

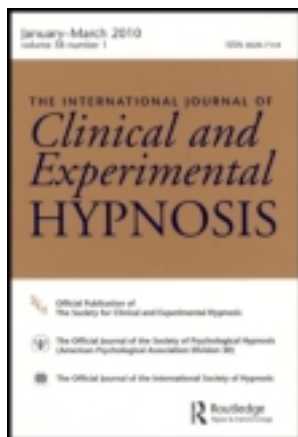
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HYPNOSIS DELIVERED THROUGH IMMERSIVE VIRTUAL REALITY FOR BURN PAIN: *A Clinical Case Series*

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Abstract: This study is the first to use virtual-reality technology on a series of clinical patients to make hypnotic analgesia less effortful for patients and to increase the efficiency of hypnosis by eliminating the need for the presence of a trained clinician. This technologically based hypnotic induction was used to deliver hypnotic analgesia to burn-injury patients undergoing painful wound-care procedures. Pre- and postprocedure measures were collected on 13 patients with burn injuries across 3 days. In an uncontrolled series of cases, there was a decrease in reported pain and anxiety, and the need for opioid medication was cut in half. The results support additional research on the utility and efficacy of hypnotic analgesia provided by virtual reality hypnosis.

Hypnotic analgesia has increased in popularity, perhaps, in part, due to recent research demonstrating that medical hypnosis can reduce medical-procedure costs (e.g., Lang et al., 2000) and that hypnotic analgesia results in measurable changes in brain activation (Barabasz et al., 1999; Kosslyn, Thompson, Costantini-Ferrando, Alpert, & Spiegel, 2000; Rainville, Duncan, Price, Carrier, & Bushnell, 1997). Moreover, a recent meta-analysis (Montgomery, DuHamel, & Redd, 2000) reported analgesic effects in the majority of studies that employed hypnosis for clinical and experimental pain. A more recent review noted that anecdotal reports of hypnotic pain relief have been published on virtually every type of pain (Patterson & Jensen, 2003) and identified 29 randomized, controlled studies of hypnotic analgesia, concluding that (a) the evidence supporting the efficacy of hypnotic

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analgesia is strong and (b) hypnotizability is related to outcome in most studies when this variable is measured.

Despite the promising findings concerning the efficacy of hypnotic analgesia, the evidence is also clear that not every patient benefits from this treatment and that not every patient who might benefit has access to hypnotic analgesia. Thus, there is a need for research that will identify methods for making hypnosis more available to patients overall and more effective for those with low hypnotizability scores (Holroyd, 1996). These goals could potentially be accomplished by (a) eliminating the need for a live hypnotist by using either audiotaped or computer-assisted hypnosis, and (b) making hypnosis less effortful for those with low hypnotizability scores.

Studies examining the effectiveness of using audiotapes to provide a clinical hypnotic intervention have yielded mixed results. In coronary-artery-bypass-surgery patients, Blankfield and colleagues (Blankfield, Zyzanski, Flocke, Alemagno, & Scheurman, 1995) found no significant differences between nonspecific audio-hypnosis tapes, music tapes, or no treatment on several outcome measures including opioid use and length of hospital stay. In dental surgery patients, Ghoneim and colleagues (Ghoneim, Block, Sarasin, Davis, & Marchman, 2000) found that audiotaped hypnosis decreased state anxiety but not pain in the hypnosis condition relative to a no-treatment control condition. In a randomized, controlled trial of patients with irritable bowel syndrome, Forbes and colleagues (Forbes, MacAuley, & Chiotakakou-Faliakou, 2000) found that live hypnosis improved symptoms of irritable bowel syndrome in 76% of patients compared to 59% of patients who received the audiotape. Finally, Enqvist and colleagues have published a series of randomized, controlled studies looking at the effectiveness of audiotaped hypnosis on several types of surgery. In patients undergoing breast surgery, (Enqvist, Bjorklund, Engman, & Jakobsson, 1997), investigators found that patients receiving audiotaped hypnosis reported significantly less nausea, vomiting, and need for analgesics after surgery compared to patients who received standard care (no hypnosis). For patients undergoing maxillofacial surgery (Enqvist, von Konow, & Bystedt, 1995), they found that patients in three experimental groups—(a) those receiving preoperative audiotaped suggestions, (b) those receiving both preoperative and postoperative audiotaped suggestions, (c) those receiving perioperative suggestions only—all showed reductions in blood loss as compared to the standard-care control group. Similarly, dental surgery patients who received audiotaped hypnosis showed significantly less anxiety than controls (Enqvist & Fischer, 1997). Together, these various studies show some promising results for audiotaped hypnosis when posthypnotic suggestions are specific and when compared to standard-care control conditions. However, more research is needed to compare the efficacy of audiotaped hypnosis to a live hypnotist.

In addition to exploring alternatives to live hypnotic induction, a logical step in increasing the impact of hypnosis is to make hypnotic induction less effortful for patients. Because considerable concentration is required to self-generate the scenarios used in an induction and to imagine the objects cued by the hypnotist, patients experiencing significant pain or who are taking powerful analgesics may not benefit, as they are able to exert only limited amounts of cognitive effort. In these settings, the use of computer-generated stimuli to capture and guide the patient's attention to induce hypnosis may be of particular benefit.

VIRTUAL REALITY

There have been few attempts to apply computer-aided hypnosis to clinical situations. Grant and Nash (1995) were the first to demonstrate computer-assisted hypnosis as a behavioral technique for assessing hypnosis, using digitized speech processing coupled with interactive involvement of the hypnotized subject. A digitized voice guided subjects through the procedure at a pace comfortable for the person. Software was tailored to the procedure according to each subject's unique responses and reactions.

The present study expands on the use of computerized hypnosis by using immersive virtual reality (VR) as a new medium. Immersive VR is a technology that isolates subjects from the outside world, including any threatening stimuli associated with health care. Participants have the illusion of going inside the three-dimensional computer-generated environment, a sensation known as *presence*. This quality makes immersive VR particularly effective in capturing participants' attention. The strength of the illusion of presence is thought to reflect the amount of attention drawn into the virtual world (Hoffman, Prothero, Wells, & Groen, 1998). Because VR is designed to be a highly attention-grabbing experience, it reduces the amount of attention available to process pain and instead maximizes the person's ability to narrowly focus on the hypnotic induction thereby facilitating dissociation of the pain. Less attention to pain can result in a reduction in pain perception. Distraction, in the absence of hypnosis, has been shown to be effective in reducing pain in a number of clinical studies (Hoffman, Doctor, Patterson, Carrougher, & Furness, 2000; Hoffman, Patterson, & Carrougher, 2000; Hoffman, Patterson, Carrougher, Nakamura, et al., 2001; Hoffman, Patterson, Carrougher, & Sharar, 2001). However, hypnosis *per se* has been shown to produce significantly more pain reduction than distraction (Freeman, Barabasz, Barabasz, & Warner, 2000; Smith, Barabasz, & Barabasz, 1996). VR provides a new method of inducing hypnosis.

VIRTUAL REALITY HYPNOSIS

Our goal with virtual reality hypnosis was to develop a three-dimensional, immersive VR technology that could guide the patient through the same steps that are used when hypnosis is induced through an interpersonal process. A typical clinician-to-patient hypnotic induction relies on self-absorption and imagination and involves: (a) establishing rapport and setting the stage, (b) enhancing relaxation through slowed breathing, (c) suggestions for deepening the hypnotic state, (d) providing posthypnotic suggestions for subsequent analgesia, and (e) alerting. Theoretically, inducing hypnosis with VR provides these same elements, yet VR replaces with a rich audiovisual sensory experience many of the stimuli that patients normally have to imagine effortfully via verbal cueing from the therapist.

A reasonable question is whether the virtual reality hypnosis paradigm meets the formal definition of hypnosis. The definition of hypnosis that we used in our recent review of hypnosis and pain (Patterson and Jensen, 2003) was that of Kihlstrom (1985): "a social interaction in which one person, designated the subject, responds to suggestions offered by another person, designated the hypnotist, for experiences involving alterations in perception, memory, and voluntary action." Our procedure was defined as hypnosis to the patient and contained suggestions for a change in perception (i.e., pain). Perhaps the only point that might be made regarding whether our procedure meets the definition of hypnosis is that the person performing hypnosis was not present, in that the induction was provided through an audiotape that was synchronized with a virtual reality world. The formal definitions available for hypnosis do not allow for such substituted technology; however, if the hypnosis used in the current study does not meet Kihlstrom's definition, then neither does any of the audiotaped hypnosis described in the several studies that have been published using this technology.

In the first case study that used VR to induce hypnosis for relaxation and pain control (Patterson, Tininenko, Schmidt, & Sharar, 2004), a 37-year-old male with severe burn injuries covering 55% of his body received VR-induced hypnosis prior to wound care. His subjective 0–10 Graphic Rating Scale pain-intensity ratings dropped 40% after VR hypnosis and his anxiety scores dropped 50%, relative to standard wound care. His opioid analgesic requirements for wound care dropped from 37 opioid equivalents without VR hypnosis to 23 opioid equivalents with VR hypnosis. The patient reported a moderate level of absorption based on the Tellegen Absorption Scale (TAS; Tellegen & Atkinson, 1974) and a medium level of hypnotizability as determined by the Stanford Hypnotic Clinical Scale (SHCS; Morgan & Hilgard, 1978/1979). The current study expands on this initial case report by reporting the results of 13 patients who received VR-induced hypnosis for their burn wound care.

APPLYING VIRTUAL REALITY HYPNOSIS TO BURN PAIN

Burn injury results in severe pain, and the subsequent treatment prolongs this suffering. Typical burn care involves a series of aggressive procedures that stimulate nociceptive afferent fibers on a daily basis for days, weeks, or even months after the initial injury. Wound cleaning, limb-mobility exercises, therapeutic skin stretching, and other medical procedures result in "procedural pain," which can be of very high intensity but usually has limited duration. Opioid analgesics, such as morphine, oxycodone, hydromorphone and fentanyl, are the cornerstone of treatment for the three types of pain—all severe—that accompany burn injuries (Patterson & Sharar, 2001). However, pharmacologic agents do not control all burn-related pain in all patients and carry the risk of unpleasant side effects (Brown, Albrecht, Pettit, McFadden, & Schermer, 2000; Cherny et al., 2001).

Psychological interventions are often a critical component of a burn-pain management regimen, can facilitate the effects of pharmacologic analgesics (Ewin, 1986a, 1986b; Patterson & Ptacek, 1997), and in some cases may either reduce or eliminate the need for opiates (Ohrbach, Patterson, Carrougher, & Gibran, 1998; Wakeman & Kaplan, 1978). In fact, early anecdotal work by Ewin suggests that hypnosis may have the potential to retard the progression of a severe burn injury in addition to its impact on pain control. Unfortunately, randomized, controlled studies of psychological treatments for burn and other forms of acute pain are few, and studies discussing innovative psychological interventions of this nature are even more rare. However, burn pain is severe enough that modalities developed to control it have the potential to generalize to many other etiologies of acute pain.

METHOD

Patients were chosen to participate in this study if they were 16 years of age or older, had a burn injury that required at least 3 days of hospitalization and dressing changes, and had no cognitive impairments that would prevent them from being able to rate their pain and anxiety. Patients who met the inclusion criteria were invited to participate in the study, the study was explained thoroughly, and institution-approved written consent was obtained. Baseline measures of pain and anxiety assessment (see below) were taken following wound care on Study Day 1 (no VR-hypnosis). Prior to wound care on Study Day 2, patients received an audiotaped hypnotic induction while drifting through a three-dimensional computer-generated virtual world called Snow World. Because the intervention occurred prior to wound care, the posthypnotic suggestions were an important component of the hypnotic intervention. In Snow World, participants began at the top of

an icy canyon and floated over a stream towards the bottom of the canyon as the program progressed. Using a Kaiser ProView XL50 VR helmet, (www.keo.com) and Polhemus Fastrak head-tracking device (www.Polhemus.com), patients had a sense that they are floating through their environment.

The program began by having a patient hovering at the top of the canyon while an audiotape of the hypnotist's voice prepared the patient for what he or she would experience during the virtual hypnosis. After 4 minutes of instruction, patients then began a 4-minute descent into the "snowy" 3-D canyon. They experienced themselves as slowly floating by sequential numbers (1 through 10, in order) and were instructed to deepen their relaxation as they passed each number. At number 10, patients were told that they were in their most relaxed state and had descended deep into the canyon. At this point, they were instructed to close their eyes and imagine that they were in a special place. They then heard 4 minutes of audio posthypnotic suggestions. Posthypnotic suggestions involved an Eriksonian-style of providing three options for how the patients might experience pain relief, followed by a suggestion that they will experience increased comfort no matter which option they choose. Patients were told that (a) they might experience coolness and numbness in any sites where they were having wound care, (b) they might find that the period of wound care went by surprisingly quickly, or (c) they would have some dissociation during the event of wound care. To illustrate, they were told:

You may find that all the areas where you have been burned become cool, numb, and comfortable. You may find that you drift off and you're asleep, and you're not even aware of what's going on. Or you may feel a couple of little things but mainly the sense of comfort and relaxation. I don't know exactly how this will seem to you, I only know that your experience will seem surprisingly more comfortable, surprisingly more relaxed, that you will have a profound sense of being more comfortable. You will also find that your wounds begin to heal surprisingly quickly, that your whole experience of being in the hospital begins to move by much more quickly and more comfortably than you ever might have imagined.

They were told that however they might experience their wound care, they would experience more relaxation and more comfort during wound-care procedures.

The final 4-minute alerting segment began with the audio instructing patients to open their eyes and prepare to ascend back up to the top of the canyon with each number acting as a cue for increased wakefulness. This time, the numbers began with 10 and decreased to 1 as the patients returned to the top of the canyon. Patients were told that they would become more awake and refreshed with each igloo that was passed on the way up until they reached complete alertness at the top of the canyon.

Immediately after their wound care on Study Day 2, Graphic Rating Scale ratings (GRS; Scott & Huskisson, 1976) and other assessments (see below) that reflected pain and anxiety levels during the wound-care session were elicited from the patients. An identical VR hypnosis induction was repeated prior to wound care on Study Day 3, as were the postwound-care measures.

Although we often refer to what we did with this patient as a "study" (baseline and posttest measures of pain were employed), it would be more appropriate to describe this work as a clinical case series. There was no control group or random assignment to study condition. Our intent with this study was to determine if an innovative approach to hypnosis was worthy of more formal investigation.

Measures

Patients rated their worst pain, average pain, and time spent thinking about pain during wound care using GRS. At 0, the GRS was labeled *no pain*, and at 100, the GRS label was *the worst possible pain*. Patients were asked to choose a number from 0 to 100 that best represented their pain. The abbreviated Burn Specific Pain Anxiety Scale (BSPAS; Taal & Faber, 1998) was used to assess anxiety during wound care. It is a five-item visual analog scale that identifies anxiety associated with burn pain. The low end of the 100-point scale is labeled "0-not at all," and the high end is labeled, "100-the worst imaginable way." The total score is calculated by adding the numbers given for each question and dividing by five. These specific items are, "I find it impossible to relax when my burns are being treated; I feel my muscles getting tense when the treatment actually begins; I am frightened of the pain during and/or after the treatment; The pain makes me nervous and restless; I find myself worrying about the possible pain I might have to endure for every medical operation."

Medication Use

All opioid medications given to the patients were recorded and converted into an opioid equivalent (OE) for purposes of comparison. The OE uses morphine as the standard where 10mg of morphine is equal to 1 OE. Nurses were told to medicate patients for wound care and background pain as usual. Participants' total OE and wound-care OE were then used as additional outcome measures.

Trait Measures

The patients' absorption and hypnotizability were assessed with two separate scales administered on Day 3 for patients that were still hospitalized and available to fill out the measures. Absorption was measured by using the TAS. Hypnotizability was measured with the SHCS.

RESULTS

Thirteen individuals participated in this study; however, 5 patients were dropped from the study prior to Day 3 due to changes in burn-management plans, surgical plans, or preprocedure nausea. Data for Days 1 and 2 are presented on all 13 patients. Data for Day 3 include 8 patients. The majority of patients were Caucasian (92%) and male (92%), and the study participants had a mean age of 38 years, a mean total burn surface area of 17%, and a mean length of hospitalization of 24 days (range, 4 to 97 days). The location of the burn varied and patients with face burns (46%) were able to participate in the study with the use of additional bandages. The mean level of absorption for patients was 23.85 (out of a possible 34; range, 12 to 33), indicating a moderate level of absorption. The mean hypnotizability score was 2.57 (out of a possible five; range, 1 to 5), also indicating a moderate level of hypnotizability, on average. See Table 1 for the means of the measures of pain unpleasantness, worst pain intensity, time spent thinking about pain, opioid equivalent, and anxiety for each of the 3 study days.

As can be seen, all GRS pain scores (for pain unpleasantness, worst pain intensity, and time spent thinking about pain) decreased steadily from baseline to Day 3. There was an 11% drop in pain unpleasantness scores, a 20% drop in reports of patient's worst wound-care pain, and a 29% drop in the time patients spent thinking about their pain from baseline to Day 3. Anxiety scores dropped by 26%. There was a 50% drop from baseline to Day 3 in the amount of opiates patients were given before, during, and immediately after wound care. No one indicated that the VR experience led to nausea or motion sickness. Although the number of patients in this study was low, Spearman Rho correlations were conducted on hypnotizability scores and the change scores created by calculating the difference from baseline to Day 3 in Worst Pain GRS scores. The correlation indicated a moderate association ($r_2 = .33$), but given the small N was not quite statistically significant ($p = .52$).

Table 1
Results of Graphic Rating Scales and the BSPAS

	Baseline (N = 13)	Day 2 (N = 13)	Day 3 (N = 8)
Unpleasantness	65.9	59.4	54.1
Worst Pain	86.2	75.3	66.6
Time Spent Thinking About Pain	76.0	66.4	47.6
OE—Wound care	2.6	2.4	1.3
BSPAS	62.5	46.9	36.4

Note. OE, opioid equivalent; BSPAS, Burn Specific Pain Anxiety Scale.

DISCUSSION

The pain associated with a burn injury is reported to be among the most intense and unpleasant of any etiology. No one method of pain control can completely alleviate such pain in the majority of patients. Combined pharmacological and nonpharmacological techniques should be utilized to help control burn pain, particularly during painful procedures such as wound care. The purpose of this case series was to investigate the potential utility of VR technology for delivering hypnotic analgesia for burn pain. This study showed promising results and indicates that further investigation with a randomized, controlled trial is warranted. Pain intensity levels dropped by 20%, and anxiety levels dropped by 26% in the VR condition relative to baseline. In addition, there was a substantial drop in opioid analgesic use. The magnitude of these decreases in pain and anxiety levels is clinically significant for a population experiencing extremely high pain levels. Moreover, there were no undesirable side effects, such as nausea, noted. As an aside, all of the patients reported enjoying the VR experience.

There are several compelling elements to VR hypnotic induction. First, this technology potentially decreases the effort required to create imagery during the procedure, as patients are able to keep their eyes open during this induction and are subjected to a captivating audiovisual environment. VR hypnosis can potentially be particularly attractive to patients who are struggling with imaginative absorption—especially in a hospital setting—and whose attention span may be diminished. The procedure also holds great promise for patients with hearing impairment as written suggestions can be incorporated into the program. Finally, this technology can potentially eliminate the need for the presence of a live hypnotist at every intervention, at least for very subscribed problems such as procedural pain. With less dependence on the skill of a trained hypnotist, such technology may increase our capacity to reach a greater number of patients with hypnotic analgesia.

Limitations of the study include the high dropout rate (38%) on the 3rd day compared to the 2nd day of the study. Reasons for dropout varied and are consistent with clinical research in a medical setting. As we continue to use this approach in patients with burn pain, we will be able to systematically track reasons for dropout. Another limitation of the study is selection bias. It is noteworthy that all but 1 patient was male, even though it was offered to both genders; however, the majority of patients treated for burn injuries are male, typically in a 4:1 ratio (Patterson et al., 1993). Finally, this study did not use a randomized, controlled study design but rather reductions in pain scores were compared with baseline scores. Without a control group and with the influence of potential historical factors, we cannot definitively say that reductions

in pain, anxiety, and medication were attributable to the hypnotic intervention as opposed to the course of time. The merits of this study lie in the innovation of the intervention, and further outcome assessment under better-controlled conditions is clearly warranted.

Another limitation is failure to provide any indication that the use of VR offers any advantage to hypnotic suggestions provided by audiotape alone. We would argue, however, that even if the visual stimuli presented offers no advantage for the general population, there may still be groups of patients who could benefit substantially from this technology. For example, patients with hearing impairments or who struggle with imagination or concentration could potentially benefit from VR hypnosis even if audiotaped hypnosis alone produces similar outcomes, on average. Future research should continue to investigate the use of this technology for enhancing hypnotic analgesia by using a randomized, controlled study design. Different scripts may also be investigated to determine the most effective suggestions. Although our patients showed moderate levels of hypnotizability, on average future studies with larger sample sizes will be able to assess the impact of this technology on those with low hypnotizability scores.

REFERENCES

- Barabasz, A., Barabasz, M., Jensen, S., Calvin, S., Trevison, M., & Warner, D. (1999). Cortical event-related potentials show the structure of hypnotic suggestions is crucial. *International Journal of Clinical and Experimental Hypnosis*, 47, 5–22.
- Blankfield, R. P., Zyzanski, S. J., Flocke, S. A., Alemagno, S., & Scheurman, K. (1995). Taped therapeutic suggestions and taped music as adjuncts in the care of coronary-artery-bypass patients. *American Journal of Clinical Hypnosis*, 37(3), 32–42.
- Brown, C., Albrecht, R., Pettit, H., McFadden, T., & Schermer, C. (2000). Opioid and benzodiazepine withdrawal syndrome in adult burn patients. *American Surgeon*, 66, 367–370.
- Cherny, N., Ripamonti, C., Pereira, J., Davis, C., Fallon, M., McQuay, H., Mercadante, S., Pasternak, G., & Ventafridda, V. (2001). Strategies to manage the adverse effects of oral morphine: An evidence-based report. *Journal of Clinical Oncology*, 19, 2542–2554.
- Enqvist, B., Bjorklund, C., Engman, M., & Jakobsson, J. (1997). Preoperative hypnosis reduces postoperative vomiting after surgery of the breasts. A prospective, randomized and blinded study. *Acta Anaesthesiol Scand*, 41, 1028–1032.
- Enqvist, B., & Fischer, K. (1997). Preoperative hypnotic techniques reduce consumption of analgesics after surgical removal of third mandibular molars: A brief communication. *International Journal of Clinical and Experimental Hypnosis*, 45, 102–108.
- Enqvist, B., von Konow, L., & Bystedt, H. (1995). Pre- and perioperative suggestion in maxillofacial surgery: Effects on blood loss and recovery. *International Journal of Clinical and Experimental Hypnosis*, 43, 284–294.
- Ewin, D. (1986a). The effect of hypnosis and mental set on major surgery and burns. *American Journal of Clinical Hypnosis*, 26, 5–8.
- Ewin, D. (1986b). Emergency room hypnosis for the burned patient. *American Journal of Clinical and Experimental Hypnosis*, 29, 7–21.
- Forbes, A., MacAuley, S., & Chiotakakou-Faliakou, E. (2000). Hypnotherapy and therapeutic audiotape: Effective in previously unsuccessfully treated irritable bowel syndrome? *International Journal of Colorectal Disease*, 15(5–6), 328–334.

- Freeman, R., Barabasz, A., Barabasz, M., & Warner, D. (2000). Hypnosis and distraction differ in their effects on cold-pressor pain. *American Journal of Clinical Hypnosis*, *43*, 137–148.
- Ghoneim, M. M., Block, R. I., Sarasin, D. S., Davis, C. S., & Marchman, J. N. (2000). Tape-recorded hypnosis instructions as adjuvant in the care of patients scheduled for third molar surgery. *Anesthesia & Analgesia*, *90*(1), 64–68.
- Grant, C. D., & Nash, M. R. (1995). The computer-assisted hypnosis scale: Standardization and norming of a computer-administered measure of hypnotic ability. *Psychological Assessment*, *7*, 49–58.
- Hoffman, H. G., Doctor, J. N., Patterson, D. R., Carrougher, G. J., & Furness, T. A., III. (2000). Use of virtual reality as an adjunctive treatment of adolescent burn pain during wound care: A case report. *Pain*, *85*(1–2), 305–309.
- Hoffman, H. G., Patterson, D. R., & Carrougher, G. J. (2000). Use of virtual reality for adjunctive treatment of adult burn pain during physical therapy: A controlled study. *Clinical Journal of Pain*, *16*(3), 244–250.
- Hoffman, H. G., Patterson, D. R., Carrougher, G. J., Nakamura, D., Moore, M., Garcia-Palacios, A., & Furness, T. A., III (2001). The effectiveness of virtual reality pain control with multiple treatments of longer durations: A case study. *International Journal of Human-Computer Interaction*, *13*, 1–12.
- Hoffman, H. G., Patterson, D. R., Carrougher, G. J., & Sharar, S. R. (2001). Effectiveness of virtual reality-based pain control with multiple treatments. *Clinical Journal of Pain*, *17*(3), 229–235.
- Hoffman, H. G., Prothero, J., Wells, M., & Groen, J. (1998). Virtual chess: The role of meaning in the sensation of presence. *International Journal of Human-Computer Interaction*, *19*, 251–263.
- Holroyd, J. (1996). Hypnosis treatment of clinical pain: Understanding why hypnosis is useful. *International Journal of Clinical and Experimental Hypnosis*, *XLIV*, 33–51.
- Kihlstrom, J. F. (1985). Hypnosis. *Annual Review of Psychology*, *36*, 385–418.
- Kosslyn, S., Thompson, W., Costantini-Ferrando, M., Alpert, N., & Spiegel, D. (2000). Hypnotic visual illusion alters color processing in the brain. *American Journal of Psychiatry*, *157*, 1279–1284.
- Lang, E. V., Benotsch, E. G., Fick, L. J., Lutgendorf, S., Berbaum, M. L., Berbaum, K. S., Logan, H., & Spiegel, D. (2000). Adjunctive non-pharmacological analgesia for invasive medical procedures: A randomised trial. *Lancet*, *355*(9214), 1486–1490.
- Montgomery, G. H., DuHamel, K. N., & Redd, W. H. (2000). A meta-analysis of hypnotically induced analgesia: How effective is hypnosis? *International Journal of Clinical and Experimental Hypnosis*, *48*, 138–153.
- Morgan, A. H., & Hilgard, J. R. (1978/1979). The Stanford Hypnotic Clinical Scale for Adults. *American Journal of Clinical Hypnosis*, *21*(2&3), 134–147.
- Ohrbach, R., Patterson, D. R., Carrougher, G., & Gibran, N. (1998). Hypnosis after an adverse response to opioids in an ICU burn patient. *Clinical Journal of Pain*, *14*, 167–175.
- Patterson, D. R., Everett, J. J., Bombardier, C. H., Questad, K. A., Lee, V. K., & Marvin, J. A. (1993). Psychological effects of severe burn injuries. *Psychological Bulletin*, *113*, 362–378.
- Patterson, D. R., & Jensen, M. (2003). Hypnosis and clinical pain. *Psychological Bulletin*, *129*, 495–521.
- Patterson, D. R., & Ptacek, J. T. (1997). Baseline pain as a moderator of hypnotic analgesia for burn injury treatment. *Journal of Consulting and Clinical Psychology*, *65*, 60–67.
- Patterson, D., & Sharar, S. (2001). Burn pain. In J. Loeser (Ed.), *Bonica's Management of Pain*. (3rd ed.) (pp. 780–787). Philadelphia: Lippincot, Williams & Wilkins.
- Patterson, D. R., Tininenko, J. R., Schmidt, A. E., & Sharar, S. (2004). Virtual reality hypnosis: A case report. *International Journal of Clinical and Experimental Hypnosis*, *52*(1), 27–38.

- Rainville, P., Duncan, G. H., Price, D. D., Carrier, B., & Bushnell, M. C. (1997). Pain affect encoded in human anterior cingulate but not somatosensory cortex. *Science*, 277, 968–971.
- Scott, J., & Huskisson, E. C. (1976). Graphic representation of pain. *Pain*, 2, 175–184.
- Smith, J., Barabasz, A., & Barabasz, M. (1996). A comparison of hypnosis and distraction in severely ill children undergoing painful medical procedures. *Journal of Counseling Psychology*, 43, 187–195.
- Taal, L. A., & Faber, A. W. (1998). Post-traumatic stress, pain and anxiety in adult burn victims. *Burns*, 23(7/8), 545–549.
- Tellegen, A., & Attkinson, G. (1974). Openness to absorbing and self-altering experiences (“absorption”), a trait related to hypnotic susceptibility. *Journal of Abnormal Psychology*, 33, 268–277.
- Wakeman, J. R., & Kaplan, J. Z. (1978). An experimental study of hypnosis in painful burns. *American Journal of Clinical Hypnosis*, 21, 3–12.

Hypnose in einer Virtual-Reality-Umgebung bei verbrennungsbedingtem Schmerz

David R. Patterson, Shelley A. Wiechman, M. Jensen und Sam R. Sharar
Zusammenfassung: Dies ist die erste Studie, die Virtual-Reality-Technologie bei einer Reihe von Patienten einsetzt, um hypnotische Analgesie weniger anstrengend für die Patienten zu machen und durch den Wegfall der notwendigen Anwesenheit eines ausgebildeten Klinikers die Effizienz von Hypnose zu erhöhen. Diese automatisierte hypnotische Induktion wurde eingesetzt, um Patienten mit Verbrennungen hypnotische Analgesie zu vermitteln während sie sich schmerzhaften Wundversorgungsmaßnahmen unterzogen. Prä- und Post-Maße wurden bei 13 Patienten mit Brandverletzungen über drei Tage hinweg erhoben. Bei einer unkontrollierten Reihe von Fällen kam es zu einem Abfall der berichteten Schmerzhaftigkeit sowie Angst, und der Verbrauch opioider Medikation wurde halbiert. Die Ergebnisse regen dazu an, den Einsatz und die Effizienz von hypnotischer Analgesie über Virtual-Reality-Hypnose-Umgebungen weiter zu untersuchen.

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Utilisation de l’hypnose dans une immersion de réalité virtuelle pour des douleurs de brûlures

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Résumé: cette étude est la première à utiliser la technologie de réalité virtuelle sur une série de patients afin de rendre l’analgésie hypnotique moins difficile et d’augmenter l’efficacité de l’hypnose en éliminant le besoin de la présence d’un clinicien. Cette technologie, basée sur les inductions hypnotiques, a été utilisé pour une analogie hypnotique chez des brûlés recevant des soins extrêmement douloureux. Des mesures pre- and post-procédures ont été effectuées sur 13 brûlés pendant 3 jours. Dans plusieurs cas non contrôlés, on rapporte une diminution de la douleur et de l’anxiété, et le besoin d’un traitement à base d’opioïdes est réduite de moitié.

Ces résultats s'ajoutent à d'autres recherches qui mettent en évidence l'utilité et l'efficacité d'une analgésie hypnotique mise en place par une hypnose liée à la réalité virtuelle

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Hipnosis mediante inmersión en realidad virtual para el dolor de quemaduras

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Resumen: Este es el primer estudio que usa la tecnología de realidad virtual en una serie de pacientes clínicos para hacer que la analgesia hipnótica requiera menos esfuerzo de los pacientes y para aumentar la eficiencia de la hipnosis al eliminar la necesidad de tener a un profesional entrenado presente. Usamos esta inducción hipnótica basada en tecnología para proporcionar analgesia hipnótica a pacientes con daños de quemadura mientras experimentaban un tratamiento terapéutico doloroso. Obtuvimos mediciones antes y después del procedimiento en 13 pacientes con daños de quemadura durante 3 días. En una serie de casos no controlada, hubo decrementos en informes de ansiedad y dolor, y la necesidad de medicación opiacea se cortó a la mitad. Los resultados invitan investigación adicional sobre la utilidad y la eficacia de la analgesia hipnótica proporcionada por hipnosis mediante realidad virtual.

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