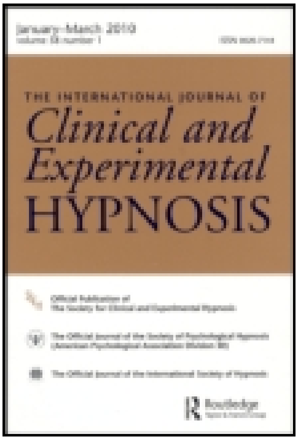

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Enrico Facco [a b] , Edoardo Casiglia [a b] , Serena Masiero [a b] , Valery Tikhonoff [a b] , Margherita Giacomello [a b] & Gastone Zanette [a b]

[a] University of Padua , Italy

[b] Italian Center of Clinical and Experimental Hypnosis , Turin, Italy

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EFFECTS OF HYPNOTIC FOCUSED ANALGESIA ON DENTAL PAIN THRESHOLD[1]

Enrico Facco, Edoardo Casiglia, Serena Masiero, Valery Tikhonoff, Margherita Giacomello, and Gastone Zanette[2]

University of Padua, Italy; and Italian Center of Clinical and Experimental Hypnosis, Turin, Italy

Abstract: The rate, intensity, and selectivity of hypnotic focused analgesia (HFA) were tested with dental pulp stimulation. Thirty-one healthy subjects were hypnotized, and hypnotic suggestions were given for anesthesia of the right mandibular arch. A posthypnotic suggestion of persisting analgesia was also given. The pain threshold of the first premolar was bilaterally measured before, during, and after hypnosis using a pulp tester. During hypnosis, the pain threshold increased significantly ($p < .0001$) for both sides. The posthypnotic right pain threshold was also significantly ($p < .0015$) higher than in the basal condition.

According to the International Association for the Study of Pain (IASP), pain is an unpleasant sensory and emotional experience associated with actual or potential tissue damage or described in terms of such damage (Merskey, 1994). This definition emphasizes the nature of pain as an experience, closely dependent on affectivity and far from being just an expression of tissue damage only. Being that emotion and pain are inseparable, attention, anxiety, and fear are powerful pain enhancers, and all methods capable of modulating them are an essential part of pain treatment. This is especially true in dentistry, where oral surgery is perceived as a stressful condition, causing a relevant increase in anxiety, expected suffering, and pain immediately before the operation (Eli, Baht, Kozlovsky, & Simon, 2000; Eli, Schwartz-Arad, Baht, & Ben-Tuvim, 2003).

The possibility of undergoing surgery with only the aid of hypnotic analgesia (HA) was perceived as puzzling in the mid-20th century

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[2]Address correspondence to Enrico Facco, Department of Medico-Surgical Specialities, University of Padua, via Giustiniani 2, 35128 PADOVA, Italy. E-mail: enrico.facco@unipd.it

(Mason, 1955; Winkelstein & Levinson, 1959): It showed that hypnosis was not a fantasy but a powerful analgesic tool, thus helping to decrease distrust of a method so disquieting and seemingly mysterious. Now, these studies is available in the literature on the features and mechanisms of analgesia in both clinical and experimental pain. Despite, however, that the neurobiology of hypnosis is far from being fully understood, these studies have shown some of the brain areas and circuits involved (Chapman & Nakamura, 1998; Chaves, 1994; Crawford et al., 1998; De Pascalis, Bellusci, Gallo, Magurano, & Chen, 2004; De Pascalis, Cacace, & Massicolle, 2008; De Pascalis, Chiaradia, & Carotenuto, 2002; De Pascalis, Magurano, Bellusci, & Chen, 2001; Faymonville, Boly, & Laureys, 2006; Faymonville et al., 2003; Goldstein & Hilgard, 1975; Kiernan, Dane, Phillips, & Price, 1995; Kupers, Faymonville, & Laureys, 2005; Rainville, 2008; Rainville, Hofbauer, Bushnell, Duncan, & Price, 2002; Schulz-Stubner et al., 2004; Sharav & Tal, 2006; Zachariae, Andersen, Bjerring, Jorgensen, & Rendt-Nielsen, 1998), as well as the differences between hypnosis and other psychological stimuli, such as mental imagery and distraction (Freeman, Barabasz, Barabasz, & Warner, 2000).

HA does not seem to be closely related to the concept of trance state, suggesting that therapeutic interventions might be tailored at least partly disregarding the depth of hypnosis (Chaves, 1994), while pain experience may be modulated at different levels, including attention, memory, and the loop between present perception and unconscious processing shaping the features of future experience (Chapman & Nakamura, 1998). HA yields significant changes in somatosensory and auditory event-related potentials, skin conductance, and phasic heart rate, showing its capability of affecting brain processing of afferent stimuli (Crawford et al., 1998; De Pascalis et al., 2001, 2004, 2008) but also seems to involve spinal antinociceptive reflexes (Kiernan et al., 1995; Zachariae et al., 1998); these effects can be extended to the posthypnotic condition (De Pascalis et al., 2008), suggesting that, in clinical practice, hypnosis might help modulate both intraoperative and postoperative pain. Neuroimaging studies have shown that HA rises through the modulation of the cingulate cortex and a large neural network involving the right prefrontal cortex, insula, presupplementary motor area, striatum, thalamus, and brainstem (Faymonville et al., 2003, 2006; Schulz-Stubner et al., 2004); a part of these areas are involved in the hypnotic modulation of consciousness, attention, and memory as well (Rainville, 2008; Rainville et al., 2002). Furthermore, HA is far from being mediated by endogenous opioids only (Goldstein & Hilgard, 1975; Zachariae et al., 1998).

The possibility of inducing analgesia via hypnotic suggestion has been explored in human experimental settings of nontrigeminal pain using electrical or laser stimuli (Croft, Williams, Haenschel, &

Gruzelier, 2002; Friederich et al., 2001; Kiernan et al., 1995; Roder, Michal, Overbeck, van de Ven, & Linden, 2007; Sharav & Tal, 2006; Watanabe, Hattori, Kanazawa, Kano, & Fukudo, 2007; Zachariae et al., 1998), the cold-pressor test (Casiglia et al., 2007; Freeman et al., 2000), or both (Crawford et al., 1998). When HA in trigeminal pain is considered, only two studies have been published so far (Houle, McGrath, Moran, & Garrett, 1988; Sharav & Tal, 2006), one using a transcutaneous electrical stimulation and the other a dental pulp stimulation (Houle et al. 1988).

The use of localized stimuli allows the study of hypnotic focused analgesia (HFA), that is, the capability of limiting the increase of pain threshold to a specific body area. HFA can be achieved with a suggestion of local anesthesia and has proved to be superior to deep relaxation and imagery in high hypnotizable subjects (De Pascalis et al., 2004; De Pascalis, Magurano, & Bellusci, 1999; Sharav & Tal, 2004). Sharav and Tal (2006) studied HFA in response to electrical stimuli applied to the face or leg; their results showed the coexistence of a localized HFA and a partial increase in the pain threshold in remote areas. They also found that HFA and generalized relaxation yielded different stimulus-response curves to stimuli of ascending intensity, without a clear relationship between them (Sharav & Tal, 2004).

Concerning the potential clinical relevance of hypnosis in orofacial pain and dentistry, there are no studies dealing with pain threshold, apart from the paper by Houle et al. published in 1988. The authors reported a stronger hypnotic effect on trigeminal pain, when compared to the cold-pressor test on the forearm. Sharav and Tal (2006) analyzed HFA in the face versus the leg, but no data are so far available on contiguous areas, such as the right and left trigeminal nerves. Furthermore, Houle et al. reported a small increase of pain threshold, similar to the one obtained with relaxation.

From the above mentioned data, one can draw the following conclusions: (a) There is still a lack of data on HA in trigeminal areas; (b) only one paper using dental pulp stimulation is available, showing a small increase in dental pain threshold; (c) dental analgesia might be strongly improved by changing the hypnotic protocol and adding HFA; (d) so far, HFA has been studied only comparing a trigeminal area to a distant one, while there are no data on homologous areas. The latter is relevant to check the selectivity of HFA. Therefore, our working hypothesis is to check the rate, intensity, and selectivity of HFA following dental pulp stimulation of both sides and its extension to the posthypnotic phase in an unselected sample of healthy subjects. Should HFA provide good analgesia in dental pulp stimulation, hypnosis would prove to be an effective tool in dental practice and able to provide anxiolysis, deep relaxation, and a partial but satisfactory analgesia—a local anesthesia without unpleasant sensation during a procedure.

Method

Subjects comprised 31 healthy volunteers (12 males and 19 females aged 28 ± 4.6 years) recruited among the students and fellows of the dental and medical schools of the University of Padua; a few of them had some specific knowledge and/or experience of hypnosis, having attended lectures on this topic by the first two authors (EF and EC). The volunteers were apprised of all details of the protocol, including that they would experience painful stimuli at the threshold level. They were, however, also in full control of the stimulation, being instructed to stop stimuli as soon as the pain threshold was reached (see below).

All the subjects were given medical and dental examinations prior to the study to check their general and oral health. Those with unhealthy teeth, restorations (such as crowns, amalgams, or composites), or any other disorder affecting sensitivity of the first premolars were discarded from the study. All the subjects were healthy and did not take any medication in the month prior to the study. The study protocol is described in Figure 1.

Measures

The pain thresholds of the right and left first premolars (RPM and LPM, respectively) were measured before and during hypnosis and posthypnosis using a Digitest^{TM} electric pulp tester (Parkell, Inc., Farmingdale, NY, USA). This device is designed to deliver short trains of square wave electric stimuli of increasing intensity up to the maximal value of 64 mA, providing a linear relationship between the intensity of stimuli and pain intensity. It acts by stimulating the closest A-alpha fibers (Narhi, Virtanen, Kuhta, & Huopaniemi, 1979), usually eliciting a tingling or burning sensation that can be perceived as discomfort,

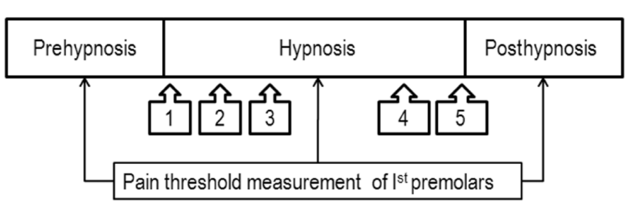

Figure 1. **Study design. The measurement of pain threshold was performed before hypnosis, during hypnotic focused analgesia (HFA) and in posthypnotic conditioning: (1) Induction of hypnosis; (2) suggestion of HFA; (3) suggestion of neglect of right low arch; (4) posthypnotic command of residual effect of local anesthesia in the right low arch; (5) dehypnotization.**

while a maximal stimulation without any sensation is considered an indication of tooth unviability.

The Digitest was set in the slow mode, increasing the stimulus intensity every 400 msec. The buccal surface of the RPM and LPM were dried to prevent any electrical contact with the adjacent teeth and gum. A small amount of electroconductive gel was applied to the tip of the probe to obtain proper contact with the tooth then the probe was applied to the center of the buccal surface of the tooth and the stimulation started. The subjects kept the ground electrode firmly in their hand and were instructed to remove it as soon as they perceived the stimuli as painful, thus opening the circuit and stopping stimulus delivery. The pain threshold was tested once in each tooth and each phase of the experiment, and the order of stimulation of the left and right teeth was randomized.

The intensity of the painful stimulus corresponding to the pain threshold was recorded and considered as its objective estimation.

Hypnosis

We attempted to produce the most effective hypnotic protocol for dental analgesia, by combining hypnosis, HFA, suggestion of neglect of the right mandibular arch, distraction, and imagery. The hypnotic induction focused on verbal suggestions for relaxation and well-being. This method had been used with success in previous experiments carried out by our research group (Casiglia et al., 1997, 2006, 2007, 2010). Through the voice of an expert hypnotist, each participant was guided toward focusing his or her attention on a single idea, excluding any other external or internal stimuli. Hypnotic induction consisted of a brief enumeration coupled with suggestions of general well-being, eyelid heaviness, regular deep breathing, and staring at a point. After spontaneous eyelid closure was obtained, participants were invited to concentrate on their own body from head to foot, while a feeling of heaviness and muscular relaxation was suggested.

The verification of hypnosis was based on signals, such as arm levitation, the easing of facial tension, a dropped lower jaw with a slight opening of the mouth, and a slowing of breathing rate (Casiglia et al., 2007). The analysis of these signals enabled the hypnotist to verify that participants were really hypnotized and to maintain or modify this condition by means of continuous, appropriate suggestions. The aim of this preparatory procedure was to establish a valid relationship between the operator and the participant and monoideism in the following experimental setting. To reduce the time needed for further inductions, a posthypnotic condition was given in all participants during this first phase.

HFA was then induced with the following protocol:

1. Induction of local anesthesia of the right mandibular arch was obtained by suggesting an inferior alveolar nerve block while touching the depression between the zygomatic arch and the mandibular notch.
2. Enhancement of HFA was obtained by repeatedly touching and scraping with a finger the right cheek over the mandible and suggesting immediately after that the perceived sensation in the right side was due to local anesthesia and was a clear sign that the right inferior teeth and gum were becoming completely insensitive.
3. Repeated suggestions of ignoring the right mandibular arch, including teeth, gum, mucosa, and skin.

After obtaining HFA, subjects were given suggestions to swim in a beautiful tropical sea and to go under water to explore the undersea coral reef and its denizens. During this task, the pain threshold of both premolar teeth was measured with the pulp tester and recorded.

Before ending hypnosis, a posthypnotic suggestion of residual analgesia was given, telling the subjects that, as in any other local anesthesia performed in dental care, he or she would have perceived numbness in the right side of the mouth after the end of hypnosis, which would spontaneously disappear in the following 20 minutes.

Results

Statistical analyses were conducted using a Shapiro-Wilks test (to check for gaussianity), Friedman test, Wilcoxon test, and chi-square test. The data were analyzed using the SPSS 13.0 program for Windows.

The baseline pain threshold was 14.6 ($SD = 6.7$) mA in RPM and 13.4 ($SD = 6.6$) mA in LPM. The upper limit of normal was estimated as a mean +3 standard deviations of values obtained from both sides, corresponding to 34.4 mA. This enabled us to classify the level of hypnotic analgesia as follows: 1 = no analgesia, if pain threshold remained at values below 34.4 mA; 2 = partial analgesia, if pain threshold was between 34.4 and 63 mA; 3 = full analgesia if no pain was perceived at the maximal stimulation of 64 mA.

There was no evidence for a Gaussian distribution of values during HFA, leading us to choose nonparametric statistical tests.

Figure 2 shows the pain threshold of RPM before hypnosis, during HFA, and posthypnosis. Most subjects had a relevant increase of pain threshold that did not completely revert to basal values after hypnosis. Figure 3 shows the boxplots of pain threshold of both teeth in the three experimental conditions. A huge increase was observed

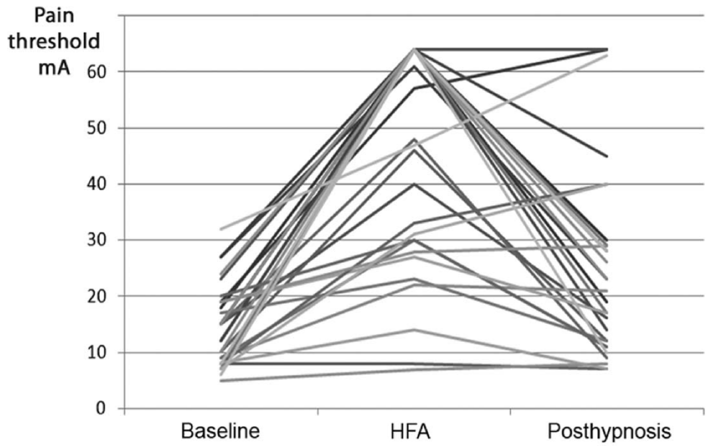

Figure 2. **Changes of tooth pain threshold in hypnotic focused analgesia (HFA) and in posthypnotic phase in each patient: Most patients show a relevant increase of pain threshold, which is not completely reverted to basal values after the end of hypnosis.**

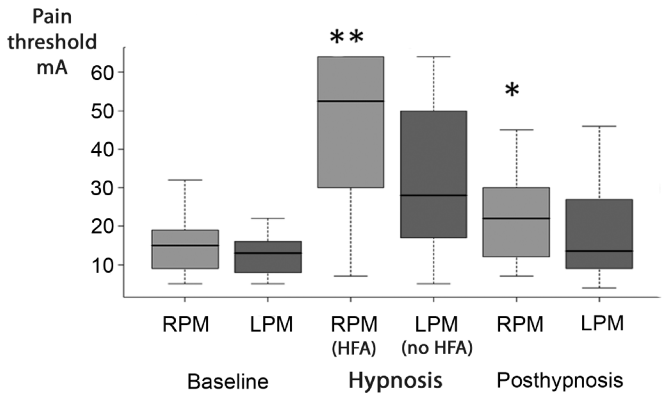

Figure 3. **Boxplots of pain threshold in right and left first premolar (RPM and LPM, respectively) in basal conditions, during hypnosis with hypnotic focused analgesia in RPM, and in posthypnotic phase: A significant increase is present in both sides during hypnosis, where analgesia is significantly higher in RPM. In posthypnotic phase, a residual increase of pain threshold persists in RPM (*$p = .03$, and **$p < .0001$; tested for baseline vs. hypnotic focused analgesia and posthypnotic phase).**

in the RPM during HFA, 46.7 ($SD = 19.7$) mA, equal to +220%; $p < .0001$. It had only partially reverted in the posthypnotic phase, where it remained significantly higher than baseline values, 26.3 ($SD = 17.7$),

Table 1
Strength of Analgesia in Hypnosis and in Posthypnotic Phase in 31 Healthy Volunteers

	Analgesia			
	Poor	Partial	Full	
Hypnosis				
RPM	11 (35.5%)	6 (19.3%)	14 (45.2%)	$\chi^2 = 7.479$, $p = .0238$[a]
LPM	21 (67.8%)	5 (16.1%)	5 (16.1%)	
Posthypnosis				
RPM	24 (77.4%)	3 (9.7%)	4 (12.9%)	*ns*
LPM	26 (83.9%)	3 (9.7%)	2 (6.4%)	

[a]tested for partial + full vs. poor analgesia.

+80%; $p = .0015$. The LPM showed a significant increase of pain threshold as well during hypnosis, 31.1 ($SD = 19.9$) mA; +132%; $p < .0001$, but it was lower than the one yielded by HFA in RPM. In the posthypnotic phase, it had reverted to 20.1 ($SD = 16.2$) (+50%), a value at the limit of significance level ($p = .054$). The difference between RPM and LPM during hypnosis was significant ($p = .02$), showing that HFA provided a stronger analgesia than hypnosis alone, while the difference between the two teeth in the posthypnotic phase was at the limit of significance ($p = .06$).

Two patients (6.4%) showed bilaterally full analgesia, 3 (9.7%) had full analgesia in LPM and only a partial one in RPM, while 1 developed partial analgesia on LPM only. In the three cases with full RPM analgesia, the LPM showed a partial analgesia with pain threshold in the range of 50–61 mA.

Fourteen out of 31 subjects (45.2%) developed full HFA, since they did not perceive any pain at maximal pulp tester stimulation, and 6 (19.3%) a partial analgesia, while for the remaining 11 (35.5%) the pain threshold was only slightly changed (Table 1). The difference between RPM and LPM was significant during hypnosis only ($p = .0238$).

Discussion

Pain is a very complex and subjective phenomenon; the experiential definition of pain, according to the IASP, avoids tying pain to the stimulus and the induced activity of nociceptive pathways (Merskey, 1994). If the essence of pain is experience, hypnosis may have great potential for its modulation, no less than analgesic drugs, and it is not surprising that it has been increasingly advocated for both acute and chronic pain control in recent years.

Hypnosis, being able to decrease or abolish both anxiety and pain perception, has great potential in both pain therapy and dentistry. Furthermore, it promises to be a truly analgesic tool preventing hemodynamic stress responses yielded by painful stimuli (Casiglia et al., 2007) and not simply by providing dissociation from the pain experience. However, its effectiveness may depend both on a subject's hypnotizability and the chosen hypnotic protocol, where HFA has proven superior to hypnosis alone. As a result, administered words, suggestions, and scenarios in hypnosis behave like different drugs and their doses in pharmacological therapy.

The experimental pain following dental pulp stimulation has some specific anatomic and physiologic features with respect to a cold-pressor test and electrical stimulation of nerves from the skin, which may yield different results. Houle et al. (1988) already emphasized that electrical stimulation to the teeth activated predominantly small fibers and produced brief pain sensations, while the cold-pressor test activated a variety of nociceptive and nonnociceptive fibers. Quantitative studies on tooth innervation have shown that human premolars receive about 2300 axons at the root-apex, of which about 13% are myelinated (mainly A-alpha fibers) and 87% are nonmyelinated fibers; the former conduct impulses perceived as a short, localized sharp pain, while the slow-conducting C-fibers mainly transmit impulses experienced as dull, poorly localized, and lingering pain (Nair, 1995). Instead, when transcutaneous stimulation is used on the mental nerve, as in the 2006 Sharav and Tal study, a conduction velocity of about 65 m/second is recorded (Colin, 1997), which reflects the activity of large myelinated sensory fibers of the alveolar nerve, while only in supramaximal stimulation are the slower A-alpha and C fibers added to the afferent volley. Since transcutaneous electrical stimulation and electroacupuncture have shown analgesic effects (Erdogan, Erdogan, Erbil, Karakaya, & Demircan, 2005; Schafer, Finkensiep, & Kaup, 2000; Solak et al., 2009; Xu et al., 2003), and acupuncture analgesia involves opioid peptides (Han, 2004), pain obtained by cutaneous stimulation of the inferior alveolar nerve is qualitatively different from the one obtained by dental pulp stimulation. In fact, the former yields a mixed sensory and painful perception, where the input from large myelinated fibers might differently affect pain perception modulating the gate control and neuromatrix (Melzack, 1999).

Houle et al. (1988) reported a 22% mean increase of dental pain threshold, with no differences between hypnosis and relaxation. Sharav and Tal (2006) studied HFA following stimulation of the inferior alveolar or sural nerve while administering analgesia in the same area or the remote one. They showed that HFA was mostly confined to the area aimed at, but some spread of analgesia could occur. However, in their study only the overall level of analgesia was reported and the strength of HFA in the trigeminal area could not be extrapolated; as a whole, HFA was anyway able to decrease pain intensity by 39.8% in local area and 26.0% in the remote one of high hypnotizable subjects, while it decreased 19% and 14%, respectively, in low hypnotizable subjects.

The aim of the present study was to check the analgesic power of hypnosis on tooth pain, an essential aspect of its potential use in orofacial pain and dentistry. Therefore, we tried to elaborate the most effective hypnotic protocol and checked it in unselected healthy subjects, in order to evaluate the rate and strength of HFA regardless to their hypnotizability: This is a methodological limitation when studying the mechanisms of hypnosis, but is a good choice when the aim is to check the overall effectiveness and feasibility of hypnosis in dental clinical practice. HFA was induced in the attempt to obtain the maximal analgesic effect and to provide further data on its selectivity: This was achieved by analyzing it in two very close homologous areas of the two sides, namely RPM and LPM, distant less than 5 cm from each other. We tested each tooth once during each phase of the experiment in order to avoid possible changes in pain threshold yielded by repeated stimulation. The lack of Gaussianity of our results was probably due to a kurtosis of distribution yielded by the ceiling of the maximal available pulp tester stimuli during hypnosis, thus calling for a nonparametric statistical analysis.

The bilateral huge increase of pain threshold during hypnosis observed in our subjects, which was significantly higher where HFA was applied, confirms the analgesic power of HFA as well as its partial selectivity. The contralateral increase of pain threshold may be due to a general analgesic effect of hypnosis yielded by our protocol and/or to a spread of HFA to the contralateral site. The latter has reasonably occurred in cases with bilateral full analgesia or higher threshold in LPM than RPM: It may be due to both the spread of analgesia and/or decreased discrimination of the right and left side. HFA also allows for a partial increase of pain threshold in the posthypnotic phase, suggesting that hypnosis may help improve the postoperative pain in clinical practice.

The increase of a pain threshold in our study was much higher than in previous reports (Benhaiem, Attal, Chauvin, Brasseur, & Bouhassira, 2001; De Pascalis et al., 1999; Houle et al., 1988; Sharav & Tal, 2006), being its mean value increased 132% in the contralateral side and 220% in the HFA, with about two thirds of cases showing a partial or full analgesia (45.2% with no pain at maximal stimulation and 19.3% with pain threshold raised above 34.4 mA). These differences may be due to (a) sample variability, (b) method for pain evaluation, and (c) hypnotic protocol. Unlike other studies, we have measured only the pain threshold (defined by the pulp tester intensity of stimulus), while other authors have analyzed pain tolerance using the visual analogue scale or other parameters, making hard a direct comparison with these series. We chose to check the pain threshold in order to assess at which extent HFA can prevent pain perception, while in patients with full analgesia the search for pain intensity and tolerance is meaningless.

The hypnotic protocol may influence HFA with different suggestions, each of them with its own potential. Previous studies have shown that HFA is superior to imagery, distraction, and other suggestions. HFA looks to work in an opposite way in respect with distraction: In fact, it calls for increasing instead of decreasing the attention to the body area where analgesia is to be obtained, in order to change its sensitivity (e.g., suggesting numbness and/or insensitivity). Anyway, both distraction and HFA are helpful to get analgesia, with different modalities and probably exploiting different brain mechanisms (De Pascalis et al., 2008; De Pascalis et al., 1999; Friederich et al., 2001): If so, HFA, distraction of attention, dissociation, and imagery, despite different, might not necessarily be incompatible tools. We elaborated our hypnotic protocol in the attempt of obtaining the maximal analgesic effect, by combining all these hypnotic tasks all together: After induction of hypnosis and HFA, the subjects were asked to withdraw the attention from the right part of the mandible and to behave as if it no longer exists; in other words, we used a sequence of focused attention to get analgesia, followed by inattention from the anesthetized part. Once we reached this stage, the attention was further distracted, engaging the subjects in a pleasant task, that is, swimming undersea in a silent environment completely separated from ordinary life, where they might admire the coral reef and undersea life. Of course, we cannot check the relevance of these different components in the development of but only the effects of their combination, which provided a significant increase of pain threshold or full analgesia in about two thirds of cases.

Our data suggest that hypnosis may be a powerful tool, able to modulate trigeminal pain and to improve the quality of care in dentistry. Further studies on the somatic reaction and stress induced by dental pulp stimulation are required (study in progress), in order to confirm the previous results by Casiglia et al. on hypnotic prevention of cardiovascular response to cold-pressor test pain (Casiglia et al., 2007): Should hypnosis prove to be able to block brain processing of pain and to protect patients from surgical stress (instead of simply dissociating from pain perception), it should be considered as a real analgesic tool, standing the comparison with pharmacological sedation. Finally, the pulp tester is a very simple and cheap device, which might be introduced to get a direct measure of subject's analgesic capability, instead of indirectly estimating it from hypnotizability.

In conclusion, hypnosis is a powerful analgesic tool, able to provide a strong increase of dental pain threshold in the majority of cases. HFA yields a significant increase of pain threshold in the target area when compared to homologous contralateral teeth. Therefore, the use of hypnosis in the dental setting may allow for withdrawal of pain related to local anesthesia as well as any other unpleasant sensation during the operation, besides providing deep relaxation and anxiolysys.

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Effekte hypnotisch fokussierter Analgesie auf die Zahn-Schmerz-Schwelle

Enrico Facco, Edoardo Casiglia, Serena Masiero, Valery Tikhonoff, Margherita Giacomello und Gastone Zanette

Zusammenfassung: Die Häufigkeit, Intensität und Selektivität hypnotisch fokussierter Analgesie (HFA) wurde mithilfe einer Zahnmark-Stimulation überprüft. 31 gesunde Versuchspersonen wurden hypnotisiert und hypnotische Suggestionen zur Analgesie des rechten Mandibularbogens wurden verabreicht. Zudem wurde die posthypnotische Suggestion zur fortwährenden Analgesie gegeben. Die Schmerzschwelle der ersten Backenzahns wurde vor, während und nach Hypnose mithilfe eines Zahnmarktesters bilateral gemessen. Während Hypnose stieg die Schmerzschwelle beidseitig signifikant an ($p<.0001$). Die rechte Schmerzschwelle war auch posthypnotisch signifikant erhöht ($p<.0015$) gegenüber der Basisbedingung.

Ralf Schmaelzle
University of Konstanz, Germany

Les effets de l'analgésie hypnotique sur le seuil de tolérance à la douleur dentaire

Enrico Facco, Edoardo Casiglia, Serena Masiero, Valery Tikhonoff, Margherita Giacomello et Gastone Zanette

Résumé: La fréquence, l'intensité et la sélectivité de l'analgésie hypnotique (AH) ont été mises à l'essai par voie de stimulation de la pulpe dentaire. Trente-et-un sujets en bonne santé ont reçu des suggestions hypnotiques d'anesthésie de l'arc mandibulaire droit. Ils ont également reçu une suggestion posthypnotique d'analgésie continue. Le seuil de tolérance à la douleur de la première prémolaire a été mesuré bilatéralement avant, durant et après l'hypnose à l'aide d'un appareil de vérification de la pulpe dentaire. Durant l'hypnose, le seuil de tolérance à la douleur a augmenté de façon significative ($p < 0,0001$) des deux côtés. Après l'hypnose, le seuil de tolérance à la douleur du côté droit était plus élevé que l'état basal.

JOHANNE REYNAULT
C. Tr. (STIBC)

Efectos de la analgesia focalizada por hipnosis en el umbral de dolor dental

Enrico Facco, Edoardo Casiglia, Serena Masiero, Valery Tikhonoff, Margherita Giacomello, y Gastone Zanette

Resumen: Se evaluó el nivel, intensidad, y selectividad de la analgesia focalizada hipnóticamente (HFA) mediante la estimulación de pulpa dental. Se hipnotizó a treinta y un sujetos sanos, y se impartieron sugerencias hipnóticas de analgesia en el arco mandibular derecho. También se incluyó una sugerencia posthipnótica para que persistiera la analgesia. El umbral de dolor para el primer premolar se midió bilateralmente antes, durante, y después de hipnosis utilizando un vitalómetro. Durante hipnosis, el umbral de dolor incrementó significativamente ($p < .0001$) para ambos lados. El umbral de dolor derecho posthipnótico también fue significativamente mayor ($p < .0015$) que en la condición basal.

OMAR SÁNCHEZ-ARMÁSS CAPPELLO
Autonomous University of San Luis Potosi, Mexico