

Is Hypnosis an Appropriate Conjunctive Treatment for Dental Phobia?

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ABSTRACT

This paper was written to explore the use of hypnosis as a conjunctive treatment. A brief history of hypnosis from ancient times to modern practice is presented as well as public views, mechanisms, effects, uses, evidence, and dentistry-specific case studies. Hypnosis has been both widely accepted and rejected, and its methods and uses have evolved over time. Current research has found neurophysiological evidence to support the use of hypnosis, and it has been successfully used in various fields of practice. No single indicator can prove the phenomenon and its effectiveness is the result of a complex set of procedures. Hypnosis as it is known today can serve as an alternative conjunctive treatment for certain individuals under certain conditions.

IS HYPNOSIS AN APPROPRIATE CONJUNCTIVE TREATMENT FOR DENTAL PHOBIA?

Many people find it very difficult to visit doctors, especially dentists. Often negative experiences coupled with low pain tolerances and fear can lead to avoidance and phobias. Dental procedures are important beyond the concept of maintaining clean and straight teeth. Dentists and hygienists may detect cancers and other disorders of the tissue in and around the mouth. Dental decay can lead to blood infections, bad breath and a whole host of negative symptoms.

If a patient has developed a phobia of dental procedures, convincing him or her to undergo treatment may be next to impossible. In most modern cases patients with such phobias are sedated by some chemical form, usually a nitrous oxide gas. The use of sedatives can be costly, invasive, and may carry a risk of interactions and side effects. Concerns of drug side effects may lead many patients and physicians to consider alternative treatments.

Throughout history, hypnosis has been used for various effects ranging from hysteria to memory recall, but overall it has been shown to be an effective relaxation mechanism. For certain patients hypnosis may offer an inexpensive, noninvasive supplemental procedure to reduce the anxiety associated with dental visits.

The purpose of this paper was to explore hypnosis and its role in society and specifically the medical setting. Can hypnosis truly offer an alternative to chemical

sedation at a level safe and efficient enough to mandate widespread use? Also, the views on hypnosis theories and hypnosis itself have been investigated in an attempt to gather foresight of medical hypnosis compliance.

HISTORY

Hypnosis is by no means a recent discovery. Hypnosis has been practiced, researched, investigated and debated for centuries. It has evolved from beliefs of mystical and divine intervention to theories of magnetic force and, most recently, theories of suggestibility, psychophysiology and diversion. Both support and criticisms for the use of hypnosis as a form of treatment have occurred since ancient times. In order to gain perspective on the procedure and its feasible applications, hypnosis' past should first be examined.

In 1843 James Braid coined the term hypnosis, but the practice of hypnosis has been around since antiquity. Principles of hypnosis have been traced back as far as the Ancient Egyptians who used a form of it in dream temples (Waterfield, 2004). A stele, which is an upright inscribed stone slab, was discovered in 1972 by Charles Muses. It depicted a scene of a trance induction that occurred during the rule of Ramses II (Lockert, 2001). Even Socrates and some of his followers alluded to the healing power of words (Muses & Young, 1972). Evidence indicating the use of hypnosis or hypno-related procedures dates back over a thousand years BC.

One of the more familiar names in hypnotism is Franz Anton Mesmer. Mesmer gained notoriety for his elaborate hypnotic practices, but several physicians, priests, and alchemists developed principles of hypnotism prior to his birth. Two hundred years before Mesmer, in 1529, a Swiss alchemist and physician, Paracelsus, suggested that a heavenly, magnetic fluid played a role in disease and healing (Gezundhajt, 2007). A few years later, a man by the name of Girolamo Cardano published material related to hypnosis. Most researchers account Cardano, a medieval Italian mathematician who lived from 1501 to 1576, with the first reported case of self-hypnosis. In 1551, Cardano printed *De Subtilitate Rerum* in which he described feelings of trance and out of body experience (Gezundhajt, 2007). The early 1500's marked a period of discovery and theorizing of hypnosis before it was even known by that term.

Another predecessor to Mesmer was Father Johann Joseph Gassner (1729-1779). Gassner is considered the real precursor to modern hypnotherapy (Burkhard, 2005). Gassner practiced exorcisms by intentionally provoking the symptoms, then "curing" the symptoms via verbalization with the patient. Although his actions are not what a lay person would associate with hypnosis, Gassner's methods of treatment demonstrated the potential power of words over psychological and physical detriments.

Mesmer (1734-1815), whose name is the root of the English word mesmerize, was born into a strongly Catholic family. He initially entered a Jesuit college, but later left the church to study medicine. He graduated from the University of Vienna as a Doctor of Medicine. Later, with influence from Father Maximillian Hell, Mesmer formulated the idea of mineral and animal magnetism (Lockert, 2001). In 1774, Mesmer observed Father Hell as he put magnets on patients to treat physical symptoms. In 1775, Mesmer

expounded on Hell's methodology. Mesmer wrote a document claiming the magnets could be replaced with nearly any inanimate object (Crabtree, 1993). In 1777, Mesmer met Johann Gassner and observed the priest's ability to cure without magnets. Subsequently, Mesmer discarded the belief that the magnets held supernatural powers and instead switched his theories to nature-based principles (Forrest, 1974).

A few years later in 1784, Marquis de Puysegur stumbled across what we modernly consider a hypnotic state. While attempting to enter a young peasant into a trance state in order to treat him for fever and congestion, Puysegur did not observe the convulsive state that was common with the Mesmerian practices of the time. Puysegur instead observed that the young man had entered a deep state of relaxation that resembled somnambulism (Crabtree, 1993). Puysegur's observations were contrary to what was commonly observed with trance induction of the time, but resembled the more modern idea of a hypnotic state.

Beyond the ideas of magnetism stood an Indo-Portuguese monk by the name of Abbe Jose Custodio de Faria (1746-1819). De Faria hypothesized that a magnetizer's will has no effect on the patient and the presence (or lack of) magnetic fluid also had no effect. De Faria hypothesized the hypnotic trance was created by a fascination that a subject felt towards the inducer and the persuasion and coercion that had been implemented (Gezundhajt, 2007). De Faria was an early theorist on the strength of rapport. His theories and practice attempted to disprove the need for physical objects in order to induce a trance.

A few years later, a Scottish surgeon named James Esdaile (1808-1859) was in charge of a hospital in India and began to utilize the methods of hypnosis. Just prior to the discovery of chloroform, Esdaile used Mesmeric analgesia very successfully in a number of procedures and presented his results to the government. After the release of his results, Esdaile was placed in charge of a small hospital in Calcutta where he performed thousands of procedures using Mesmeric analgesia (Gezundhajt, 2007). The Indian natives flocked to Esdaile out of respect and admiration of his treatments. James Esdaile is one of many pioneers who brought hypnosis into medical hospitals.

James Braide, also a Scottish surgeon, helped push hypnosis into more modern procedures. Although he also dabbled in phrenology, he is most credited as the "father of hypnotism." He derived the term hypnosis from the Greek word for sleep. It was Braide's belief that hypnosis did not require any direct action by the hypnotist on the subject, and catalepsy would occur in hypnotized subjects. Braide felt that hypnosis should only be used in the medical and dental professions as an addition that could help cure several ailments (Gezundhajt, 2007). Braide not only coined the term hypnosis but also postulated that hypnosis could be induced without any physical contact between the hypnotist and the patient.

One of the theorists on the idea of suggestibility was a Frenchman, Auguste Ambroise Liebeault (1823-1904). He was a country doctor who used information from the famed brain specialist Paul Broca. Liebeault believed that about ninety-five percent of people are hypnotizable and that magnetic medicine is simply the power of the imagination (Bernheim, 1889). Today, much of the research on hypnosis has focused on who is hypnotizable and what characteristics may distinguish those who are hypnotizable from those who are not.

More recently, Sigmund Freud (1856-1939) practiced hypnosis in Vienna. Initially Freud felt hypnosis was simply ordinary sleep (Gravitz, 2004). However, as Freud continued his practice he came to believe that hypnosis was nothing like nocturnal sleep or drug induced sleep. According to Freud, during hypnosis changes can occur and a person is capable of mental functions that they are incapable of during normal sleep (Freud, 1905). The idea that hypnotized subjects are capable of performing tasks outside their normal range of capabilities has been scrutinized ever since.

Freud used hypnosis to help treat neurotics, but he became frustrated after he found it impossible to induce everyone. Freud is quoted by Chertok (1979) from Freud's *Five Lectures on Psychoanalysis* (1910) as saying:

I soon came to dislike hypnosis, for it was a temperamental and, one might almost say, a mystical ally. When I found that in spite of all my efforts, I could not succeed in bringing more than a fraction of my patients into a hypnotic state, I determined to give up hypnosis Since I was not able at will to alter the mental state of the majority of my patients, I set about working with them in their normal state.

Over the course of the last few thousand years man has investigated the nature of hypnosis. Hypnosis has been theorized to occur due to things such as divine intervention, supernatural powers, magic rituals, natural powers of objects, subject fascination, and suggestion. Certainly many more physicians, alchemists, therapists and others have practiced and contributed to hypnosis than those listed previously. Throughout time hypnosis has experienced changes in both title and theory, and its practicality as a treatment procedure is still being explored today.

PUBLIC AND SCIENTIFIC VIEWS

Throughout history hypnosis has been praised and spurned by everyone from kings to peasants. Public opinion and scientific insights have varied from culture to culture, year to year, and individual to individual. Still today opinions on hypnosis vary to both ends of the spectrum. The past has shown that hypnosis and those who practice it have been subject to a plethora of public action from admiration to defamation and banishment. The nature and very existence of hypnosis has been debated for centuries and will continue to be debated for years to come.

During the Middle Ages in Europe, trances were rejected by the many rulers of the time and its proclaimed power to heal or spiritually enlighten was completely disregarded. Several hypnotists were discredited and/or banished due to their hypnotic practices. Anton Mesmer was banned from the Medical Faculty of Vienna in 1777 after temporarily treating a woman's blindness (Forrest, 1974). Later, Mesmer was the subject of two royal investigations. The first was by the Academie des Sciences and the Academie de Medecine which included the American Benjamin Franklin. The second was conducted by the Societe Royale. Both investigations discredited Mesmer's idea of the existence of an internal fluid that could be manipulated in order to cure (Darnton, 1968). Even Mesmer, one of the most documented hypnotists today, came under scrutiny of the public and scientific community.

In the mid 1800's an English physician by the name of John Elliotson was banned from practicing at University Hospital in London after using magnetic sleep as an analgesic during major surgeries. Elliotson was a professor of medicine and was one of the first physicians to advocate the use of the stethoscope (Gezundhajt, 2007). In a similar fashion, John Esdaile was also eventually looked down upon by both the medical community and the church because the use of chloroform had become an accepted medical practice (Gezundhajt, 2007). Once practitioners were able to empirically prove the effects of chemically induced analgesia, the seemingly non-provable method of hypnosis was disregarded as substandard practice.

Beyond the medical realm, the use of hypnosis for public entertainment, or stage hypnosis, has resulted in some governmental regulation, at least in the United Kingdom. In the United Kingdom stage hypnotists must apply for a special license which is granted by a local council (Heap, 2000).

Heap (2000) cites two cases in which participants were negatively afflicted by stage hypnosis. The first case occurred in 1995. A young man sued a hypnotist after falling off a stage while running from imaginary mice. He later claimed to have developed a phobia of mice. The second case involved the death of a healthy young woman one night after she took part in stage hypnosis. The mother of the deceased felt the stage hypnosis was directly related to her death. The news of these trials was publicized and at least two more cases arose. The sudden influx in stage hypnosis related court cases prompted the United Kingdom Home Office to establish a panel of experts to explore the dangers of hypnosis. In October 1995 the panel reported that no significant risks to mental health were posed by stage hypnosis; therefore, prohibition was not warranted (Home Office, 1996). Even with the panel's suggestion, many medical practitioners worry about the efficacy and safety of hypnotic procedures (Cangus & Wagstaff, 2000).

Although stage and clinical hypnosis are quite different, several common misconceptions have skewed the general public's view of hypnosis. For example, some fear involves the thought that a hypnotist may fail to cancel a suggestion entirely, and a compulsion may develop. Such a case was reported by Heap (2000). A man claimed to have an intense desire to have sexual relations with household furniture and appliances post-hypnosis. Heap reports such reactions are highly unjustifiable as modern research indicates hypnotic suggestion is inhibited by six factors:

1. The suggested response must be within the subject's repertoire of abilities.
2. The response must be acceptable to the subject and compatible with the context it is given.
3. Although the suggestion may be experienced by the subject as having a compulsive quality, it involves cognitive effort on the subject's part.
4. The influence of suggestion is easily overridden by existing competing habits.
5. The subject's impulse to respond to the suggestion usually dissipates with time.
6. The influence of the suggestion is determined by the explicit and implicit demands of the context and when those demands are perceived as no longer operative, the subject stops responding.

In Spain and the surrounding countries there has been a surge of interest in hypnosis (Capafons, 1999). Spanish researchers discovered that post-hypnotic amnesia only

occurred in exceptional cases and the amnesia was easily reversed. The same researchers claim that when patients are told they will be hypnotized it evokes attitudes and expectations that interfere with the therapeutic process. Thus, these researchers feel that the term hypnosis should be scrapped in favor of a more fitting title (Caycedo, Pons & Sarro, 1969). Spain has been somewhat of a recent hot spot for hypnosis research.

Furthermore, Spanish policies show that hypnosis is not yet fully accepted as a justifiable procedure there. Psychoanalysis and hypnosis are excluded from publicly financed health services in Spain based on the belief that there is a lack of scientific evidence on its safety and efficiency (Royal Decree 63/1995). Current research in Spain is focusing on ideas that reject hypnosis as a special state and attempts to prove its effectiveness (Cangas & Wagstaff, 2000).

Hypnosis certainly has a past colored with periods of high acceptance and times of total disregard. Its use in hospitals, stage performances, and therapeutic treatments has brought attention from the general public and scientists alike. Scrutiny of its use has led to legislation and new focuses in research. Such scrutiny may lead to disbelief and doubt which may in turn lead to research that may unlock some of the mysteries associated with hypnotism.

MECHANISM

The inductions of trances and hypnosis have varied just as their theories have. Similar to the theories on the nature of hypnosis, theories and methods of induction have largely been shaped by skepticism and investigation. Inductions have been as complicated as to involve elaborate mechanisms and machines and as simple as using a mere visual focus. Modern advances in neuroimaging have allowed for research on the physiological effects of the induction. Another area of modern research has been conducted on the presence and effects of susceptibility. Inductions have gone through major changes in order to stay up to date with the associated theories.

Early mechanisms for entering trances varied greatly, but one that is especially documented is Mesmer's use of the *baquet*. The *baquet*, as described by Crabtree (1993), is an oaken tub specially designed to store and transmit magnetic fluid. It is four to five feet in diameter and one foot deep. It had a lid, and along the bottom were bottles arranged in concentric circles. Some of the bottles were empty and pointing towards the center. Others were filled with magnetized water and pointed towards the outside. The tub was filled with water containing iron filings and powdered glass. Iron rods were positioned in the lid, and as such they could be placed against the pained area of the subject's body. Procedures inside the *baquet* were done in large rooms with huge mirrors. Meanwhile, Mesmer would dress in a cloak and play a glass harmonica. His assistants sat in the corners to help control convulsing subjects because convulsions were very common. Mesmer's induction process was complex and highly ritualistic.

Most modern forms of inductions are not a random assortment of procedures that the subject is told to follow. Rather, an induction follows a sequence with neurophysiological logic. The induction involves initially activating the anterior left sided attention

mechanisms which are later inhibited to allow for selective inhibition of frontal functions. This selective inhibition creates the possibility for hypnotic experiences such as automaticity and involuntariness (Gruzelier, 2000).

Inducting a trance or hypnotic state does not ensure that the hypnotist will be able to impose any sort of effect on the subject. Ideas can be suggested into actualization by three mechanisms (Bierman, 1995). Bierman states rapport, linkage, and authority reign over hypnosis. Rapport is used to create a feeling that the patient and therapist are of similar mind. The hypnotist's ideas and state of mind are the same as the patient's. Rapport is often created through a series of meetings in which a relationship of trust is built. Next, linkage is the creation of a feeling that the therapist's words are the patient's experience. Linkage allows the hypnotist to not only describe current behavior but also future experiences. Linkage is, according to Bierman, what is considered the classic induction. Linkage is the idea that the hypnotist has the ability to predict or produce future experiences. Finally, Bierman states authority as the idea that the therapist's ideas are now the client's reality. Authority is correlated to the instruction of the young by the old and is an inevitable consequence of mammalian child rearing. Hypnotic induction actually could be considered the entire process from rapport to formal induction, as every step is crucial to developing the hypnotic state.

Much of the recent hypnotic research has been related in some way to the idea of susceptibility. Susceptibility refers to the ability of the participant to be hypnotized. Participants are most often defined as being either high or low in susceptibility. Different theories have proposed that highly susceptible patients are not only hypnotized easier, but experience stronger effects than those not as high in susceptibility (Gruzelier, 2000).

In a medical setting, many low susceptible patients adamantly wish to experience hypnosis and therefore comply heartily with instructions (Gruzelier & Brow, 1985). Research in susceptibility may lead to an ability to train subjects who are otherwise not susceptible to hypnosis to be hypnotized. The attention of highly susceptible patients responding to instructions of hypnosis is different than when the instructions come from a story. Attention under hypnosis also differs from patients who were deeply relaxed or in a hypnosis simulation, and different from the attention of low susceptibles (Gruzelier & Brow, 1985). Susceptibility may also be increased by dispelling of misconceptions and worries (Gruzelier, 2000). In opposition to that, negative hypnotic experiences can lead to decreased susceptibility.

Hypnotic induction involves several components. Feelings of rapport, linkage and authority are crucial to the hypnotic experience. Hypnotic susceptibility may also play a key role in hypnosis as highly susceptible patients have exhibited differences in focused attention and susceptibility which can be influenced by misconceptions. Evidence has shown that several key elements need to be established in order for there to be a hypnotic effect.

EFFECTS AND POTENTIAL USES

Hypnotism has experienced a multitude of critics and skeptics. The effects of hypnosis have been credited with many detrimental and dangerous results as well as

many beneficial ones. Advocates of hypnotism and those in opposition to its practice have long disputed the true effects of hypnosis. Treatment possibilities, side effects, potential dangers, and even the derivation of the word hypnosis have been researched.

In modern practice the derivation of the word hypnosis opposes many practitioners' theories. Hypnosis is derived from the Greek word for sleep and the association between hypnosis and sleep has for the most part been abandoned. Also, the idea of a trance is more accurately defined in modern times as a state of mental abstraction from external things, absorption, exaltation, and ecstasy (Gruzelier, 2000). Many titles have been proposed and discussed in an attempt to find a suitable name for the experience currently known as hypnosis, but for the vast majority of the population, hypnosis is what it is regardless of the derivation of the word.

Misconceptions with hypnosis have been commonplace throughout the history of its practice. Jean Sylvain Bailly wrote to the French King Louis XVI concerned that Mesmer's magnetism practices on women were more effective because women were more prone to enter a trance than men. He based his belief on thoughts that women had more responsive nerves, their imaginations are livelier, and that they are more excitable (Bailly et al., 1784). Bailly worried that Mesmer was using women's frailty to seduce them. Years later Sigmund Freud also became worried when a woman threw her arms around him confessing an undying love after exiting a hypnotic state. Hypnosis has been attributed with the idea that subjects of hypnotism may develop intense feelings for the practitioner.

Sivec and Lynn (2000) studied participants of hypnosis, progressive relaxation, and non-hypnotic interviews. The participants were asked to recall their earliest childhood memory. After hypnosis and progressive relaxation, participants reported a higher perceptual-kinaesthetic experience that was not reported in the interview group. This study and others like it have provided evidence that hypnotic procedures may increase patients' self-awareness beyond that of their non-hypnotized state.

Earlier, it was mentioned that susceptibility has been a large focal point for current research. A large amount of evidence has been gathered indicating low and high susceptible subjects differ not only in their neurophysiology but also in the effects of their hypnotic induction (Miltner et al., 2000). The Stroop interference effect, which is a measure of reaction time, is greatly reduced in those who are highly susceptible when compared to those who exhibit low susceptibility (Rubichi, Ruicci, Padovani & Scaglietti, 2005). Accordingly, high susceptible participants perform much better on tasks of sustained and focused attention such as the Necker cube illusion and the auto-kinetic movement illusion (Crawford, Brown & Moon, 1993). These studies exhibit evidence that those who are highly hypnotizable experience different effects than those who are not.

One would be inclined to believe that if highly susceptible subjects are better at focusing attention, they should be able to more effectively use distraction to moderate pain even when they are not hypnotized. Research in this area has achieved various results. In one study, participants of both susceptibility categories showed no significant pain management prior to hypnotism; however, following hypnotism the highly susceptible group reported pain levels significantly lower. Most susceptibility research has resulted in mixed results, making it difficult to generalize findings. (Miller, Barabasz & Barabasz, (1991).

Other effects of hypnosis have also been studied. Some studies have found that telling participants they were hypnotized can have an effect on their reported changes, responsiveness, results, etc. For example, Gandhi and Oakley (2005) had two groups listen to identical relaxation scripts with the only difference being the title of the script. One was titled relaxation and the other was titled hypnosis. Those who listened to the script labeled hypnosis demonstrated higher responsiveness to suggestion than the group who listened to the script titled relaxation.

Hylands-White and Derbyshire (2007) conducted two interesting studies. In the first they assessed the relationship between pain reduction during a task and hypnotizability. They discovered that highly susceptible subjects were no more capable of decreasing perceived experienced pain than those of lower susceptibility. The second study, similar in nature to Gandhi and Oakley (2005), tested the influence of labeling a procedure relaxation versus hypnosis. Identical procedures were administered with different titles. The group who received the procedure titled hypnosis reported being almost five-fold more hypnotized. Hylands-White and Derbyshire (2007) combined data from the two trials and concluded their findings by stating it is better that the participant believes he or she could be hypnotized rather than being highly hypnotizable. Also, analgesic benefits do not increase with hypnotic suggestibility. However, labeling the procedure hypnosis rather than relaxation did show increased analgesic effects.

A minority of patients experience negative post hypnotic symptoms. One study published results stating that 8-49% of post hypnotic participants experience negative effects such as headaches, dizziness, nausea and stiff necks while 62-85% of post hypnotic participants report positive experiences such as relaxation (Lynn, Martin & Frauman, 1996). Brentar, Lynn, Carlson and Kurzhals (1972) developed an instrument to measure post hypnotic experience. They named the scale the Posthypnotic Experience Questionnaire and administered it to three groups. One group was hypnotized, the second was asked to sit with their eyes closed and were instructed they would be tested on body awareness, and the third group, the control, sat quietly in a room for 20 minutes with no special instructions. Hypnotized participants did not report positive experiences at a higher frequency than either of the other two groups. The frequency of reported negative experience was comparable for all groups (Brentar, et al., 1992). This study suggests that hypnotism does not cause more negative effects than sitting quietly in a room.

Most all treatments of any kind come with some form of potential harmful effects, and hypnosis is no exception. Safeguards must be in place to assure that the least amount of harm or discomfort is induced. Subjects should be screened for psychopathology prior to hypnotic induction (Orne, 1965). In addition, before subjects are brought out of a hypnotic state they should be informed they will feel refreshed and alert in order to avoid feelings of headache, confusion, and decreased arousal (Guzelier, 2000).

Even if negative symptoms are not common, measures should be taken to avoid as many negative effects as possible. Some important steps to avoiding transient experiences during hypnosis were outlined by Crawford, Hilgard, and MacDonald (1982). First the development of positive rapport should begin during the very first session between the subject and the hypnotist. The hypnotist should maintain constant vigilance towards the subject's reactions. The end of the hypnosis should be clearly defined so that the patient

is completely de-hypnotized before leaving. Also, anyone wishing to use hypnotic treatment should be trained for sensitivity towards and proper treatments for transient experiences that may occur. Crawford et al. continue by stating, obviously, if further medical or psychological treatment is warranted, a qualified practitioner should be made available to the subject.

Hypnosis has been found to alter attentional abilities on certain tasks and decrease feelings of pain. However, telling someone they have been hypnotized also seems to have similar effects. Those who are more easily hypnotized seemingly experience more profound effects from hypnosis. In a few cases hypnosis has been reported to have caused some negative after-effects. A full understanding of exactly who can be hypnotized and the exact effect hypnosis will have on participants is not known. The uncertainties surrounding the effects of hypnosis make it very important to follow proper procedures to ensure the safety and efficiency of the procedure.

EVIDENCE

Solid evidence of hypnosis may be difficult to come by and some scientists believe the quest for neurobiological evidence should be abandoned. Similar to schizophrenia, no simple brain wave, neurochemical or other single neurobiological marker is likely to define hypnosis. Hypnosis is best defined as a complex system involving alterations of brain systems that are determined by social context and the influence of the hypnotist (Gruzelier, 2000).

Frontal brain lobe activity can alter personality and character without altering intellectual functions which was made evident by the famous case of Phineas Gage. With such evidence, it is not unlikely to believe that hypnosis can alter character so that patients are guided only by immediate prospects and can be guided in the absence of anticipatory responses (Gruzelier, 2000).

Wagstaff (1998) states neurophysiological evidence would definitely offer more acceptable evidence than simply lay opinions and would also have the greatest chance of promoting a scientific understanding. EEG and other neuro-imaging technology have provided evidence linking left anterior brain inhibition with hypnosis. However, a marker common with left frontal inhibition, left frontal theta, cannot by itself define a hypnotic state (Spiegel, 1998).

Researchers have discovered electroencephalographic gamma oscillations recorded over the orbital frontal cortex of a non-hypnotized subject correlate positively with reported pain. During hypnosis the location of oscillations shifted away from the frontal region (Croft, Williams, & Gruzelier, 2000). Other research (Gruzelier, 1998) found neurophysiological links to the induction of hypnosis. As hypnotic induction is begun with fixation and focusing, left anterior selective attention processes are engaged. As induction continues into the suggestion of tiredness, selective anterior inhibition is initiated. Finally guided imagery provokes posterior involvement which includes more involvement from the right than the left hemisphere of the brain. Neurophysiological research utilizing imaging technology has found indications of specific cranial region

involvement in hypnosis, but a true cause/effect relationship has yet to be discovered. Further research conducted on the relaxation associated with hypnosis has shown relaxation in hypnosis is different from other forms of relaxation. Gruzelier (2000) provides a summarization of these differences:

1. Electrodermal orienting responses were found to differentiate hypnosis from a relaxation control without differences in tonic arousal.
2. Hypnotic relaxation exhibits a left to right hemispheric shift that normal relaxation does not.
3. A lateral shift with a haptic task during hypnosis was different from that of participants of deep relaxation in a flotation tank.
4. Alpha and theta activity also varies between hypnosis and relaxation even after de-hypnosis.

Furthermore, it was found that subjects deemed highly susceptible showed a higher sensitivity in the right hemisphere of the brain and medium susceptibles showed a bilateral improvement in sensitivity (McCormack & Gruzelier, 1993).

Although no single cause of hypnosis is currently known, and some say one does not exist, researchers have unveiled many clues to how hypnosis affects brain functioning. Hypnosis appears to correlate with fairly distinct changes in neural activity especially in the left frontal region of the brain. Susceptibility and cranial hemispheric sensitivity have also been shown to be correlated. Current research has provided evidence towards fundamental causes of a hypnotic state, but certainly future research is needed if a cause and effect relationship is to be established without confounding variables.

HYPNODONTIA

Truly anxious patients often are incapable of tolerating in-depth dental procedures without drug treatment, sedation, or general anesthesia. These treatments are costly, time-consuming and invasive. One proposed alternative is medical hypnosis which can be used as a relaxant or sedative for essentially minimal monetary cost.

Dental procedures may create a mental state of anxiety in some. Psychosomatic dental fear may lead to several detrimental physical manifestations such as treatment avoidance and neurophysiological reactions before, during, and after dental procedures (Eitner; Schultze-Mosgan, Heckman, Wichmenn, & Hotst, 2006). Psychosomatic reactions can be triggered by things like sounds, smells, feeling of impending pain, and feelings of subjectivity (ter Horst & de Wit, 1993). A common method of measuring dental anxiety is Corah's Dental Anxiety Scale (DAS). The DAS is a four question scale that asks patients to rate feelings on a range from 1 (no anxiety) to 5 (extreme anxiety). A score from 4-12 indicates little anxiety. A score equal to or greater than 15 means high anxiety and possible phobia (Eitner et al., 2006).

Eitner et al. (2006) released a case report of a 54-year-old patient in need of molar implants on both her left and right mandibles. Her score on the DAS was 13. The patient showed no symptoms of obvious fear of physicians, psychological disorders, or general fears. She reported only fearing dental procedures. The thought alone induced sweating,

an elevated heart rate, an elevated respiratory rate, and nausea. She received hypnotic treatment prior to the procedure on the left mandible but not on the right. The vital parameters of heart rate and blood pressure were monitored during both procedures. During the non-hypnosis procedure the heart rate and blood pressure elevated above the levels that were observed during the hypnosis treatment side. According to Eitner, the patient showed similar vital and stress parameters under hypnosis as someone who had received drug sedation via Midazolam. In addition, the patient post-operatively reported a 'loss of sense of time', considered the procedure a positive experience, and stated optimism for future procedures.

Similarly, a 31 year old female with throbbing pain in her left third molar which kept her from sleeping the previous two nights visited a dentist. The following is from Gow's (2006a) case report. She reported extreme anxiety towards dental procedures. 'Jan' showed increased respiration and perspiration at the mention of a tooth extraction. Immediately she stated she felt it would be impossible for her to tolerate such a procedure. Jan reported anxiety and low tolerance for pain. Also, she feared the anesthetic would not work, and the dentist would continue even though the tooth was not numb. She scored high on the DAS (16) and had a history of avoiding dental appointments. Jan was scheduled for a series of sessions in which rapport would be established and the processes of hypnosis explained to her.

However, one week prior to her third scheduled session Jan experienced tremendous pain. She revisited Gow, and he determined an immediate surgical extraction was warranted. Jan was induced into a hypnotic state via eye fixation and reverse counting. The upper third molar was removed with a pair of forceps. Before ending the hypnotic state, Jan was reinforced that she had overcome irrational fears of dental treatment and she would now experience less anxiety at the dentist. Jan was brought out of hypnosis via reverse counting. Her post-operative DAS score had lowered to a 7. She stated, "Hypnosis definitely helped. I can now use these techniques with my new dentist."

Gow (2006b) also recounts the case of a 55 year old female with dental phobia in need of periodontal treatment and an extraction. 'Jo' presented an interesting case as she was blind from birth. Jo self reported extreme anxiety. Her DAS score was 20 which also indicated dental phobia. When asked about previous dental experience she reported her pain as 9 out of 10 with 10 being the most pain imaginable. Furthermore, when asked to rate the pain she anticipated on further treatment, she reported an 8/10.

Gow reported that a diagnosis of dental phobia was applicable to Jo considering her extremely high DAS score and her tendency to avoid dental appointments. Jo also stated she felt she had a low pain tolerance threshold. Both her son and daughter also feared dental treatment. Interestingly, Shaw (1975) discovered parents who had children suffering from dental anxiety were more likely to be more anxious themselves. Similarly to Jan, Jo reported that her biggest fear was the belief the dentist would perform a Gow assured her the tissues would indeed be numb. He also offered hypnosis as a complementary pain management procedure. Jan then told Gow she had no previous experience with hypnosis but felt it may help her control her fear.

A series of rapport building sessions followed in which Jo's fears and misconceptions of hypnosis were discussed. During the third rapport building session, Jo was induced

into hypnosis by vivid description of all five senses. Jo was told to find a very special place and go there. Her hypnosis was deepened by encouragement to use her four intact senses of hearing, touch, smell and taste. Jo imagined her special place to be a garden and she reported hearing birds, feeling the wind, smelling flowers, and petting her dog. Jo was given a post-hypnotic suggestion that when she returned for the procedure she would become more relaxed and more quickly. Jo's hypnosis was ended by a reverse counting from seven to one. After termination of hypnosis, Jo stated her experience was difficult to describe. She went on to say she was able to imagine every suggestion but did not feel like she was actually experiencing them. Jo's experience demonstrates an ability to mentally distance oneself from an immediate physical environment.

One week later Jo's dental procedure was carried out while she was under hypnosis. To induce the hypnosis, Gow instructed Jo to close her eyes and picture herself back in the garden at the count of seven. Jo was treated for periodontal disease and the hypnosis was terminated once again via reverse counting from seven to one. Jo returned twice more for teeth cleaning and scaling, and she asked to again be hypnotized both times. A few months later Jo needed a tooth extraction which was also conducted under hypnosis. After the extraction Jo again took the DAS and her score was a 10. When asked about fear for pain in future procedures, she now rated it as a 3/10.

Hypnosis has been practiced in professions beyond general dentistry. Another field in which hypnosis has been notably used and researched is maxillofacial surgery. A three year study was conducted in Germany at the University Hospital Schleswig-Holstein in Luebeck, Germany. Hermes, Hakim, and Sieg (2006) examined patients who showed interest in a combined method of treatment that included local anesthetic paired with hypnosis. These patients received an in-depth explanation of both the procedure they would receive and hypnosis. Every patient received a standardized hypnosis CD and was instructed to listen to the CD two times before the day of their operation. On the day of the operation, hypnosis was inducted via headphones from a portable Sony CD player. Surgery in complete absence from pharmacological anesthetics was not deemed appropriate or ethical, so all patients received a local anesthetic.

Fifty patients scheduled for elective oral surgery were used for a prospective study. Twenty-five patients received only local anesthesia. The other twenty-five received both anesthesia and tape recorded hypnosis. Both groups showed increased preoperative anxiety, but those who received hypnosis returned to baseline anxiety levels intra-operatively. The non-hypnotized group remained at the heightened anxiety state. The results from the prospective study warranted further research.

During the three years of the study, 340 procedures on 295 patients were completed using tape-recorded hypnosis. Procedures included oral surgery (n=371), septic surgery (n=12), plastic and reconstructive surgery (n=39), oncological surgery (n=22) and traumatological surgery (n=20). The patients reported feelings of relaxation, anxiolysis and mental distance from the procedure during post-operative interviews. 78 percent of the participants felt hypnosis was an enrichment of medical therapy. 86.5 percent felt further research on the medical use of hypnosis is warranted. The researchers reported sedation, anxiolysis, inhibited motor skills, and increased tolerance for procedures as positive intra-operative effects of hypnosis. The surgeons reported hypnosis allowed

patients with a history of severe anxiety to be operated on with only local anesthesia instead of general anesthesia. Eight patients reported no benefit from the combined treatment and four more patients with high anxiety reported no relief of anxiety. In conclusion the German researchers propose that hypnosis could never serve as a full-on substitute for pharmacological sedation or general anesthesia, but it may be a very effective conjunctive treatment for anxiety and sedation (Hermes et al., 2006).

DISCUSSION

Elements of hypnosis have been practiced since ancient times and are still practiced today. One of the major contributor's to hypnosis whose name is commonly associated with hypnosis, is Franz Mesmer. There are also lesser known contributors such as James Esdaile. Historically hypnosis has survived mixed investigations and public opinions. It has evolved from a supernatural ritual into a more scientifically influenced procedure. Early hypnotists challenged each others' ideas which, in turn, furthered the understanding of what was actually necessary to create a hypnotic state. The public's perception of hypnosis changed along with the theories and was often met with criticism and skepticism. Many hypnotists were discredited and/or barred from practice based on misconceptions. Public and scientific opinions have traditionally had an impact on hypnosis practice and research.

Hypnosis has been used and tested for several ailments. Historical methods often utilized complex and involved equipment and procedures. Today simpler, less involved methods have been developed. Furthermore, EEG evidence has shown that specific brain regions may be involved in hypnosis, and certain sequences of activation and inhibition of cranial lobes may be related to suggestibility. Hypnotism has also been shown to increase one's ability to focus attention. Experiments have been conducted comparing hypnosis to normal relaxation and somewhat distinct differences have been found. Researchers have also found that some patients are more easily hypnotized than others, and the more susceptible patients may experience stronger effects.

Hypnosis has been specifically used in dentistry and other medical fields to effectively manage anxiety and fear. Patients who would otherwise be incapable of tolerating medical and dental visit have undergone dental and maxillofacial procedures. Patients report lower scores on Corah's Dental Anxiety Scale after undergoing a procedure while under hypnosis and report decreased anxiety for future appointments. Side effects from hypnosis are very rare and in the majority of the cases were easily reversed. Negative effects have been significantly controlled by making sure proper safeguards are in place.

Hypnosis is monetarily inexpensive and has very low risk of side effects. It has been found effective in anxiety reduction and relaxation. Hypnosis may very well be an inexpensive and relatively safe alternative to general anesthesia for patients experiencing phobia or extreme anxiety. Alternative treatments for anxiety such as hypnosis may allow people who would otherwise be unable to tolerate procedures to receive dental and/or medical care. Hypnosis, whether it can be scientifically explained or not, has been shown

to manage anxiety and has allowed patients to handle stressful situations. In some patients it has decreased pain perception and created a feeling of mental distance from the procedures.

Research on hypnosis has shown it to be a feasible alternative treatment to willing patients. Currently, no single mechanism or method of hypnosis has been proven effective beyond a reasonable doubt of confounds, but to be fair, the same might be said about some medications currently prescribed. It is the opinion of this author that hypnosis may in fact be warranted in some cases, if, and only if, the patient is willing to try it as a conjunctive therapy.

Evidence has not shown hypnosis capable of being used in solitude for general anesthesia, only as a supplement to local anesthesia or as a sedative. If being hypnotized or being told he or she were hypnotized increases a person's ability to tolerate procedures, it may be against the Hippocratic Oath not to allow them such a treatment. Hypnosis cannot be proven to exist without doubt, nor can it be disproven beyond reasonable doubt. Can hypnosis be used effectively as a treatment method for dental anxiety? Probably, especially in those patients willing to try an alternative procedure and especially in conjunction with local anesthetic. Should hypnosis be a mandated practice? No. One should be familiar with hypnotic inductions and dangers before considering implementation of hypnosis into a treatment plan. Use of hypnosis should be determined strictly at the patient/physician level and be based on both parties' comfort and the practitioner's knowledge of the procedure. Future research may someday prove or disprove the effects of hypnosis, but as it is known today, hypnosis has the potential, in certain cases, to decrease anxiety, fear, and cost associated with medical and dental procedures.

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REFERENCES

- Bailey, J. (1784). Rapport Secret sur le Mesmerisme, In *The Papers of Benjamin Franklin*, The American Philosophical Society and Yale University, retrieved 20 March 2008 from <http://franklinpapers.org/franklin/framedVolumes.jsp?vol=42&page=115>
- Bernheim, H. (1889/1957). *Suggestive Therapeutics*. Westport, Conn: Associated Booksellers. (translated in English, originally published in France 1886)
- Bierman, S. (1995). Medical hypnosis. *Advance: The Journal of Mind-Body Health*, 11 (1). 65-72.
- Brentar, J., Lynn, S., Carlson, B., & Kurzhals, R. (1992). Controlled research on hypnotic aftereffects: The post-hypnotic experience questionnaire. In W Bongartz (ed.) *Hypnosis: 175 years after Memer*. Konstanz, Germany: University of Konstanz Press, 179-201.
- Cangas, A. & Wagstaff, G. (2000). The current status of hypnosis in Spain. *Contemporary Hypnosis*, 17 (1). 42-47.

- Capafons, A. (1999). Hypnosis in Spain. *Psychological Hypnosis*, 8, 7-8.
- Chertok, L. & Saussure, R. (1979). *The Therapeutic revolution: From Mesmer to Freud*. New York: Brunner/Mazel.
- Crabtree, A. (1993). *From Mesmer to Freud: Magnetic Sleep and the Roots of Psychological Healing*. New Haven: Yale University Press.
- Crawford, H., Brown, A. & Moon, C. (1993). Sustained attentional and disattentional abilities: Differences between low and highly hypnotizable persons. *Journal of Abnormal Psychology*, 102, 534-543.
- Crawford, H., Hilgard, J. & MacDonald, H. (1982). Transient experiences following hypnotic testing and special termination procedures. *International Journal of Clinical and Experimental Hypnosis*, 30, 117-126.
- Croft, R., Williams, J., and Gruzelier, J. (2002). Pain Perception, Hypnosis, and 40 Hz oscillations. *International Journal of Psychophysiology*, 46, 101-108.
- Darnton, R. (1968). *Mesmerism and the end of the Enlightenment in France*. Cambridge, MA: Harvard University Press.
- Eitner, S., Shultze-Mosgau, S., Heckmenn, J., Wichmenn, M. & Holst, S. (2006). Changes in neurophysiologic parameters in a patient with dental anxiety by hypnosis during surgical treatment. *Journal of Oral Rehabilitation*, 33, 496-500.
- Forrest, D. (1974). Von Senden, Mesmer, and the recovery of sight in the blind. *The American Journal of Psychology*, 87(4): 719-722.
- Freud, S. (1905). *Physical (or mental) treatment* standard edition, London, UK: Hogarth Press, Vol 7; pp 283-304.
- Gandhi, B. & Oakley, D. (2005). Does 'hypnosis' by any other name smell as sweet? The efficacy of 'hypnotic' inductions depends on the label hypnosis. *Consciousness and Cognition*, 14, 304-315.
- Gezundhajt, H. (2007). An evolution of the historical origins of hypnotism prior to the twentieth century: Between spirituality and subconscious. *Contemporary Hypnosis*, 24(4). 178-194.
- Gow, M. (2006a). Hypnosis with a 31-year old female with dental phobia requiring an emergency extraction. *Contemporary Hypnosis*, 23 (2). 83-91.
- Gow, M. (2006b). Hypnosis with a blind 55 year-old female with dental phobia requiring periodontal treatment and extraction. *Contemporary Hypnosis*, 23(2). 92-100.
- Gravitz, M. (2004). The historical role of hypnosis in the theoretical origins of transference. *Journal of Clinical and Experimental Hypnosis*, 52(2). 113-131.
- Gruzelier, J. (1998). A working model of the neurophysiology of hypnosis: A review of the evidence. *Contemporary Hypnosis*, 15, 3-21.
- Gruzelier, J. (2000). Redefining hypnosis: theory, methods and integration. *Contemporary Hypnosis*, 17 (2). 51-70.
- Gruzelier, J. & Brow, T. (1985). Psychophysiological evidence for a state theory of hypnosis and susceptibility. *Journal of Psychosomatic Research*, 29, 287-302
- Heap, M. (2000). The alleged dangers of stage hypnosis. *Contemporary Hypnosis*, 13(3). 177-126.

- Hermes, D., Hakim, S. & Sieg, P. (2006). Standardised hypnosis in oral and maxillofacial surgery: Three-year experience and first study results. *European Journal of Clinical Hypnosis*, 6 (4). 2-9.
- Home Office. (1995). Report of the Expert Panel Appointed to consider the Effects of Participation in Performances of Stage Hypnosis.
- Hylands-White, N. & Derbyshire, S. (2007) Modifying pain perception: Is it better to be hypnotizable or feel that you are hypnotized? *Contemporary Hypnosis*, 24 (4). 143-153.
- Lockert, O. (2001). Hypnose: Evolution humaine, Qualite de Vie, Sante. Paris France. IFHE
- McCormack, K. & Gruzelier, J. (1993). Cerebral asymmetry and hypnosis: A signal detection analysis of divided visual field stimulation. *Journal of Abnormal Psychology*, 102. 352-257.
- Miller, F., Barabasz, A., & Barabasz, M. (1991). Effects of active alert and relaxation hypnotic inductions on cold pressor pain. *Journal of Abnormal Psychology*, 100. 223-226.
- Miltner W., Weiss, T. Friederich, M., Trippe, & R., Ozcan, M. (2000). Differences of pain contral in low and high susceptible subjects during hypnotic analgesia and attentional distraction from noxious input. *International Journal of Psychophysiology* (accepted but unpublished).
- Muses, C. & Young, A. (Eds.). (1972). *Consciousness and reality: The human pivot point*. New York: Outerbridge and Lazard Inc., 9-17.
- Orne, M. (1965). Undesirable effects of hypnosis: the determinants and management. *International Journal of Clinical and Experimental Hypnosis*, 13. 226-237.
- Outerbridge,
- Royal Decree 63/1995 as cited in Cangas, A. & Wagstaff, G. (2000). The current state of hypnosis in Spain. *Contemporary Hypnosis*, 17 (1). 42-47
- Rubichi, S., Ricci, F., Padovani, R., & Scaglietti, L. (2005). Hypnotic susceptibility, baseline attentional functioning, and the Stroop task. *Consciousness and Cognition*, 14. 296-303.
- Shaw, O. (1975). Dental anxiety in children. *British Dental Journal*, 139. 134-139.
- Sivec, H. & Lynn, S. (2000). Early memories elicited in hypnotic and non-hypnotic experiences. Paper presented at the Annual Meeting of the Society for Clinical and Experimental Hypnosis, Arlington Heights, IL.
- Spiegel, D. (1998). Using our heads: effects of mental state and social influences on hypnosis. *Contemporary Hypnosis*, 15. 175-177.
- Ter Horst, G. & de Wit, C. (1993). Dental anxiety, dentist-patient relationship, compliance and dental attendance. *International Dentistry Journal*, 43. 265-278.
- Wagstaff, G. (1998). The semantics and physiology of hypnosis as an altered state: Towards a definition of hypnosis. *Contemporary Hypnosis*, 15. 149-165
- Waterfield, R. (2004). *Hidden Depths: The Story of Hypnosis*. Macmillan: London.

