A META-ANALYSIS OF HYPNOSIS FOR CHRONIC PAIN PROBLEMS:
A Comparison Between Hypnosis, Standard Care, and Other Psychological Interventions

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Abstract: Hypnosis is regarded as an effective treatment for psychological and physical ailments. However, its efficacy as a strategy for managing chronic pain has not been assessed through meta-analytical methods. The objective of the current study was to conduct a meta-analysis to assess the efficacy of hypnosis for managing chronic pain. When compared with standard care, hypnosis provided moderate treatment benefit. Hypnosis also showed a moderate superior effect as compared to other psychological interventions for a non-headache group. The results suggest that hypnosis is efficacious for managing chronic pain. Given that large heterogeneity among the included studies was identified, the nature of hypnosis treatment is further discussed.

Many people are suffering from chronic pain worldwide (Verhaak, Kerssens, Dekker, Sorbi, & Bensing, 1998). Chronic pain not only personally impacts those individuals but is also associated with great economic cost (i.e., health care costs) inflicted by such conditions (Turk, 2002). The United States Congress passed into law a provision declaring the 10-year period beginning in January 1, 2001, as the Decade of Pain Control and Research (Lippe, 2000). This legislation reflects the considerable societal drain that can be associated with chronic pain. While chronic pain results in severe external consequences for the self and society, psychological factors can exacerbate the experience of chronic pain (e.g., catastrophizing, depression, and fear; Cook, Brawer, & Vowles, 2006; Jensen, Turner, & Romano, 2001; Spinhoven et al., 2004; Sullivan et al., 2001, Vlaeyen, Kole-Snijders, Boeren, & van Eek, 1995). Psychotherapy is widely used to help alleviate chronic pain.
Cognitive-behavioral and hypnotic approaches are two strategies that appear to be rather popular and effective (Kisley, Campbell, Skerritt, & Yelland, 2010).

Hypnosis has long been shown to be an effective psychological treatment (Melzack & Wall, 1982). Several brain-imaging studies assessing hypnotic analgesia have received a fair amount of research attention (Abrahamsen et al., 2010; Faymonville et al., 2000; Hofbauer, Rainville, Duncan, & Bushnell, 2001; Jensen, 2010; Rainville, Duncan, Price, Carrier, & Bushnell, 1997).

Although some individual studies have shown the efficacy of hypnosis for intractable chronic pain (Haanen et al., 1991; Jensen Barber, Romano, Hanley, et al., 2009; Jensen Barber, Romano, Molton, et al., 2009; Muraoka, Komiyama, Hosoi, Mine, & Kubo, 1996), the field would benefit from efforts to summarize results of individual interventions to determine the overall efficacy of hypnotic treatment. Only a handful of studies have reported the overall efficacy of hypnosis for chronic pain (Jensen & Patterson, 2006; Montgomery, Duhamel, & Redd, 2000; Patterson & Jensen, 2003). While Jensen and Patterson, and Patterson and Jensen, provide a narrative review of the literature, only Montgomery et al. have provided a systematic review. Montgomery and colleagues’ review is of great utility, because it summarizes the results of individual interventions for clinical and experimental pain using a meta-analysis.

Montgomery et al. (2000) investigated the effects of hypnosis for clinical pain including burns, coronary disease, cancer, headache, and experimental pain inductions (i.e., cold pressor, ischemic pain, and focal pressure). Statistical analysis was conducted on 18 published studies including samples totaling 933 participants. Calculated effect sizes revealed that hypnosis had a large effect ($d = 0.80$) in managing clinical pain and a moderate-to-large effect ($d = 0.70$) for managing experimental pain.

However, Montgomery et al. (2000) included acute and experimental pain within a broader scope. A meta-analytical study reporting the efficacy of hypnosis that narrows the focus to only chronic pain has not been previously conducted. Thus, we conducted a systematic review to investigate the efficacy of hypnosis for managing chronic pain.

**Method**

*Search Strategy*

We searched three electronic databases: Cochrane Central Register of Controlled Trials (CENTRAL), MEDLINE, and PsycINFO for studies published on or before June 29, 2011. Searches were carried out using a combination of the following keywords: *pain*, *hypnosis*, and *clinical trial*.
The search strategy for the MEDLINE database is listed in section 1 of the Appendix. This approach yielded 130 articles.

For CENTRAL and PsycINFO, we basically used the Medical Subject Heading and subject search strategies. We also used a keyword search to complement the former strategies. Hypnosis and pain were used as the search terms (see the Appendix, sections 2 and 3). This approach yielded 228 articles from CENTRAL and 167 articles from PsycINFO. Moreover, the reference lists of previous review articles (Jensen & Patterson, 2006; Montgomery et al., 2000; Patterson & Jensen, 2003) were scanned to obtain three additional studies.

**Inclusion and Exclusion Criteria**

Our inclusion criteria were as follows: (a) randomized controlled trials (RCTs) or controlled clinical trials as experimental design; (b) trials targeting only chronic pain problems; (c) application of hypnosis as the main therapeutic intervention; (d) inclusion of a control group (groups receiving both a standard care and other psychological interventions); (e) pain or pain intensity as the main outcome; (f) studies written in English; (g) published journal articles; and (h) studies containing data where effect sizes could be calculated, such as means and standard deviations.

Exclusion criteria were as follows: (a) application of hypnotic-like interventions, such as autogenic training (AT) or progressive muscle relaxation (PMR) as the main interventions; (b) absence of data that could be used for calculating effect sizes; (c) studies written in a language other than English; (d) use of a case report and/or a narrative review as the study method; and (e) unpublished work, doctoral dissertations, published abstracts, books, letters, commentaries, and editorials.

**Assessment of Methodological Quality**

Methodological quality was assessed with a scale for assessing quality of psychological trials for treating pain developed by Yates, Morley, Eccleston, and Williams (2005). This scale provides an overall total score (0 to 35) that consists of two subscales. These include a treatment quality (0 to 9) and a design and methods scale (0 to 26). The first and second authors (TA and HF) scored all of the studies. TA and HF discussed their disagreements in ratings regarding the coding notes of this scale. Each disagreement was discussed until consensus was reached.

**Data Analysis**

Hedges’s $g$ (Hedges & Olkin, 1984) and 95% confidence intervals were calculated. $Q$ statistics and $I^2$ tests were used to measure statistical heterogeneity; a $Q$ statistic $p$ value of greater than .1 and an $I^2$ value
of less than 30% indicated homogeneity (Higgins & Green, 2011). We used random effects models in all analyses. We examined the effects of interventions based on the points of evaluation (i.e., postintervention or at follow-up) and the type of control groups (standard care or other psychological interventions). Calculations were performed using MIX 2.0 computer software, and analyses were conducted using SPSS 17.0.

Results

Characteristics of Included Studies

**Literature search.** Excluding 53 duplicate articles across three databases, and two duplicates within the CENTRAL database, 473 relevant articles were identified in our initial search. The first author (TA) reviewed these articles and rejected 391 articles on titles and abstracts. TA reviewed full texts of the remaining 82 articles and evaluated them in detail. Finally, only 12 clinical studies met our inclusion criteria. Of these, six were relevant RCTs and six were relevant clinical trials.

**Study quality.** For the 12 included studies, the mean overall quality of the studies was 15.00 (SD = 3.13, range: 11 to 21). The mean design quality was 11.00 (SD = 2.30, range: 6 to 15), and the mean treatment quality was 4.00 (SD = 1.65, range: 2 to 7). When rating design quality, items on an allocation bias and a power calculation were scoreless within all included studies.

A Spearman’s rank correlation was calculated to investigate the association between the year of publication and treatment quality score, design quality score, and total quality score (Eccleston, Palermo, Williams, Lewandowski, & Morley, 2009; Eccleston, Williams, & Morley, 2009). This was also calculated between the N at the end of treatment and three treatment quality parameters. Treatment quality, design quality, and total quality were not associated with the year of publication (treatment, r = .09, ns; design, r = .42, ns; total, r = .33, ns). The N at the end of treatment also was not associated with the three methodological qualities (treatment, r = -.09, ns; design, r = -.05, ns; total, r = .05, ns).

**Participants.** The total number of participants within each study ranged from 22 to 157 (M = 55.75, SD = 37.78). Types of chronic pain included fibromyalgia, headache (i.e., tension-type headache and migraine), irritable bowel syndrome, multiple sclerosis, noncardiac chest pain, orofacial pain, osteoarthritis pain, spinal cord injury, temporomandibular disorders, and other forms of chronic pain). Only four studies reported participants’ mean pain duration; among these, mean pain duration ranged from 9.5 years to 13.7 years (M = 11.53, SD = 1.76). The mean ages of the study participants were reported in
8 of 12 studies. Ages ranged from 36 to 64.7 years ($M = 47.15$, $SD = 10.24$). The percentage of men in the samples across the studies included in the review ranged from 0% to 76%. The ratio of females exceeded males within 9 studies. A diagnosis of specific illness, degree of pain, degree of a cognitive impairment, and the presence of a mental disorder was given as inclusion or exclusion criteria. Characteristics of study participants are summarized in Table 1.

**Interventions.** The main intervention was hypnosis, because our major interest was to clarify the efficacy of hypnotic treatment. The number of interventions varied from 3 to 12 sessions; the duration of a single session lasted between 30 to 90 minutes. Eleven studies used individual treatment formats, and only one study used a group treatment format. Only one study just compared hypnosis with a wait-list control, and eight studies compared hypnosis with other psychological interventions. Three other studies compared hypnosis with both types of control groups. Standard care included no treatment, treatment as usual, and a wait-list control. Other psychological interventions included autogenic training, biofeedback, cognitive-behavior therapy (CBT), guided imagery, progressive muscle relaxation, and supportive psychotherapy (see Table 2).

**Measures.** Although pain or pain intensity was the main outcome for inclusion criteria, all included studies measured pain or pain intensity using a variety of scales. Most studies used the numerical rating scale (NRS) or the visual analogue scale (VAS) to quantify pain. Eight studies calculated pain scores to tally the NRS or used 5- to 11-point Likert scales. Most studies used a questionnaire that assessed psychological symptoms (e.g., the Self-Rating Depression Scale, Zung, 1965; the State-Trait Anxiety Inventory, Spielberger, Gorsuch, & Lushene, 1970; the 90-item version of Symptom Check List, Derogatis, Lipman, & Covi, 1973). Eight studies measured hypnotizability using several different scales, and four studies measured treatment expectancy. Other outcome indicators included pain interference, pain coping strategy, quality of life, sleep quality, perceived control over pain, and capacity for mental imagery (see Table 2).

**Efficacy of the Interventions**

**A comparison between hypnosis and a standard care.** Table 3 displays results for the postintervention comparisons between hypnosis and standard care. We pooled the four studies providing postintervention data allowing us to conduct this comparison. The effect size revealed that hypnosis had a significant and moderate effect, $g = .60$, 95% CI: 0.03–1.17, $p < .05$, on treatment efficacy compared to standard care. However, heterogeneity was quite large, $Q = 7.03$, $p < .10$; $I^2 = 57.30\%$. 


<table>
<thead>
<tr>
<th>Study</th>
<th>Diagnosis</th>
<th>Pain duration (years)</th>
<th>N at the end of treatment</th>
<th>Mean age (Range)</th>
<th>Gender % (M:F)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Abrahamsen et al. (2009)</td>
<td>Temporomandibular Disorders</td>
<td>11.9</td>
<td>43</td>
<td>40</td>
<td>0 : 100</td>
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<tr>
<td>Abrahamsen et al. (2008)</td>
<td>Persistent Idiopathic Orofacial Pain</td>
<td>9.5</td>
<td>41</td>
<td>41</td>
<td>15 : 85</td>
</tr>
<tr>
<td>Castel et al. (2009)</td>
<td>Fibromyalgia</td>
<td>11</td>
<td>47</td>
<td>39</td>
<td>5 : 95</td>
</tr>
<tr>
<td>Gay et al. (2002)</td>
<td>Osteoarthritis Pain</td>
<td>13.71</td>
<td>41</td>
<td>36</td>
<td>8 : 92</td>
</tr>
<tr>
<td>Spinhoven et al. (1992)</td>
<td>Tension Headache</td>
<td>–</td>
<td>56</td>
<td>46</td>
<td>39 : 61</td>
</tr>
<tr>
<td>ter Kuile et al. (1994)</td>
<td>Chronic Headaches</td>
<td>–</td>
<td>157</td>
<td>146</td>
<td>–</td>
</tr>
<tr>
<td>van Dyck et al. (1991)</td>
<td>Tension Headache</td>
<td>–</td>
<td>71</td>
<td>55</td>
<td>49 : 51</td>
</tr>
<tr>
<td>Zitman et al. (1992)</td>
<td>Tension Headaches</td>
<td>–</td>
<td>96</td>
<td>79</td>
<td>46 : 54</td>
</tr>
<tr>
<td>Study</td>
<td>RCT</td>
<td>Interventions</td>
<td>Settings of Hypnotic Intervention</td>
<td>Assessment Point</td>
<td>Measures</td>
</tr>
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<tr>
<td>Abrahamsen et al. (2009)</td>
<td>Yes</td>
<td>Hypnosis Relaxation and visualization of a comfortable, safe place</td>
<td>60 min. × 4 sessions; No descriptions about frequency; Individual; HW = listening to a taped instruction</td>
<td>Pre, Week 3 (Post)</td>
<td>NRS, MPQ, CSQ, SCL–60, PSQI, HGSHS–A</td>
</tr>
<tr>
<td>Abrahamsen et al. (2008)</td>
<td>Yes</td>
<td>Hypnosis Relaxation and visualizing a nice safe place</td>
<td>5.1 ± 0.8 (range 3–6) sessions of hypnosis; 5.3 ± 0.9 sessions (range 3–6) of control; 5 sessions were planned; No descriptions about frequency; HW = listening to a taped instruction; Individual</td>
<td>Pre, Week 4 (Post)</td>
<td>VAS (Pain diary), MPQ, PSQI, SCL–60, SF–36, CSQ, SHCS</td>
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<tr>
<th>Study</th>
<th>RCT</th>
<th>Interventions</th>
<th>Settings of Hypnotic Intervention</th>
<th>Assessment Point</th>
<th>Measures</th>
<th>Pain Indicators</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Castel et al.</td>
<td>Yes</td>
<td>Hypnosis + Cognitive Behavior Therapy Cognitive Behavior Therapy Treatment As Usual</td>
<td>90 min. × 12 sessions; No descriptions about frequency; HW = listening a taped instruction; Group</td>
<td>Pre, After 12 sessions (Post)</td>
<td>NRS, FIQ, MPQ, HGSHS–A</td>
<td>Usual pain intensity, composite (NRS) *</td>
<td>No significant differences between treatment groups [Post]</td>
</tr>
<tr>
<td>Gay et al.</td>
<td>Yes</td>
<td>Hypnosis Jacobson’s Progressive Muscle Relaxation No treatment</td>
<td>30 min. × 8 sessions; Weekly; No descriptions about HW; Individual</td>
<td>Pre, week 4, week 8 (Post), 3 month (Follow-up), 6 month (Follow-up)</td>
<td>VAS, STAI, SDS, Imagery vividness (derived from Sheehan’s Questionnaire of Mental Imagery, 0-4 points), SHSS–C, a priori belief in the treatment efficacy (3-points scale)</td>
<td>Pain (VAS)</td>
<td>Hypnosis &gt; No treatment [Post] PMR &gt; No treatment [Post] Hypnosis &gt; No treatment [3 month FU]</td>
</tr>
<tr>
<td>Study</td>
<td>Hypnosis/Biofeedback</td>
<td>Treatment Duration</td>
<td>Evaluation Points</td>
<td>Outcomes</td>
<td></td>
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<tr>
<td>Jensen, Barber, Romano, Hanley, et al. (2009)</td>
<td>Yes</td>
<td>Hypnosis Biofeedback</td>
<td>10 sessions; Variant frequency; HW = listening to a taped instruction at least once a day; Individual</td>
<td>Pre, After 10 sessions (Post), 3 month (Follow-up)</td>
<td>NRS, TES, BPI, SHCS, SOPA, CES-D</td>
<td>Daily average pain (NRS) *</td>
<td>Hypnosis &gt; Biofeedback [Post]</td>
</tr>
<tr>
<td>Jensen, Barber, Romano, Molton, et al. (2009)</td>
<td>No</td>
<td>Hypnosis Progressive Muscle Relaxation</td>
<td>10 sessions; No descriptions about frequency; Individual; HW = listening to a taped instruction at least once a day; Individual</td>
<td>Pre, After 10 sessions (Post), 3 month (Follow-up)</td>
<td>NRS, TES, BPI, SHCS</td>
<td>Daily pain intensity composite (NRS) *</td>
<td>Hypnosis &gt; PMR [Post], Hypnosis &gt; PMR [FU]</td>
</tr>
<tr>
<td>Jones et al. (2006)</td>
<td>Yes</td>
<td>Hypnotherapy Supportive psychotherapy</td>
<td>30 min. × 12 sessions; Variant frequency; HW = listening to a taped instruction; Individual</td>
<td>Baseline, Week 17 (Post)</td>
<td>a global assessment of chest pain, a global assessment of well-being, MacNew QOL instrument, Linear analogue Scale (Pain severity 0–100), HAD</td>
<td>Pain severity (Linear analogue scale, 0-100)</td>
<td>Hypnosis &gt; Supportive psychotherapy [Post]</td>
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<tr>
<th>Study</th>
<th>RCT</th>
<th>Interventions</th>
<th>Settings of Hypnotic Intervention</th>
<th>Assessment Point</th>
<th>Measures</th>
<th>Pain Indicators</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Palsson et al. (2002)</td>
<td>No</td>
<td>Hypnosis Waiting list</td>
<td>45 min. × 7 sessions; Biweekly (over 12 weeks); HW = listening to a taped instruction daily; Individual</td>
<td>Pre, Week 2 (Post), 4 month (Follow-up)</td>
<td>the Symptom diary (bowel movement: 4-point, the worst episode of abdominal pain &amp; bloating: 5-point), BDI, SCL–90R, SPSI</td>
<td>The severity of the worst episode of abdominal pain (5-point scale per day; 14 days symptom sum scores) *</td>
<td>Hypnosis &gt; Waiting list [Post]</td>
</tr>
<tr>
<td>Spinhoven et al. (1992)</td>
<td>No</td>
<td>Self-hypnosis Autogenic Training</td>
<td>45 min. × 4 sessions; Biweekly; HW = listening to a 15-min. taped instruction twice daily; Individual</td>
<td>Pre, Week 16 (Post), 6 month (Follow-up)</td>
<td>Headache Index, Global Pain rating, SCL–90, CSQ</td>
<td>Pain intensity (Headache Index) *</td>
<td>No significant differences between treatment groups [Both Post &amp; FU]</td>
</tr>
<tr>
<td>Study Authors</td>
<td>Technique Type</td>
<td>Description</td>
<td>Duration &amp; Frequency</td>
<td>Pre, Post Measurement</td>
<td>Pain intensity</td>
<td>Outcome</td>
<td></td>
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<tr>
<td>ter Kuile et al. (1994)</td>
<td>Cognitive self-hypnosis</td>
<td>Autogenic Training</td>
<td>60 min. × 7 sessions; Weekly; HW = listening to a 15-min. taped instruction twice daily; Individual</td>
<td>Headache Index (weighed 6-point Likert scale), SCL–90, SHCS, Headache Characteristics Questionnaire, Migraine Index, Treatment Expectation (0–200% scale)</td>
<td>Pain intensity (Headache Index) *</td>
<td>AT &gt; Waiting list</td>
<td></td>
</tr>
<tr>
<td>van Dyck et al. (1991)</td>
<td>Future-oriented hypnotic imagery</td>
<td>Autogenic Training</td>
<td>Total 150 min.; 4 session; Variant frequency; HW = listening to taped instructions total 25 h (1500 min.); Individual</td>
<td>Headache Diary, STAI, SDS, CIS, SHCS</td>
<td>Pain intensity (Headache Index) *</td>
<td>No significant differences between treatment groups [Post]</td>
<td></td>
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</table>

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Table 2
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<table>
<thead>
<tr>
<th>Study</th>
<th>RCT</th>
<th>Interventions</th>
<th>Settings of Hypnotic Intervention</th>
<th>Assessment Point</th>
<th>Measures</th>
<th>Pain Indicators</th>
<th>Results</th>
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<tbody>
<tr>
<td>Zitman et al.</td>
<td>No</td>
<td>Future-oriented hypnotic imagery</td>
<td>Total 300 min.; 8 session; Variant frequency; HW = listening to taped instructions totaling 49 h (2940 min.); Individual</td>
<td>Pre, Week 8 (Post), 6 month (Follow-up)</td>
<td>Headache Diary, STAI, SDS, VAS (perceived credibility of the treatment; Borkovec &amp; Nau, 1972), the neuroticism score of the Dutch Personality Questionnaire based on the California Psychological Inventory</td>
<td>Hypnosis &gt; AT [FU]</td>
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</table>

Note. The asterisks of pain indicators refer to studies calculating pain intensity. BDI = Beck Depression Inventory; BPI = Brief Pain Inventory; CES–D = Center for Epidemiologic Studies Depression scale; CIS = Creative Imagination Scale; CSQ = Coping Strategies Questionnaire; FIQ = Fibromyalgia Impact Questionnaire; FU = Follow-Up; HAD = Hospital anxiety and depression scale; HGSHS–A = Harvard Group Scale of Hypnotic Susceptibility, Form A; HW = Homework; MacNew QOL instrument = MacNew Heart Disease Health-Related Quality of Life Questionnaire; MPQ = McGill Pain Questionnaire; NRS = Numerical Rating Scale; PSQI = Pittsburgh Sleep Quality Index; SCL–60 = 60-item version of the Symptom Check List; SCL–90 = 90-item version of the Symptom Check List; SDS = Self-rating Depression Scale; SF–36 = Medical Outcomes Study 36-Item Short-Form Health Survey; SHCS = Stanford Hypnotic Clinical Scale; SHSS–C = Stanford Hypnotic Susceptibility Scale, Form C; SOPA = Survey of Pain Attitudes; SPSI = Stress-related Physical Symptoms Inventory; STAI = State-Trait Anxiety Inventory; TES = Treatment Expectancy Scale; VAS = Visual Analogue Scale.
Only Gay, Philippot, and Luminet (2002) allowed for a comparison between hypnosis and standard care at follow-up. Thus, we could not calculate a difference in intervention efficacy at follow-up.

A comparison between hypnosis and other psychological interventions. We next examined the results for a comparison between hypnosis and other psychological interventions. Table 4 displays results for the postintervention comparisons between hypnosis and other psychological interventions. Table 5 also displays results for the follow-up comparisons. We pooled 11 studies that provided postintervention data and six studies that provided follow-up data. These comparisons were not significant, and effect sizes did not show a superior effect for hypnosis (postintervention, $g = .04$, 95% CI: –0.22–0.30, ns; follow-up, $g = -.05$, 95% CI: –0.33–0.23, ns). Heterogeneities were moderate (follow-up, $Q = 10.02$, ns; $I^2 = 30.16\%$) to large (postintervention, $Q = 22.21$, $p < .05$; $I^2 = 50.47\%$). These results indicate that the efficacy of hypnosis was not different from that of other psychological interventions.

Comparing within a diagnostic group (headache or nonheadache). Furthermore, we explored the efficacy of hypnosis with respect to specific diagnostic groups (headache group or nonheadache group) and the type of interventions. Jensen Barber, Romano, Hanley, et al. (2009) reported that pain intensity within a hypnosis group was significantly stronger than within a control group during a pretreatment phase. We excluded Jensen, Barber, Romano, Hanley, et al. (2009) from subsequent analyses in order to more accurately discuss the efficacy of hypnosis.

Within the headache group, we pooled four studies that provided postintervention data and three studies that provided follow-up data. These comparisons did not produce significant results (postintervention, $g = -.21$, 95% CI: –0.44–0.03, ns; follow-up, $g = -.06$, 95% CI: –0.34–0.22, ns). However, the effect sizes revealed a small effect for other psychological interventions being more efficacious than hypnosis at postintervention. Heterogeneities were relatively small (postintervention, $Q = 2.28$, ns; $I^2 = 0.00\%$; follow-up, $Q = 2.26$, ns; $I^2 = 0.00\%$).

Within the nonheadache group, we pooled six studies that provided postintervention data and two studies that provided follow-up data. Effect sizes indicated a significant moderate effect (postintervention, $g = .46$, 95% CI: 0.16–0.75, $p < .01$) and an insignificant small effect (follow-up, $g = .27$, 95% CI: –0.20–0.74, ns) of hypnosis. Heterogeneities were also rather small within both comparisons (postintervention, $Q = 1.54$, ns; $I^2 = 0.00\%$; follow-up, $Q = 1.30$, ns; $I^2 = 0.00\%$).

Comparing the type of intervention. We also examined results for comparisons between hypnosis and three psychological treatments:
Table 3
Meta-Analysis Comparing Hypnosis With Standard Care at Postintervention Phase

<table>
<thead>
<tr>
<th>Study</th>
<th>Control</th>
<th></th>
<th></th>
<th></th>
<th>Experimental</th>
<th></th>
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<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>SD</td>
<td>N</td>
<td>Mean</td>
<td>SD</td>
<td>N</td>
<td>Weight (%)</td>
<td>g ivt, random, 95% CI</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Castel et al. (2009)</td>
<td>7</td>
<td>1.01</td>
<td>7</td>
<td>5.79</td>
<td>2.05</td>
<td>16</td>
<td>20.97%</td>
<td>0.64 [−0.27, 1.55]</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gay et al. (2002)</td>
<td>4.23</td>
<td>1.14</td>
<td>10</td>
<td>1.85</td>
<td>1.65</td>
<td>13</td>
<td>19.71%</td>
<td>1.58 [0.61, 2.54]</td>
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<tr>
<td>Palsson et al. (2002)</td>
<td>16.8</td>
<td>3.6</td>
<td>9</td>
<td>12.9</td>
<td>12.39</td>
<td>15</td>
<td>22.94%</td>
<td>0.37 [−0.46, 1.21]</td>
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</tr>
<tr>
<td>ter Kuile et al. (1994)</td>
<td>25.4</td>
<td>16</td>
<td>53</td>
<td>22.5</td>
<td>14.8</td>
<td>40</td>
<td>36.38%</td>
<td>0.19 [−0.23, 0.60]</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total (95% CI)</td>
<td>79</td>
<td>84</td>
<td>100.00%</td>
<td>100.00%</td>
<td>0.60 [0.03, 1.17]</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note. ivt = inverse-variance with t2. Heterogeneity: Q = 7.03, df = 3 (p < .10); I^2 = 57.30%; Test for overall effect: Z = 2.05 (p < .05).
Table 4
Meta-Analysis Comparing Hypnosis With Other Psychological Interventions at Postintervention Phase

<table>
<thead>
<tr>
<th>Study</th>
<th>Control</th>
<th>Experimental</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>SD</td>
</tr>
<tr>
<td>Abrahamsen et al. (2009)</td>
<td>3.9 1.5</td>
<td>20</td>
</tr>
<tr>
<td>Abrahamsen et al. (2008)</td>
<td>54.1 29.64</td>
<td>19</td>
</tr>
<tr>
<td>Castel et al. (2009)</td>
<td>6.1 2.52</td>
<td>16</td>
</tr>
<tr>
<td>Gay et al. (2002)</td>
<td>2.37 1.62</td>
<td>13</td>
</tr>
<tr>
<td>Jensen, Barber, Romano, Hanley, et al. (2009)</td>
<td>3.36 1.28</td>
<td>11</td>
</tr>
<tr>
<td>Jensen, Barber, Romano, Molton, et al. (2009)</td>
<td>4.13 1.69</td>
<td>7</td>
</tr>
<tr>
<td>Jones et al. (2006)</td>
<td>47.31 26.55</td>
<td>13</td>
</tr>
<tr>
<td>Spinhoven et al. (1992)</td>
<td>2.5 1.4</td>
<td>23</td>
</tr>
<tr>
<td>ter Kuile et al. (1994)</td>
<td>16.2 12.1</td>
<td>41</td>
</tr>
<tr>
<td>van Dyck et al. (1991)</td>
<td>48.6 30.6</td>
<td>28</td>
</tr>
<tr>
<td>Zitman et al. (1992) –1</td>
<td>48.6 30.6</td>
<td>28</td>
</tr>
<tr>
<td>Zitman et al. (1992) –2</td>
<td>48.1 48.2</td>
<td>27</td>
</tr>
<tr>
<td>Total (95% CI)</td>
<td>246 259</td>
<td>100.00%</td>
</tr>
</tbody>
</table>

Note. ivt = inverse-variance with t2. Heterogeneity: Q = 22.21, df = 11 (p < .05); I² = 50.47%, Test for overall effect: Z = 0.28 (ns).
Hypnosis is compared with autogenic training in “Zitman et al. (1992) –1” and with future-oriented imagery in “Zitman et al. (1992) –2.”
### Table 5

**Meta-Analysis Comparing Hypnosis With Other Psychological Interventions at Follow-Up Phase**

<table>
<thead>
<tr>
<th>Study</th>
<th>Control</th>
<th>Experimental</th>
<th>Weight (%)</th>
<th>g ivt, random, 95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gay et al. (2002) –1</td>
<td>2.75</td>
<td>1.66</td>
<td>9.63%</td>
<td>0.62 [-0.17, 1.41]</td>
</tr>
<tr>
<td>Gay et al. (2002) –2</td>
<td>2.8</td>
<td>2.38</td>
<td>10.00%</td>
<td>0.19 [-0.57, 0.97]</td>
</tr>
<tr>
<td>Jensen, Barber, Romano, Hanley, et al. (2009)</td>
<td>3.13</td>
<td>4.9</td>
<td>9.94%</td>
<td>-0.06 [-0.96, 0.83]</td>
</tr>
<tr>
<td>Jensen, Barber, Romano, Molton, et al. (2009)</td>
<td>3.35</td>
<td>3.48</td>
<td>7.87%</td>
<td>-0.06 [-0.96, 0.83]</td>
</tr>
<tr>
<td>Spinhoven et al. (1992)</td>
<td>2</td>
<td>2.5</td>
<td>13.63%</td>
<td>-0.22 [-0.85, 0.40]</td>
</tr>
<tr>
<td>ter Kuile et al. (1994)</td>
<td>15.7</td>
<td>19.6</td>
<td>19.47%</td>
<td>-0.27 [-0.73, 0.20]</td>
</tr>
<tr>
<td>Zitman et al. (1992) –1</td>
<td>50.7</td>
<td>41.6</td>
<td>14.72%</td>
<td>0.20 [-0.39, 0.78]</td>
</tr>
<tr>
<td>Zitman et al. (1992) –2</td>
<td>48.8</td>
<td>41.6</td>
<td>14.74%</td>
<td>0.15 [-0.43, 0.74]</td>
</tr>
<tr>
<td>Total (95% CI)</td>
<td>143</td>
<td>164</td>
<td>100.00%</td>
<td>-0.05 [-0.33, 0.23]</td>
</tr>
</tbody>
</table>

Note. ivt = inverse-variance with t2. Heterogeneity: $Q = 10.02$, $df = 7$ (ns); $I^2 = 30.16\%$, Test for overall effect: $Z = -0.33$ (ns).

autogenic training (AT), guided imagery, and progressive muscle relaxation (PMR). For AT, we pooled four studies with postintervention data and three studies with follow-up data. Comparisons with these studies were not significant (postintervention, $g = -0.23$, 95% CI: $-0.49$–$-0.03$, $ns$; follow-up, $g = -0.12$, 95% CI: $-0.44$–$-0.19$, $ns$), but AT was slightly more effective than hypnosis. Heterogeneities were quite small (postintervention, $Q = 2.09$, $ns$; $I^2 = 0.00$%; follow-up, $Q = 1.61$, $ns$; $I^2 = 0.00$%).

For guided imagery, we pooled three studies with postintervention data. This comparison with hypnosis was also insignificant (postintervention, $g = 0.31$, 95% CI: $-0.13$–$0.74$, $ns$), but the comparison with guided imagery garnered a small-to-moderate effect in favor of hypnosis. The heterogeneity was moderate (postintervention, $Q = 3.20$, $ns$; $I^2 = 37.56$%). Only Zitman, van Dyck, Spinhoven, and Linssen (1992) compared hypnosis with guided imagery at follow-up. Thus, we could not calculate a difference in efficacy between hypnosis and guided imagery at follow-up.

For PMR, we pooled two studies providing postintervention and follow-up data. Both comparisons were insignificant (postintervention, $g = 0.40$, 95% CI: $-0.19$–$0.99$, $ns$; follow-up, $g = 0.27$, 95% CI: $-0.20$–$0.74$, $ns$). However, the effect sizes showed that hypnosis produced a small-to-moderate effect in comparison to PMR. Heterogeneities were relatively small (postintervention, $Q = 1.4$, $ns$; $I^2 = 0.00$%; follow-up, $Q = 1.30$, $ns$; $I^2 = 0.00$%).

**Discussion**

*Main Findings*

The results showed that hypnosis was moderately effective for managing chronic pain compared to a standard care during a postintervention phase. This result is consistent with those of Montgomery et al. (2000). Montgomery and colleagues reported that hypnosis was moderately to largely efficacious for treatment of clinical pain and for ameliorating experimental pain (e.g., cold pressor test). Next, on the whole, our results revealed no differences in efficacy between hypnosis and other psychological interventions during both postintervention and follow-up phases. According to our diagnostic groups, hypnosis resulted in a significant moderate effect in comparison to other psychological interventions within a nonheadache group during a postintervention phase. Further analysis suggested that hypnosis also resulted in superior efficacy during a follow-up phase. In the headache group, hypnosis was no more efficacious than other psychological interventions. Conversely, analysis of effect sizes suggested that other psychological interventions were slightly more efficacious than
hypnosis during a postintervention phase. Based on treatment comparison, effect size analysis indicated that AT had a slightly greater effect when compared to hypnosis during a postintervention phase. However, hypnosis was slightly or moderately more effective than guided imagery and PMR. Within these three comparison treatments, no significant differences emerged. Taken together, our results suggest that hypnosis is moderately more efficacious than standard care and other psychological interventions within nonheadache groups. Therefore, it appears that hypnosis can be an effective psychotherapy for chronic pain.

Lunde, Nordhus, and Pallesen (2009) conducted a meta-analysis that compared CBT for chronic pain within an older adult sample and used a control group (a wait-list control and pretreatment group). This meta-analysis showed that CBT produced a small-to-moderate effect (d = 0.47) during postintervention. In our analysis, hypnosis was moderately effective as compared to standard care during a postintervention phase, and our effect size was greater than that obtained by Lunde et al. (2009). Thus, it is possible that hypnosis is more effective than CBT for managing chronic pain when both hypnosis and CBT are compared to groups that do not conduct particular treatments.

Our results revealed no differences in efficacy between hypnosis and other psychological interventions for managing overall chronic pain. However, effect size analysis indicated that hypnosis was more effective than other psychological interventions for a nonheadache group. Morley, Eccleston, and Williams (1999) and Eccleston, Williams, et al. (2009) investigated the efficacy of psychotherapies, especially CBT, for managing chronic pain (excluding headache). These authors suggested that psychological treatments for headache are sufficiently different from those used for other types of chronic pain. Morley et al. also said that “pain relief is a much more realistic result of treatment than in other chronic pain” (1999, p. 2). Morley and colleagues’ results showed that CBT had a small, but greater, effect on managing chronic pain than active control groups receiving education, physiotherapy, occupational therapy, and treatment as usual (Morley et al., 1999, g = .29; Eccleston, Williams, et al., 2009; Standardized Mean Differences = −.14, a negative sign indicates a positive effect of CBT in their study). The effect size of our results exceeded those of Morley et al. and Eccleston, Williams, et al. when we compared hypnosis to other psychological interventions in a nonheadache group during a postintervention. Thus, it is possible that hypnosis has superior efficacy to other psychological interventions, including CBT.

Although the differences were not significant, our results revealed that other psychological interventions were more effective than hypnosis for those suffering from headaches. During our systematic review, all studies investigating the efficacy of hypnosis for headache groups
had substantial overlap with studies comparing the efficacy of hypnosis versus AT. Four studies compared hypnosis with AT during a postintervention phase and three studies compared these two treatments during a follow-up phase. This suggests that AT is more efficacious than hypnosis for managing headaches. However, Kanji, White, and Ernst (2006) reported that AT and hypnosis are similarly efficacious for the treatment of headaches. A meta-analysis of controlled clinical trials reported by Stetter and Kupper (2002) showed that AT for headaches was weakly inferior to other psychological interventions (postintervention, $g = -0.25$; follow-up, $g = -0.26$). As mentioned above, there were inconsistent results between our results when compared to previous studies. We need to further investigate differences in efficacy between hypnosis and other psychological interventions (especially AT) for the treatment of headaches.

Our results indicated that hypnosis was more effective than guided imagery and PMR for managing chronic pain; however, differences in the effectiveness of hypnosis were not statistically significant. Our results are intriguing given that studies comparing hypnosis with these two interventions through a meta-analysis had not been conducted before. There are a few systematic reviews comparing guided imagery and PMR with standard care or a wait-list control (Henschke et al., 2011; Posadzki, Lewandowski, Terry, Ernst, & Stearns, 2012). However, these reviews did not reveal effect sizes compatible with our results. Further exploration will be needed to clarify differences in efficacy between hypnosis and guided imagery or PMR.

TA and HF rated methodological quality using procedures described in Yates et al. (2005). All methodological quality indices revealed lower scores as compared to previous studies (Eccleston, Palermo, et al., 2009; Eccleston, Williams, et al., 2009). High limits within design quality were low, and items regarding allocation bias and power calculation scores equal to 0 were observed in all 12 studies. These scores do not indicate that authors of the 12 studies did not perform proper random allocation and power calculations. These indices only suggest that adequate description as to the procedures for random allocation and results of the power calculations prior to starting participant recruitment for each study were not reported in all 12 studies. Decorrelations between methodological quality, the year of publication, and the $N$ at the end of treatment were also recorded. Methodological qualities of clinical hypnotic intervention studies have remained at low levels, which is inconsistent with the date and the scale of study (i.e., the number of study samples).

In general, people are likely to view hypnosis as a suspect method and mental state. Clinicians and researchers who use hypnosis are always required to seek sound evidence for the efficacy of their treatment. Some guidelines for improving the methodological quality
of intervention studies have been suggested (i.e., the CONSORT guidelines; Begg et al., 1996; Moher et al., 2010; Moher, Schulz, & Altman, 2001). Controlling the researcher’s intent regarding the allocation and power calculations is possible regardless of the vague nature of hypnosis. We suggest that procedures for random allocation and the results of power analyses should be reported enough in future research articles. In future studies, researchers who seek sound evidence of hypnotic efficacy should aspire to guarantee methodological quality to a certain targeted level in order to heighten the credibility of the results.

Implications

Implications for research. Although target diseases and study designs are diverse, large heterogeneities reported in the current study are related to the nature of hypnosis. There is ambiguity as to whether a hypnotic intervention from Study X and Study Y can specifically be defined as “hypnosis.” Both studies might have different therapeutic mechanisms. Whether an altered state of consciousness is evoked by a hypnotic induction procedure is an area of controversy within research on hypnosis. Using functional brain imaging, Rainville and colleagues showed that cerebral physiological changes are evoked by hypnosis (Hofbauer et al., 2001; Rainville, Bao, & Chrétien, 2005; Rainville et al., 1997). Whether an altered state of consciousness is evoked by a hypnotic induction procedure needs future study. However, studies revealing the nature of hypnosis from an empirical standpoint are important to extend the credibility of hypnotic techniques.

Although pain or pain intensity was defined as the main outcome in this study, studies have shown that hypnosis works well on both the affective (Holroyd, 1996) and cognitive dimensions (Jensen et al., 2011) of pain. Perhaps we can better assess the multilateral efficacy of hypnosis in order to define the unpleasantness of pain or a cognitive dimension of pain as the main outcome. Jensen and Patterson (2006) suggested, “the primary goal is not to alter pain during hypnosis, but to make hypnotic suggestions and teach skills that will alter pain intensity and its impact throughout the patient’s daily life” (p. 96). Investigation of other outcomes beyond pain should be addressed in future studies to better determine the efficacy of hypnosis.

Other psychological interventions assessed in our meta-analysis included AT, biofeedback, CBT, guided imagery, PMR, and supportive psychotherapy. Some studies suggest that those interventions share similar therapeutic components with hypnosis (e.g., relaxation and focused attention; Gay et al., 2002; Jensen Barber, Romano, Hanley, et al., 2009; Jensen Barber, Romano, Molton, et al., 2009). AT is also regarded as a form of self-induced hypnotherapy (Schultz, 1987). Supportive psychotherapy reported by Jones, Cooper, Miller, Brooks, and Whorwell (2006) could be distinguished from hypnosis. Since the CBT used in
Castel, Salvat, Sala, and Rull (2009) included several interventions, it is difficult to limit one component as the main intervention utilized in their study. We could argue that other psychological interventions sampled in our study are regarded as hypnotic-like interventions, except for the supportive psychotherapy reported in Jones et al. (2006) and the CBT reported in Castel et al. (2009). Given that most psychological interventions in our study are regarded as hypnotic-like interventions, we need to further examine a comparison of the efficacy between hypnotic-like interventions and less hypnotic-like interventions, such as in vivo exposure (Boersma et al., 2004; Vlaeyen, de Jong, Geilen, Heuts, & van Breukelen, 2002) and operant conditioning (Fordyce, Fowler, & DeLateur, 1968; Fordyce et al., 1973; Lindstrom et al., 1992). Such studies would help clarify the therapeutic mechanisms of clinical hypnosis.

**Implications for practice.** Our results have demonstrated the efficacy of hypnosis in clinical studies. Below, we describe a few suggestions regarding the active clinical use of hypnosis.

The essential aspects of our results in terms of active clinical use of hypnosis include the following:

- When compared with nonspecific interventions including a wait-list control and a treatment as usual, hypnosis shows good efficacy for managing overall chronic pain;
- Hypnosis led to larger effect sizes when compared to other psychological interventions, including CBT, for managing nonheadache chronic pain;
- It is unclear whether hypnosis is more effective than other psychological interventions for managing headaches.

From these, hypnosis should be promoted as an effective psychological intervention for managing chronic pain. We should use hypnosis actively for intractable chronic pain, such as nonheadache pain. However, we do not have strong evidence for preferentially using hypnosis to manage headaches.

Although our results showed that the efficacy of hypnosis might be superior to CBT, the treatments do not have to be mutually exclusive. Kirsch, Montgomery, and Sapirstein (1995) reported that using hypnosis as an adjunct to CBT enhances treatment outcomes for clinical problems, such as chronic pain. Castel, Cascon, Padrol, Sala, and Rull (2012) also conducted an RCT targeting fibromyalgia and reported that CBT with hypnosis was more effective than just CBT alone. Thus, we suggest that the combination of hypnosis and CBT could lead to more effective clinical treatment.

We need to consider the application of hypnosis within group settings. Eleven of our studies used hypnosis in individual settings, while only Castel et al. (2009) adopted a group setting. Vinogradov and Yalom (1989) described the efficient use of resources and the cost
effectiveness of group psychotherapy. Hypnosis within group settings has been used to treat several diseases, such as allergies (Madrid, Rostel, Pennington, & Murphy, 1995), breast cancer (Butler et al., 2009; Spiegel & Bloom, 1983), depression (Butler et al., 2008), fibromyalgia (Castel et al., 2009, 2012), and posttraumatic stress disorder (Lesmana, Suryani, Jensen, & Tiliopoulos, 2009). These studies also reported the efficacy of hypnotic interventions. Although it is difficult to establish the best-suited therapy for one patient or client, group interventions might provide an effective format to deliver hypnotherapy for chronic pain.

Limitations

First, results of our meta-analysis revealed large heterogeneities between studies. Large heterogeneity distorts the reliability of our results. Efficacy of hypnosis might not have been clearly determined based on the current results. Second, it is possible that the current study did not provide a pure comparison of hypnosis with other psychological interventions by including two studies (Castel et al., 2009; Zitman et al., 1992). Therefore it is possible that we are overestimating the efficacy of hypnosis in our study.

Conclusions

The objective of this study was to demonstrate the empirical efficacy of hypnosis. We observed that hypnosis was moderately effective for managing chronic pain compared to a standard care during a postintervention phase. Hypnosis was also effective when compared with other psychological interventions in a nonheadache group. However, the methodological quality of individual studies was rather low. Large heterogeneities were also observed. Future studies should improve upon methodological quality and heterogeneity to better determine the efficacy of hypnosis for chronic pain management.

References

*References marked with an asterisk indicate studies included in the meta-analysis.


**APPENDIX**

**SEARCH STRATEGY**

1. **Medline**

   1. randomized controlled trial.pt.
   2. randomized Controlled Trial/
   3. Randomized Controlled Trial as Topic/
   6. Clinical Trial/
   7. Clinical Trial as Topic/
   8. Random Allocation
   9. Double-Blind Method/
   10. Single-Blind Method/
   11. Comparative Study/
   12. Empirical Research/
   13. Treatment Outcome/
   14. Comparative Effectiveness Research/
   15. or/1-14
   16. exp Hypnosis/
   17. exp "Pain/
   18. 15 and 16 and 17
   19. Remove duplicates from 18
   20. Limit 19 to English language
   21. Limit 20 to “review articles”
   22. 20 not 21

2. **CENTRAL**

   1. Medical Subject Heading descriptor Pain explode all trees
   2. (pain*:ti,ab,kw
   3. MeSH descriptor Hypnosis explode all trees
   4. (hypnos*:ti,ab,kw
   5. (#1 OR #2)
   6. (#3 OR #4)
   7. (#5 OR #6)
3. PsycINFO

1. exp *Pain/
2. exp Hypnosis/
3. 1 and 2
4. limit 3 to English language
5. limit 4 to all journals

Eine Meta-Analyse zu Hypnose bei Chronischen Schmerzsyndromen – Ein Vergleich zwischen Hypnose, Standardbehandlung und anderen psychologischen Interventionen

Tomonori Adachi, Haruo Fujino, Aya Nakae, Takashi Mashimo und Jun Sasaki


Stephanie Reigel, MD

Une méta-analyse de l’hypnose dans les cas de douleurs chroniques – une comparaison entre l’hypnose, les soins habituels et d’autre interventions psychologiques

Tomonori Adachi, Haruo Fujino, Aya Nakae, Takashi Mashimo et Jun Sasaki

Résumé: L’hypnose est considérée comme un traitement efficace des affections psychologiques et physiques. Pourtant, son efficacité comme stratégie de gestion de la douleur chronique n’a pas été évaluée par des méthodes méta-analytiques. L’objectif de cette étude consistait à mener une méta-analyse afin d’évaluer l’efficacité de l’hypnose dans la gestion de la douleur chronique. Comparativement aux soins standards, l’hypnose en tant que traitement était modérément bénéfique. De plus, le traitement par l’hypnose s’est révélé supérieur à la moyenne, comparativement à d’autres interventions psychologiques auprès d’un groupe ne souffrant pas de maux de tête. Ces résultats semblent indiquer que l’hypnose est efficace dans la gestion de la douleur chronique. Étant donné la grande hétérogénéité des études
comprises dans cette recherche, la nature du traitement par l’hypnose y est longuement examinée.

Johanne Reynault
C. Tr. (STIBC)

Un meta-análisis de la hipnosis para problemas de dolor crónico: Una comparación entre hipnosis, tratamiento estándar, y otras intervenciones psicológicas

Tomonori Adachi, Haruo Fujino, Aya Nakae, Takashi Mashimo, y Jun Sasaki

Resumen: La hipnosis es considerada como un tratamiento efectivo para enfermedades físicas y psicológicas. Sin embargo, su eficacia como estrategia para el manejo de dolor crónico no ha sido evaluada a través de métodos meta-analíticos. El objetivo del presente estudio fue la realización de un meta-análisis para evaluar la eficacia de la hipnosis para el manejo de dolor crónico. Al compararla con el tratamiento estándar, la hipnosis brindó un beneficio moderado. La hipnosis también mostró un efecto superior moderado al compararla con otras intervenciones psicológicas para un grupo que no padecía dolores de cabeza. Los resultados sugieren que la hipnosis es eficaz para el manejo de dolor crónico. Considerando la gran heterogeneidad de los estudios incluidos, se profundiza en la discusión sobre la naturaleza de la hipnosis como tratamiento.

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