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# Differential Effects of Hypnotherapy and Cranial Electrotherapy Stimulation on Acute and Chronic Insomnia: A Critical Review

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**Abstract**

Sleeping disorders have been troubling human beings with their continuous involvement in increased stress-level activities. Despite the technological advancement of practices for its diagnosis, assessment and treatment, these have been posing challenges to medical science. The present paper therefore attempts to critically review the valuable research contributions of scholars, especially on two approaches for the treatment of insomnia: hypnotherapy and cranial electrotherapy stimulation (CES). The review framework operates on the themes of mechanisms of action, treatment outcomes and efficacy of these approaches. Following a systematic method for the inclusion and exclusion of research papers, the shortlisted 26 papers reveal helpful insights about the differential impact of the application of hypnotherapy and CES. Wherein, the former approach is observed to promote informed decision-making about the efficacy of insomnia management strategies, while CES seems to demand further research.

**Keywords:** Cranial Electrotherapy, Hypnotherapy, Insomnia, Sleep Disorders, Therapeutic

## Introduction

Sleep is that core aspect of health which influences various physiological and psychological functions such as metabolic regulation, emotion regulation, memory consolidation and brain recuperation (Ramar et al., 2021). Given its critical role, it should be considered as vital to health as diet and exercise. According to Vernon et al. (2010), insomnia is inadequate or non-restorative sleep despite sufficient time in bed. This significantly cripples an individual's functioning and aftermath their family and society at large if left untreated. The treatment of insomnia widely utilizes both pharmacological and non-pharmacological interventions (Vyas, 2013). But the very fact is that hypnotherapy (Peiffer, 2013) and Cranial Electrotherapy Stimulation (Shekelle et al., 2018) are emerging as popular alternatives due to their potential to mitigate harmful side effects associated with medications.

Hypnotherapy is well known for its psychotherapeutic utilization of hypnosis (Alladin, 2012). It has emerged as a prominent efficient method for addressing both physiological and psychological maladies by being an effective solution to inciting events and disrupting negative response patterns. Hypnotherapy in its new avatar is defined by the American Psychological Association as "a state of focused attention and reduced peripheral awareness characterized by an enhanced capacity for response to suggestion" (Lynn, et. al., 2015). In recent times it has gained immense recognition as a valuable therapeutic tool (Hussain, 2021) because of its significant potential in uncovering triggering events and breaking patterns

of negative responses. Consequently, hypnosis can effectively address both physical and psychological issues that may be the underlying cause of insomnia (Brugnoli, 2016). Scientific findings suggest that hypnosis can enhance immune efficiency by increasing lymphocyte production (Neumann, 2005). On the other hand, CES, employs low-intensity microcurrents to modulate brain excitability and stimulate neurotransmitter and hormone secretion which might cause anxiety, depression and insomnia (Chang, et. al., 2022). It offers a non-intrusive approach that regulates brain activity thereby ameliorating sleep quality.

In the present work, we have therefore performed a comprehensive review of the literature of hypnotherapy and Cranial Electrotherapy Stimulation (CES) as non-pharmacological interventions for insomnia management. By critically evaluating both hypnotherapy and CES based on three significant themes viz. mechanism of action, treatment outcomes and efficacy and attempt has been made to thoroughly understand the benefits and limitations of these techniques. It is expected that this paper would help clinicians and individuals to make more informed decisions regarding their use, ultimately enhancing the effectiveness of insomnia treatment strategies.

## The Main Text

### *Research Objective and Method*

For any therapy to be used successfully as a treatment method, out of the various factors such as the therapeutic relationship, patient conditions, motivation, corrective experiencing, insight, self-efficacy etc, the three basic factors which form the core of any therapy anticipated for the purpose of this review are;

1. Feasibility of the process to be administered to the patient (mechanism of action of the therapy)
2. The amount of impact of the treatment (treatment outcome)
3. Result of the therapy under various circumstances (efficacy)

The principal intent of this literature review is to captiously inspect and compare the differential effects of hypnotherapy and cranial electrotherapy stimulation (CES) on both acute and chronic insomnia. The primary time period is research development in 21$^{st}$ century, however review of few classical scholarly contributions from previous century is not ruled out. We adopted a review approach to examine in detail the benefits and limitations of hypnotherapy and CES on the basis of three operative themes - Mechanism of action, Treatment outcome and Efficacy. Out of 52 shortlisted research papers 26 articles were finally then classified for critical review based on these themes.

### *Scope and Criteria for Inclusion/Exclusion*

There are thousands of papers published on hypnotherapy and CES till date. Out of them only those papers have been chosen which specifically speak about the mechanism of action, treatment outcomes and efficacy of hypnotherapy and CES. Hypnosis as a therapy was introduced by Franz Mesmer a German physician in the 18$^{th}$ century. But, in the 20th century, Gregg E. Gorton, M.D (2005) in his article about Milton Hyland Erickson said “Dr. Milton H. Erickson, M.D. (popularly known as the father of modern clinical hypnosis) had a pivotal realization that even as a hypnotherapist, he could be most effective when not using formal or directive hypnosis. The nondirective, naturalistic style he invented is called Ericksonian hypnosis and his revolutionary psychotherapeutic approach is called Ericksonian psychotherapy. He conceptualized what he was doing as actively catalyzing some new possibility, not as passively awaiting change or as commanding, prescribing or controlling the ultimate outcome. When he was asked about this in July 1977, he said, *Once you start a snowball rolling from the top of a mountain, who can tell what it will grow into and what path it will take?*”

## Literature Review

### Critical review of Hypnotherapy based on mechanism of action

#### *Benefits*

Hypnosis is a valuable therapeutic tool that enhances experiences and connects them to patients' situations, providing diverse interventions and yielding lasting positive outcomes (Ng & Lee, 2008). Increased suggestibility and enhanced imagery support various therapeutic approaches, including techniques such as direct suggestion and symptom substitution, which alleviate discomfort (Peiffer, 2013). Neuroimaging studies shed light on distinct brain activity during hypnosis, revealing involvement of structures like the anterior cingulate cortex and thalamus (Ng & Lee, 2008). Hypnotic trance aids in relaxation, anxiety management and promoting restful sleep (Holdevici, 2014). Hypnotherapy for acute or chronic insomnia employs visualization techniques to induce calmness, exemplified by Stanton's model (Ng & Lee, 2008). Lam et al. (2018) highlight hypnotherapy's effectiveness in managing anxiety, promoting relaxation and enhancing self-control through induction, relaxation, deepening and therapeutic suggestions.

#### *Limitations*

Hypnotherapy, traditionally focused on insight and unconscious reframing, lacks systematic restructuring of dysfunctional cognitions (Alladin, 2012). Combining hypnotherapy with other treatments, like cognitive-behavioral therapy (CBT), enhances efficacy, although empirical research on hypnotherapy for sleep disorders, particularly insomnia, remains scarce (Graci & Hardie, 2007). Uncontrolled trials provide limited insights due to significant placebo effects, while conducting randomized controlled trials poses challenges due to the necessity of patient-therapist rapport for receptive trance states (Ng & Lee, 2008). Analytical hypnotherapy often complements suggestion hypnotherapy, emphasizing the importance of addressing root causes before treatment (Peiffer, 2013). Disease-specific and generic suggestions in hypnotherapy for insomnia exhibit comparable efficacy, albeit with common, mostly mild adverse effects (Lam et al., 2018). Additionally, hypnotic susceptibility is required for positive individuals' responses to hypnosis (Chamine, Atchley, & Oken, 2018). Summary of these is shown in Table – 1.

**Table - 1**

| S.No. | Year | Research Topic |
|---|---|---|
| 1 | 2008 | "Hypnotherapy for sleep disorders" (Ng, B. Y., & Lee, T. S.) |
| 2 | 2012 | "Cognitive hypnotherapy: A new vision and strategy for research and practice" (Alladin, A) |
| 3 | 2013 | "Principles of Hypnotherapy: What it is, how it works" (Peiffer, V) |
| 4 | 2014 | "Relaxation and hypnosis in reducing anxious-depressive symptoms and insomnia among adults." (Holdevici, I) |
| 5 | 2018 | "Hypnotherapy for insomnia: A randomized controlled trial comparing generic and disease-specific suggestions" (Lam, T. H., Chung, K. F., Lee, C. T., Yeung, W. F., & Yu, B. Y. M) |
| 6 | 2018 | "Hypnosis intervention effects on sleep outcomes: a systematic review" (Chamine, I., Atchley, R., & Oken, B. S) |

### Critical review of Hypnotherapy based on treatment outcome

#### *Benefits*

Non-drug interventions demonstrate efficacy in improving sleep for chronic insomnia, with 70-80% of patients experiencing benefits, including significant improvement for 50% and a one third achieving good

sleep status (Morin et al., 1999). Prospective studies reveal that 58.3% report hypnosis as beneficial for sleep, particularly in low-bias studies, with meta-analysis indicating superiority over waitlist in reducing sleep latency (Lam et al., 2018). Hypnotherapy effectively targets cognitive overactivity and nervous system excitation, common contributors to insomnia, providing relief by addressing underlying conflicts or fears (Hammond, cited in Holdevici, 2014). Both acute and chronic insomnia respond well to hypnotherapy, often necessitating only a few sessions for noticeable improvement, with some cases demonstrating lasting effects (Becker, cited in Holdevici, 2014). Despite initial skepticism, hypnosis induces relaxation, countering anxious arousal and facilitating sleep (Chamine et al., 2018). Furthermore, combining hypnosis with cognitive-behavioral therapy (CBT) significantly enhances treatment outcomes for various disorders, including insomnia, affirming its therapeutic value (Kirsch et al., cited in Ng & Lee, 2008). Self-hypnosis and autohypnosis also prove beneficial in reducing arousal and altering pre-sleep thoughts, potentially improving sleep disturbances (Anbar & Slothower, 2006; Anderson et al., 1979).

***Limitations***

Hypnotherapy has shown to decrease sleep onset time, although the quality of studies is low, indicating promising but less convincing evidence compared to CBT-I (Riemann et al., 2017). While treatment benefits many patients, achieving ideal sleep remains elusive for most, with non-drug interventions sustaining improvements for up to six months, often overlooking their impact on daytime functioning (Morin et al., 1999). Safety concerns are paramount in hypnosis, with experiments reporting varied experiences ranging from positive to adverse effects like headaches and dizziness, yet adverse event monitoring in hypnotherapy remains limited (Lam et al., 2018). The optimal number of hypnotherapy sessions for effective treatment varies, typically ranging from 3 to 5 sessions tailored to individual needs (Chamine et al., 2018). Summary of these is shown in Table – 2.

**Table - 2**

| S.No. | Year | Research Topic |
|---|---|---|
| 1 | 1979 | “Insomnia and hypnotherapy” (Anderson, J. A. D., Dalton, E. R., & Basker, M. A) |
| 2 | 1999 | “Nonpharmacologic treatment of chronic insomnia” (Morin, C. M., Hauri, P. J., Espie, C. A., Spielman, A. J., Buysse, D. J., & Bootzin, R. R) |
| 3 | 2006 | “Hypnosis for treatment of insomnia in school-age children: a retrospective chart review” (Anbar, R. D., & Slothower, M. P) |
| 4 | 2008 | “Hypnotherapy for sleep disorders” (Ng, B. Y., & Lee, T. S.) |
| 5 | 2014 | “Relaxation and hypnosis in reducing anxious-depressive symptoms and insomnia among adults.” (Holdevici, I) |
| 6 | 2018 | “Hypnotherapy for insomnia: A randomized controlled trial comparing generic and disease-specific suggestions” (Lam, T. H., Chung, K. F., Lee, C. T., Yeung, W. F., & Yu, B. Y. M |
| 7 | 2018 | “Hypnosis intervention effects on sleep outcomes: a systematic review” (Chamine, I., Atchley, R., & Oken, B. S |

**Critical review of Hypnotherapy based on efficacy**

***Benefits***

Pharmacological treatments such as benzodiazepines and Z-drugs are effective in managing acute or chronic insomnia short-term, but tolerance and dependency develop after 3-4 weeks. However, hypnosis,

supported by sleep research, enhances deep sleep waves, offering a promising alternative. Two studies have demonstrated superior sleep outcomes with hypnosis compared to pharmaceuticals (Mamoune et al., 2022). Hypnotherapy could potentially aid benzodiazepine discontinuation, warranting further investigation into its efficacy in reducing medication dosage (Riemann et al., 2017). Relaxation and hypnotherapy, combined with sleep hygiene guidance, often alleviate both acute and chronic insomnia, and have proven effective for nightmares and sleep terrors. Hypnotherapy demonstrates success in treating various parasomnias, including bedwetting and sleepwalking. Notably, posthypnotic suggestions have reduced nocturnal sensory stimulation in specific cases of night terrors (De Niet et al., 2009). Self-hypnotic exercises at home have shown considerable improvement in individuals over extended periods (De Niet et al., 2009). Hypnosis, preferred over pharmacotherapy by patients, typically requires only a few office visits. It has also effectively treated primary nocturnal enuresis in children and adolescents, possibly more so than medication in older children. Additionally, hypnosis has demonstrated efficacy in managing excessive daytime sleepiness, cataplexy, and sleep paralysis. In cases of loud snoring, hypnotherapy offers strategies such as altering sleeping positions or reframing noise perception for the bed partner. Overall, hypnotherapy holds significant therapeutic potential in managing various sleep disorders (Ng & Lee, 2008). Hypnotherapy significantly reduced PTSD symptoms that were measured by the Posttraumatic Disorder Scale, with lasting effects observed at one-month follow-up. It also improved sleep variables and decreased intrusion and avoidance reactions (Abramowitz et al., 2008). Hypnosis effectively treats various clinical conditions, such as alleviating cancer treatment side effects and managing pain, with low adverse event rates (Hrehová & Mezian, 2021). Medical hypnosis effectively reduces symptoms of anxious-depressive disorders and insomnia, regardless of gender, benefiting both men and women in the study (Holdevici, 2014). Hypnotherapy addresses psychological distress and promotes well-being by tapping into unconscious resources, aligning with positive psychology's emphasis on strengths enhancement (Guse, 2012). Home practice aided by session recordings enhances treatment effectiveness and potentially reduces session frequency. Hypnotherapy for sleep issues shows promise with minimal reported adverse events (Chamine et al., 2018).

***Limitations***

Robust methodology is crucial to assess whether hypnosis can efficiently treat insomnia, with the framework that is ideal thereby providing insights for future studies, including “Innovation, Development, Exploration, Assessment, Long-term follow up”. Methodological shortcomings in therapeutic hypnosis research necessitate improved study designs, and applying the IDEAL framework can enhance the evaluation of non-pharmacological therapies (Mamoune et al., 2022). When hypnotherapy effects diminish over time, discontinuation should involve gradual medication tapering, supplemented by counseling, CBT-I, or alternative medications if needed. Hypnotics may lead to side effects such as hangover, perplextion, falls, recoil of insomnia, resistance and dependency, especially in older adults and those on multiple medications. Dependency and tolerance potential are well-established for benzodiazepines and benzodiazepine receptor agonists (BZRA) (Riemann et al., 2017). Methodological flaws, including inadequate quality and lack of effect size calculation, hinder us to make a rigorous conclusion regarding the impact of non-pharmacological interventions on the sleep quality of an insomniac (De Niet et al., 2009). Many clinicians emphasize that clients’ responses to suggestions depend not just on induction methods but also on various factors. These include clients’ pre-hypnotic attitudes, beliefs and expectations, ability to engage with suggestions, trust in the therapist, interpretation of suggestions, discernment of cues and the progression of interaction with the therapist. Additionally, the suitability of

relevant therapeutic methods and suggestions to the contributing problem plays a crucial role. Hypnotic scripts can enhance skills and confidence in novice therapists. Hypnosis proves effective for insomnia, especially when combined with cognitive therapy like sleep hygiene. Conducting a gold standard randomized double-blind trial is challenging due to the necessity of patient-therapist cooperation for a receptive trance state. Patient characteristics such as fear, attentiveness, and belief in hypnosis influence outcomes, as do practitioner attributes like training and experience. According to Milton H. Erickson, therapists merely create conditions for patients to do the work themselves (Ng & Lee, 2008; Guse, 2012). Summary of these is shown in Table – 3.

**Table - 3**

| S.No. | Year | Research Topic |
|---|---|---|
| 1 | 2008 | "Hypnotherapy for sleep disorders" (Ng, B. Y., & Lee, T. S) |
| 2 | 2008 | "Hypnotherapy in the treatment of chronic combat-related PTSD patients suffering from insomnia: a randomized, zolpidem-controlled clinical trial" (Abramowitz, E. G., Barak, Y., Ben-Avi, I., & Knobler, H. Y) |
| 3 | 2009 | "Review of systematic reviews about the efficacy of non-pharmacological interventions to improve sleep quality in insomnia" (De Niet, G. J., Tiemens, B. G., Kloos, M. W., & Hutschemaekers, G. J) |
| 4 | 2012 | "Enhancing lives: A positive psychology agenda for hypnotherapy" (Guse, T.) |
| 5 | 2014 | "Relaxation and hypnosis in reducing anxious-depressive symptoms and insomnia among adults" (Holdevici, I.) |
| 6 | 2017 | "European guideline for the diagnosis and treatment of insomnia" (Riemann, D., Baglioni, C., Bassetti, C., Bjorvatn, B., Dolenc Groselj, L., Ellis, J. G., ... & Spiegelhalder, K.) |
| 7 | 2018 | "Hypnosis intervention effects on sleep outcomes: a systematic review" (Chamine, I., Atchley, R., & Oken, B. S) |
| 8 | 2021 | "Non-pharmacologic treatment of insomnia in primary care settings" (Hrehová, L., & Mezian, K) |
| 9 | 2022 | "Hypnotherapy and insomnia: A narrative review of the literature" (Mamoune, S., Mener, E., Chapron, A., & Poimboeuf, J) |

**Critical review of CES based on mechanism of action**

***Benefits***

CES likely influences release of endorphin or neurotransmitter activity, enabled by electrodes placed on earlobes transmitting microcurrents through cranial nerves to key brain regions. fMRI studies reveal cortical deactivation, potentially reducing obsessive worry and enhancing attention. Electroencephalographic analysis indicates increased alpha waves, suggesting anxiety reduction. These effects could benefit chronic insomnia by decreasing rumination and anxiety, promoting sleep (Feusner et al., 2012). CES also induces cortical deactivation uniformly across different frequencies, potentially aiding insomnia sufferers by promoting normal brain activity. Moreover, CES enhances cerebral blood flow and regulates neurotransmitters, improving sleep latency, quality, and duration (Brunyé et al., 2021). Embraced in alternative medicine, CES's minimal side effects make it suitable for subclinical conditions, often overlooked by conventional medicine (Mindes, Dubin, & Altemus, 2014). Additionally, athletes

undergoing CES treatment experience reduced negative emotions, improved reaction times, and stabilized nerve activity, counteracting sleep efficiency decline (Lee et al., 2013).

***Limitations***

A justified application of CES in occupational training, operations or recovery requires establishment of empirical connections between CES and human performance which is peremptory to ensure reliability and discerning its effects. Proposed mechanisms include cortical and subcortical stimulation, modulation of brain oscillations, and influence on neurotransmitters, hormones, and endorphins, with key inquiries focusing on CES's direct brain stimulation capabilities (Brunyé et al., 2021; Mindes et al., 2014). Summary of these is shown in Table – 4.

**Table - 4**

| S.No. | Year | Research Topic |
|---|---|---|
| 1 | 2012 | "Effects of cranial electrotherapy stimulation on resting state brain activity" (Feusner, J. D., Madsen, S., Moody, T. D., Bohon, C., Hembacher, E., Bookheimer, S. Y., & Bystritsky, A) |
| 2 | 2014 | "Cranial electrical stimulation. In Textbook of Neuromodulation: Principles, Methods and Clinical Applications" (Mindes, J., Dubin, M. J., & Altemus, M) |
| 3 | 2021 | "A critical review of cranial electrotherapy stimulation for neuromodulation in clinical and non-clinical samples" (Brunyé, T. T., Patterson, J. E., Wooten, T., & Hussey, E. K) |
| 4 | 2022 | "Cranial electrotherapy stimulation to improve the physiology and psychology response, response-ability, and sleep efficiency in athletes with poor sleep quality" (Chang, W. D., Tsou, Y. A., Chen, Y. Y., & Hung, B. L) |

**Critical review of CES based on treatment outcome**

***Benefits***

Neuromodulation methods offer multifaceted benefits, improving learning, rest and task performance. CES shows promise in enhancing occupational performance and alleviating insomnia symptoms, with about half of robust studies indicating improvement (Brunyé et al., 2021). Users commonly report increased energy, euphoria and reduced concerns with CES, contributing to its acceptance in alternative medicine (Mindes et al., 2014). CES induces stress reduction, promoting relaxed sleep states (Lande & Gragnani, 2018), and effectively alleviates stress, benefiting insomnia patients and reducing drug reliance (Kirsch & Gilula). CES's application in chronic pain and medication reduction for anxiety and depression warrants consideration (Gilula & Barach, 2004).

***Limitations***

The effectiveness of CES treatment intensity on sleep outcomes may lack consistency (Kirsch & Nichols, 2013), with outlined side effects like vertigo, irritation of skin, and headaches occurring in approximately 1% of cases (Kirsch et al., 2014). Clinical trials highlight biases across various stages, including randomization, intervention, outcome data, measurement and result selection. Administering CES involves a significant challenge in balancing clinical application with scientific rigor (Lande & Gragnani, 2018). In patients with traumatic stress disorder, prior advisement is crucial, as initial panic may occur

due to misconceptions about CES effects. While some may relax with pre-warning, others may struggle to sleep due to heightened alertness (Kirsch & Gilula). Summary of these is shown in Table – 5.

**Table - 5**

| S.No. | Year | Research Topic |
|---|---|---|
| 1 | 2004 | "Cranial electrotherapy stimulation: a safe neuro-medical treatment for anxiety, depression, or insomnia" (Gilula, M. F., & Barach, P. R) |
| 2 | 2007 | "CES in the Treatment of Anxiety Disorders. A review and meta-analysis of cranial electrotherapy stimulation (CES) in the treatment of anxiety disorders" (Kirsch, D. L., DAAPM, F., & Gilula, M. F) |
| 3 | 2014 | "Cranial electrical stimulation. In Textbook of Neuromodulation: Principles, Methods and Clinical Applications" (Mindes, J., Dubin, M. J., & Altemus, M) |
| 4 | 2018 | "Prospective study of brain wave changes associated with cranial electrotherapy stimulation" (Lande, R. G., & Gragnani, C. T.) |
| 5 | 2021 | "A critical review of cranial electrotherapy stimulation for neuromodulation in clinical and non-clinical samples" (Brunyé, T. T., Patterson, J. E., Wooten, T., & Hussey, E. K) |

**Critical review of CES based on efficacy**

***Benefits***

CES has shown effectiveness in treating insomnia among patients who are receptive to the treatment and can adapt to it, additionally assisting in reducing reliance on medication (Kirsch & Gilula, 2007). Although the evidence regarding CES's efficacy for improving sleep outcomes is not definitive, studies suggest its potential to increase total sleep duration, particularly in men, with a significant initial increase followed by a subsequent improvement (Lande & Gragnani, 2013). While the efficacy of CES remains inconclusive, it appears relatively safe, with limited adverse events reported in randomized controlled trials (RCTs) (Shekelle et al., 2018). Reported adverse effects, such as vertigo, skin irritation and headaches, are rare and typically resolve with adjustments in current levels, although vivid dreams have been reported in PTSD patients (Kwon et al., 2019). If proven effective, CES would turn out to be a promising option for preliminary or adjunctive therapy in psychiatric and neurological disorders due to its minimal side effects and affordability, particularly for populations such as the aged, individuals who have substance use disorders and expecting or lactating women. Moreover, CES may also have potential in managing milder anxiety, depression and insomnia, potentially preventing clinical illness onset and maintaining remission (Mindes, Dubin, & Altemus, 2014).

***Limitations***

A small proportion of individuals may find it challenging to use CES before bedtime due to its potential to induce an alert mental state, which may hinder sleep initiation by stimulating thought processes (Kirsch & Gilula, 2007). Lande and Gragnani (2013) state that "administering CES requires randomized, double-blind, and placebo-controlled clinical trial" thereby limiting the efficacy of the process. Summary of these is shown in Table – 6.

**Table - 6**

| S.No. | Year | Research Topic |
|---|---|---|
| 1 | 2007 | "CES in the Treatment of Insomnia: A Review and Meta-analysis." (Kirsch, D. L., & Gilula, M. F.) |
| 2 | 2013 | "Efficacy of cranial electric stimulation for the treatment of insomnia: a randomized pilot study" (Lande, R. G., & Gragnani, C) |
| 3 | 2014 | "Cranial electrical stimulation. In Textbook of Neuromodulation: Principles, Methods and Clinical Applications" (Mindes, J., Dubin, M. J., & Altemus, M.) |
| 4 | 2018 | "Benefits and harms of cranial electrical stimulation for chronic painful conditions, depression, anxiety, and insomnia: a systematic review" (Shekelle, P. G., Cook, I. A., Miake-Lye, I. M., Booth, M. S., Beroes, J. M., & Mak, S.) |
| 5 | 2019 | "Synergic effects of cranial electrotherapy stimulation with sleep hygiene in patients with chronic insomnia" (Kwon, D. R., Park, J. A., Lee, Y. S., Kwak, J. H., Do, J. K., & Kim, J. E) |

**Findings and Discussion**

Hypnotherapy employs a multifaceted mechanism of action that leverages increased suggestibility and heightened imagery. This thereby induces therapeutic effects. By tapping into the brain's neural networks, hypnosis engages structures like the anterior cingulate cortex and thalamus, which are associated with attention, perception and consciousness (Ng & Lee, 2008). The engagement of these structures facilitates a state that heightens the receptivity to therapeutic suggestions which in turn leads to the modification of cognitive processes and emotional responses.

The techniques that are frequently used in hypnotherapy are direct suggestion and symptom substitution (Erickson, M. H.,1954). These portray a promising potential to alleviate discomfort and promote well-being. Out of the many advantages that hypnotherapy delivers, one of the most fundamental is its ability to enhance experiences that connects it to patients' specific situations. It resorts to a personalized approach that concedes for diverse interventions tailored to individual needs. This has led to lasting positive outcomes.

Relaxation, management of anxiety and restful sleep are notably fostered by hypnotherapy. It often utilizes visualization techniques for treating insomnia. This induces a sense of calmness and facilitates the transition into a state of deep relaxation, favorable for sleep onset. Studies have revealed that management of psychological conditions, including anxiety and insomnia can be efficiently handled by administering hypnotherapy.

Research by Lam et al. (2018) has highlighted that hypnotherapy has been remarkably effective in reducing anxiety levels thereby promoting relaxation and enhancing self-control through the induction of hypnotic trance states and therapeutic suggestions. Additionally, hypnotherapy well controls cognitive overactivity and nervous system excitation which are the common contributors to insomnia thereby providing relief by addressing underlying conflicts or fears.

Just as every coin has two sides so does hypnotherapy. It counters several limitations, despite its therapeutic potential. There are methodological challenges which include the difficulty of conducting randomized controlled trials due to the necessity of patient-therapist rapport thereby hindering a rigorous

evaluation of its efficacy. The presence of safety concerns and individual variability in treatment response cannot be overlooked while administering hypnotherapy. This raises the necessity of further research to optimize its clinical utility and address potential adverse effects.

Ongoing research is essential to elucidate its mechanisms of action, refine treatment protocols and maximize the effectiveness of hypnotherapy in clinical practice because though hypnotherapy is a promising therapeutic modality for various psychological conditions, including insomnia and anxiety yet it has not emerged as perfect treatment for it.

CES operates by transmitting microcurrents through cranial nerves via electrodes. This influences endorphin release or neurotransmitter activity. Studies suggest that cortical deactivation, increased alpha waves and enhanced cerebral blood flow reduces anxiety and promotes sleep (Feusner et al., 2012). This mechanism benefits chronic insomnia sufferers by decreasing rumination and anxiety, facilitating relaxation and sleep initiation. CES has particularly proved beneficial for athletes and those experiencing sleep disturbances as it can cause stress reduction, promoting relaxed sleep states and improved reaction times. Therefore, in order to justify its widespread application empirical connections between CES and human performance need to be thoroughly established.

CES does not show consistent effectiveness on sleep outcomes. Moreover, it has side effects like vertigo and headaches thereby posing challenges to its potential benefits. There is a notable need for a balance between clinical application and scientific rigor during CES because clinical trials highlight biases. Administering CES may induce initial panic in patients with traumatic stress disorder, underscoring the need for prior advisement.

While evidence regarding CES's efficacy for improving sleep outcomes is not definitive, it appears relatively safe, with limited adverse events reported in randomized controlled trials. CES could offer an attractive option for primary or adjunctive therapy in psychiatric and neurological disorders due to its minimal side effects and affordability if proven effective. Though it can be said that CES has potential in managing milder anxiety, depression and insomnia, potentially preventing clinical illness onset and maintaining remission (Mindes, Dubin, & Altemus, 2014), yet challenges in its application before bedtime and the necessity for rigorous clinical trials underscore the need for further research to optimize CES's efficacy and safety in clinical practice.

## Conclusion

Hypnotherapy and CES have distinct mechanisms of action and treatment outcomes. They offer promising avenues for addressing sleep disorders (Acunzo, D. J., & Terhune, D. B., 2021). Hypnotherapy efficiently manages insomnia by notably controlling cognitive overactivity and promoting relaxation. Moreover, only a few sessions are required for noticeable improvement. This systematic literature review concludes that despite methodological challenges and limitations, hypnotherapy holds significant therapeutic potential, especially when combined with cognitive-behavioral therapy.

On the other hand, CES ascends endorphin release and neurotransmitter activity. This causes stress reduction and enhances cerebral blood flow thereby fostering relaxation and improved sleep initiation. The study of literature has revealed that treatment outcomes of CES are not consistent and side effects like vertigo and headaches have been reported. Therefore, to optimize CES's efficacy and safety it is quite evident that further research is exigent.

Individual patient characteristics and preferences are of foremost consideration while making the selection for the most suitable approach of treatment. Therefore, future studies must emphasize on conducting

rigorous clinical trials to perceive the mechanisms of action and optimize treatment outcomes for both hypnotherapy and CES in managing insomnia whether acute or chronic. Last but not the least, these interventions are valuable alternatives to traditional pharmacological approaches. They also highlight the importance of exploring non-invasive, adjunctive therapies for improving sleep quality and overall well-being.

**References**

1. Abramowitz, E. G., Barak, Y., Ben-Avi, I., & Knobler, H. Y. (2008). Hypnotherapy in the treatment of chronic combat-related PTSD patients suffering from insomnia: a randomized, zolpidem-controlled clinical trial. *Intl. Journal of Clinical and Experimental Hypnosis*, *56*(3), 270-280.
2. Acunzo, D. J., & Terhune, D. B. (2021). A critical review of standardized measures of hypnotic suggestibility. *International Journal of Clinical and Experimental Hypnosis*, *69*(1), 50-71.
3. Alladin, A. (2012). Cognitive hypnotherapy: A new vision and strategy for research and practice. *American Journal of Clinical Hypnosis*, *54*(4), 249-262.
4. Anbar, R. D., & Slothower, M. P. (2006). Hypnosis for treatment of insomnia in school-age children: a retrospective chart review. *BMC pediatrics*, *6*, 1-6..
5. Anderson, J. A. D., Dalton, E. R., & Basker, M. A. (1979). Insomnia and hypnotherapy1. *Journal of the Royal Society of Medicine*, *72*(10), 734-739.
6. Brugnoli, M. P. (2016). Clinical hypnosis for palliative care in severe chronic diseases: a review and the procedures for relieving physical, psychological and spiritual symptoms. *Annals of Palliative Medicine*, *5*(4), 28097-28297.
7. Brunyé, T. T., Patterson, J. E., Wooten, T., & Hussey, E. K. (2021). A critical review of cranial electrotherapy stimulation for neuromodulation in clinical and non-clinical samples. *Frontiers in human neuroscience*, *15*, 625321.
8. Chamine, I., Atchley, R., & Oken, B. S. (2018). Hypnosis intervention effects on sleep outcomes: a systematic review. *Journal of Clinical Sleep Medicine*, *14*(2), 271-283.
9. Chang, W. D., Tsou, Y. A., Chen, Y. Y., & Hung, B. L. (2022). Cranial electrotherapy stimulation to improve the physiology and psychology response, response-ability, and sleep efficiency in athletes with poor sleep quality. *International Journal of Environmental Research and Public Health*, *19*(4), 1946.
10. De Niet, G. J., Tiemens, B. G., Kloos, M. W., & Hutschemaekers, G. J. (2009). Review of systematic reviews about the efficacy of non-pharmacological interventions to improve sleep quality in insomnia. *International Journal of Evidence-Based Healthcare*, *7*(4), 233-242.
11. Erickson, M. H. (1954). Special techniques of brief hypnotherapy. *International Journal of Clinical and Experimental Hypnosis*, *2*(2), 109-129.
12. Feusner, J. D., Madsen, S., Moody, T. D., Bohon, C., Hembacher, E., Bookheimer, S. Y., & Bystritsky, A. (2012). Effects of cranial electrotherapy stimulation on resting state brain activity. *Brain and behavior*, *2*(3), 211-220
13. Gilula, M. F., & Barach, P. R. (2004). Cranial electrotherapy stimulation: a safe neuromedical treatment for anxiety, depression, or insomnia. *HEALTH*, *3*, 22
14. Guse, T. (2012). Enhancing lives: A positive psychology agenda for hypnotherapy. *South African Journal of Psychology*, *42*(2), 214-223.

15. Holdevici, I. (2014). Relaxation and hypnosis in reducing anxious-depressive symptoms and insomnia among adults. *Procedia-Social and Behavioral Sciences*, *127*, 586-590
16. Hrehová, L., & Mezian, K. (2021). Non-pharmacologic treatment of insomnia in primary care settings. *International Journal of Clinical Practice*, *75*(6), e14084.
17. Hussain, F. A. (2021). Hypnotherapy as an Adjunct to Medical Treatment: Highlighting Effectiveness and Identifying Barriers to Further Integrative Treatment. *Journal of Health Management*, *23*(2), 185-196.
18. Kirsch, D. L., & Gilula, M. F. (2007). CES in the Treatment of Insomnia: A Review and Meta-analysis. *Pract Pain Manag*, *7*(7), 28-39
19. Kwon, D. R., Park, J. A., Lee, Y. S., Kwak, J. H., Do, J. K., & Kim, J. E. (2019). Synergic effects of cranial electrotherapy stimulation with sleep hygiene in patients with chronic insomnia. *Journal of sleep medicine*, *16*(1), 36-40.
20. Lam, T. H., Chung, K. F., Lee, C. T., Yeung, W. F., & Yu, B. Y. M. (2018). Hypnotherapy for insomnia: A randomized controlled trial comparing generic and disease-specific suggestions. *Complementary Therapies in Medicine*, *41*, 231-239.
21. Lande, R. G., & Gragnani, C. (2013). Efficacy of cranial electric stimulation for the treatment of insomnia: a randomized pilot study. *Complementary therapies in medicine*, *21*(1), 8-13.
22. Lande, R. G., & Gragnani, C. T. (2018). Prospective study of brain wave changes associated with cranial electrotherapy stimulation. *The primary care companion for CNS disorders*, *20*(1), 26714.
23. Lynn, S. J., Green, J. P., Kirsch, I., Capafons, A., Lilienfeld, S. O., Laurence, J. R., & Montgomery, G. H. (2015). Grounding hypnosis in science: the "New" APA division 30 definition of hypnosis as a step backward. *American Journal of Clinical Hypnosis*, *57*(4), 390-401.
24. Mamoune, S., Mener, E., Chapron, A., & Poimboeuf, J. (2022). Hypnotherapy and insomnia: A narrative review of the literature. *Complementary Therapies in Medicine*, *65*, 102805.
25. Mindes, J., Dubin, M. J., & Altemus, M. (2014). Cranial electrical stimulation. In *Textbook of Neuromodulation: Principles, Methods and Clinical Applications* (pp. 127-150). New York, NY: Springer New York.
**26.** Morin, C. M., Hauri, P. J., Espie, C. A., Spielman, A. J., Buysse, D. J., & Bootzin, R. R. (1999). Nonpharmacologic treatment of chronic insomnia. *Sleep*, *22*(8), 1134-1156.
27. Neumann, P. (2005). The use of hypnosis in modifying immune system response. *Australian Journal of Clinical and Experimental Hypnosis*, *33*(2), 140.
28. Ng, B. Y., & Lee, T. S. (2008). Hypnotherapy for sleep disorders. *Ann Acad Med Singapore*, *37*(8), 683-688.
29. Peiffer, V. (2013). *Principles of Hypnotherapy: What it is, how it works*. Singing Dragon.
30. Ramar, K., Malhotra, R. K., Carden, K. A., Martin, J. L., Abbasi-Feinberg, F., Aurora, R. N., ... & Trotti, L. M. (2021). Sleep is essential to health: an American Academy of Sleep Medicine position statement. *Journal of Clinical Sleep Medicine*, *17*(10), 2115-2119.
31. Riemann, D., Baglioni, C., Bassetti, C., Bjorvatn, B., Dolenc Groselj, L., Ellis, J. G., ... & Spiegelhalder, K. (2017). European guideline for the diagnosis and treatment of insomnia. *Journal of sleep research*, *26*(6), 675-700.
32. Shekelle, P. G., Cook, I. A., Miake-Lye, I. M., Booth, M. S., Beroes, J. M., & Mak, S. (2018). Benefits and harms of cranial electrical stimulation for chronic painful conditions, depression, anxiety, and insomnia: a systematic review. *Annals of internal medicine*, *168*(6), 414-421.

33. Vernon, M. K., Dugar, A., Revicki, D., Treglia, M., & Buysse, D. (2010). Measurement of non-restorative sleep in insomnia: A review of the literature. *Sleep Medicine Reviews*, *14*(3), 205-212.
34. Vyas, U. K. (2013). Non-pharmacological management of insomnia. *Br J Med Pract*, *6*(3), 6-10.