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THE EFFICACY OF HYPNOTIC ANALGESIA IN ADULTS: A REVIEW OF THE LITERATURE

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Abstract

This article both summarizes the previous reviews of randomized, controlled trials of hypnotic analgesia for the treatment of chronic and acute pain in adults, and reviews similar trials which have recently been published in the scientific literature. The results indicate that for both chronic and acute pain conditions: (1) hypnotic analgesia consistently results in greater decreases in a variety of pain outcomes compared to no treatment/standard care; (2) hypnosis frequently out-performs non-hypnotic interventions (e.g. education, supportive therapy) in terms of reductions in pain-related outcomes; and (3) hypnosis performs similarly to treatments that contain hypnotic elements (such as progressive muscle relaxation), but is not surpassed in efficacy by these alternative treatments. Factors that may influence the efficacy of hypnotic analgesia interventions are discussed, including, but not limited to, the patient's level of suggestibility, treatment outcome expectancy, and provider expertise. Based upon this body of literature, suggestions are offered for practitioners who are using, or would like to use, hypnosis for the amelioration of pain problems in their patients or clients.

Keywords

pain; chronic pain; acute pain; hypnosis; hypnotic analgesia

Introduction

The use of hypnosis in clinical settings has been gaining acceptance as a treatment for both acute/procedural pain and chronic pain problems. This increase in popularity is probably due to several factors. First, due to growing health care costs and the untoward side effects of many pharmacological treatments for pain, health care practitioners are searching for alternate treatments that are relatively easy to administer, are cost-effective, and have fewer side effects. Similarly, the challenges facing the United State's health care system and the lack of effective treatments for many chronic conditions, including pain, have led patients to seek out non-traditional forms of medical treatment. Hypnosis may be considered as one of such treatments and consumer interest/demand may be playing a role in its recent resurgence. Another factor that may be contributing to increased interest in hypnosis for the treatment of pain is the mounting number of brain imaging studies demonstrating the neurophysiological changes that can and do occur as a result of hypnotic analgesia treatment. Studies using fMRI and PET scan technology have revealed that a number of brain structures involved in the perception of pain (e.g. somatosensory cortex, anterior cingulate cortex, insula) are demonstrably affected through hypnotic suggestion (e.g. Rainville, Duncan, Price, Carrier, and Bushnell, 1997;

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Hofbauer, Rainville, Duncan and Bushnell, 2001; Derbyshire, Whalley, Stenger and Oakley, 2004). Finally, a substantial number of clinical randomized controlled studies of hypnotic analgesia now support its efficacy, providing practitioners with empirical evidence for selecting hypnosis as treatment for pain.

A hypnotic intervention for pain typically begins with an induction and suggestions for deepening the trance state. These are followed by various suggestions for reduced pain or discomfort. For chronic pain management, posthypnotic suggestions are almost always given that any pain reduction achieved will last beyond the session, and/or for the patient to recreate a sense of comfort and relaxation outside of the session by use of a simple cue (e.g. closing one's eyes and taking a deep breath). Hypnotic analgesia interventions also frequently make use of self-hypnosis training and patients are provided with a CD or a recording of one or more sessions so they can practice the skills they have learned on their own between sessions. For acute pain, providing suggestions for pain relief can be a straightforward issue; for chronic pain, suggestions for pain relief often must be accompanied by suggestions that address the complex psychosocial issues that frequently accompany this health condition (Jensen and Patterson, 2008).

Regarding the efficacy of hypnosis for the treatment of acute and chronic pain conditions, several recent and thorough literature reviews have adeptly summarized the findings of the existing published, randomized controlled trials (Patterson and Jensen, 2003; Jensen and Patterson, 2006; Elkins, Jensen, and Patterson, 2007). As we do not intend to repeat this body of work, the goals of the present review are threefold: (1) to briefly highlight the findings of the existing reviews; (2) to review trials of hypnotic analgesia for both acute and chronic pain conditions in adults that have recently been published; and (3) to offer suggestions to practitioners that can be gleaned from this body of literature. The inclusion of studies for the current review was based upon a number of criteria. First, a search was conducted on PubMed and PsycInfo using the terms *hypnosis*, *hypnotic analgesia* and *pain*. From these results, studies were selected only if (1) they were randomized, controlled trials comparing hypnosis to another type of care (e.g. attention control, routine care); (2) the participants came from clinical or medical populations versus `healthy' populations (e.g. college students), and as such, their pain condition(s) could be identified as being either chronic or acute; and (3) they had not been included in the previously published reviews.

Conclusions drawn from previous reviews

Efficacy in chronic pain populations

Chronic pain, defined as pain that persists for 6 months or longer (Keefe, 1982), is frequently associated with chronic or degenerative disease processes (Chapman, Nakamura and Flores, 1999) and may not always have a directly identifiable physiological cause. Additionally, chronic pain can be quite difficult to treat and this `treatment resistance' is often associated with emotional or psychological distress, which may serve in turn to further exacerbate or intensify the pain experience (Turk, 1996).

The aforementioned reviews (i.e. Patterson and Jensen, 2003; Jensen and Patterson, 2006; Elkins, Jensen and Patterson, 2007) highlight the findings of almost twenty studies which explored the applicability of hypnosis training to a wide variety of chronic pain conditions including headache (e.g. Spinhoven, Linssen, Van Dyck and Zitman, 1992), low back pain (e.g. Spinhoven and Linssen, 1989), arthritis (e.g. Gay, Phillipport and Luminet, 2002), fibromyalgia (Haanen, Hoenderdos, van Romunde, Hop, Mallee and Terwiel and Hekster, 1991), disability- and cancer-related pain (e.g. Spiegel and Bloom, 1983; Jensen, Hanley, Engel, Romano, Barber, Cardenas et al., 2005), and mixed chronic pain problems (e.g. Melzack and Perry, 1975). In these studies, hypnosis was generally found to result in significant

reductions in a number of key pain-related outcomes (e.g. pain intensity, duration, frequency, analgesic medication use), but efficacy varied as a function of a number of factors, such as pain condition, sample size and study design.

Efficacy also varied according to the type of comparison condition used. Intervention with hypnosis was consistently more efficacious than *no treatment* or *standard care*. Similarly, when compared to other effective treatments that *did not contain hypnotic elements* (such as physical therapy, education and medication management) hypnosis appeared to be superior in producing changes in subjective reports of pain (e.g. Jensen and Patterson, 2006). However, in comparison to treatments that *included hypnotic elements*, and therefore may operate via similar mechanisms as hypnosis (such as progressive muscle relaxation, autogenic training, and certain forms of cognitive-behavioural therapy [CBT] for pain) hypnosis was not always associated with greater efficacy. Across most studies, the actual act of hypnotic induction did not appear to have a substantial effect above and beyond relaxation and suggestion. Interestingly, however, when patients showed equivalent reductions in pain control with relaxation or autogenic training, they tended to have high scores on measures of hypnotizability (Patterson and Jensen, 2003); in other words, highly suggestible patients often showed improvement regardless of treatment condition.

Efficacy in acute/procedural pain populations

In contrast to chronic pain, acute pain occurs in response to specific tissue damage, tends to be of shorter duration, and usually resolves once the injury heals (Melzack and Wall, 1973; Williams, 1999). Because situations that provoke acute pain associated with minor injuries are naturally unpredictable, hypnosis research in the area of acute pain has generally focused on using hypnosis as an adjunct to the pain associated with scheduled medical procedures (i.e. *procedural pain*) or with labour/childbirth. The prior reviews (i.e. Patterson and Jensen, 2003; Jensen and Patterson, 2006; Elkins et al., 2007) identified and summarized approximately twenty studies investigating the efficacy of hypnotherapy as a treatment for acute/procedural pain conditions including bone marrow aspiration (e.g. Liossi and Hatira, 1999), burn wound dressing change and debridement (e.g. Patterson, Questad and DeLauter, 1989), labour pain (e.g. Harmon, Hynan and Tyre, 1990), invasive surgical procedures such as angioplasty or arteriograms (e.g. Weinstein and Au, 1991; Lang, Joyce, Spiegel, Hamilton and Lee, 1996), chemotherapy (Syrjala, Cummings and Donaldson, 1992), and elective plastic surgery (Faymonville et al., 1997). Again, across studies, hypnosis was generally found to be associated with significant decreases in a number of pain measures as well as reductions in related outcomes such as anxiety, length of hospital stay, and duration of Stage 1 labour in childbirth.

Factors affecting response to hypnotic analgesia

Process analyses can be used to determine the predictors or covariates of treatment outcomes, and can test or develop theories regarding the specific mechanisms that underlie hypnosis (e.g. suggestibility, expectations, dissociation), while component analyses can be used to determine the relative efficacy of certain aspects or `parts' of the hypnosis treatment (e.g. content of induction, number of treatment sessions) by assigning participants to different hypnosis conditions (Jensen and Patterson, 2006). Results of the former indicate that hypnotic suggestibility and the ability to experience vivid images are often, but not always, significantly associated with treatment outcome in hypnosis; this finding has also been observed for treatments that include hypnotic elements (e.g. progressive muscle relaxation, autogenic training). However, even patients identified as having `low' hypnotizability can benefit from hypnosis treatment (Andreychuk and Skriver, 1975; Friedman and Taub, 1984; Holroyd, 1996). Regarding provider factors, very little work has examined therapist skill in providing hypnotic analgesia, and the studies that have been done have demonstrated no significant

difference among trained providers (Zitman, Van Dyck, Spinhoven and Linssen, 1992). Perceived control over pain (Spinhoven et al., 1992) and treatment outcome expectancy (Jensen et al., 2005) have also been positively associated with treatment outcomes in some studies, but results regarding the latter have been somewhat inconsistent and difficult to interpret. Furthermore, motivation to participate in treatment may be greater in patients with severe acute pain compared to those with chronic pain, which may in turn increase the effectiveness of hypnotic analgesia (Patterson and Ptacek, 1997). Interestingly, in terms of component analyses, explicit labelling of a hypnotic treatment as `hypnosis' appears to have little short-term benefit over not providing this label, but may be associated with greater long-term maintenance of treatment effects (Zitman et al., 1992). We should note, however, that this finding is based on only one study that did not include a large number of subjects.

One legitimate critique of the literature on hypnosis in general (and hypnotic analgesia specifically) is that very few studies have accounted for the impact of non-specific factors such as therapist attention or collaboration/support between the therapist and the patient. Jensen (e.g. Jensen and Patterson, 2005; Jensen and Patterson, 2006) has argued that a particularly useful control condition for hypnosis research would be a `minimal effect treatment' that would control for treatment time spent with a therapist, be viewed by patients as being as logical and potentially efficacious as the hypnosis intervention, and be known or thought to have minimal specific effects on pain intensity. Unfortunately, very little data based on this sort of design is available and the data that do exist, specifically regarding treatment outcome expectancy (as mentioned above), is mixed (e.g. Gay et al., 2002; Jensen et al., 2005).

Recent controlled trials of hypnosis in the treatment of chronic pain problems in adults

The second goal of the present study was to identify and review randomized, controlled trials of hypnotic analgesia interventions in adults that have been published since the previous reviews. Our current literature search revealed five recent studies exploring the analgesic effects of hypnosis for chronic pain conditions including irritable bowel syndrome (IBS) (Simrén, Ringström, Björnsson and Abrahamsson, 2004; Roberts, Wilson, Singh, Roalfe and Greenfield, 2006); non-cardiac chest pain (Jones, Cooper, Miller, Brooks and Whorwell, 2008); fibromyalgia (Castel, Pérez, Sala, Padrol and Rull, 2007); and multiple sclerosis (MS) (Jensen, Barber, Romano, Molton, Raichle, Osborne et al., in press).

IBS and abdominal pain

Roberts et al. (2006) randomized 81 adult patients with IBS to either receive five sessions of hypnotherapy in addition to usual care, or to receive usual care alone. The hypnotherapy sessions were half-hour sessions of `gut-directed' hypnotherapy which included a standard hypnotic induction followed by deepening procedures and use of hypnotic suggestions that had been tailored to reflect each patient's particular symptoms or difficulties with IBS (e.g. constipation, pain). The patients in the treatment condition were also given an autohypnosis tape at the first session and were encouraged to practice with the tape on a daily basis. Pain, which was one of four primary outcomes (pain, constipation, diarrhea, quality of life) was measured at baseline and at 3, 6, and 12 months post-randomization. Both groups demonstrated a significant improvement in pain over the 12 months; at 3 months, the hypnotherapy group showed significantly greater improvements in pain compared to the control group. Although this difference was not maintained at 12 months, patients in the intervention group were significantly less likely to require medication for their IBS, and most reported that their condition had improved.

Simrén et al. (2004) conducted a randomized controlled trial to determine the effects of hypnotherapy on sensory and motor components of the gastrocolonic response in patients with (IBS) who were refractory to standard medical treatment. Twenty-eight patients with IBS were randomized to receive either 12, 1-hour sessions of `gut-directed' hypnotherapy or to a wait-list control condition which consisted of supportive therapy with a dietician, a physiotherapist, a gastroenterologist, and a study nurse who offered telephone support. The hypnosis sessions included an induction with progressive relaxation to deepen the hypnotic state. Hypnotic suggestions were aimed primarily at restoring normal gastrointestinal function (e.g. a river flowing smoothly, a blocked river flow being cleared by the patient). It was further recommended that patients practice their hypnotic skill on a daily basis. Patients' gastrocolonic response was measured through a barostat procedure in which a balloon catheter was placed in the midsigmoid colon with a flexible scope. The balloon was expanded and contracted at various time points to obtain baseline/fasting and postprandial (i.e. administration of a lipid solution) readings of the gastrocolonic response. After receiving the duodenal lipids, the hypnotherapy group experienced increased tolerance for gas and discomfort, but not pain, while the control group experienced a decreased threshold for all three variables. The hypnotherapy group also evidenced decreased colonic tone response compared to the controls during the lipid infusion.

Non-cardiac chest pain

Jones et al. (2006) conducted a randomized study to determine the efficacy of hypnosis in treating patients with non-cardiac chest pain (NCCP). Fifteen patients received 12 sessions of hypnotherapy over a 17-week period while 13 patients received 12 sessions of supportive therapy plus placebo medication over the same time frame. Hypnosis was induced by eye closure, followed by progressive muscle relaxation and deepening techniques. `Chest-focused' suggestions were delivered along with suggestions for reduction of pain and improvement of health. Patients were also given an audio tape or CD of one session and were encouraged to practice daily. A significant difference was found between the experimental and control groups, in that 80% of the hypnosis group showed improvements in global chest pain compared to only 23% of the control group. The hypnosis group also witnessed a significant reduction in pain severity compared to the control group, and the difference in pain frequency between the two groups approached significance. Patients in the hypnosis group decreased their use of over-the-counter and prescription medications, whereas patients in the control group increased their use of pharmaceuticals.

Fibromyalgia

Castel et al. (2007) compared the relative effects of hypnosis and relaxation on clinical pain in 45 patients with fibromyalgia and explored whether presenting the relaxation suggestions as `hypnosis' versus `relaxation training' would impact pain outcomes. Patients were randomized to one of three groups: (1) hypnosis with relaxation suggestions (presented as hypnosis); (2) hypnosis with analgesia suggestions (presented as hypnosis); and (3) relaxation (presented as such). Each treatment condition consisted of one 20-minute session and pain was assessed pre- and post-session with the McGill Pain Questionnaire (MPQ; Melzack, 1975; Spanish adaptation by Lázaro, Bosch, Torrubia and Baños, 1994), and a visual analogue scale (VAS). With regard to the MPQ, only its Pain Rating Index Sensory (PRI-S) and Pain Rating Index Affective (PRI-A) subscales were used in analyses to determine if different types of suggestions (i.e. analgesia or relaxation) would differentially influence the sensory and affective components of pain. Patients who received hypnosis with analgesia suggestions (e.g. imagining a blue, analgesic stream filtering into the painful area) experienced significantly greater reductions in pain intensity, and in the sensory dimension of pain, than did patients in either the hypnosis with relaxation (e.g. visualizing a pleasant beach) or relaxation conditions. Reductions in pain intensity were found to be similar (and non-significant) between the

hypnosis with relaxation suggestions and the relaxation conditions. Furthermore, no significant differences were found among the three groups with regard to the affective dimension of pain.

Multiple sclerosis (MS)

Twenty-two patients with MS were randomized by Jensen et al. (in press) to receive either 10 sessions of self-hypnosis training or 10 sessions of progressive muscle relaxation (PMR) in order to compare the relative efficacy of these two treatments on pain intensity and pain interference. The self-hypnosis training (HYP) treatment protocol was a modified version of a treatment protocol described in detail in a previous case series study (Jensen et al., 2005). Specifically, the modifications consisted of (1) inviting the patient to visualize being in a `special place' of their own choosing (the patient could also imagine him/herself in a soothing body of water, if desired); (2) suggesting the patient experience one classic hypnotic phenomenon (such as hand or arm lowering, hands pulled together, head pulled to the side) to enhance the participant's sense of successful hypnotic responding; and (3) altering the number and content of analgesia suggestions (five analgesic suggestions were administered *only* in the first two sessions; in the remaining eight sessions, only two specific suggestions, one of which was `decreased unpleasantness', were used). Participants in the HYP condition were given audiotapes or CDs of two sessions with the suggestion that they listen to the recordings at least once every day, but more often if they found the recordings helpful. PMR was chosen as the active control condition as it controls for therapist attention, time, and patient outcome expectancy, three key nonspecific factors that could potentially explain the effects of self-hypnosis treatment. Both the HYP and the PMR conditions were also introduced to patients using similar vocabulary to minimize differences in expectancy between the two treatment conditions that might occur if they were given different labels (i.e. relaxation). Pain intensity was assessed with an 11-point NRS and pain interference was measured with a modified version of the Pain Interference Scale from the Brief Pain Inventory (BPI; Daut, Cleeland and Flannery, 1983; Cleeland and Ryan, 1994). Patients in the HYP condition experienced significantly greater pre- to post-session and pre- to post-treatment decreases in pain intensity and pain interference compared to patients in the PMR condition; these gains were maintained at 3-month follow-up. While general hypnotizablity was not related to the outcomes in question, treatment outcome expectancy assessed before and after the first session was. Interestingly, treatment outcome expectancy did not differ significantly between the two conditions.

Recent controlled trials of hypnosis in the treatment of acute/procedural pain problems in adults

With regard to acute pain, our present review uncovered nine recent studies investigating the use of hypnotic analgesia in a variety of populations and medical procedures including pain related to gynecologic or women's health procedures (Lang, Berbaum, Faintuch, Hatsiopoulou, Halsey, Li et al., 2006; Marc, Rainville, Verreault, Vaillancourt, Masse and Dodin, 2007; Montgomery, Bovbjerg, Schnur, David, Goldfarb and Weltz, 2007); invasive vascular or renal procedures (Schupp, Berbaum, Berbaum and Lang, 2005; Lutgendorf, Lang, Berbaum, Russell, Berbaum, Logan et al., 2007); burn wound care and treatment (Harandi, Esfandani and Shakibaei, 2004; Wiechman-Askay, Patterson, Jensen and Sharar, 2007); and pain associated with healing of a wound or injury (Ginandes and Rosenthal, 1999; Ginandes, Brooks, Sando, Jones and Aker, 2003).

Gynecologic/women's health procedures

Lang et al. (2006) conducted a prospective randomized trial to determine whether adjunct self-hypnosis training could reduce the pain and anxiety associated with undergoing a large core needle biopsy (LCNB) of the breast. Two hundred and thirty-six women who were referred

for LCNB were randomized to one of three groups: (1) standard care, (2) structured empathic attention, and (3) self-hypnotic relaxation. The hypnosis treatment consisted of a standard induction followed by suggestions for sensory substitution and if needed, anxiety management. Patients' self-ratings of pain and anxiety were taken every 10 minutes during the procedure using a 0-10 VAS (0 = no pain/anxiety, 10 = worst pain/anxiety imaginable). During the procedure, ratings of pain intensity increased in all three conditions. Compared to standard care, pain scores rose significantly more slowly in both the empathic attention and the hypnosis groups; however, there was no significant difference in the rate of change of pain between the empathic attention and the hypnosis groups.

Marc et al. (2007) explored whether a brief hypnotic intervention would reduce requests for pain medication (nitrous oxide, N_2O) in a sample of women undergoing a first-trimester surgical abortion. Thirty minutes before the procedure, 30 women were randomized into standard-care or hypnosis groups. After randomization, hypnosis was induced in the experimental participants and suggestions for relaxation, comforting imagery, pain reduction and abdominal numbness were given. Each patient was then walked to the operating room and suggestions for deepening were given by the hypno-therapist once the patient was situated on the surgical table. The patient was told that during the procedure she could ask for anything that would make her more comfortable. Suggestions to end hypnosis and become more alert were given once the procedure was completed. Significantly fewer patients in the hypnosis group (36%) requested N_2O during the procedure than did patients in the control group (87%). However, no differences were observed between groups with regards to self-reported pain intensity or pain unpleasantness.

Montgomery et al. (2007) randomized 200 women who were scheduled to undergo an excisional breast biopsy or a lumpectomy to one of two conditions: (1) a 15-minute presurgery hypnosis session, or (2) an attention control. The hypnosis session was conducted within one hour before surgery and consisted of a relaxation-based induction, suggestions for pleasant visual imagery, relaxation and peace, specific symptom-focused suggestions (i.e. to experience decreased pain, nausea and fatigue), a deepening procedure, and instructions for self-practice following the intervention. Pain intensity and pain unpleasantness were assessed post-operatively on a 0-100 VAS, as were the additional outcome measures of fatigue, nausea, physical discomfort and emotional upset. With regard to intraoperative pain medications, patients in the hypnosis condition used significantly less lidocaine and propofal than did patients in the attention control condition. Similarly, all outcome measures, including pain intensity and pain unpleasantness, were significantly lower in those patients who had received the hypnosis intervention compared with patients who were in the attention control condition. Mean differences between the two groups on all outcome variables were also found to be clinically meaningful; i.e. the effect size for each of the VAS outcomes was larger than 0.2, the minimum value for clinical meaningfulness. Of note, this study found that patients in the hypnosis group spend 10.60 fewer minutes in surgery compared to patients in the control group, resulting in an average savings of $772.71 in institutional costs per patient.

Invasive vascular or renal procedural pain

Two studies were published using secondary data analysis from a prospective, randomized, single-centre study conducted by Lang, Benotsch, Fick, Lutgendorf, Berbaum and Berbaum (2000). The original study explored the efficacy of self-hypnosis (compared to standard care and structured attention) in reducing the pain and discomfort associated with percutaneous vascular and renal procedures in 241 patients. Briefly, self-hypnosis was shown to have more pronounced effects on pain and anxiety reduction, decreases in procedure duration, and even resulted in improvements in hemodynamic stability.

Lutgendorf and colleagues (2007) used secondary data analysis from this trial to explore whether patient age would affect responsiveness to self-hypnosis during invasive medical procedures of the vasculature and kidneys. As stated, two hundred and forty-one patients had been randomly assigned to receive hypnosis, empathic attention or standard care during interventional radiological procedures. Patients in the hypnosis condition were given a standardized, eye-roll induction along with suggestions for visualizing one's self in a safe, peaceful place during the procedure. Suggestions to address pain and anxiety were also delivered as needed. Patients in all three conditions had access to patient-controlled analgesia/sedation. Pain and anxiety were assessed by verbal self-report on a 0-10 numerical rating scale (NRS) 15 minutes prior to the procedure, and again at 15-minute intervals during the procedure. There was no significant relationship between age and hypnotizability as assessed by the Hypnotic Induction Profile (Spiegel and Spiegel, 1978). Pain increased significantly over time in the standard care and attention groups, but not in the hypnosis group. More specifically, reductions in pain corresponded to patient age in the hypnosis group, suggesting that the efficacy of hypnosis for analgesia increases with age. Compared with standard care, final pain ratings were significantly lower in the attention and hypnosis groups, with a trend toward lower final pain with hypnosis; these outcomes did not vary by age. Although patients in the attention and hypnosis groups both requested, and received, less medication than did patients receiving standard care, no significant differences were observed in these variables between the attention and hypnosis groups. Beneficial effects of hypnosis and empathic attention were also observed in reduction of procedure duration and oxygen desaturation, with increased age leading to greater oxygen desaturation in the standard care group.

Also using data from Lang et al., Schupp et al. (2005) explored whether the level of underlying anxiety in patients affected their responsiveness to pharmacologic and nonpharmacologic interventions while undergoing invasive vascular and renal procedures. Two hundred thirty-six of the 241 patients had completed the State-Trait Anxiety Inventory (STAI, Spielberger, Gorsuch and Lushene, 1983) and were randomized to the conditions stated above (standard care treatment, structured empathic attention or self-hypnosis relaxation). All patients were divided into two groups, low anxiety and high anxiety, based upon their scores on the STAI. During the medical procedures, providers of the nonpharmacologic interventions sat near the head end of the patient table behind a lead glass shield to administer the empathic attention and hypnosis treatments (the hypnosis treatment is the same as described above). Again, all patients had access to patient-controlled analgesics and rated their pain and anxiety on an 11-point NRS (0 = no pain/anxiety, 10 = worst possible pain/anxiety) every 15 minutes throughout the procedure. Patients in the high anxiety group required significantly longer procedure times and requested and received more medication than did patients in the low anxiety group. A similar pattern of findings was observed when comparing the standard care condition to the attention control and hypnosis conditions, with standard care resulting in longer procedure times and increased medication requested and administered. For patients with low anxiety levels, the nonpharmacologic treatments provided significantly better pain control than did the standard care treatment. While all patients experienced a decrease in anxiety over the course of the procedure, patients in the high anxiety group experienced the greatest drop in anxiety levels in both the attention control and hypnosis groups. Patients with low state anxiety appeared to cope fairly well regardless of treatment condition.

Burn wound care or treatment

Harandi et al. (2004) randomized 44 women hospitalized in a burn unit to intervention (hypnosis) and control (standard care) groups to determine whether hypnosis would reduce the procedural pain and anxiety related to physiotherapy (physical therapy, PT). The intervention group received 4 hypnotherapy sessions which included a modified version of Barber's (1977) `rapid induction analgesia' (RIA) for the management of pain. Pain and anxiety were

assessed with a VAS for four consecutive days, both pre- and post-physiotherapy. By the end of the study, pain and anxiety scores had dropped significantly in the hypnotherapy group compared to the control group. Hypnosis was also found to have a significant effect on the outcomes after the first session, but optimal results were achieved with subsequent sessions.

Weichman-Askay et al. (2007) investigated the use of hypnotic analgesia for decreasing burn pain during wound debridements. Forty-six adult patients who had been hospitalized for burn injuries were randomly assigned to a hypnosis intervention or an attention + relaxation control group. A psychologist delivered the hypnosis script and posthypnotic suggestions, which specifically addressed burn injury wound care, to patients prior to their wound care on day 3 of the study. During wound care, the patients then listened to a recording of the hypnotic induction followed by music of their choice. A psychologist also spent an equivalent amount of time with patients in the control group, and these participants were given a recording which they could listen to during their wound care as well. The recording consisted of 3 minutes of silence (for imagery/visualization) and relaxing music. Pain was assessed with the Short Form of the McGill Pain Questionnaire (SF-MPQ; Melzack, 1987) and the Graphic Ratings Scales (Scott and Huskisson, 1976). Three measures were also used to assess hypnotizability (Stanford Hypnotic Clinical Scale; Hilgard and Hilgard, 1975); absorption (Tellegen Absorption Scale; Lyons and Crawford, 1997); and dissociation (Stanford Acute Stress Reaction Questionnaire; Koopman, Classen and Spiegel, 1994). Both groups experienced a reduction in pain from pre- to post-treatment. The hypnosis group, however, evidenced a significant reduction in pain compared to the control group, but only as assessed by the SF-MPQ. The authors concluded that because the SF-MPQ assesses multiple domains of pain (e.g. pain quality, pain unpleasantness) versus pain intensity solely, it may be a more sensitive (and applicable) measure to use in hypnotic analgesia studies. Of note, no significant relationships were found between worst pain intensity score and hypnotizability, absorption and dissociation, nor did opiod analgesic use differ significantly between the two groups.

Injury/wound healing

Although pain reduction was not the primary variable measured, two studies that focused on wound healing are worthy of mention: Ginandes and Rosenthal (1999) and Ginandes et al. (2003). Certainly, there is speculation that reducing acute pain can facilitate wound healing. Physiological responses to acute pain, such as activation of the sympathetic nervous system, may impede wound healing via increased cardiovascular stress and the release of stress hormones and suppression of the immune response (Chien, 1967; Chapman and Bonica, 1983; Chapman, 1985; Mackersie and Karagianes, 1990). Managing pain, therefore, may play an important role in supporting the body's natural ability to heal and recover from injury.

In the first study (Ginandes and Rosenthal, 1999), twelve adults with nondisplaced malleolar (ankle) fractures were randomly assigned to receive either customary orthopedic care alone or customary care + 6 sessions of hypnosis, which included a series of audiotapes for home practice. The hypnotic intervention was targeted towards acceleration of healing and direct and indirect suggestions were given for the alleviation of pain, reduced inflammation and swelling, and enhanced tissue growth and fusion, among others. Pain was assessed via self-report on a 1-10 VAS. Objective (blinded) radiologist ratings revealed a trend towards faster healing in the hypnosis group through week 9 following injury, and a significant difference in fracture edge healing in favour of the hypnosis group was observed at week 6. Patients who received hypnosis reported less pain at weeks 1, 3, 6, and 12, and less analgesic use at weeks 1, 3, and 9. Orthopedic assessments also demonstrated a trend towards better healing through week 9 in the hypnosis group, namely in improved ankle mobility and greater functional ability to descend stairs.

In the second study (Ginandes et al., 2003), eighteen women presenting for medically recommended breast reduction surgery were randomly assigned to (1) an adjunctive hypnotic intervention, (2) supportive attention, or (3) usual care only. Women in the hypnosis condition received 8 weekly, 30-minute individual sessions of hypnotherapy and were given audiocassettes for home practice. As in the ankle fracture study, hypnotic suggestions were aimed at accelerated wound healing and related parameters such as decreased pain and reduced inflammation. Through postoperative week 7, objective ratings from medical personnel indicated significantly greater incision healing in the hypnosis condition compared to both control conditions, with the usual care condition displaying the least amount of healing. Observations at weeks 1 and 7 also revealed that the patients in the hypnosis group were significantly more healed than were patients in the usual care group. Although the differences were not statistically significant, perhaps due to lack of power from the small sample size, at week 6 the hypnosis group reported lower mean pain scores than did the other two groups, and the hypnosis group's mean pain score changed (decreased) the most from weeks 1-6.

Discussion

In the present review, we identified fourteen randomized controlled trials that have recently been conducted (i.e. subsequent to previous literature reviews) investigating the efficacy of hypnosis as a treatment for pain in adult clinical populations. Five of these studies focused on the use of hypnosis in chronic pain conditions, while the remaining nine studies explored the utility of hypnosis for treating acute/procedural pain problems. In each of the five chronic pain trials, hypnosis generally performed either better than, or at least as well as, the alternate treatments in reducing pain and pain-related outcomes. These findings are consistent with the conclusions drawn by the previous reviews on chronic pain that were highlighted earlier: (1) when compared to no-treatment (i.e. standard care) or to interventions that are `non-hypnotic' in nature (e.g. attention control, supportive therapy), hypnosis tends to result in greater reductions in a variety of pain measures or domains; and (2) when hypnosis is compared with interventions that have `hypnotic-like' qualities (e.g. progressive muscle relaxation, autogenic training), the resulting pain outcomes are similar; although hypnosis often does not `out-perform' the control condition(s), its efficacy is not surpassed by the other treatments.

In terms of acute/procedural pain, the findings from both the current and the previous literature reviews suggest that hypnosis, compared to no-treatment or `non-hypnotic' interventions, results in significantly greater reductions in pain outcomes at least 50% of the time, and performs as well as the control conditions in the remaining 50% of trials. Similarly, when hypnotic analgesia for acute/procedural pain is compared to viable treatments (e.g. relaxation training, CBT), hypnosis is superior to these interventions in roughly half the trials, with no alternate treatment surpassing hypnosis in efficacy.

Regarding possible mechanisms of action, hypnotizability is often, but not always, associated with treatment outcomes, and there is some speculation that labeling treatment as `hypnosis' may further contribute to its analgesic effects - specifically when hypnosis consists primarily of analgesic versus relaxation suggestions. Patient beliefs, such as perceived control over pain and treatment outcome expectancy, have also been related to beneficial outcomes; however, data on treatment outcome expectancy has been inconsistent. Studies addressing provider characteristics (e.g. expertise, skill) and non-specific factors associated with treatment (e.g. attention, rapport) are lacking and further data is required before making any conclusions about these possible predictors. Furthermore, although all of the findings presented here are promising, they still must be considered as somewhat preliminary, due to the numerous `blanks' which remain to be filled. Methodological issues which have plagued previous trials (e.g. lack of standardization of hypnotic interventions, small sample sizes, failure to conduct long-term

follow-ups) should ideally be addressed in future studies so that strong conclusions and accurate treatment recommendations can be made (Elkins et al., 2007).

Recommendations

The final goal of this review is to present practitioners, either those who are already using hypnosis for the treatment of pain or those who are considering using the technique, with several practical suggestions based upon the findings from the previous and present reviews. For detailed descriptions of hypnotic analgesia treatment protocols, examples of inductions and suggestions, or descriptions of in-depth case studies, we refer the reader to the many excellent textbooks and journals that have been published on these topics (e.g. Barber, 1996; *American Journal of Clinical Hypnosis*; International Journal of Clinical and Experimental Hypnosis; our protocols are also available to readers who are interested). Once a practitioner, however, has a grasp of the basics of hypnotic analgesia, the following recommendations can be incorporated into any treatment protocol:

1. It is unlikely that hypnosis focused solely on relaxation will result in the greatest possible reductions in pain that can be achieved; therefore, a variety of suggestions, both analgesic and non-analgesic, should be tried and selected based upon their effectiveness in session and patient preference. Suggestions for analgesia include, but are not limited to, reduced unpleasantness, hypnoanesthesia, direct abolition of pain, time distortion, and dissociation (Erikson, Rossi and Rossi, 1976). Some evidence indicates that for patients with chronic pain, suggestions aimed at diminishing or attenuating levels of pain may be more effective in the long-term than suggestions aimed at the complete abolition of pain (Erickson et al., 1976).

In addition to relaxation, helpful non-analgesic suggestions would be likely to include those for improved sleep, increased energy levels and ego-strengthening (e.g. improved self-confidence and self-efficacy). Certain types of suggestions may also be given depending on the `components' of the pain experience as they may influence different brain structures or processes (Jensen, in press). For example, suggestions aimed at decreased pain unpleasantness (pain affect) have been shown to be associated with decreased activity in the ACC (but not the somatosensory cortices) (Rainville et al., 1997), while suggestions aimed at decreased pain intensity have been shown to be associated with decreased activity in the primary somatosensory cortex - but not the ACC (Hofbauer et al., 2001).

It is interesting that in the treatment of chronic pain, the goal often may not necessarily involve a decrease in ratings or perception of pain (e.g. Turk and Okifuji, 1998a; Turk and Okifuji, 1998b; Turk and Flor, 1999). Patients who pursue a more active and functional lifestyle, return to work, or report greater life satisfaction may be considered treatment successes. The single most impactful treatment for chronic pain may be increasing activity. As such, suggestions that lead to the increase of `safe' (i.e. sanctioned by the doctor) activities might be those that are ultimately most helpful to the patient. Similarly, suggesting to the patient that they will be motivated to attend sessions of physical therapy and to exercise regularly might be the intervention that has the longest-lasting impact for some types of chronic pain.

2. Do not expect that all patients undergoing hypnotic analgesia will respond to treatment like patients described in case studies (i.e. with profound or even extraordinary results). It is important to remember that case reports are selectively reported by authors based on the most dramatic cases, and are likely to involve patients with a high level of hypnotic talent. In day-to-day clinical care, some patients will experience significant reductions in pain intensity or unpleasantness with hypnosis, and others will not. Most patients, however, will probably say that they enjoy hypnosis and find the skills helpful in managing their pain or in generally improving their quality of life. Furthermore, self-hypnosis training in persons living with chronic pain appears to have two levels of effect: (1) A short-term reduction in chronic pain

that occurs during the treatment session or hypnosis practice (in about 70% of persons with chronic pain); and (2) a longer- term permanent reduction in baseline daily pain (in between 20% and 30% of patients; Jensen et al., 2005; Jensen, Hakiman, Sherlin and Fregni, 2008). It is worth noting that hypnosis may be most effective in conditions involving primarily neuropathic or vascular pain, and that evidence for efficacy is lacking in primarily musculoskeletal (e.g. lower back) pain.

3. In reviewing the literature, it appears that there are no patient or demographic characteristics that necessarily `rule out' the use of hypnosis for pain, other than severe cognitive impairment. For example, the studies presented in this review have shown that hypnosis is efficacious in reducing pain in both older and younger adults (see also the review article in this issue regarding the efficacy of hypnosis for pediatric pain conditions); therefore, patient age alone does not appear to be a valid reason for withholding treatment. Similarly, although hypnotizability has been consistently associated with treatment outcomes, it does not predict any one patient's particular success. Even patients who have low levels of hypnotizability prior to treatment with hypnosis can exhibit significant and meaningful reductions in pain and/or discomfort (for an example of just such a case, see Stoelb, Tackett and Jensen, in press). Therefore, as with age, hypnosis should not necessarily be withheld from a patient based on their level of hypnotizability alone.

4. Although we are not aware of any studies which have investigated the effects of home practice on treatment outcomes, it is likely that patient skill in hypnosis will increase and become more automatic with regular practice (as is the case with most human behaviour). Our clinical experience indicates that patients who practice more typically report greater benefit from the treatment. We advise providing patients with a tape or a CD of one or more hypnosis sessions to allow for ongoing home practice. We also recommend to our participants that they practice at least once a day, and suggest that the more they practice, the more likely they are to achieve the maximum benefit in terms of pain relief and overall well-being.

In conclusion, the data presented in this review supports the use of hypnosis as a viable treatment for both chronic and acute pain conditions. Our hope is that through continued research, hypnosis will gain increased recognition as a scientifically valid and clinically practical treatment for reducing pain in diverse patient populations.

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