

# Hypnosis in Pain Management

Hoi Ning Ngai '00

## Introduction

One issue that continues to face medicine is the lack of trust in innovative procedures, even those which have proven effective in practice. Without application of these procedures, though, there is little opportunity for the advancement and evolution of medicine. According to clinical and experimental research, hypnosis is very effective at pain management. Yet, despite the visible evidence, the techniques are still not used to a great degree. The phenomenon of hypnosis is difficult for some to accept because it is defined in psychological rather than physiological terms. The process involves the induction of a trancelike state which is characterized by extreme relaxation, focused attention, and heightened susceptibility to suggestion. The two most common applications of hypnosis to pain reduction are hypnoanalgesia (the use of hypnosis to decrease sensitivity to pain) and hypnoanesthesia (the use of hypnosis to numb sensation of pain). For both conditions, the most important factor is the patient's ability to focus attention. Research into psychological and physiological mechanisms supports the idea that the use of attention is what gives the mind power over the body. The acceptance of hypnosis into mainstream treatment could have profound effects on the practice of medicine. It will permit the patient to get involved in the healing process and to take control of his or her own health.

## Treatment Procedure

Within the realm of medicine, the method of hypnoanalgesia can be adapted for various situations. In most cases, the intervention consists of four main stages (Chaves, 1994). The first stage involves preparation of the patient. As can be expected, most patients come into hypnosis with various expectations. In order to obtain the maximum gain, the therapist works to direct the patient toward the most realistic goals. The second stage involves the hypnotic induction. As studies have not shown that differences exist between indirect and direct suggestions, most therapists make use of a mixture of the two. In this stage, the therapist needs to help the patient enter into a focused and relaxed state. The third stage involves therapeutic suggestions. This is the most important stage in which the therapist focuses the attention of the patient. In the context of pain reduction, the therapist helps the patient develop imaginary situations (regardless of feasibility) which will achieve the goal of less pain. An example is dissociation, in which the patient imagines the hand separate from the body or made of a different material. The fourth stage involves posthypnotic suggestions and termination. The posthypnotic suggestions allow the patient to retain achievements (i.e. pain reduction abilities) outside of the hypnotic state (e.g. with a tap on the shoulder).

## Applications

### *Acute Pain*

The most researched form of acute (short-term) pain in the context of hypnosis is that associated with burn patients. The use of hypnosis is important at the outset as well as throughout the healing process. For burn patients, the use of hypnotic induction as close as possible to the time of injury is essential as it helps to limit the amount of inflammatory reaction to the injury. Furthermore, the minds of the patients are focused upon entry into the emergency room which makes hypnosis easy to induce. According to earlier studies, signs of inflammation are affected by the attitude of the patient toward the injury (Chapman et al., 1959). Therefore, the perception of heat at the burn site leads to increased inflammation and the perception of coolness leads to decreased inflammation. Applied before the initiation of the natural response, hypnotic suggestions of cooling and anesthesia limit and prevent inflammation. Burn patients who accept the suggestions that the wounded area is <sup>3</sup>cool<sup>2</sup> and <sup>3</sup>comfortable<sup>2</sup> are easier to treat, more optimistic, and heal faster (Ewin, 1978). As burn patients go through the healing process, the pain of caring for the wound is reported to be more severe than the pain of sustaining the wound. In order to prevent infection, patients must undergo daily debridement, which involves scraping necrotic tissue off the wound and applying antiseptic. The procedure causes excruciating pain. Since the frequency of wound care prohibits regular use of general anesthesia, the use of hypnoanalgesia is highly applicable (Patterson et al., 1996).

In a study done by Patterson et al. (1992), 30 burn patients undergoing debridement were randomly assigned to three groups: hypnosis, attention/pseudohypnosis (placebo), and no intervention (control). The hypnosis condition included suggestions for relaxation, analgesia, amnesia, and comfort when touched on the shoulder. The placebo condition involved pseudohypnosis (closing your eyes, counting to 20, imagining yourself in a relaxing place), the touch on the shoulder, and instructions to distinguish between sensations of healing and signals of harm. The control condition provided no other procedures to alleviate pain. The results showed that only the group which underwent true hypnosis reported a significant reduction in pain. The true hypnosis group reported a 46% decrease in pain from the baseline, the placebo group reported a 16% decrease, and the control group reported a 14% decrease. Even though the placebo group believed that they underwent hypnosis, those assigned to that group did not report much less pain than those assigned to the control group. Therefore, the results discount the effects of expectancy and reveal that pain reduction due to hypnoanalgesia goes beyond relaxation.

### *Chronic Pain*

Another important application of hypnoanalgesia is in the area of chronic (long-term) pain. While the research in acute pain focuses on burn patients, the research in chronic pain is more scattered. One target of chronic pain research is cancer patients, who often have to suffer through the pain, nausea, and vomiting associated with chemotherapy. In a study done by Syrjala et al. (1992), 35 cancer patients were randomly assigned to three groups: hypnosis, cognitive behavioral training, and attention (placebo). The hypnosis condition included relaxation, suggestions to reduce pain, nausea, and emotional reaction to symptoms, and phrases relating to healing, well-being, self-control, and coping capabilities. The cognitive behavioral condition included two kinds of relaxation and various cognitive coping skills (e.g. cognitive restructuring, exploring meaning of illness). The placebo condition involved normal therapist contact. The results showed that those in the hypnosis group had a significant decrease in pain from chemotherapy compared to the other two groups. In addition, the hypnosis group

also tended to use less medication. Because the hypnosis group and the cognitive behavioral group both involved relaxation techniques, the effects of hypnoanalgesia do not simply result from the relaxation of mind and body. Since the hypnosis group focused more on the ability of the patients to reduce their symptoms, the issue which underlies hypnotic pain reduction is one of personal control.

Another study in the field of chronic pain research was done by Haanen et al. (1991) in the area of fibromyalgia. Fibromyalgia is a disorder characterized by muscle pain and sleep problems. The experimental group received hypnotic suggestions for relaxation, improved sleep, and control of muscle pain. The control group received relaxation therapy and massage. The results showed that those in the first group were able to reduce symptoms of pain and fatigue much more than those in the second group. In addition, the hypnosis group also tended to use less medication. As with the aforementioned study, the issue which underlies hypnoanalgesia is one of personal control since both groups used relaxation techniques but to different degrees of effectiveness. Without the suggestion of personal control, the control group was much less effective.

### *Surgery*

The use of hypnoanesthesia in surgery dates back to the 1800s when there was a lack of chemical anesthesia (Manusov, 1990). With the development of general anesthesia in the modern age, the use of hypnoanesthesia is much rarer now than in the past. Due to the high anxiety level with which numerous individuals come into surgery, the use of hypnotic suggestions allows patients to enter a more relaxed state. While complete hypnoanesthesia without chemical anesthesia is feasible in about only 10% to 16% of the population, the use of hypnotic suggestions is important to relieve apprehension before the use of general anesthesia (Erickson, 1994). As soon as the anesthesia begins to take effect, the use of hypnotic suggestions allows patients to retain some mental control. Furthermore, studies show that the use of hypnosis tends to result in a reduction of chemical anesthesia and a reduced length of hospitalization (Manusov, 1990).

## **Psychological Evidence**

### *Experimental Pain*

While clinical studies done with patients who suffer acute or chronic pain have produced visible results of pain reduction, experimental studies have been done in the laboratory to examine the mechanisms behind the phenomenon. In a study done by Arendt-Nielsen et al. (1990), eight subjects (tested to be highly susceptible to hypnosis) were given laser stimulation. The sensory and pain thresholds as well as the laser-evoked brain potentials for the subjects were measured in three conditions: waking state, suggestion of hyperaesthesia (increased sensitivity to pain), and suggestion of analgesia (decreased sensitivity to pain). In the condition of hyperaesthesia, the subjects were asked to imagine first their right hand placed in hot water and then their right hand withdrawn but still very hot and sensitive. In the condition of analgesia, the subjects were asked to imagine that their right hand was no longer their own and made of some insensitive material. After each condition, the subjects were told that they would receive a series of laser stimuli. The thresholds and evoked brain potentials taken for the waking state were used as the baseline measures.

In the hyperaesthesia condition, thresholds decreased by 47% and 48% for sensory and pain, respectively. In the analgesia condition, thresholds increased by 316% and 190% for sensory and pain, respectively. The pain-related potentials increased by 14% with hyperaesthesia and decreased by 31% with analgesia. The experiments suggest that the induced changes might have two possible explanations: an interaction between neurochemical/hormonal action and endogenous opiates or a modulation in the cognitive processes to focus and de-focus attention (Arendt-Nielsen et al., 1990). Because the hypnotic suggestions can be quickly reversed, the implication of hormonal mechanisms and endogenous opiates (which has been suggested in some studies) is not likely. However, the use of a neurochemical mechanism is possible, though not as well studied in this experiment. The explanation in terms of cognitive processes supports the data as well as clinical pain studies. The increased focus in attention in hyperaesthesia would tend to make the subjects more attentive (increased potentials) and more sensitive (decreased thresholds) to the stimuli. The decreased focus in analgesia would tend to make the subjects less attentive (decreased potentials) and less sensitive (increased thresholds) to the stimuli. In addition, the idea of a modulation in the cognitive processes supports the results of clinical pain studies in that individuals in a state of relaxation have the ability to control the direction of their mental activities.

#### *Dissociated Experience vs. Dissociated Control*

Another study which attempts to examine the mechanism behind hypnoanalgesia was done by Miller and Bowers (1993). The study attempts to determine whether cognitive resources are expended in the process of pain reduction. Thirty-six subjects were placed into two treatment groups. Before the groups were determined, the subjects were tested for hypnotizability (susceptibility to hypnosis) levels. The groups were divided so that each group contained nine high-hypnotizables and nine low-hypnotizables. The first treatment group was the stress inoculation group in which the subjects were instructed to use cognitive strategies to deal with the pain. The strategies included diverting attention away from the pain and creating imaginary situations inconsistent with the pain situation. The second treatment group was the hypnosis group in which the subjects were given hypnotic induction and suggestions for analgesia. The suggestions included remaining relaxed and comfortable and feeling that their arm was made of insensitive material or not there at all. With one of their hands submerged in ice cold water (referred to as a cold pressor stimulus task), the subjects underwent three vocabulary tests. The scores of the three tests were measured against baseline scores taken prior to treatment group assignment.

In the first treatment group, both high- and low-hypnotizables showed a 30% decline in vocabulary performance. In the second treatment group, both high- and low-hypnotizables showed little or no decline. Throughout the experiment, high-hypnotizables reported less pain than low-hypnotizables for both groups. However, neither high- nor low-hypnotizables expended much cognitive effort to deal with the pain situation. Therefore, their scores remained about the same. The results support the argument of the experimenters that the hypnotic suggestions activate lower levels for pain control and circumvent executive involvement (Miller & Bowers, 1993). Consequently, none of the executive functions (like those required for the vocabulary tests) are distracted by the pain. The results of this experiment support the idea suggested in the previous experiment: a de-focus in attention towards the pain stimulus. The results also support the clinical studies in that patients who undergo hypnoanalgesia

might tend to expend cognitive effort on other activities (e.g. family, work, exercise) and thereby get well sooner in comparison to those who focus their mental energies on the pain.

### *Hypnotizability*

The susceptibility of individuals to hypnosis is taken into account for all clinical and experimental studies. In some studies, like that done by Arendt-Nielsen et al. (1990), only high-hypnotizables are used. In other studies, like that done by Miller and Bowers (1993), both high- and low-hypnotizables are used for comparison. The level of hypnotizability can be determined by different scales, but studies most often use adaptations of the Stanford Hypnotic Susceptibility Scale. A number of studies like that done by Tenenbaum et al. (1990) examine the correlation between hypnotizability and pain reduction. Twenty-four high-hypnotizable and 24 low-hypnotizable subjects were exposed to a cold-pressor stimulus where the subjects were asked to immerse their hands in cold water. The pain ratings and immersion times were determined for the subjects in both conditions. The high-hypnotizable subjects reported lower pain ratings and kept their hands immersed longer than the low-hypnotizable subjects. In other words, the high-hypnotizable subjects were able to partake of greater pain relief than the low-hypnotizable subjects.

As a result of these and similar findings, clinicians tend to believe that only high-hypnotizable individuals can benefit from hypnosis. However, Holroyd (1996) made some observations which support the idea that low-hypnotizable individuals can benefit just as much. First, experimental studies (e.g. Arendt-Nielsen et al., 1990) indicate that the use of hypnotic suggestions can increase pain thresholds over time. Second, clinical studies (e.g. Lewis, 1992) reveal that a learning process can take place in which patients improve pain control given practice with hypnoanalgesia. In essence, this research supports the idea that the level of hypnotizability is not very significant, because individuals can experience pain reduction with time and practice.

### *Direct vs. Indirect Suggestion*

In addition to the level of hypnotizability in subjects, experimental studies have focused on the type of hypnotic suggestion used on subjects. Direct suggestions make use of attribution and prediction. The subjects are told what they feel and what they will feel. Indirect suggestions make use of permissive language. The subjects are told what they might feel and provided with a range of possible responses. Some researchers believe that high-hypnotizable individuals might be more responsive to direct suggestion because of decreased resistance to hypnotic suggestion and low-hypnotizable individuals might be more responsive to indirect suggestion because the subtle choice of words might be able to penetrate the increased resistance to hypnotic suggestion. However, a review of literature compiled by Lynn et al. (1993) states that there is insufficient evidence to conclude a relationship between hypnotizability level and suggestion type. In essence, the message within the hypnotic suggestion is more important than the type of hypnotic suggestion.

## **Physiological Evidence**

### *Neurophysiological Mechanisms*

From a neurophysiological perspective, various studies suggest that the effects of hypnoanalgesia might stem out of inhibition at various levels of the nervous system. One level affected is the central nervous system (CNS). When excitatory neurons in the brain fire in response to painful stimuli, inhibitory neurons fire in order to modulate those excitatory signals. The level of pain is thus regulated in order to prevent sensory overload. The perception of painful stimuli is checked at the spinal cord as well. Holroyd (1996) noted various studies in which spinal reflexes were reduced in response to suggestions not to feel electric shock. In essence, pain is gated at both ends of the central nervous system. Another level affected is the peripheral nervous system (PNS). Various studies have shown that the galvanic skin response (GSR) can diminish in response to painful stimuli (Holroyd, 1996). Therefore, modulation of pain sensations occurs twice--first on the PNS upon contact with the body and next on the CNS upon processing of the stimulus. This double dose of down-regulation reduces the pain sensations to a much lower level. Moreover, this double dose system supports the idea of increased pain thresholds with hypnotic suggestion. The individual requires a much higher level of pain stimuli in order to effect a response on the nervous system.

Extensive research done by Crawford (1994) suggests that hypnoanalgesia inhibits patterns of brain activity as well. The effects of pain stimuli have been observed with event-related brain potentials (ERPs). The potentials are electrical responses which relate to initial recognition and subsequent attention to stimuli. After hypnotic induction to not feel a pain stimulus, the initial components were unaffected but the later components were reduced. This signifies that the subjects were less aware of the pain. Further research done by Crawford (1994) also reveals more pronounced theta rhythms associated with hypnoanalgesia. The rhythms are inhibitory patterns which are associated with suppressed awareness. The fact that the rhythms are generated by lower centers of the brain supports the idea suggested by Miller and Bowers (1993) that hypnotic suggestion heads straight for lower centers to control pain. The overall results provide physiological support for the idea that attentional de-focusing enables greater pain tolerance.

## **Conclusion**

While the field of psychology has used hypnosis on patients for decades, the field of medicine has been much more reluctant to support applications of this phenomenon. However, recent research shows hypnosis to have a genuine appeal to the needs of the medical community. In terms of anesthesia, hypnosis has been used to help those who are unable to undergo the traditional procedures--some have allergic reactions to chemical anesthesia, some cannot go under without additional assistance. Depending on the circumstances, hypnoanesthesia has been able to provide some patients with alternate routes to the operating room. In terms of analgesia, hypnosis has been effective for those who suffer short-term pain as well as those who suffer long-term pain. For some patients, hypnoanalgesia has been able to afford a great deal of pain relief without the use of drugs or other chemicals. But most important of all, hypnosis has allowed the patient to participate in the healing process. With the acceptance of hypnosis into the field of medicine, physicians would no longer hold sole responsibility for diagnosis and treatment. The healing process would become the shared responsibility of physician and patient--a powerful combination.

## References

- Arendt-Nielsen, L., Zachariae, R., & Bjerring, P. (1990). Quantitative evaluation of hypnotically suggested hyperaesthesia and analgesia by painful laser stimulation. *Pain, 41*, 243-51.
- Chapman, L. F., Goodell H., & Wolff, H. G. (1959). Augmentation of the inflammatory reaction by activity of the central nervous system. *AMA Archives of Neurology, 1*, 557-72.
- Chaves, J. F. (1994). Recent advances in the application of hypnosis to pain management. *American Journal of Clinical Hypnosis, 37*, 117-29.
- Crawford, H. J. (1994). Brain dynamics and hypnosis: Attentional and disattentional abilities. *International Journal of Clinical and Experimental Hypnosis, 42*, 204-232.
- Erickson, J. C. (1994). The use of hypnosis in anesthesia: A master class commentary. *International Journal of Clinical and Experimental Hypnosis, 42*, 3-12.
- Ewin, D. M. (1978). Clinical use of hypnosis for attenuation of burn depth. *Hypnosis at its Bicentennial-Selected Papers from the Seventh International Congress of Hypnosis and Psychosomatic Medicine*. New York: Plenum Press.
- Ewin, D. M. (1992). The use of hypnosis in the treatment of burn patients. *Psychiatric Medicine, 10*, 79-87.
- Haanen, H. C. M., Hoenderdos, H. T. W., Van Romunde, L. K. J., Hop, W. C. J., Malle, C., Terwiel, J. P., & Hekster, G. B. (1991). Controlled trial of hypnotherapy in the treatment of refractory fibromyalgia. *Journal of Rheumatology, 18*, 72-5.
- Holroyd, J. (1996). Hypnosis treatment of clinical pain: Understanding why hypnosis is useful. *International Journal of Clinical and Experimental Hypnosis, 44*, 33-51.
- Lewis, D. O. (1992). Hypnoanalgesia for chronic pain: The response to multiple inductions at one session and to separate single inductions. *Journal of the Royal Society of Medicine, 85*, 620-4.
- Lynn, S. J., Neufeld, V., & Maré, C. (1993). Direct versus indirect suggestions: A concept and methodological review. *International Journal of Clinical & Experimental Hypnosis, 41*, 124-52.
- Manusov, E. G. (1990). Clinical applications of hypnotherapy. *Journal of Family Practice, 31*, 180-4.
- Miller, M. E., & Bowers, K. S. (1993). Hypnotic analgesia: Dissociated experience or dissociated control? *Journal of Abnormal Psychology, 102*, 29-38.
- Patterson, D. R., Everett, J. J., Burns, G. L., & Marvin, J. A. (1992). Hypnosis for the treatment of burn pain. *Journal of Consulting and Clinical Psychology, 60*, 713-7.
- Patterson, D. R., Goldberg, M. L., & Ehde, D. M. (1996). Hypnosis in the treatment of patients with severe burns.

*American Journal of Clinical Hypnosis*, 38, 200-12.

Syrjala, K. L., Cummings, C., & Donaldson, G. W. (1992). Hypnosis or cognitive behavioral training for the reduction of pain and nausea during cancer treatment: A controlled clinical trial. *Pain*, 48, 137-46.

Tenenbaum, S. J., Kurtz, R. M., & Bienias, J. L. (1990). Hypnotic susceptibility and experimental pain reduction. *American Journal of Clinical Hypnosis*, 33, 40-9.