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ALTERNATIVE TREATMENTS FOR PAIN MEDICINE (M JONES, SECTION EDITOR)

# Hypnosis As A Therapy for Chronic Lower Back Pain

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## Abstract

**Purpose of Review** Chronic lower back pain is a crippling condition for the individual and a significant burden on society. It is notoriously challenging to manage despite access to invasive interventions. Understanding hypnosis as a powerful therapeutic adjunct to this condition allows holistic treatment of patients in distress.

**Recent Findings** In addition to classic etiologies of chronic lower back pain, hypnosis has proven to be beneficial in chronic back pain caused by pregnancy, diabetic and HIV neuropathy. Combination of hypnosis with other mind–body techniques such as olfactory stimulation, music therapy and patient education offers further promise to this treatment modality.

**Summary** Our review provides a run-through of the fundamental mechanisms of hypnosis in moderating chronic back pain, its quantifiable benefits, its novel areas of use and its potentials in the future based on the most recent and relevant peer-reviewed literature in order to guide clinicians to better deploy this valuable resource.

**Keywords** Hypnosis · Hypnotherapy · Chronic pain · Lower back pain

## Introduction

Chronic lower back pain is an intensely debilitating condition widely recognized to have immense social and economic impacts through the erosion of quality of life (QOL), loss of productive man-hours as well as an increase in healthcare utilization [1–5]. In developed countries, the prevalence of lower back pain could be as high as 84% [6] over one's lifetime and across the world, it is prevalent at 9.4% (95% CI 9.0 to 9.8) [7]. Unsurprisingly, it is also crowned the top spot in the greatest number of years lived with a chronic disease among patients in Western Europe [7, 8]. In the USA, up to 30% of the population is adversely affected by it on a yearly basis [9].

The root cause of chronic back pain is not always apparent as organic pathology inter-mingles with the psychological state and socioeconomic standing [10], collectively culminating in what is termed the "chronic pain experience" by Banks and Kerns [11]. Often defined as pain lasting for at least 3 months, identifiable and quantifiable pathologies include lumbar stenoses, radiculopathies, neuropathies and structural deformations of the bony axis directly contributing to pain and distress. The recognition of underlying cognitive, affective and behavioral elements has led specialists to adopt strategies of combination therapies [12]. The implementation of physiotherapy and the analgesia ladder with judicious use of opioids and neuropathic agents is currently common practice. Targeted interventions in the form of image-guided injections of steroids and local anesthetics as well as radiofrequency ablations represent popular options of invasive therapies shy of nerve stimulation, minimally invasive and open surgeries. Psychosocial modalities of education, relaxation/meditation and hypnosis loosely categorized under cognitive behavioral therapy (CBT) are proving to be crucial in the holistic management of chronic back pain.

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## Hypnosis in Chronic Lower Back Pain

Hypnosis attains in its subject a plane of consciousness susceptible to the exaggeration of subsequent suggested therapy [13, 14]. The use of hypnosis for pain management dates back over hundreds of years, and its employment in the intervention of chronic lower back pain has been explored in detail since the 1960s [15]. Certain concepts of hypnosis have been singled out in formulation of strategies to be used in particularly resistant chronic lower back pain conditions such as in failed back surgery syndrome [16••]. *Relaxation* is a technique proposed by Sacerdote [17] which through the use of eye fixation, patients could control and obliterate muscle spasm and thereby interrupt the cycle of pain. Erickson used the approach of *Displacement* [18], during which pain is perceived as an entity which could be displaced and left in a medium separate from that of the patient. Crasilneck [15, 19] described the strategy of *Age Regression* which allows patients to regress to a time prior to the occurrence of pain, strengthening their understanding of its source and their ability to control it. No matter the use of which technique or combination of techniques, *Self-hypnosis* described by Cheek [20] achieves the reinforcement of most if not all techniques and empowers individuals to exercise these skills continuously on their own without further direction.

It is worthwhile at this juncture to consider if the entire population is expected to respond to hypnosis the same way and to the same degree. Hypnotic susceptibility refers to the likelihood of an individual to respond when subjected to hypnosis and hypnotic suggestions, and this tendency can be measured using standardized tools such as the Stanford Hypnotic Suggestibility Scale or the Harvard Group Scale of Hypnotic Susceptibility [21, 22]. Suggestibility varies widely within the general population, and it is believed to fall in a Gaussian distribution with the least representation in the most susceptible and least susceptible groups [21, 23, 24]. Unsurprisingly, it was found that greater hypnosis susceptibility also translates to greater hypnotic pain reduction. Montgomery [21, 25] demonstrated higher weighted effect size ($D = 1.6$) in subjects of high susceptibility range compared to subjects in medium ($D = 0.64$) or low ranges ($D = -0.01$). While certain studies explicitly made high hypnotizability an inclusion criteria [26, 27], it is clear from our literature search that in the general population, an inverse relationship exists between the adoption of hypnotic treatment and back pain intensity (Table 1).

Placing the above fundamentals in context, recent studies exploring the efficacy of backpain control via hypnosis have mostly assumed the model of in-person classes on self-hypnosis and follow-up sessions evaluating the effectiveness of its reproduction at home [28••, 29•, 30]. While preserving the essence of the traditional models, modern technology has been adopted to further improve on the methods of therapy delivery. Bodt [31•] described an ongoing study delivering the technique of relaxation through a smartphone app. The app provides instructions and daily exercises to be accomplished, at the same time functioning as an electronic diary collecting real-time responses on its questionnaires assessing progress and therapy efficacy.

## Measures of Efficacy

Returning to the fundamentals of neuroanatomy, Nusbaum [27] utilized functional neuroimaging (PET) to demonstrate the neural territories positively influenced by hypnosis in patients with chronic back pain. It was revealed that these patients consistently recorded lower scores on the visual analogue scale (VAS) under hypnosis, and that the brain's fronto-limbic (emotional-weighted) network appeared to be more profoundly activated in states of hypnosis following direct or indirect suggestions. Therefore it was suggested that the state of analgesia is attained via the enhancement of positive emotions through hypnosis. Although not in complete congruence with the former in terms of activated brain territories, Derbyshire [26] showed with functional MRI that hypnosis enhanced the efficacy of suggestion after hypnotic induction, thereby lessening the experience of pain.

Domangue [32] in 1985 sought to demonstrate a measurable change in serum neurotransmitter levels as a direct result of hypnotic intervention in subjects with chronic musculoskeletal pain. The investigator found significantly elevated B-endorphin levels after hypnosis ($p < 0.03$) and norepinephrine levels trending higher post-treatment ($p = 0.07$), somewhat in congruence to a uniform reduction in pain, anxiety and self-reported measure of depression. This study provided an early insight into the potential biochemical manifestations of chronic pain and the potency of hypnosis in effecting a quantifiable change that is reproducible.

Subjective questionnaires and scales are commonly used to quantify the positive outcomes in chronic back pain following hypnotic interventions. These often include pain intensity (e.g., VAS) [33, 34], disability (e.g., Roland Morris Disability Questionnaire) [35, 36], catastrophizing (e.g., Pain Catastrophizing Scale) [37], physical function (e.g., Patient-specific Function Scale) [33, 38], quality of life (e.g., Neuropathic Pain Index on QOL) [29•], anxiety (e.g., State-Trait Anxiety Inventory) [30] and depression (e.g., Beck Depression Inventory) [39]. Overall, hypnosis is seen to be an extremely consistent modality of intervention demonstrating superiority against its respective controls in the management of chronic back pain (Table 1).

**Table 1** PubMed article summary on chronic back pain and hypnosis (LoE: level of evidence; RCT: randomized controlled trial; RA: rheumatoid arthritis).

| Year | Author | Journal | Study Type | n | Hypnosis intervention | Follow-up (days/ wks/ mths) | Pain Etiology | Oxford LoE | Conclusion |
|---|---|---|---|---|---|---|---|---|---|
| 2020 | Izgu | J Nurs Scholarsh | RCT | 65 | Progressive muscle relaxation; mindfulness meditation | 14 wks | Diabetic neuropathic pain | 1 | Beneficial |
| 2020 | McKittrick | Am J Clin Hypn | Case study | 1 | Hypnotherapy | 4 yrs | Diabetic neuropathic pain | 5 | Beneficial |
| 2019 | Hussain | J Evid Based Integr Med | Prospective cohort | 105 | Mindfullness meditation; control meditation; progressive relaxation meditation | 3 mths | Diabetic neuropathic pain | 2 | Beneficial |
| 2018 | Rizzo | J Pain | RCT | 100 | Hypnotherapy | 3 mths | Non-specific back pain > 3 mths | 1 | Beneficial |
| 2016 | Aveni | Explore | Cross-sectional observation | 1247 | Hypnotherapy | N/A | Non-specific chronic back pain | 5 | Beneficial |
| 2015 | Tan | Eur J Pain | RCT | 100 | Hypnotherapy | 6 mths | Non-specific chronic back pain | 1 | Beneficial |
| 2014 | Akmese | J Midwifery Womens Health | RCT | 73 | Progressive muscle relaxation | 8 wks | Pregnancy lower back pain 12–24 wks | 1 | Beneficial |
| 2014 | Bubenzer | Int J Clin Exp Hypn | Case series | 2 | Olfactory stimulation in hypnosis | 3–5 mths | Chronic back pain; cancer pain | 4 | Beneficial |
| 2013 | Dorfman | Pain Med | Prospective cohort | 36 | Hypnotherapy | 17 wks | Distal sensory polyneuropathy | 3 | Beneficial |
| 2013 | Donatone | Am J Clin Hypn | Case study | 1 | Hypnotherapy | 8 wks | Non-specific chronic back pain | 5 | Beneficial |
| 2010 | Tan | Int J Clin Exp Hypn | Case series | 9 | Hypnotherapy | 6 mths | Non-specific chronic back pain | 4 | Beneficial |
| 2010 | Nusbaum | Int J Clin Exp Hypn | Bench study | 14 | Hypnotherapy | N/A | Non-specific chronic back pain | 5 | Beneficial |
| 2009 | Kröner-Herwig | Curr Opin Psychiatry | Opinion | N/A | Hypnotherapy | N/A | Chronic back pain | 4 | Beneficial |
| 2008 | Bernateck | Forsch Komplementmed | RCT | 44 | Autogenic training | 3 mths | Non-specified pain from RA | 1 | Beneficial |
| 2007 | Sierpina | Explore | Cross-sectional observation | 74 | Mind body medicine | N/A | Multiple symptoms inclusive of chronic back pain | 5 | Beneficial |
| 2007 | Torem | Am J Clin Hypn | Case series | 5 | Hypnotherapy | N/A | Muscle and joint pain in autoimmune diseases | 5 | Beneficial |

**Table 1** (continued)

| Year | Author | Journal | Study Type | n | Hypnosis intervention | Follow-up (days/ wks/ mths) | Pain Etiology | Oxford LoE | Conclusion |
|---|---|---|---|---|---|---|---|---|---|
| 2006 | Tan | J Clin Psychol | Case series | 2 | Hypnotherapy; cranioe lectrotherapy stimulation | N/A | Mechanical back injury | 4 | Beneficial |
| 2001 | Simon | Int J Clin Exp Hypn | Case study | 1 | Hypnotherapy | N/A | Lumbar puncture back pain | 5 | Beneficial |
| 1998 | Crawford | Int J Clin Exp Hypn | Cohort study | 17 | Hypnotherapy | 3 wks | Chronic back pain | 2 | Beneficial |
| 1995 | Crasilneck | Am J Clin Hypn | Case series | 12 | Hypnotherapy | 9–12 mths | Chronic backache; headache; arthritis; postherpetic neuralgia | 4 | Beneficial |
| 1989 | Spinholven | Br J Clin Psychol | Prospective cohort | 31 | Hypnotherapy | 2 mths | Non-specific back pain > 6 mths | 2 | Neutral |
| 1989 | Belgrade | Postgrad Med | Opinion | N/A | Hypnotherapy & psychotherapy | N/A | Cancer pain | 5 | Beneficial |
| 1985 | Domangue | J Clin Psychiatry | Prospective cohort | 19 | Hypnotherapy | N/A | Musculoskeletal pain; unspecified | 3 | Beneficial |
| 1984 | Trifiletti | Genet Psychol Monogr | Systematic review | 24 | Hypnotherapy; music therapy | 6 mths | N/A | 3 | Beneficial |
| 1983 | Savitz | South Med J | Opinion | 3 | Hypnotherapy | N/A | chronic back; shoulder; knee pain | 5 | Beneficial |
| 1979 | Crasilneck | Am J Clin Hypn | Case series | 29 | Hypnotherapy | 2 mths | Failed back syndrome | 4 | Beneficial |
| 1978 | Sacerdote | J Human Stress | Case study | 1 | Hypnotherapy | 1 wk | Chronic back pain among others | 5 | Beneficial |
| 1977 | Van Nuys | J Am Soc Psychosom Dent Med | Case study | 1 | Hypnotherapy | 2 wks | Sacro-iliac pain | 5 | Beneficial |
| 1976 | Crawford | Anesth Analg | Case series | 18 | Hypnotherapy | 3 days | Intra-op Harrington operation for scoliosis | 4 | Beneficial |
| 1973 | Levit | Am J Clin Hypn | Case study | 1 | Hypnotherapy | 1 mth | Failed back syndrome | 5 | Beneficial |

## Unique Etiologies of Back Pain

Hypnosis has proven itself efficacious in unique circumstances involving back pain. During the course of pregnancy, 50% to 70% of women would experience some degree of lower back pain [40–44]. Pelvic girdle pain in pregnancy has a prevalence of 45% globally [45], and in the underserved population in the USA, the prevalence is higher at 67% [46]. Despite not being formally classified as chronic back pain, it is not difficult to imagine that pregnancy-induced lower back pain could easily be experienced over a 3-month duration beyond 20 weeks of gestation. Akmese adopted the modality of progressive muscle relaxation (PMR—a common induction strategy in hypnosis) in the treatment of back pain in pregnant women. The results were overwhelmingly in favor of PMR with music therapy, where the intervention group achieved reduced perception of pain ($p < 0.001$) and a higher QOL ($p < 0.001$) over a follow-up period of 8 weeks.

HIV patients often experience chronic pain due to neuropathy as a direct result of disease progression as well as side effects from antiretroviral therapy. Chronic back pain was in fact found to be the third most prevalent pain syndromes encountered in poorly controlled disease, behind headache and abdominal pain [47]. Through hypnosis intervention,

Dorfman [30] demonstrated a convincing reduction in pain intensity ($P < 0.001$) and this effect was sustained for at least 7 weeks after cessation of intervention whether the patient was already medicated on analgesics. Furthermore, in patients experiencing depression, hypnosis significantly improved symptoms ($p = 0.026$) and helped to attain higher QOL scores ($p = 0.020$).

The efficacy of hypnosis in the cognitively impaired has been demonstrated in various studies involving patients with schizophrenia/psychosis and neurological impairment with speech deficit [48–50]. Extrapolating that potential, Simon [51] explored the use of hypnosis in back pain during lumbar puncture in a challenging patient with dementia and had great success. With pre-procedural hypnotic rehearsal reinforcing suggestions, direction and redirection, the subject remained calm, comfortable and motionless throughout the invasive procedure.

## Clinical Sentiments and Summary of Literatures

A literature search on PubMed conforming to our defined search criteria of adult hypnosis, back pain, radiculopathy and neuropathy in various permutations turned up 30 articles of relevance upon filtering (Table 1). The articles were published between 1976 [39] and 2020 [52], exploring various etiologies of chronic lower back pain in excess of common mechanical and degenerative causes, such as diabetic and HIV neuropathies and pregnancy-associated back pain. Oxford Center Evidence levels ranged from 5 to 1 representing professional opinions and randomized contsrolled trials at either ends of the spectrum, respectively. Measures of efficacy center on pain intensity, anxiety, depression and QOL among others. Out of all 30 articles (96.7%), 29 demonstrated beneficial outcomes with hypnosis in back pain with a single article having a neutral effect. This firmly established the role of hypnosis as a modality of high efficacy and safety with little or even no side effects.

Aveni [53] conducted a cross-sectional survey among 1247 healthcare professionals at Lausanne University Hospital, Switzerland, and 96.1% agreed or strongly agreed that complimentary medicine could be beneficial in the management of chronic pain. Specifically, 89.8% of the respondents expressed confidence in hypnosis—the highest among all individual treatment modalities ahead of osteopathy (85.5%) and acupuncture (83.4%). Furthermore, 70.1% of the respondents identified lower back pain as the condition warranting referral for management through complementary medicine.

## The Future

Hypnosis has proven itself to be a formidable tool in the holistic management of chronic lower back pain. Due to its versatility, there is much room for continuous modification and enhancement with other adjuncts to further improve patient care. Rizzo [28••] convincingly demonstrated the positive influence of pain education when combined with hypnosis, building upon prior concepts that individuals benefit through the accumulation of knowledge on the biology, physiology and anatomy of the conditions that afflict them, thereby becoming more amenable to additional pain-alleviating interventions. The proposed underlying mechanisms include reduced catastrophizing, fear-avoidance and behavioral modulations in favor of pain management, directly reducing the amount of pain resources used [54]. Akmese [55••] coupled instructions on progressive muscle relaxation (widely considered the most common hypnotic induction employed) with music therapy given to subjects on compact discs, showing improved self-reported QOL and pain intensity over a 2-month period. Bubenzer [56••] introduced olfactory stimulants as an anchor to be used in conjunction with hypnosis. The rationale is for this olfactory stimulant to serve as a posthypnotic cue, evoking a desirable memory which achieves the state of analgesia. This combination treatment served to be effective in both end-stage cancer pain in the pelvis and lower back, as well as lower back pain secondary to failed back syndrome. Cognitive behavioral therapy is itself a basket of multiple mind–body therapies inclusive of hypnosis widely implemented in different therapeutic settings of chronicity. The mixing and matching of these modalities create an environment of limitless potentials for clinicians to explore and experiment on.

## Conclusion

Chronic lower back pain presents as an extremely common yet exceedingly complex challenge, carrying with it a significant degree of life-long debility. Mind–body techniques have and will continue to play a crucial role as advances in medicine lead us into the future down the road of increasingly less invasive therapeutic modalities. Hypnosis with its efficacy and unparalleled safety profile proven through its long history will remain a powerful arsenal in the armamentarium of the pain physician. This is further bolstered by its ease of adoption by modern technology, making it a promising adjunct throughout all stages of a comprehensive pain management strategy.

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• Of importance
•• Of major importance


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