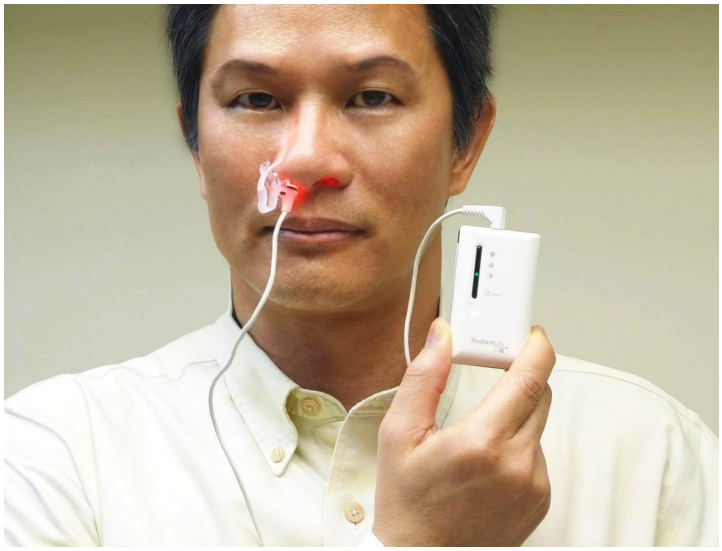
A natural treatment for insomnia and sleep disorder

Lew Lim
MedicLights Research Inc and Vielight Inc.
August 2012

Introduction

There are pharmaceutical medication options available to treat insomnia and sleep disorder. Sufferers may prefer an effective, safe and low cost option – which intranasal light therapy promises to offer.

Intranasal light therapy involves the simple process of illuminating the nasal cavity with red light (may be laser-based) for 25 minutes each time. MedicLights/Vielight's technology, patented in the US is designed as a user-friendly device to deliver this treatment naturally. See below.



A video instruction/demonstration is available on the Mediclights main webpage - http://www.mediclights.com/.

Bright light therapy

Conventional "light therapy", especially that is involved with regulating sleep rhythm involves the use of bright blue light in the morning. Bright blue light has the effect of suppressing melatonin, a hormone that encourages the body to go into sleep mode and regulate the sleep cycle (or circadian rhythm). However, red light as used in our therapy, appears to have the opposite effect to the blue light by

working with the melatonin to regulate the sleep cycle. Related studies demonstrate correlation between its use and the presence of increased levels of melatonin in patients with sleep disorder.

Based on the evidence discussed below, the use of intranasal light therapy itself would in most cases be sufficient. However, the two modalities can also be combined; the bright blue light for use in the morning soon after waking up, and the intranasal red light therapy for use at night before retiring to bed.

The direct evidence for intranasal red light therapy

The anecdotal evidence to support the efficacy of intranasal light therapy for sleep disorder is clear. We have found more consistent positive outcome for this insomnia or sleep disorder than for most other conditions. The clinical evidence below supports this.

Success in regulating sleep involves addressing the substances and factors that affect sleep

It is common knowledge that the hormone melatonin plays the key role in regulating the circadian rhythm, the daily cycle that prepares one's body to sleep or stay awake. The first documented use of a similar intranasal light therapy device to directly observe melatonin level was conducted by Xu C et al in 2001. They treated 38 subjects that had insomnia with intranasal low level laser therapy once a day over 10 days. They found that serum melatonin had increased.[1] The same group of researchers further treated another group of 128 patients with insomnia and found that the polysomnogram (sleep study that includes data on brain waves as electrical activity) data had improved.[2]

In 2006, Wang F et al reported that they had treated 50 patients with insomnia with intranasal low level laser therapy that is of similar specifications to Vielight's laser device for 60 minutes per session. Each session was conducted once a day over between 10 to 14 days. They found that the condition had improved significantly in 41 (82%) of the cases, mild for 4 (8%) of the cases, and none for 5 (10%) of the cases.[3]

Traditional Chinese Medicine practitioners often prescribe herbs as remedy for insomnia. This seems to help somewhat. Chen YM et al tested 90 patients and found that that the condition improved significantly for 40% of the cases, mild for 37.5% and none for 22.5% of the cases. In the group that added the extra element of the intranasal low level laser therapy, the improvement in the number of positive results were significantly more impressive. 78% of the patients experienced significant improvement, 20% mild and 2% none.[4]

The other factors

We have seen the evidence above inferring intranasal light therapy as an effective method for increasing melatonin. However, insomnia and sleep disorders are also affected by other factors. Tactors that can cause sleep problems include:

- Physical (for example, pain and discomfort)
- Medical (for example, asthma)
- Neural (for example, depression and anxiety disorders)

Short-term or acute insomnia can be caused by life stresses (such as job loss or change, death of a loved one, or moving), illness, or environmental factors, such as light, noise, or extreme temperatures. These can be overcome with the passing of time or the help of cognitive therapy which are outside the scope of this paper.

It is the long-term or chronic insomnia, defined as that which occurs at least three nights a week for a month or longer, that are of greater concern. These can be caused by physical and neural factors such as pain and depression. It has been found that in fact, intranasal low level laser therapy can modulate these factors, which would result in improved sleep.

Evidence on modulating pain

Pain is a common contributor to sleep deprivation. It is not often cited in literature because this fact is obvious. We have receive dramatic anecdotal feedback on the technology alleviating systemic pain such as in the case of fibromyalgia. Independent research also supports its effectiveness for pain relief.

In a study presented in 1998, intranasal light therapy was shown to be able to treat chronic headache, migraine and trigeminal neuralgia (which involves severe facial pain) when tested on 39 patients . After 2 weeks of treatment of 30 minutes a day, 26 (66.7%) experienced significant improvement, 9 (23.1%) mild, and 4 (10.2%) no improvement. Blood β endorphin (a hormone that alleviates pain) was also found in the 35 patients that experienced improved symptoms.[5 6] β endorphin is endogenous in the central nervous system. It also has the added bonus effect of slowing down the growth of cancer cells.[7]

Evidence on treatment of medical conditions

Over the decades, numerous studies support different light therapy methods to treat many diseases. This is through the restoration of homeostasis, both at systemic as well as cellular level.[8] More recently, the intranasal method is getting increasingly recognised as a legitimate therapeutic technology in view of the evidence accumulated internationally.[9] Asthma is one such disease that interferes with sleep, which is addressed with intranasal light therapy.

Evidence on the treatment of depression and other neural disorders

When Xu C et al studied the effect of intranasal light therapy on post-stroke patients, they found the number of positive responses to be significant. They also found that the level of serum melatonin has increased.[10] The results suggest that the nasal therapy reverses depression.

Neural disorders respond to transcranial light therapy. The process involves illuminating the brain from outside the skull ("transcranial") without any physical intrusion, usually using light of red to infrared red wavelengths. Some disorders found to be responsive to this therapy are stroke, traumatic brain injury and neurodegenerative diseases.[11]

In comparison to the transcranial modality, the intranasal modality should achieve the similar outcomes more efficiently because there are less tissue barriers between the light source and most parts of the brain through the nasal cavity.

The mechanisms of action

Every cell in our bodies contains mitochondria, including nuerons. The mitochondria produces cellular energy that is ultimately the basis of us being alive and healthy. The whole body has been programmed to be healthy by having all the systems in homeostasis, or in optimum internal balance. The gravitation to homeostasis starts at cellular level.

In a commonly presented pathway, all mitochondria contain photoacceptors that respond to light within the spectrum covering red to near infrared red light wavelengths, when they are not in homeostasis. They respond by increasing cellular activity. There is now increasing number of scientific literature that explains this mechanism[12] that leads to improvement in health. In the case of sleep, improvements can come from overcoming the factors that affect sleep such as overcoming depression and pain, and likely other factors such as anxiety.

A second pathway follows the proposition that melatonin is released. The pineal gland produces the melatonin. The photoacceptors in the eyes send signals to the pineal gland to regulate melatonin production. Therefore either these photoacceptors or pineal gland, or both together are responding to the presence of the red light which are being directed to the brain via the nasal cavity.[13]

A third pathway could involve the blood circulatory system, which distributes the signals to all cells in the body, including the brain, which ultimately affects sleep. Evidence suggests that blood that is illuminated with low energy red light (say by injecting directly into the bloodstream in the vein of the forearm) can stimulate systemic homeostatic response. This may even cover mental disorders such as those presented here, including the release of endorphin.[14] The carriers may be the ubiquitous chromophores acting as photoacceptors transporting the photons and low level reactive oxygen species (ROS - a set of low level free radicals) throughout the body through the circulatory system. These particles then triggers the other two pathways expounded above.

In summary, there are at least 3 pathways that can stimulate the rehabilitation of the brain that eventually improves the quality of sleep.

Conclusion

The mechanisms of action involved in intranasal light therapy are still in the early stages of discovery. Notwithstanding this, evidence are there to support the efficacy of this healing modality for improving sleep disorder, either by regulating the circadian rhythm or overcoming the other neural disorders that affect sleep.

References

[1]Xu C, Wang L, Tan Y, Li Q. 2001. Endonasal low energy He-Ne laser treatment of insomnia. Qian Wei J Med & Pharm. 18(5): 337-338 (in Chinese).

[2] Xu C, Wu Z, Wang L, Shang X, Li Q. 2002. The effect of endonasal low energy He-Ne laser treatment on insomniaon on sleep EEG. Prac J Med Pharm. 19(6): 407-408 (in Chinese).

[3] Wang F. 2006. Therapeutic effect observation and nurse of intranasal low intensity laser therapy on insomnia. Journal of Community Medicine. 4(3): 58 (in Chinese).

[4] Chen YM, Cheng HY. 2004. Clinical observation of the integrated therapy of intranasal low intensity He-Ne laser therapy and herb therapy on insomnia. Journal of Traditional Chinese Medicine and Chinese Materia Medica of Jilin. 24(4): 38 (in Chinese).

[5] Li Q, Guo K, Kang J and Jiang B. 1998. Clinic analysis of endonasal low energy He-Ne laser treatment of 39 cases of intractable headache. Acta Academiae Medicine Qingdao Universitis (1):53 (in Chinese).

[6] Li Q, Guo K, Kang J, Jiang B and Wang J. 1998. β endorphin research for endonasal low energy He-Ne laser treatment of ache in head or face. Chin J Neurol. 31(2): 91 (in Chinese).

[7] Sarkar DK, Murugan S, Zhang C, Boyadjieva N. 2012. Regulation of cancer progression by β-endorphin neuron. Cancer Res. 2012 Feb 15;72(4):836-40.

[8] Moshkovshka T, Mayberry J. 2005. It is time to test low level laser therapy in Great Britain. Postgrad Med J. 81: 436-441.

[9] Liu CY, Zhu P. 2009. Intranasal Low Intensity Laser Therapy. People's Military Medical Press. Beijing.

[10] Xu C , Wang L, C Lu C. 2003. Endonasal low-energy He-Ne laser treatment of post-stroke depression. Prac. J. Med & Pharm 19(11): 893 (in Chinese).

[11] Naeser M, Hamblin MR. 2011. Potential for Transcranial Laser or LED Therapy to Treat Stroke, Traumatic Brain Injury, and Neurodegenerative Disease. Photomed & Laser Surgery. 29(7): 443-446.

[12] Hashmi JT, Huang YY, Osmani BZ, Sharma SK, Naeser MA and Hamblin MR. 2010. Role of Low-level Laser Therapy in Neurorehabiliation. Am Ac Phys Med and Rehab. Suppl 2 S292-S305.

[13] Shirani A, Erik K. 2009. Illuminating Rationale and Uses of Light Therapy. J Clin Sleep Med. 5(2): 155-163.

[14] Moshkovshka T, Mayberry J. 2005. It is time to test low level laser therapy in Great Britain. Postgrad Med J. 81: 436-441.