of adopting several forms at the same time and of changing form.
- This term seems to us to be adapted to the dynamic definition that we have sought to give to cancer pain: this type of pain can effectively evolve in how it presents, in relation to the different factors, whether or not they are linked to cancer and its management.
- In short, cancer pain is not a fixed entity in itself or over time. It changes, alters, evolves, or devolves, presenting in different forms at any time, from the diagnosis until after the cure or in palliative situations when applicable.
- These modifications depend on a series of intrinsic or extrinsic factors generally associated with each other, which play a part in initiating an imbalance at the level of pain management and thus create disruptions

Conclusion

- Cancer pain has changed : multimorphism is at the heart of the global analgesic strategy
- Supportive care is the cornerstone of modern cancerology
- Photobiomodulation is one of the most exciting technology to improve our patient's guality of life

PBM is useful along the whole cancer care pathway

- Pain management is one of the major supportive care in cancer
- PBM is (probably) the best available technology to literally "support" side effects of cancer treatments to date
- Including prevention...
- ... and useful indications in palliative care (ex: visceral pain, complex pain syndromes)

PBM is a multimodal

approach on its <u>own</u>

peripheral (receptors) and central

(medullar and cortical) targets, and

• Mechanisms : metabolism, Reactive Oxygen Species, nitric oxide, blood

flow, ion-channels (Ca, TRPV), anti-

neuroprotection, neuroplasticity...

• Treating pain with PBM implies

allows neuromodulation

inflammatory effects,

PBM can be effective on most painful syndromes

- PBM alone as a first line treatment. or in association with medication and/or more invasive interventions and/or complementary approaches
- Within a multimodal approach to target nociceptive, neuropathic, nociplastic components of pain

Which means (mandatory):

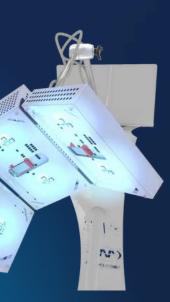
exhaustive analysis of multimorphic pain, evaluations and re-evaluations of patients, defining objectives of an optimal analgesic balance throughout the care pathway

PBM is science-based

- Publications
- Guidelines (3,4,5)
- Dosimetry/protocols standardisation
- Teaching

We need more real-life data to implement international pain guidelines with PBM

But we need medico-economic studies to prove it





PBM is cost-effective

Considering :

• the global cost of an entire cancer care pathway • the cost of non-quality · the cost of avoidable side effects or complications

PBM is probably one of the most cost-effective technologies in regard to its possibilities

Photobiomodulation in supportive care: pain as a major symptom to manage global analgesic strategy

WALT 2022 and MASCC/ISOO 2020 recommendations for PBM treatments in prevention and/or management of cancer therapy-related complications		Therapeutic prospects to the use of photobiomodulation in supportive care	
Oral mucositis	Pain	Chemotherapy-induced Cognitive Impairment	
Acute radiodermatitis	Pain	Anxiety and depression	
Lymphoedema	Pain	Opioids addiction	
Radiation fibrosis	Pain	Ototoxicity	
Palmar-plantar erythrodysesthesia		Cancer-fatigue	
Graft versus host disease	Pain	Cancer treatment acne and skin changes	ain
Dysphagia	Pain	Focal neuropathies Pa	ain
Dysgeusia		Myofascial pain syndromes	ain
Xerostomia and hyposalivation	Pain	Visceral pain Pa	ain
Osteonecrosis and musocal necrosis	<mark>Pain</mark>	Musculoskeletal pain syndromes Pa	ain
Voice and/or speech alterations		Tendinitis Pa	ain
Chemotherapy-induced peripheral neuropathy	Pain	Complex multimorphic pain syndromes requiring central and peripheral Pa neuromodulation	ain
Chemotherapy-induced alopecia		Wound healing Pa	ain
Periodontal lesions after chemotherapy	Pain	Erectile dysfunction	
Trismus	Pain	Vaginal dryness Pa	ain
		Radiation cystitis Pa	ain
		Xeropthalmia	

2070.00404 Lodewijckx J, Arany P, Barasch A, Bjordal JM, Bossi P, Chilles A, Corby PM, Epstein JB, Elad S, Fekrazad R, Fregnani ER, Genot M-T, I Lalla R, Latifian S, Maiya A, Mebis J, Migliorati CA, Milstein DMJ, Murphy B, Raber-Durlacher JE, Roseboom HJ, Sonis S, Treister ad S, Cheng KKF, Lalla RV, Yarom N, Hong C, Logan RM, Bowen J, Gibson R, Saunders DP, Zadik Y, Ariy