

Influence of Hypnotic Suggestions to Increase Periodontal Patients' Compliance

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ABSTRACT

Objective: To evaluate the effectiveness of hypnosis 1) to reduce dental anxiety in periodontal patients, and 2) to increase periodontal patients' compliance through the reduction of dental anxiety. **Methods:** This was a randomized control trial of 22 patients (13 males, 9 females; 40.14 ± 19.59 years) who underwent non-surgical periodontal therapy in the Postgraduate and Undergraduate Clinics. Patients were divided into the case, H, (hypnosis; $n=11$) and controlled, N, (no hypnosis; $n=11$) groups, where patients' dental anxiety level was assessed twice for both groups using IDAF-4C+ during the first visit and the second visit. The compliance was evaluated during the follow-up visit. **Results:** The result showed statistically significant differences ($p < 0.05$) in the H group during the second visit indicating a reduction in dental anxiety as compared to N group. However, there were no statistically significant differences ($p > 0.05$) in the pattern of reduction of blood pressure between both case and control groups. Based on the heart rate, patients were found to be more relaxed with hypnotherapy at the beginning of the treatment but halfway through, patients without hypnotherapy had a more significant reduction in heart rate level. **Conclusion:** Hypnotic suggestions were found to help reduce patient's fear and anxiety. However, the compliance of the patients with or without hypnotherapy proved to have a similar outcome.

Keywords: hypnosis; hypnodontics; dental anxiety; audio distraction; periodontal treatment

INTRODUCTION

Successful dental treatment may be gratefully influenced by the patient's compliance, despite all the revolutionary advances in the fields of dentistry, it remains as one of the main contributing factors (Gokulanathan et. al., 2014). Compliance could be defined as the extent to which a person's behaviour coincides with medical or other health-related advice. It reflects a patient's willingness to comply with preventive and therapeutic strategies set forth by his or her health care provider (Alcántara et. al., 2014). Many factors have been reported as the possible influence of patient's compliance (Alcántara et. al., 2014).



One of the factors is a person's perception of his or her vulnerability to disease (Armfield et. al., 2007). In other words, if the patient perceived the disease to be less life-threatening, the compliance rate will be higher. Other factors include the cost-benefit ratio of preventive care versus treatment needed, the perception of the importance of patient's participation in the implementation of preventive and therapeutic strategies, the socioeconomic class of the patient, and poor communication between the oral health care provider and the patient (Alcántara et. al., 2014). This is similar to a report by Freeman (1990), where he mentioned the main four groups of barriers to compliance, (i) dental anxiety, (ii) financial costs, (iii) perceptions of need and, (iv) lack of access (Freeman, 1999). Dental anxiety was reported as one of the most important factors in determining a person's attitude towards dental care, as high levels of anxiety could lead to the abandonment of necessary dental care, which eventually impacts oral health and the quality of life negatively (Elkins, 2007). And for most dental patients, periodontal therapy is anxiety-inducing dental treatment and very expensive (Appukuttan, 2016). Which resulted in most of them deciding not to return for follow up.

Periodontal therapy is a therapy that includes both surgical and non-surgical techniques to restore health to the supporting structures of the teeth such as the gingiva and alveolar bone to avoid tooth loss (Van der Weijden et. al., 2019). As reported by Liu et. al., a high level of dental fear had been associated with patients undergoing periodontal therapy (Liu et. al., 2015). It was further reported that periodontal therapy usually consisted of multiple long treatments, and patients were subjected to a fearful situation that aggravated their dental anxiety. Studies had shown about 71% of patients had dental fear associated with periodontal therapy, and 12.1% of patients had extreme fear during treatment. Thus, the feeling of discomfort or pain during the procedure caused by constant fear might have negative effects on clinical outcomes, resulting in poor oral health. Periodontal health will deteriorate resulting from poor patient's compliance towards treatment due to dental fear (Beaton et. al., 2013).

According to Appukuttan (2016), there is no one-single therapy that could manage anxiety as there are multiple contributing factors that could lead to this psychological behavior (Appukuttan, 2016). Previous studies had reported that dentists had used many ways to tackle dental anxiety and related problems (Agras et. al., 1969; Alcántara et. al., 2014; Appukuttan, 2016; Beaton et. al., 2013; Freeman, 1999; Liu et. al., 2015). Both pharmacological interventions such as the use of nitrous oxide and/or non-pharmacological interventions, to provide distraction and relaxation to the patient were used (Agras et. al., 1969; Alcántara et. al., 2014; Beaton et. al., 2013; Freeman, 1999; Liu et. al., 2015; Mendoza et. al., 1991). Most of the methods had worked tremendously well in managing dental anxiety.

The first visit is very important as it could give an idea about the presence of the patient's anxiety and fear, this could be evaluated subjectively or objectively (Appukuttan, 2016; Corah, 1969). Calm, continuous conversation helped the dentist to identify the source of anxiety and fear that the patient is having (Appukuttan, 2016). Besides, asking open-ended questions can direct the dentist to establish a patient's reasons for attending, such as, the events that happened during the previous dental treatment, what had been troubling them regarding the treatment, and their hopes. Corah's Dental Anxiety Scale (CDAS), Modified Dental Anxiety Scale (MDAS) are commonly used, dependable, and valid to assess the level and cause of anxiety (Armfield, 2011; Corah, 1969; Humphris et. al., 1995). However, each of the anxiety scale questionnaires has its shortcomings and is not considered as the gold standard. The major limitation of CDAS is anxiety towards local anaesthesia injection is not included (Corah, 1969). These anxiety scales have different cut-off points that affected the prediction of consequences such as fear of loss of control, avoiding the dentist owing to fear and problem-oriented visiting (Armfield, 2011).

One of the methods used to overcome dental anxiety is hypnosis. There were many types of research done on the use of hypnosis in Dentistry for the past decades (Patel et. al., 2000). According to Bryant (2006), hypnosis was defined as a state or condition of mind connected to deep relaxation, narrowed focus, and increased suggestibility (Bryant & Mabbutt, 2006). It is an intermediate state between sleep and wakefulness. The term "hypnosis" is referred to as the interaction between a "hypnotist" and the "subjects". The hypnotist attempts to affect and influence the subjects' perceptions, feelings, and behaviour by focusing on ideas and images that may evoke the intended effects which can be used to provide relaxation (Appukuttan, 2016). As reported by Patel, dentists who use hypnosis regularly in their clinical practices experience some significant advantages (Patel et.

al., 2000). Currently, the most common uses of hypnosis in Dentistry are to reduce anxiety and fear encountered when attending a dental visit, and, for behavioural management in Paediatric dental patient (Glaesmer, Geupel, & Haak, 2015). Other dental applications of hypnosis include bleeding and saliva control, gagging control, physical and psychological adjustment to new prostheses and control of parafunctional habits such as bruxism (Kroger, 2008).

Despite the many applications of hypnosis in the past years, there are still many misconceptions and misunderstandings of hypnosis. According to Crawford (1992), some claim that hypnosis is insidiously coercive (Crawford et. al., 1992). While Kroger (2008) reported that some even relate hypnosis to witchcraft and anti-scientific and, therefore antithetical to evidence-based clinical practice (Kroger, 2008). Moreover, Malamed (2018) pointed out that some had suggested that those who are susceptible to hypnosis are only less than 25%, although the percentage of patients influenced by hypnosis when used clinically was higher (Malamed, 2018).

Despite being a very safe practice, inexpensive, poses minimal risk, an adverse reaction to the patient, minimal studies were found on hypnotherapy use in dental settings (Bryant & Mabbutt, 2006). Most of the studies were done on paediatric patients whose dental anxiety experience was as stated before. However, it should not be used in persons or patients diagnosed with mental health problems, personality disorders, and neurodegenerative disorders for fear of potential adverse reactions to patients' mental health conditions (Appukuttan, 2016). There were a minimum number of studies testing the effect of hypnosis on adult patients seeking periodontal treatment. There was one earlier research conducted by Wood et al. in 1999 about the use of hypnotherapy in periodontal patients. A widely used comprehensive hypnosis reference by Hammond in 1990 did not mention periodontal diseases at all (Kelly et. al., 1990).

In the present study, hypnosis was used as an adjunct to reduce anxiety during periodontal treatment and to increase patient compliance. The many uses of hypnosis in Dentistry that have been described in the literature have targeted Paediatric patients and few references have been made specifically about the application of hypnosis to patients who had periodontal diseases. The current study concentrated on the use of hypnosis on the periodontal patient to tackle dental anxiety that affects the patient's compliance.

MATERIALS AND METHODS

This was a randomized clinical trial carried out for 10 months from February 2019 until December 2019 at the Faculty of Dentistry Universiti Teknologi MARA (UiTM). Ethical approval was obtained from the Ethics Committee of Universiti Teknologi MARA (UiTM) Shah Alam. Twenty-two (n=22) patients were selected from the undergraduate students and postgraduate students at the Centre of Periodontology Studies in UiTM; specifically, patients who underwent nonsurgical periodontal treatment such as scaling and root debridement were invited to participate. The purpose of the study was explained and written consent was obtained from participants.

The participants were randomly assigned into a) control, N (n=11), and, b) case, H (n=11) groups.

All participants were asked to complete Corah's Dental Anxiety Scale (CDAS) (Figure 1) to assess the pre-operative anxiety level before the commencement of periodontal surgery. Only participants with score ≤ 18 were included in this study. Score 18 was chosen because it is the maximum score for someone to be classified as fairly anxious. (Corah et al., 1978) Those with a score of 19 or beyond were considered highly anxious dental patients and therefore, they were excluded from this study.

Participants included in this study were; (i) individuals between 18 and 45 years, (ii) patients with CDAS ≤ 18 , (iii) patients requiring non-surgical periodontal therapy, and (iv) patients who agree to participate in this study. The exclusion criteria were; (i) patients who did not consent to participate in this study, (ii) patients who are deaf, and (iii) patients who are highly anxious.

Haemodynamic variables, systolic blood pressure (SBP), diastolic blood pressure (DBP), and heart rate (HR) were recorded pre-, intra-, and postoperatively. The participants' SBP (mmHg), DBP (mmHg), and HR (bpm) were measured using a digital blood pressure sphygmomanometer for both control and case group.

Control group, N

1. BP and HR were recorded four times throughout the process, where:

T0 = when they sat on the dental chair

T1 = during the administration of local anaesthesia (if any)

T2 = 20 minutes into the periodontal procedure, which is at the same time of post-hypnotic suggestions given to the hypnosis group

T3 = after the completion of the periodontal procedure

Case group, H

1. BP and HR were recorded four times (Tx) throughout the process, where:

T0 = before induction

T1 = during distraction manipulation

T2 = end of post-hypnotic suggestion

T3 = after completion of treatment and after awakening

For the case group, hypnosis was pre-recorded by a qualified hypnotherapist. The pre-recorded recordings of hypnotherapy were played throughout the periodontal treatment. The recording consists of all stages of hypnosis, (i) induction, (ii) manipulation of distraction, (iii) deepening, (iv) ego-strengthening, (v) homework, and (vi) awakening. The control group was not offered any form of hypnotherapy or other forms of relaxation.

During the second visit, a second IDAF-4C+ questionnaire was given to once again measure anxiety level and to observe any improvement from the first visit. The patients' compliance was assessed by their attendance and feedback and for those who underwent hypnotherapy, their conformation towards the post-hypnotic suggestions given to them previously.

STATISTICAL ANALYSIS

Data management and statistical analysis were done with IBM SPSS Version 25. Independent Sample T-Test was used to analyse the data to find out the differences between the means of each group; case and control group, interventions are done on each group and the change of scores in the IDAF-4C+ questionnaire. The means between two unrelated groups were compared on the same continuous and dependent variable.

RESULTS

A total of 35 patients were approached to participate in this study and 22 met the inclusion criteria. **Table 1** shows a comparison of the number of patients between the two genders. The number of male patients slightly outnumbered females, and these numbers did not affect the validity of the results. The number of patients that undergone scaling was 72% (n=16), which was doubled as compared to patients that undergone SRD (**Table 2**).

Table 1: Demographic characteristics of patients

Variable	n (%)
Gender	
Male	13 (59)
Female	9 (41)

Table 2: Type of treatment received by periodontal patients

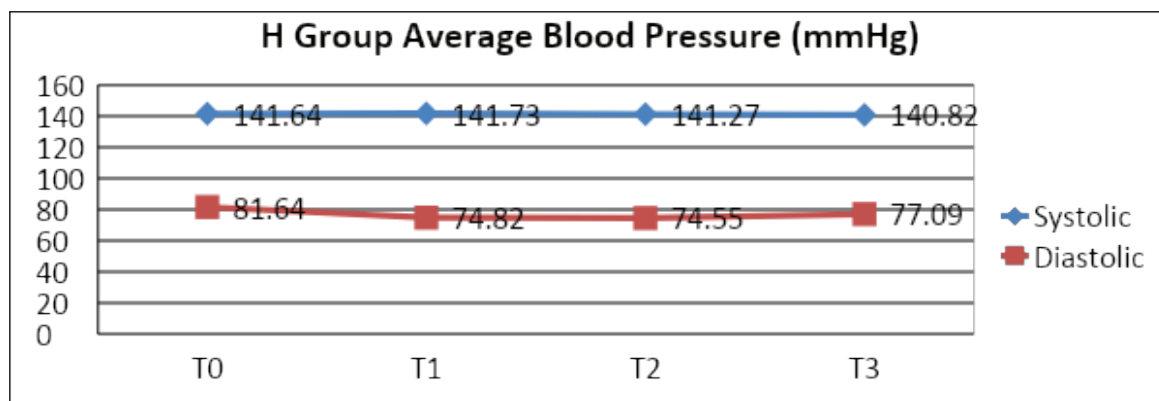
Type of treatment received	n (%)
Scaling	16 (72)
Scaling & root debridement (SRD)	6 (28)

The cumulative score of the questionnaire ranges from 8 to 40. The score can also be calculated by averaging the total score (range: 1-5). The mean value of pre- and post-IDAF-4C⁺ differs in the H group and N group, which were provided in **Table 3**. In the H group, the mean total score greatly reduced from 23.55 to 18.57. However, the score for the N group slightly increased from 24.36 to 25.75 (95% CI = -3.68 - 5.32). Although the value of pre-IDAF-4C⁺ for both groups was similar, post-hypnotic suggestions that were given to the H group was proven to be effective ($p < 0.05$) as the mean total score was reduced, as compared to N group.

Table 3: Mean score of IDAF-4C⁺

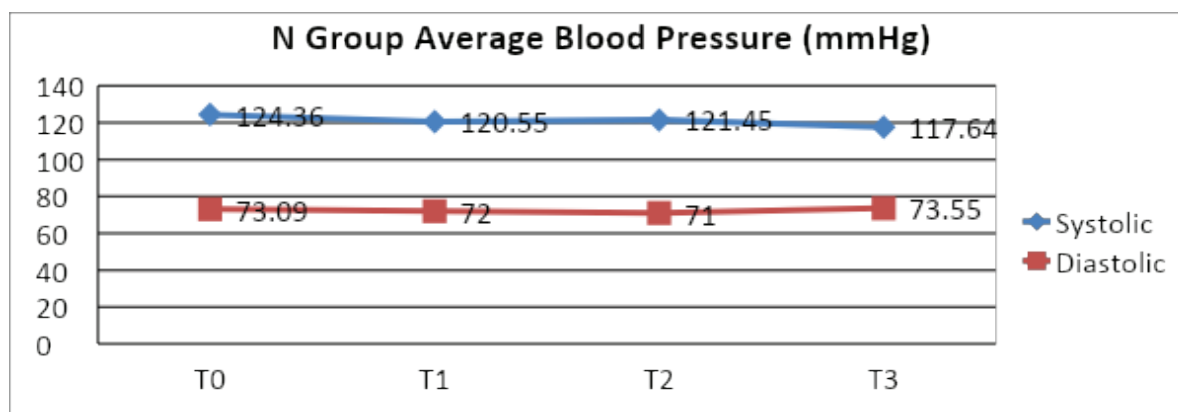
	H Group	N Group
Pre-IDAF-4C ⁺	23.55	24.36
Post-IDAF-4C ⁺	18.57	25.75

Average blood pressure measured for the H group was shown in **Graph 1**. During the transition between T0, T1, and T2, the systolic blood pressure gave a constant mean reading of 141 mmHg (95% CI = -29.37 - 3.82). Towards the end of the treatment, where the last blood pressure was taken, the reading slightly dropped to 140 mmHg. There was more reduction seen in diastolic blood pressure between T0 and T1, and the reading slowly climbs up to 77 mmHg towards the end (95% CI = -17.85 - 0.76).



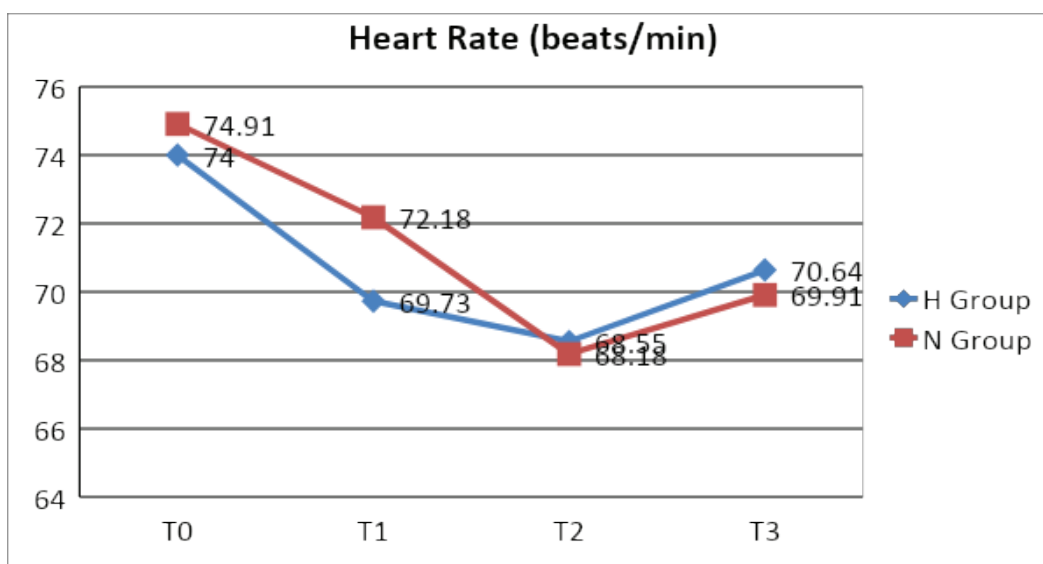
Graph 1: H group average blood pressure (mmHg)

Graph 2 shows the average blood pressure for the N group. The systolic blood pressure slightly fluctuates during treatment. Blood pressure between T0 and T1 reduced from 124 mmHg to 120 mmHg, but slightly increased to 121 mmHg between T1 and T2 (95% CI = -38.15 - 3.60). The reading then decreased to 117 mmHg during T3. Diastolic blood pressure was continuously reduced to 71 mmHg throughout T0 to T2. The reading was elevated to 73 mmHg during the last blood pressure reading (95% CI = -17.81 - 0.72).



Graph 2: N group average blood pressure (mmHg)

Graph 3 shows the average heart rate of the H and N groups. Heart rate for both groups started at a similar reading, which was 74 beats/min (95% CI = -9.40 - 11.21). As the treatment was carried out, the heart rate dropped to 68 beats/min. A higher amount of drop was recorded for the r N group ($p > 0.05$). After the treatment was completed, the heart rate of H and N group increased to 70 and 69 beats/min respectively ($p > 0.05$). There were no statistically significant differences ($p > 0.05$) in the pattern of reduction of blood pressure between both groups N and the patient's attendance for the second follow up visit determined the patient's compliance towards the treatment, as shown in **Table 4**. An equal number of patients who were compliant and not compliant were recorded for both groups, which were $n=9$ (81%) and $n=2$ (19%) respectively.



Graph 3: Average heart rate for H and N group

Table 4: Patient's attendance for second visit

Patient's Compliance	n (%)
H Group	
Compliant	9 (81%)
Non-compliant	2 (19%)
N Group	
Compliant	9 (81%)
Non-compliant	2 (19%)

DISCUSSION & CONCLUSION

American Psychiatric Association (2015) described stress as “*A state of complete physical, mental and social well-being and not just the absence of sickness or frailty*”. Since anxiety could lead to many complications, some interventions are necessary to help lessen the adrenaline rush (American Psychological Association, 2015). Hypnosis or hypnotherapy has been suggested as one of the methods to reduce the anxiety and help patients cope with the treatment (Appukuttan, 2016).

The experience in periodontal therapy is not usually life-threatening procedures. However, invasive procedures using a hand instrument or scaler, and post-operative pain and recovery could trigger dental anxiety (Croog SH, Baume RM, & Nalbandian, 1995). The administration of local anaesthesia during procedures is one of the anxiety factors. Also, Astramskaitė et al. (2016) agreed with the study done by López-Jornet et al. (2014) that the block type local anaesthesia is triggering more anxiety than infiltrative injection (Astramskaitė et. al., 2016; López-Jornet et. al., (2014).

Hypnosis is a useful adjunctive therapy in Paediatric dentistry (Smith, 1965). It is particularly indicated in the control and management of emotionally disturbed children who require dental work. However, little evidence revolve around adult patients. This is because children are often in a self-hypnosis state during imaginary play,

which occurs several times in a day-causing them to be more susceptible to hypnosis than adults. Imagining and pretending is an integral part of a child's play, and for most children, an altered state of consciousness is familiar, comfortable, and easy to achieve. Children are usually very open to hypnosis because they have fewer misconceptions, and probably have never seen or heard of stage hypnosis (Smith, 1965).

Based on the difference of IDAF-4C+ score between the first and second visits of the two groups, hypnotherapy on patients who underwent non-surgical periodontal therapy did affect reducing the dental anxiety of the specified treatment. Interestingly, patients who were treated without hypnotherapy were found to have an increase in their dental anxiety level. Verbal feedback was also obtained from the patients' post-treatment, and patients who underwent hypnotherapy reported to have more positive feedback in comparison with N. However, although there was a reduction of dental anxiety for H, compliance of the patients was similar in both groups. Therefore it could be concluded, hypnotherapy was found not to have a statistically significant difference in improving periodontal patients' compliance to a dental appointment.

According to the change of pattern in blood pressure, there was no significant reduction or difference in either group. The value and reading of blood pressure for H were higher which is in contrast to reports by previous studies on hypnotherapy than N (American Psychological Association, 2015). This could be due to the presence of existing medical illnesses such as high blood pressure. At certain times, there was a sudden increase in blood pressure reading for both groups where it doubled from the previous reading. This was because the patients' arm was slightly bent during the process of recording the blood pressure value, leading to an inaccurate measurement. Based on these findings, blood pressure solely could not determine the impact of hypnotherapy in dental anxiety reduction.

As for heart rate, during the initial treatment, the H group was found or appeared to be more relaxed. However, after half of the treatment was carried out, N group recorded lower heart rate reading than H. The heart rate increased for both groups after the treatment (T3), possibly due to the patient being aware of the end of the treatment and specifically for H, due to the awakening process of hypnotherapy. Another possibility could be due to a change of posture from supine to an upright position.

The total number of patients approached was 35 however 11 were excluded due to not meeting the inclusion criteria and another two did not give their consent. Thus, the total number of patients involved in the study was 22. However, this still did not meet the initial calculated sample size of the study which was 60. For H, the recording they were exposed to was voiced by a trained professional. The questionnaire used to measure the dental anxiety level was available in two languages, namely English and Malay and has been approved for its validity and reliability (Croog SH, Baume RM, & Nalbandian, 1995).

There were some problems encountered during data collection that could have affected the study. Among it, is the first few patients complained that the sound of the ultrasonic scaler was too loud and it interfered with the recording heard through the headphones. This problem was solved by purchasing noise-canceling headphones. Other than that, the patients' preconceived idea or mindset towards hypnosis was also a problem. Some patients doubted the effectiveness of hypnosis even before the hypnotherapy. Therefore, before conducting the research, a brief explanation was given to all the patients about the definition of hypnotherapy in dentistry, the common misconceptions of hypnotherapy, and the expectation of the patient during the hypnotherapy. Besides that, the environment played a huge role in the success of hypnotherapy. The undergraduate clinic was very noisy compared to the postgraduate clinic which interferes with the focus of some of the patients. Constant instructions by the operator during the hypnotherapy also had a similar outcome. Thus, the operator was advised to minimize as much communication with the patient as much as possible unless when necessary.

There were few studies done on the effect of hypnotherapy on periodontal patients in the past. A systematic review conducted in 2013, concluded the effectiveness of hypnosis was demonstrated but, there was a lack of clinical studies as evidence. Hence, the clinical results of this study could not be compared with previous hypnosis-related studies.

In conclusion, hypnotic suggestions were found to help reducing patient's fear and anxiety. However, the compliance of the patients with or without hypnotherapy proved to have a similar outcome. In the future, it is recommended that more studies were to be done on the effects of hypnotherapy on periodontal patients' compliance with a larger scale of participants.

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