Review Article

Hypnosis and Pain in Children

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Abstract
The development of studies on neuroimaging applied to hypnosis and to the study of pain not only helps to validate the existence of a hypnotic state but also to ratify its therapeutic effects. These studies also enable us to understand how hypnosis is effective on the cortical level. It also helps us see, from another perspective, the mechanisms of pain leading perhaps to a different definition of pain. This article develops the latest knowledge in the domain of hypnosis and pain, and approaches the clinical practices and their applications in the management of pain in children. J Pain Symptom Manage 2008;35:437–446. *© 2008 U.S. Cancer Pain Relief Committee. Published by Elsevier Inc. All rights reserved.*

Key Words
Hypnosis, pain, children, cerebral imagery, functional neuroimaging, medical care

Introduction

Hypnosis is a psychological intervention for numerous medical symptoms. This technique was little used mainly because of the difficulty in proving a hypnotic state. Due to progress in functional neuroimaging, the reality of a hypnotic state has been demonstrated and there is better knowledge of how cognitions can modulate the neurophysiology of pain. This review describes the neurophysiology and clinical application of hypnosis, focusing on its potential application in pediatric pain management. The opportunity in pediatrics may be great given the facility with which children can pick up suggestions that may be used to reduce their pain, and create a change, at least on their painful perceptions.

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Definition of Pain

According to the International Association of Pain, the official definition of pain is "an unpleasant sensory and emotional experience associated with actual or potential tissue damage, or described in terms of such damage."[1] Even though this definition takes into account both the sensory and affective dimensions of pain, the definition proposed by Price[2] seems to be more faithful to the experience of pain and can also help us understand how hypnosis can be useful in the several dimensions of the painful experience: "Pain is a somatic perception containing a) a bodily sensation with qualities like those reported during tissue damaging stimulation, b) an experienced threat associated with this sensation, and c) a feeling of unpleasantness or other negative emotion based on this experienced threat." According to Price,[3] "…the experience of pain is never an isolated sensorial event, and it never occurs without the influence of context and meaning. Pain is influenced by beliefs, attention, expectation, and emotions

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regardless of whether it occurs during the most controlled laboratory circumstances or during circumstances of physical trauma or emotional distress." He explains that "…the affective dimension of pain [is] an end product of multiple contributing processes, including the pain sensation itself, arousal, autonomic and somatomotor activation, and finally and most critically, cognitive appraisal."[2] As suggested by this comment, greater consideration has been given recently to the interaction between the two dimensions of pain: the sensorial one and the emotional one. This is important, as hypnosis can modulate the experience of pain on these two aspects.

According to Price's model, the stages of pain processing are the following: A nociceptive input is responsible for nociceptive sensations and an arousal of autonomic and somatomotor activation, which in turn leads to a perceived threat, and an *immediate pain unpleasantness*, which is the primary pain affect (immediate unpleasantness, integral to the pain experience, and intimately related to the sense of threat). The secondary stage or *extended pain affect* is characterized by emotions related to the broader meaning of pain and by the evaluation of the consequences of pain with its broader significance and future implications.

A study by Rainville et al.[4] demonstrates the interaction between pain sensation intensity and pain unpleasantness. Hypnotic suggestions targeted toward unpleasantness of a stimulus (47°C stimulus) could selectively decrease or enhance ratings of immediate pain unpleasantness without changing ratings of pain intensity. There was also a significant correlation between the stimulus-evoked heart rate increase and the pain unpleasantness, showing an interaction between pain-evoked sympathetic activity and hypnotic suggestions. When suggestions were directed toward changing pain intensity alone, both pain intensity and pain unpleasantness ratings changed. This suggests that pain intensity is the cause of pain unpleasantness, hypnosis may be a very effective tool for pain modulation, and cognitive processes that intervene during hypnotic suggestions could act directly on the affective-motivational processes, which in turn could modulate the autonomic outflow.

Immediate pain unpleasantness causes extended emotions related to pain. For example, in a cancer patient, a sudden exacerbation of pain is a reminder of the disease, which can lead to pain negative emotions. Hypnosis applies also to this part of the pain experience, because the patient, during hypnosis, can reinterpret his sensations and emotions.

What Is a Hypnotic State?

The elements of a hypnotic state have been described by Price and Barell[5] and Price:[6]

1) a feeling of ease or relaxation (a letting go of tensions or becoming at ease)
2) an absorbed and sustained focus of attention on one or a few targets
3) an absence of judging, monitoring, and censoring
4) a suspension of usual orientation toward time, location, and sense of self
5) experience of one's own responses as automatic (without deliberation or effort)

There is a strong interrelationship among these different elements. For example, relaxation (Element 1) provides a background for an absorbed and sustained focus of attention (Element 2). This state can occur naturally during fascination, for example, while watching the movement of the ocean waves. From an initial active form of concentration, one proceeds to a passive form of concentration that contributes to a reduction of orientation, which in turn affects Element 3 (absence of judging, monitoring, and censoring), so that whatever is suggested by the hypnotist is accepted very easily without a need of validation. This state allows Element 4 (suspension of orientation toward time and location). The two latter elements are responsible for Element 5 (automaticity).

The suspension of time and automaticity directly contributes to the hypnotic depth. During this experience, if the hypnotist suggests a sensation or the lack of a sensation, the subject simply and automatically identifies with whatever is suggested and does that automatically, without an effort. "These experiential data," states Rainville,[7] "indicate that hypnotic induction modifies several dimensions of the background state of consciousness, altering the usual experience of self or 'what it usually feels like to be conscious.'"[8]

Is a Hypnotic State Necessary for Suggestions of Analgesia?

Spanos[9,10] suggested that after hypnotic induction and suggestion, subjects cognitively relabel their reports of pain, not because they seem less intense, but because they want to act the role expected of them, that of feeling less pain. Other studies support that a change in state of consciousness is not necessary for hypnotic analgesia;[11–13] comparing subjects who received suggestions of analgesia after induction of a hypnotic state and subjects who received only suggestions for analgesia revealed that both groups had reductions in their pain ratings, showing that a hypnotic state is not fundamental for pain reduction, but that suggestions for analgesia seem necessary.

Other observations suggest that greater analgesia occurs when subjects are in a hypnotic state, and hypnotic susceptibility can be predictive of greater analgesia.[14] But hypnotic susceptibility is not a limiting condition when hypnosis is proposed to a patient.

A study by Green and Ryeher[15] showed that subjects could not simulate analgesia. The tolerance of pain in two groups of highly hypnotizable subjects was studied: one group was hypnotized, the other group was asked to simulate and deceive the hypnotist. The simulators were less tolerant to pain (increased tolerance to pain of 16%), compared to the truly hypnotized subjects (increased tolerance to pain of 45%). These results contradict the psycho-socio-cognitive theories that predict that hypnotic induction only serves to strengthen the demand of a situation and to encourage subjects to follow instruction and emit a desired behavior.

What Suggestions Can Be Made During a Hypnotic State?

De Pascalis[16] compared the analgesic effects produced by experimental conditions of deep relaxation, dissociated imagery, focused analgesia, and placebo to those of a waking condition in high, medium, and low hypnotizable participants. Deep relaxation, dissociated imagery and focused analgesia produced statistically significant reductions on pain-related measures and distress levels in the three groups of participants. No significant placebo effects were observed. Highly hypnotizable participants had more reductions in their pain measures and distress levels during focused analgesia and dissociated imagery than low or medium hypnotizable participants. Focused analgesia produced the largest reductions in pain measures in highly hypnotizable participants. These results show that hypnotic analgesia is not the result of placebo. Different types of suggestions are effective for pain and are facilitated by a hypnotic state. The most effective suggestions are focused analgesia requiring attention to the affected area of the body.

To create a hypnotic state, one must conduct the patient from an ordinary wakefulness to a state of imaginative absorption by helping him to focus his attention (e.g., on his foot) and to start the process of dissociating ("You could just let your foot relax comfortably…"). Children are able to do this very easily; suggestions like "Let's pretend you are in your room" can be useful. Suggestions directed to the affective or sensory dimensions of pain can then be used.

Three types of suggestions can be made when dealing with pain:[2,7]

1) Suggestions of dissociation: asking the subject not to feel some parts of his body, or simply leave part of his body here and go elsewhere.
2) Suggestions of focused analgesia or sensory substitution: replacing the pain sensations by sensations of numbness, or of complete analgesia. The "magic glove" is frequently used.
3) Suggestions targeted at reinterpreting the sensations of pain as being less unpleasant, or less harmful (e.g., a huge spider [a tarantula, image of a headache] can become a smaller insect, much less frightening and threatening).

Reinterpreting a sensation can be used in a psychotherapeutic approach. Hypnosis does not suppress the resistance of a patient. When resistance appears to a suggestion, it is a sign that one has touched a specific psychological wall. If we suggest that the pain can be felt as warmth, a resistance could appear in the child as the suggested warmth could be the echo of a past trauma (feeling

abandoned on a warm summer night). Health care professionals may try to validate this resistance and offer another suggestion, or try to understand the resistance and help overcome it. These are two different aspects of therapy, each with their advantages or inconveniences, according to the set goal (symptomatic treatment of pain or psychotherapeutic approach).

One can ask the child how he or she could represent the pain. The therapist analyzes what is drawn, not only the image but the symbolic aspect and the meaning it has for the child.

What allows this double use of hypnotic suggestions (medical aspect and psychotherapeutic approach) is that a child, like any human being, can associate his symptom to subjective facts, such as a link with a previous traumatic experience, or an association with secondary gains (having parents respond more, or being able to miss school).

According to the training of the hypnotherapist (physician or psychologist), the use of hypnotic suggestions will take different routes. The level of therapy may be different, but both approaches can help in relieving pain.

Suggestions can be permissive, or restrictive, direct or indirect. Most patients benefit from indirect and permissive suggestions because they mobilize resistance less, leaving a sense of autonomy and control over the pain. Direct suggestions in children can be associated with an authoritative parental attitude, bringing up possible conflicts and complicating pain management. Indirect suggestions leave a place for the child to use what is said, as he feels, in the same way as he can make use of his pain, and become creative. It is a way of suggesting: "Do what you feel with what I suggest so that you can do what you feel with your pain."

Suggestions can be made during or before ending the trance. These posthypnotic suggestions are effective in a clinical context: "…and each time you have this stabbing pain, you can just remember to relax, and ask your mind to bring back the numbness you felt today, just easily and peacefully…" Barber[17] gives an explanation of the action of posthypnotic suggestions: "Hypnotic suggestions result in the dissociation of noxious perceptions, reducing the sensory and/or affective components of pain. Over time, this analgesia results in neural reorganization so that pain responses are replaced by new, non-painful responses that are developed in response to painful stimuli that no longer produce suffering. The hypnotic effect is greatly facilitated by the clinical relationship." The clinical relationship is a fundamental aspect of clinical hypnosis.

How Does Hypnosis Work?

A few years ago, two main theories tried to explain how hypnosis worked: (1) the neo-dissociation theory and (2) the cognitive-behavioral and sociopsychological theory. Hilgard and Hilgard[14] proposed that hypnotic analgesia reduces the awareness of pain once the nociceptive information has reached the higher neurological centers. According to this neo-dissociation theory, "pain is registered in the body and by covert awareness during hypnotic analgesia. However, an amnesia-like barrier between dissociated streams of consciousness serves to prevent overt experience of pain."[6] The person undergoing a painful procedure can do it because of a "dissociation" between the cognitive structures responsible for pain perception and the central control structures responsible for the individual's conscious awareness.

According to the second theory, responses to suggestion are explained in terms of social role, contextual demands, and coping strategies.[10,13]

In recent years, studies have begun to suggest that hypnotic analgesia involves the centrifugal inhibition of nociceptive transmission. Hypnotic suggestions could reduce pain by activating endogenous pain inhibitory systems, which descend to the spinal cord and prevent the transmission of nociceptive information to the brain. Naloxone does not reverse hypnotic analgesia, suggesting that the mechanisms do not depend on the endogenous opioids.

Kiernan et al.[18] investigated the effects of hypnosis on descending spinal inhibition, using an electrically evoked flexion reflex, the R-III, which is spinally mediated and can be measured in humans. The latency of R-III is consistent with the conduction velocity of Aδ primary afferents and its magnitude is related to subjective pain intensity.[19] R-III was

measured in 15 healthy volunteers who gave visual analog scale-sensory and visual analog scale-affective ratings during conditions of resting wakefulness, suggestions of hypnotic analgesia, and attempted suppression of the reflex during nonhypnotic conditions. The subjects were blinded to the physiological index measured, and when informed, failed to reduce the magnitude of the reflex. During hypnosis, pain sensation was reduced by an average of 30%, pain unpleasantness by about 40%, and R-III by only about 20%. Percent changes in R-III during hypnosis ranged from a 75% reduction to an 18% increase among subjects. Hypnotic sensory analgesia was partially but reliably related to the reduction in R-III, suggesting that hypnotic sensory analgesia is, in part, mediated by descending antinociceptive mechanisms that exert control at spinal levels in response to hypnotic suggestion and are not under voluntary control.

In the latter study, reduction in R-III was 67% as great as the pain sensation and only 51% of the variance in pain sensation reduction was accounted for by reduction in spinal nociceptive processing. This suggests that spinal nociceptive activity only partly accounts for hypnotic analgesia. It is perhaps also related to processes that serve to prevent awareness of pain once nociceptive input has reached higher centers, as suggested by the neo-dissociation theory of Hilgard and Hilgard.[14] As noted, perceived unpleasantness was reduced by about 40%, whereas the sensation of pain was reduced by about 30%, and reduction of unpleasantness was not statistically reliably associated with the reduction of R-III. This suggests an additional mechanism, perhaps related to reinterpreting the meaning of the pain sensation. Such an interpretation is also supported by previous results by Price and Barber[20] showing that hypnotic suggestions produce greater percent reductions in pain unpleasantness than in pain intensity.

A study by Danziger et al.[21] also elucidates the mechanisms of hypnotic analgesia. Eighteen highly susceptible subjects were studied during nociceptive electrical stimuli. Suggestion of analgesia induced a significant increase in pain threshold of all subjects. All showed large changes (20% or more) in amplitude of their R-III reflexes during hypnotic analgesia. Although the increase in pain threshold was similar in all, two distinct patterns of R-III reflex change were observed. In 11 subjects, a strong inhibition of R-III was observed, whereas strong facilitation was observed in seven subjects during hypnotic analgesia. All subjects displayed similar decreases in the amplitude of late somatosensory evoked potentials. This suggests that different strategies of modulation can operate during hypnotic analgesia and that they are subject dependent. The decrease in the late somatosensory evoked potentials is consistent both with a mechanism that inhibits pain-related information from reaching the somatosensory cortex and the neo-dissociation theory of Hilgard and Hilgard.[14] There could be a higher order processing of somatosensory information, with an inhibition at the spinal level for certain subjects and an inhibition at higher levels for others (facilitation of the reflex). These strategies of spinal reflex modulation do not depend specifically on hypnosis. They have been observed in other experimental conditions where the subjects' expectations are modified,[22] and also in the context of the placebo effect.

What Brain Areas Are Involved During Hypnosis?

Functional brain imaging studies also have been helpful in understanding the mechanisms of hypnosis. Rainville et al.[23] measured regional cerebral blood flow (rCBF) using positive emission tomography to examine changes in brain activity during hypnosis and normal waking. Hypnotic states are associated with higher levels of rCBF in the anterior cingulate regions and in the occipital cortical areas. Similar results were obtained by Maquet et al.[24] and Faymonville et al.[25] In another study, Rainville et al.[26] asked subjects to rate their subjective level of mental relaxation and absorption in the normal control state and in a hypnotic state. Increases in hypnotic relaxation were associated with rCBF increases in the occipital cortex and decreases in the mesencephalic tegmentum of the brainstem and right parietal lobe. In contrast, increases in self-reports of mental absorption during hypnosis are associated with increases in rCBF within a connected network of brain structures involved in attention.

During normal wakefulness, the cerebral cortex is under both excitatory and inhibitory influences, mediated in part by cholinergic and noradrenergic brainstem projections. During attention, vigilance, and arousal, some inhibitory mechanisms increase; these mechanisms are thought to be decreased during slow wave sleep.[27,28] During active auditory processing, there is a decrease in rCBF in the visual cortices, a phenomenon called *cross-modality suppression*.[29] But this inhibition gradually decreases when the subject shifts from an active to a passive form of attention, resulting in an increase in rCBF in the visual cortices.

The induction of a hypnotic state produces changes in brain activity consistent with a decrease of cross-modal inhibition.[7] Rainville et al.[26] observed a decrease in rCBF in the brainstem tegmentum during hypnosis, consistent with a decrease of vigilance and arousal during hypnosis. Hypnosis was also associated with an increase in the occipital rCBF, reflecting a reduction of inhibitory processes normally affecting cortical activity during moderate or high levels of attention.

Two other studies[23,24] also observed this, suggesting that, in hypnosis, a decrease in inhibitory activity could contribute to the increase of occipital rCBF. According to Rainville and Price,[7] "the neural changes associated with mental relaxation during hypnosis are consistent with a reduction in the inhibition of competing mental and neural representations. These changes are likely to relate to the reduction in monitoring or censoring, as previously described in the phenomenological account of hypnotic state. Consistent with this account, the uncensored acceptance of suggested experiential content may thereby facilitate the incorporation of suggested alternative sensations and feelings, such as those related to hypnotic analgesia."

It is now recognized that certain regions of the brain are activated by nociceptive stimuli[30] and that hypnosis modulates theses activations.

What Scientific Studies Have Been Done in Children?

Over the past 40 years, hypnosis has been widely used in children and several books have been devoted to this topic.[31–34] Considering pain, hypnosis has been used for burns and for chronic or recurrent pain such as recurrent abdominal pain, Crohn's disease, juvenile arthritis, and headaches. Larger studies have been conducted in children for cancer pain, medical procedures, and pain and anxiety.[35–37]

Hilgard and Le Baron[32] developed an innovative imagination-focused form of clinical hypnosis for problems associated with pediatric cancer. These imaginative activities were intended to be more involving and interesting than simple distraction techniques. The child is interviewed about his favorite games, or activities, television programs, movies, etc. The therapist uses this to help the child develop a story-like fantasy that he or she can use during the medical procedure. The therapist guides the child's production, developing multisensorial aspects and introducing material brought by the child.

Zeltzer et al.[38] studied the role of imaginative-focused hypnosis in children aged 5–17 years, who developed nausea and vomiting during chemotherapy. Children reported shorter duration of nausea in both the hypnosis and the distraction/relaxation conditions than in a control condition, and a significantly shorter duration of vomiting in the hypnosis condition.

Zeltzer et al.[39] also examined the effectiveness of hypnosis on the cold pressor pain test in 37 children aged 6–12 years. Children in the hypnosis condition (imaginative-focused hypnosis) experienced more pain reduction than controls.

Zeltzer and LeBaron[40] compared the effectiveness of imaginative-focused hypnosis and distraction for reducing pain and anxiety in children and adolescents during bone marrow aspiration (BMA) and lumbar punctures. Hypnosis was superior to distraction in reducing the pain of BMA. Anxiety was reduced only by hypnosis. During lumbar punctures, only hypnosis reduced pain. Anxiety was largely reduced by hypnosis and, to a smaller degree, by nonhypnotic techniques, suggesting the superiority of imaginative-focused hypnosis on distraction.

Kuttner et al.[41] compared hypnosis, distraction, and control condition during BMA in children aged 3–6 and 7–10. Older children in the hypnosis group and distraction conditions achieved significantly greater reductions

in observer-rated pain and anxiety compared to controls. In the younger children, hypnosis produced lower distress scores than did the distraction or control treatments during the first BMA.

Smith et al.[42] compared hypnosis and distraction for reducing pain and anxiety from venipuncture, BMAs, or other medical procedures in 27 children aged 3–8 years. Highly suggestible children in the hypnosis group reported less pain and anxiety than the highs in the distraction group or the lows in both groups, indicating that hypnosis is more effective in highly suggestible children, but it can provide relief if someone acts as a therapist during the procedure.[39]

Liossi et al.[43] compared the efficacy of clinical hypnosis and cognitive behavioral coping skills (CB) in reducing pain and distress during BMAs. Hypnosis and CB were similarly effective in pain relief, but there was more anxiety and behavioral distress in the CB group. The same authors studied 80 cancer patients (6–16 years),[44] and confirmed less pain and anxiety with hypnosis and less behavioral distress than in controls. Therapeutic benefit decreased when patients were switched to self-hypnosis, indicating the crucial role of the therapist.

What Are the General Guidelines Before Using Hypnosis in Children?

Children are more hypnotically responsive than adults. Hypnotic ability is limited in children below the age of 3 years, reaches a peak during middle childhood (7–14 years), decreases during adolescence, and remains stable through middle life before decreasing again in old age.[31]

There are two prerequisites before using hypnosis in children. The first is to establish a good therapeutic relationship with the child, and the second is to adapt the techniques to the child's age of cognitive development and preferences.

Establishing a Good Rapport

The relationship between the clinician and the patient is a powerful determinant of the hypnotic effect. According to Barber,[17] "The relationship between an experimenter and the subject is less personal than the well-developed intimate and more potent relationship of a concerned clinician and a suffering patient. It is clear that clinical success with hypnotic suggestion requires innovative, personalized, clinically sophisticated procedures. It is difficult to compare such procedures with well-controlled experimental procedures."

Hypnosis mobilizes subjective facts, taking place in a privileged relationship between patient and therapist. The "active agent" is not the words, but the quality of the rapport, and the hypnotic inductions, suggestions, and imagery proposed. Rogers has largely written on empathy, congruence, and the importance of human relationship as a therapeutic agent in every therapy.[45]

Adapting the Hypnotic Technique to the Child's Cognitive Development and Preferences

It is fundamental to adapt to the child's age, cognitive level, and preferences, using what he or she likes and says, and his or her sensorial abilities: visual, auditory, tactile, kinesthetic, or olfactory. The induction techniques that can be used with children have been well-described elsewhere.[33]

What Are the Clinical Applications?

There are four categories of uses for hypnosis in the treatment of pain.

Conversational Hypnosis

Communication techniques are improved by learning hypnosis. Humans have difficulty processing some negative phrases. If someone tells you "Don't think of a pink elephant," you will "see" the pink elephant. We need to change our way of addressing children during care or hospitalization: "Don't be afraid… don't worry…it will not hurt…" Sentences such as "Think of something else," or "Be relaxed," should be avoided. They are called "paradoxical injunctions."

Projecting the patient into the future of a procedure is another technique: "How happy you will be once I finish my clinical exam when you can watch the TV."

Age regression also can be useful in some cases, such as reflex sympathetic dystrophy or

a handicap: "I can understand how difficult it is to use your hand. Do you remember when you started walking? You put one foot in front of you, then you managed to put one foot in front of the other…and one day you were able to take two steps…then to walk without any help…and then run…and now, you don't even think about the place your foot is…If you ask your "good" hand to help you with the exercise, you will be surprised to notice that your hand and your wrist, will learn…little by little…to work as they were doing before."

Hypnotic suggestions can also be placed when writing the medical prescription: "I'm going to prescribe this drug for you…and you will be surprised to notice that not only your pain is improved…but that your sleep is getting better."

Hypnosis with an Equimolar Mixture of Oxygen and Nitrous Oxide

In France, premixed nitrous oxide and oxygen (Entonox®) is widely used in pediatric hospitals[46] with few adverse effects (0.33% rate of potential life-threatening events).[47] We use it for procedural pain, in association with imaginary involvement as described by Hilgard and LeBaron.[32] Using this technique, dental care was performed in 343 phobic or handicapped children aged 2–16 years, with a success of 95%.[48]

Hypnosis in an Operative Setting

In Belgium, Faymonville et al. have used hypnosis in adults undergoing conscious sedation, performing more than 5,000 surgical procedures since 1992.[49] In children, a recent randomized study[50] compared hypnosis to midazolam in treating anxiety and perioperative behavioral disorders in 55 children aged 2–11 years. Children were less anxious, at induction, with hypnosis (39%) than with midazolam. Postoperatively, hypnosis reduced the frequency of behavioral disorders by approximately half on Day 1 (30% vs. 62%) and on Day 7 (36% vs. 59%).

Hypnosis Without Sedation

Hypnosis has been largely used for acute pain, painful procedures, and recurrent or prolonged pain in children. Hypnosis is even more efficient in an emergency setting, as an anxious patient is already in some sort of hypnotic trance (focused on his pain) and can be easily absorbed in something else. Suggestions are more directive in this setting.

In the case of chronic pain or recurrent pain, a hypnotic induction is necessary to help the child focus his or her attention. Once the induction is accomplished, the different techniques already mentioned can be used to alleviate pain, if adapted to the child's age and preferences. These techniques are developed in a film by Dr. Leora Kuttner, "No Fears, No Tears,"[51] and also in the books previously mentioned.[31–34]

It is fundamental that the child learns self-hypnosis to use it whenever he or she wants, not relying on the voice of the hypnotist or on an audiotape. Hypnosis needs practice, and the more the patient practices, the more it works. An audiotape can help the child, and we do make audiotapes for children with severe pathologies (intensive care, palliative care patients, etc.), as in these cases the child often has no more energy to help himself. Listening to an audiotape can help the child rest, go to his or her favorite place, relax, and get some energy back. Hypnosis has also an impact for the future, creating a positive way of looking at life, as shown in Dr. Kuttner's second film, "No Fears, No Tears—13 Years Later."[52]

Conclusion

Due to recent research, hypnosis is gaining new interest in the treatment of pediatric pain and the management of painful procedures. It is a tool that should be offered to all patients with acute or chronic pain. Children are particularly skillful in learning this technique and can acquire new competencies, helping them to cope with their pain. It only requires a motivated child who wants to learn and master the technique. It must be used by a competent, well-trained therapist, with a solid understanding of what happens on the psychological level in the therapeutic relationship between the patient and the therapist.

References

1. Merskey H, Bogduk N. Classification of chronic pain, 2nd ed. Seattle, WA: IASP Press, 1994.

2. Price DD. Psychological mechanisms of pain and analgesia. In: Progress in pain and research management, Vol. 15. Seattle, WA: IASP Press, 1999.

3. Price DD, Bushnell C. Overview of pain dimensions and their psychological modulation. In: Price DD, Bushnell C, eds. Psychological methods of pain control: Basic science and clinical approach, Progress in pain and research management, Vol. 29. Seattle, WA: IASP Press, 2004: 3−17.

4. Rainville P, Carrier B, Hofbauer RK, et al. Dissociation of sensory and affective dimensions of pain using hypnotic modulation. Pain 1999;82(2): 159−171.

5. Price DD, Barell JJ. The structure of the hypnotic state: a self-directed experiential study. In: Barell JJ, ed. The experiential method: Exploring the human experience. Acton, MA: Copely, 1990: 85−97.

6. Price DD. The neurological mechanisms of hypnotic analgesia. In: Barber J, ed. Hypnosis and suggestion in the treatment of pain. New York, NY: WW Norton, 1996.

7. Rainville P, Price DD. The neurophenomenology of hypnosis and hypnotic analgesia. In: Price DD, Bushnell C, eds. Psychological methods of pain control: Basic science and clinical approach, Progress in pain and research management, Vol. 29. Seattle, WA: IASP Press, 2004: 235−267.

8. Rainville P, Price DD. Hypnosis phenomenology and the neurobiology of consciousness. Int J Clin Exp Hypn 2003;51:105−129.

9. Spanos NP. The hidden observer as an experimental creation. J Pers Soc Psychol 1983;44: 170−176.

10. Spanos NP. Hypnotic behaviour: a social-psychological interpretation of amnesia, analgesia, and "trance logic". Behav Brain Sci 1986;9:440−467.

11. Barber TX, Hahn KW. Physiological and subjective responses to pain producing stimulation under hypnotically-suggested and waking-imagined "analgesia". J Soc Psychol 1962;65:411−418.

12. Barber TX, Wilson SC. Hypnosis, suggestions, and altered states of consciousness: experimental evaluation of the new cognitive behavioural theory and traditional trance-state theory of "hypnosis". In: Edmonston Jr WE, ed. Conceptual and investigative approaches to hypnotic phenomena. Ann N Y Acad Sci 1977;296:34−47.

13. Evans MB, Paul GL. Effects of hypnotically suggested analgesia on physiological and subjective response to cold stress. J Consult Clin Psychol 1985; 35:362−371.

14. Hilgard ER, Hilgard JR. Hypnosis in the relief of pain, revised ed. New York, NY: Brunner/Mazel, 1994.

15. Green RJ, Ryeher J. Pain tolerance in hypnotic states analgesia and imagination states. J Abnorm Psychol 1972;79:29−38.

16. De Pascalis V, Magurano MR, Bellusci A. Pain perception, somatosensory event-related potentials and skin conductance responses to painful stimuli in high, mid, and low hypnotizable subjects: effects of differential pain reduction strategies. Pain 1999; 83:499−508.

17. Barber J. Hypnotic analgesia: mechanisms of action and clinical approaches. In: Price DD, Bushnell C, eds. Psychological methods of pain control: Basic science and clinical approach, Progress in pain and research management, Vol. 29. Seattle, WA: IASP Press, 2004: 269−300.

18. Kiernan BD, Dane JR, Philipps LH, Price DD. Hypnotic analgesia reduces RIII nociceptive reflex: further evidence concerning the multifactorial nature of hypnotic analgesia. Pain 1995;60:39−47.

19. Willer JC. Comparative study of perceived pain and nociceptive flexion reflex in man. Pain 1977; 3:69−80.

20. Price DD, Barber J. An analysis of factors that contribute to the efficacy of hypnotic analgesia. J Abnorm Psychol 1987;96:46−51.

21. Danziger N, Fournier E, Bouhassira D, et al. Different strategies of modulation can be operative during hypnotic analgesia: a neurophysiological study. Pain 1998;75:85−92.

22. Willer JC. Influence de l'anticipation de la douleur sur les fréquences cardiaque et respiratoire et sur le réflexe nociceptif chez l'homme (Influence of anticipation of pain on heart rates, respiratory rates, and on the nociceptive reflex in man). Physiol Behav 1975;15:411−415.

23. Rainville P, Hofbauer RK, Paus T, et al. Cerebral mechanisms of hypnotic induction and suggestion. J Cogn Neurosci 1999;11:110−125.

24. Maquet P, Faymonville ME, Degueldre C, et al. Functional neuroanatomy of hypnotic state. Biol Psychiatry 1999;45:327−333.

25. Faymonville ME, Laurey S, Degueldre C, et al. Neural mechanisms of antinociceptive effects of hypnosis. Anesthesiology 2000;92:1257−1267.

26. Rainville P, Hofbauer RK, Bushnell MC, et al. Hypnosis modulates activity in brain structures involved in the regulation of consciousness. J Cogn Neurosci 2002;14:887−901.

27. Kawashima R, O'Sullivan BT, Roland PE. Positron-emission tomography studies of cross-modality inhibition in selective attentional tasks: closing the "mind's eye". Proc Natl Acad Sci USA 1995;92: 5969−5972.

28. Paus T. Functional anatomy of arousal and attention systems in the human brain. Prog Brain Res 2000;126:65−77.

29. Paus T, Zatorre RJ, Hofle N, et al. Time related changes in neural systems underlying attention and arousal during performance of an auditory vigilance task. J Cogn Neurosci 1997;9:392−408.

30. Apkarian VA, Bushnell MC, Treede RD, Zubieta JK. Human brain mechanisms of pain perception and regulation in health and disease. Eur J Pain 2005;9:463–484.

31. Olness K, Gardner GG. Hypnosis and hypnotherapy in children, 2nd ed. New York, NY: Grune and Stratton, 1988.

32. Hilgard JR, LeBaron S. Hypnotherapy of pain in children and adolescents with cancer. Los Altos, CA: William Kauffmann, 1984.

33. Olness K, Kohen DP. Hypnosis and hypnotherapy with children, 3rd ed. New York, NY: Guilford, 1996.

34. Wester WC II, O'Grady DJ. Clinical hypnosis with children. New York, NY: Brunner/Mazel, 1991.

35. Milling LS, Constantino CA. Clinical hypnosis with children: first steps toward empirical support. Int J Clin Exp Hypn 2000;48:113–117.

36. Wild MR, Espie CA. The efficacy of hypnosis in the reduction of procedural pain and distress in pediatric oncology: a systematic review. J Dev Behav Pediatr 2004;25:207–213.

37. Liossi C. The psychological management of paediatric procedure-related cancer pain. In: Liossi C, ed. Procedure-related cancer pain in children. Oxford: Radcliffe Medical Press, 2001: 141–172.

38. Zeltzer LK, Dolgin MJ, LeBaron S, et al. A randomized controlled study of behavioral intervention for chemotherapy distress in children with cancer. Pediatrics 1991;88:34–42.

39. Zeltzer LK, Fanurik D, LeBaron S. The cold pressor paradigm in children: feasibility of an interventional model: II. Pain 1989;37:305–313.

40. Zeltzer L, LeBaron S. Hypnosis and nonhypnotic techniques for reduction of pain and anxiety during painful procedures in children and adolescents with cancer. J Pediatr 1982;101:1032–1035.

41. Kuttner L, Bowman M, Teasdale M. Psychological treatment of distress, pain and anxiety for young children with cancer. Dev Behav Pediatrics 1988;9: 374–381.

42. Smith JT, Barabasz A, Barabasz M. Comparison of hypnosis and distraction in severely ill children undergoing painful medical procedures. J Couns Psychol 1996;43:187–195.

43. Liossi C, Hatira P. Clinical hypnosis versus cognitive behavioural training for pain management with paediatric cancer patients undergoing bone–marrow aspiration. Int J Clin Exp Hypnosis 1999; 47:104–116.

44. Liossi C, Hatira P. Clinical hypnosis in the alleviation of procedure-related pain in pediatric oncology patients. Int J Clin Exp Hypnosis 2003;51:4–28.

45. Rogers CR. Client centered therapy. Its current practice, implications, and theory. Houghton, MI: Mifflin Compagny, 1951.

46. Annequin D, Carbajal R, Chauvin P, et al. Fixed 50% nitrous oxide oxygen mixture for painful procedures: a French Survey. Pediatrics 2000;105:E47.

47. Gall O, Annequin A, Benoit G, et al. Adverse events of premixed nitrous oxide and oxygen for procedural sedation in children. Lancet 2001;358: 1514–1515.

48. De San Fulgencio J, Roy V, Maudier C, et al. Soins dentaires sous sedation consciente au mélange oxygène-protoxyde d'azote (MEOPA) à l'Hôpital Robert Debré (Dental care under conscious sedation with a mixture of oxygen and nitrous oxide at the Robert Debré Hospital). Douleurs 2004;5. TO 14.

49. Faymonville ME, Roediger L, DelFiore G, et al. Increased cerebral functional connectivity underlying the antinociceptive effects of hypnosis. Cogn Brain Res 2003;17:255–262.

50. Calipel S, Lucas-Polomeni MM, Wodey E, et al. Premedication in children: hypnosis versus midazolam. Pediatric Anaesthesia 2005;15:275–281.

51. Kuttner L. No fears, no tears. Fanlight Productions, 1986.

52. Kuttner L. No fears, no tears—13 years later. Fanlight Productions, 1998.