

Role of Hypnosis in Dental Treatment: A Narrative Review

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ABSTRACT

Aim: This narrative aims to outline the use of hypnosis in managing dental anxiety in during dental treatment. The PICO used to answer the objectives are (P) dental patients, (I) hypnosis, (C) conventional behaviour management techniques & (O) reduced pain/anxiety. **Materials and Methods:** An electronic search of three databases; PubMed, Scopus and EBSCOhost was conducted using the keywords “hypnosis or hypnotherapy” AND “dentistry or dental” between the year 2000 and 2020. A total of 19 studies were selected based on eligibility. Data extracted were study subject, design of study, parameters used to assess, type of hypnosis script used and the study outcome. **Results:** The studies show that hypnosis is effective in pain management and dental anxiety. It can also be used for improving compliance in patients who are wearing orthodontic appliances (Traklyali *et al*, 2008) and reducing salivary flow during dental treatment (Satzl *et al*, 2014). **Conclusion:** Hypnosis has the potential to be a useful tool in the management of children and adults.

KEYWORDS: Dental anxiety, dental pain, hypnosis, hypnotherapy

INTRODUCTION

Dental anxiety refers to an elevated fear of dental procedures, an emotional or physical state which occurs before the encounter with an object or procedure.^[1,2] The prevalence of dental anxiety is thought to be between 10% and 20%, but there have been studies which found up to 58% of patients having anxiety toward dental treatment.^[1,3] Anxiety is of great concern for dentistry as it is considered an oral health problem, which can result in avoidance of dental treatment and eventually leading to a higher prevalence of untreated dental diseases.^[1] This essentially leads to a vicious cycle of dental anxiety that causes delay in visiting the dentist, which in turn worsens the dental problem and the behavior of symptom-driven treatment feeds back into the fear experience.^[4] In short, dental anxiety can be detrimental to the patient’s oral health and should be addressed as soon as it is detected.

In the context of dental fear and anxiety, one can never ignore the topic of pain. Although pain has a clear physiological process which is the pain pathway,

it also has a strong cognitive component. This means that a person who already has dental anxiety may have an exaggerated pain perception and experience.^[5] Similarly, pain has been established as the a reason for dental anxiety and it has the potential to create a negative dental experience.^[2]

Conventional nonpharmacological behavior management techniques have been used to manage patients with dental anxiety and improve pain tolerance.^[6] Among the vast list of techniques, which ranges from effective communication to protective stabilization, and old but less used technique lies hidden away, which is hypnosis. Although it has been recognized as a useful tool in dentistry, this technique is underused and a reason for this may be the lack of knowledge among dentists about this therapy.^[7]

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The basis on which hypnotherapy works is getting the patient into an altered state of consciousness, a state whereby the patient is more relaxed and more receptive to suggestions. The response during a hypnosis session is not brought about by the practitioner but it is elicited by the patient's own will. The definition of suggestion as stated by Heap and Aravind^[8] is comprehensive and concise:

“A communication conveyed verbally by the hypnotist, that directs the subject's imagination is such a way as to elicit intended alterations in sensations, perceptions, feelings, thoughts and behavior.”

People are frequently experiencing hypnosis in their daily lives without even realizing it. Daydreaming is a perfect example of how we are able to be alert to our changing surroundings while being in a state of altered consciousness.^[8] In fact, many dentists already practice some form of hypnosis by using the right language and positive reinforcement which we have been taught to do and this is referred to as the “chairside manner.” The intonation and words used when dealing with a patient is capable of providing a relaxed state even without formal hypnotic induction.^[9] Hypnosis can be used on its own or as an adjunct to other available behavior management techniques. The use of suggestions makes it suitable for use with nitrous oxide inhalation sedation but there is lack of research and clinical reports in this area.^[10]

The opinion regarding the ease of use of hypnosis in various age categories has been conflicting. Gokli *et al.*^[11] suggested that hypnosis is more useful in 4–6 years olds, whereas Wood and Bijoy^[12] believe that children under 6 years old are not suitable for this technique due to and maintains that children between 7–14 years stand to benefit the most. This discrepancy in recommendation of appropriate age for clinical hypnosis could be due to the varying mental age staging in children and hence chronological age should not be the sole indicator.^[13] Santos *et al.*^[14] highlighted the fact that despite the promising results seen with the use of hypnosis in children, it is still underused.

Apart from the limitation of use in patients who are too young or are unable to understand the hypnosis scripts, this therapy will only work with patients who are hypnotizable. An estimated 80% of the population are hypnotizable and thus would be a good modality to pursue.^[7]

Where research regarding the effects of hypnotherapy is concerned, the parameters most commonly assessed are pain and anxiety. The normal reaction to pain occurs through the nervous communication and cognitive

channels and hypnosis creates a communication barrier, which cuts off the recognition of pain and in turn creating a state of relaxation.^[15] Anxiety is also of great interest to dentists as an anxious patient requires more time on the dental chair and increases the cost of treatment. The paper by Al-Namankany *et al.*^[16] shares the extensive list of dental anxiety scales, which are suitable for children. Although we are unable to single out any one technique as the gold standard for assessing anxiety, there are a number of methods which have been tested for reliability and validity and are suitable for research use. Common scales for observer reporting are Behavior Profile Rating Scale, Houpt Categorical Rating Scale, Global Rating Scale and Venham Anxiety and Behavior Rating Scales. Self-reported scales include Facial Image Scale, Venham Picture Test, Dental Anxiety Scale and Modified Child Dental Anxiety Scale. Bio-feedback parameters which are useful in measuring pain and anxiety are heart rate, blood pressure, and oxygen saturation level.^[16]

It is therefore important to establish the current trend in research involving hypnosis in dentistry and identify the common tools used to measure the outcome so that we can better plan future research in this field. The objectives of the literature search were based on the PICO statement as per the following: patient population (patients attending dental treatment), intervention (hypnosis), comparator (other behavior guidance techniques), and outcomes (reduced pain/anxiety). The authors also sought to determine the common type of hypnotic scripts used and the common parameters used to assess the effectiveness of hypnosis in dental treatment.

MATERIALS AND METHODS

PRISMA guideline was adhered to for the literature search of this review.^[17] Search engines used were primarily PubMed, EBSCOhost, and SCOPUS. The keywords used were “hypnosis or hypnotherapy” AND “dentistry or dental.” Studies included in this review are cohort studies, cross-sectional, case-control and randomized control studies. Only literatures in the English language were included and the time frame was set between January 2000 to January 2020. Reference lists from eligible studies were examined for additional references.

This review looks at the current trend in research pertaining to the use of hypnosis in dentistry and the common tools used to measure the results. The initial search generated 611 titles from three databases which are PubMed, Scopus, and EBSCOhost Dentistry. A cross-reference of references from obtained paper

generated another 74 titles. After removal of duplicates, 413 titles remained and were scrutinized. A total of 380 articles were removed from the list as they were either not in the English language or were not clinical studies but reviews instead. Further screening left us with 33 articles for consideration. From this list, another 14 articles were excluded with reason. The final review included 19 articles [Figure 1]. Data extracted were study subject, design of study, parameters used to assess, type of hypnosis script used and the study outcome.

DISCUSSION

The studies included in this review were clinical trials, case controls, and cohort studies [Table 1]. The selected studies were conducted within a range of 20 years from January 2000 to January 2020. The studies showed a variety of cases where the use of

hypnosis has proven effective. Hypnosis has been used for the following purposes:

- i. As an adjunct anxiolytic agent for minor oral surgery^[18-21]
- ii. Reduce the intensity of pain in orofacial and temporomandibular pain^[22,23]
- iii. Reduce anxiety^[18,19,24-28]
- iv. Increase compliance of wearing orthodontic headgear^[29]
- v. Manage pain arising from tooth hypersensitivity^[30,31]
- vi. Increase pain threshold for pain^[32,33]
- vii. Reduce salivary flow during dental treatment^[26]

There were 4 studies that specifically looked at the use of hypnosis in the pediatric age group of below 16 years of age.^[25,28,29,34] Three of these studies assessed the effects of hypnosis on anxiety during administration of local anesthetic,^[25,28,34] whereas the remaining study in

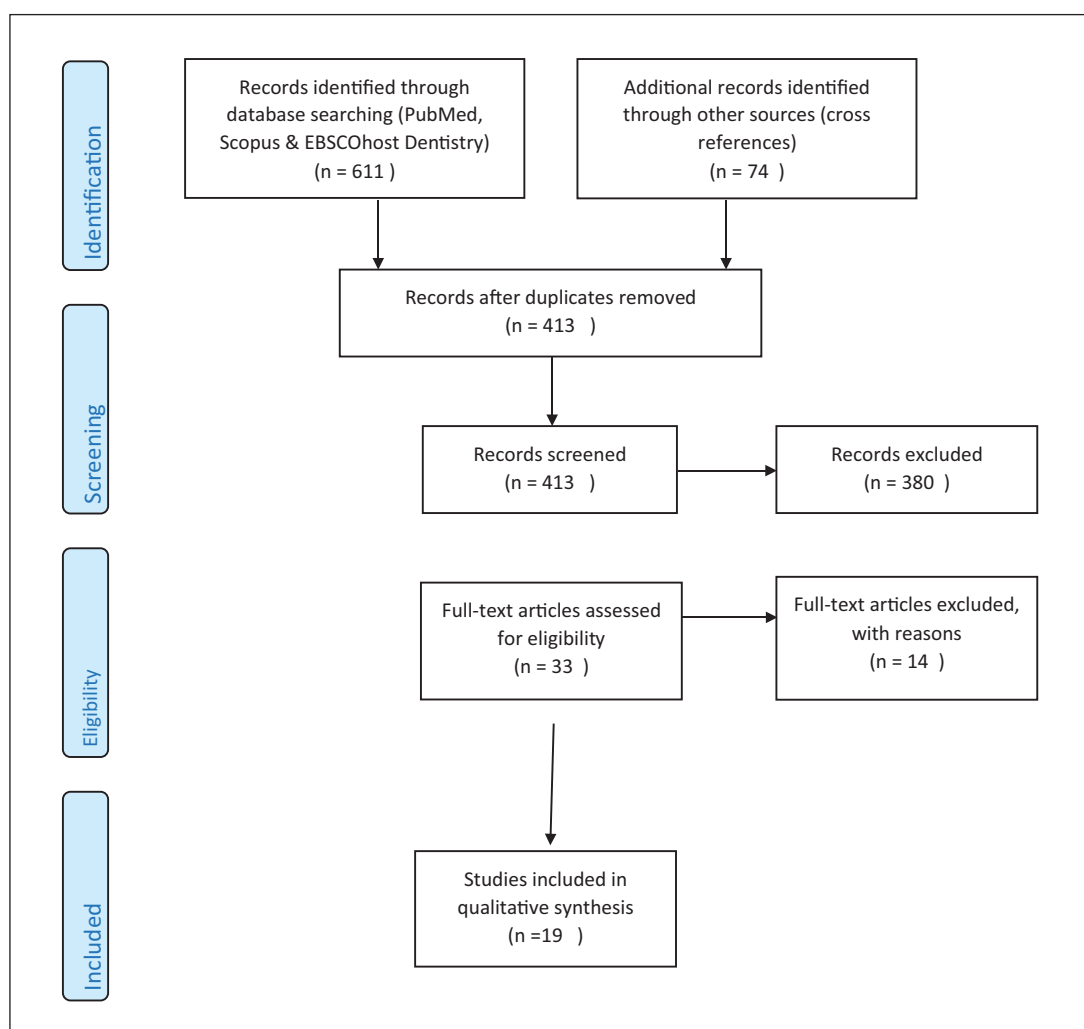


Figure 1: Flowchart of literature inclusion according to PRISMA guidelines^[17]

Table 1: Type of hypnosis used in dental treatment and the parameters used to measure it

Author, year	Subjects	Design of study	Parameters measured	Hypnosis used	Outcome
Ghoneim <i>et al.</i> (2000) ^[18]	<i>n</i> = 60 Age: 18–35 years	Controlled trial. Surgical removal of third molar under LA. Hypnosis vs. nonhypnosis groups	1. Spielberger State-Trait Anxiety Inventory 2. Nausea 3. Pain	Favorite place of relaxation, direct suggestions to alleviate pain, control bleeding. Recorded script.	Recorded hypnosis successful in reducing anxiety but a side effect of vomiting was noted among the subjects.
Moore <i>et al.</i> (2002) ^[19]	<i>n</i> = 206 Age: 19–65 years	Controlled trial. Assessment of anxiety when undergoing restorative treatment in 4 groups (hypnosis, group therapy, systematic desensitization and control)	1. Dental anxiety score 2. Dental fear survey 3. State-Trait Anxiety Inventory 4. Modified Geer Fear Score	Reframing negative thoughts, Dissociation, project anxiety on wall and try to get to the other side. Recorded script.	Intervention groups were better dental attenders and showed reduced anxiety. Hypnosis showed most attrition of patients
Abrahamsen <i>et al.</i> (2008) ^[22]	<i>n</i> = 41 Mean age = 56 ± 1.9 years	Controlled trial. Assessment of pain in patients with persistent idiopathic orofacial pain (PIOP)	1. VAS pain score 2. McGill pain questionnaire 3. Use of analgesics 4. Perceived pain area 5. Sleep quality 6. SF36 QOL questionnaire 7. Coping strategy questionnaire	Progressive muscle relaxation, pain suggestions, ego strengthening, guided imagery, dissociation and reframing	Use of hypnosis as an adjunct to weak analgesics effectively reduces pain in patient with PIOP
Traklyali <i>et al.</i> (2008) ^[29]	<i>n</i> = 30 Age : below 12 years	Total time headgear worn assessed between two groups (motivation with hypnosis vs. regular motivation)	Total number of hours headgear worn calculated using timing headgear	Not mentioned	Hypnosis is an effective method for improving orthodontic patient cooperation
Abrahamsen <i>et al.</i> (2009) ^[23]	<i>n</i> = 43 Mean age: 38.6 ± 10.8 years	Controlled trial. Assessment of temperomandibular disorder (TMD) related pain in 2 groups (hypnosis vs. simple relaxation)	1. Pain score 2. McGill pain 3. Pain on palpation of TMD 4. Symptom check list (SCL-60) 5. Pittsburgh Sleep Quality Index (PSQI)	Progressive relaxation, guided imaginary instructions. Recorded script.	Significant reduction of pain in hypnosis group

Table 1: Continued

Author, year	Subjects	Design of study	Parameters measured	Hypnosis used	Outcome
Eitner <i>et al.</i> (2010) ^[30]	<i>n</i> = 102 Mean age = 41.3 years	Controlled trial. Management of hypersensitivity In 4 groups (fluoride therapy, desensitizer, hypnosis & control group)	1. VAS pain score 2. Satisfaction questionnaire	Focus of attention, progressive muscle relaxation, remove pain from particular area.	Overall all three interventions were better than control but no significant differences between the 3 groups. Immediate effect more obvious in desensitizer and hypnosis groups
Mackey (2010) ^[36]	<i>n</i> = 91 Age: 18–25 years	Randomized control trial. Third molar removal done under 2 conditions (iv sedation with hypnosis vs. iv sedation with music)	1. Anesthetic drug amount required 2. VAS for pain intensity 3. Amount of post-op analgesics required	Hypnosis script not described. Type of music also not stated. Recorded script.	Hypnosis as adjunct to IV causes: i. Reduced amount of intraoperative propofol ii. Reduced post operative pain iii. Reduced amount of postoperative analgesics
Wannemueller <i>et al.</i> (2011) ^[24]	<i>n</i> = 137 Age : not specified	Controlled trial. Anxiety levels in patients undergoing dental treatment under 4 different behavior guidance techniques (CBT, individualized hypnosis, standard recorded hypnosis, general anesthesia)	1. Hierarchical Anxiety Questionnaire 2. Dental anxiety scale 3. Dental cognition questionnaire 4. Revised Iowa dental control index 5. State-Trait Anxiety Inventory 6. Subjective rating by patient	Not mentioned. Both recorded and face to face hypnosis used.	1. CBT more effective than individualized hypnosis 2. Individualized hypnosis better than standard recording
Facco <i>et al.</i> (2011) ^[32]	<i>n</i> = 31 Mean age: 28 ± 4.6 years	Controlled trial. Pain threshold measured 3 time (before, during and after hypnosis)	Pain threshold measured using electric pulp tester	Focus of attention, progressive muscle relaxation, arm levitation	Hypnosis increased pain threshold

Table 1: Continued

Author, year	Subjects	Design of study	Parameters measured	Hypnosis used	Outcome
Eitner <i>et al.</i> (2011) ^[20]	<i>n</i> = 82 Age: 19–80 (mean = 50.7 years)	Controlled trial. Anxiety and physiological changes measured for patients undergoing implant surgery (use of audio pillow with hypnosis and music vs. pillow without any hypnosis or music)	1. Blood pressure 2. Heart rate 3. Capillary oxygen partial pressure 4. AZI questionnaire (modified CDAS in German)	Dissociation, favorite place of relaxation, 'internal guard'	Hypnosis and music group had intraoperatively lower blood pressure and heart rate. Patients in this intervention group also felt more comfortable during surgery
Huet <i>et al.</i> (2011) ^[25]	<i>n</i> = 29 children Age: 7–12 years	Controlled trial. Anxiety and pain assessed patients receiving local anesthesia in 2 groups (LA only vs. LA and hypnosis)	1. Modified Yale preoperative anxiety scale 2. Modified objective pain score	Customized scripts based on patient's interest	Reduced anxiety by 50% in hypnosis group as compared to control group
Abdeshahi <i>et al.</i> (2013) ^[21]	<i>n</i> = 24 Age > 18 years (mean = 24.1 ± 2.7 years)	Case control. Removal of third molar done using two protocols (surgery with LA vs. surgery with hypnosis)	1. VAS pain score 2. Spielberger State-Trait Anxiety Inventory 3. Hemorrhage assessment postoperatively	Chiasson's technique, Fix gaze on one point, glove anesthesia	Patients have less pain and bleeding when removal of third molar done under hypnosis
Satzl <i>et al.</i> (2014) ^[26]	<i>n</i> = 31 Age: 18–63 years	Randomized control trial. Salivary flow rate assessed when hypnosis given via two methods (direct suggestion vs. indirect suggestion)	Unstimulated salivary flow rate	Direct suggestion: Focus on breathing relax and reduce saliva production Indirect suggestion: Script relating to dry season and desert	Both direct and indirect hypnosis techniques reduce salivation
Glaesmer <i>et al.</i> (2015) ^[27]	<i>n</i> = 102 Age > 18 years	Controlled trial. Anxiety and attitude assessed before, during and after permanent tooth extraction done (LA only vs. LA and hypnosis)	1. VAS to assess anxiety (3 stages) 2. Questionnaire assessing attitude toward hypnosis	Reference to a positive experience in the past, sound manipulation, dissociation, suggestions about reduced pain and increased bloodflow. Recorded script.	Significantly less anxiety in hypnosis group only during treatment, no significant difference before and after extraction

Table 1: Continued

Author, year	Subjects	Design of study	Parameters measured	Hypnosis used	Outcome
Wolf <i>et al.</i> (2016) ^[31]	<i>n</i> = 37 Age: 21–54 (mean age = 27.7 ± 7.85)	Randomized control trial. Stimulation of dentin-pulp complex with and without hypnosis	1. Pain threshold (vitality scanner) 2. VAS pain score 3. Hemodynamic parameters	Favorite place of relaxation, glove anesthesia (protective hand), dissociation, inner resource. Self hypnosis	Significant reduction in pain intensity and significant increase in pain threshold in hypnosis group
Oberoi <i>et al.</i> (2016) ^[28]	<i>n</i> = 200 Age: 6–16 years (mean = 9.8 years)	Controlled trial. Anxiety assessed during inferior dental nerve block (LA only vs. LA and hypnosis)	1. Pulse rate 2. Oxygen saturation	Arm levitation, progressive muscle relaxation	Hypnosis lowers heart rate and decreases resistance toward treatment
Wolf <i>et al.</i> (2016) ^[33]	<i>n</i> = 34 Age: 21–54 years (mean = 27.8 ± 7.97 years)	Randomized control trial. Pain threshold assessed in two groups (LA only vs. hypnosis)	VAS pain score Vitality scanner Hemodynamic parameters	Favorite place of relaxation, automatic responding protective hand, dissociation	Hypnosis reduced anxiety, pain and bleeding
Ramírez-Carrasco <i>et al.</i> (2017) ^[34]	<i>n</i> = 40 Age: 5–9 years	Randomized control trial. Both groups have headphones but only experimental group listens to taped hypnosis. Both groups have conventional BMT	1. FLACC 2. Heart rate 3. Skin conductance	Progressive muscle relaxation with “garden with fountain.” Ideomotor signal. Recorded script	1. No significant difference in FLACC 2. Difference of 5 beats per minute for heart rate 3. No significant difference in skin conductance
Park <i>et al.</i> (2019) ^[35]	<i>n</i> = 63 Age: 30–59 years	Randomized control trial. Patients undergoing periodontal treatment were assessed for anxiety and physiological changes in two groups (hypnosis vs. oral health education)	1. Dental anxiety score 2. Depression questionnaire 3. Saliva cortisol level 4. Blood pressure 5. Pulse rate	Progressive muscle relaxation	Hypnosis reduced anxiety, depression symptom, blood pressure, pulse rate and salivary cortisol level

children looked at compliance of wearing a headgear.^[29] Anxious patients made up the bulk of the subject population and their level of anxiety was determined using anxiety scales. Patients with severe phobia were excluded from the studies.^[18,19,21,24,25,35]

The delivery of hypnotic scripts were done using face to face sessions (63%),^[21,22,24-26,28-33,35] audio CD (32%)^[18,19,23,26,32,36] and audio pillow.^[20] Majority of the studies included a progressive muscle relaxation (42%)^[19,22,23,28,30,32,34,35] in their hypnosis script. This procedure involves the suggestion of “relaxing,” “limbs becoming heavy” beginning from either the head to toes or the reverse.^[1] It is wise to establish a “safe place” or “favorite place of relaxation” while in trance so that the patient feels comfortable throughout the session. Five of the studies in this review included “favourite place of relaxation” in the script.^[18,20,31,33,34] Three studies did not mention the techniques used for hypnosis.^[24,29,36] Dissociation was another technique which was seen in a number of the studies.^[19,22,31,33] Three studies used a glove anesthesia technique or “protective hand” to create a pain-free zone, which enables the operator to either to do a dental procedure without local anesthetic or increase the patient’s pain threshold.^[21,31,33] A combination of techniques were used in most of the studies. Only one study used customized scripts based on patient’s interest and this was done in children aged between 7 and 12 years.^[25]

Pain scores in the form of visual analog scales (VAS)^[18,21-23,25,30,31,33,36] and McGill pain questionnaires^[22,23] are useful self-reporting tools, whereas pain is quantitatively measured using electric pulp tester,^[32] vitality scanner^[31,33] and by the amount of analgesics required^[22,30] during and after treatment. A numerical rating pain scale is a verbal scale using numbers to indicate intensity of pain between 0 (no pain) to 10 (worst pain). It can be done either face to face or via telephone or video call interview.^[37] The face, legs, activity, crying, and consolability (FLACC) is based on observations by an operator and has values between 0 (relaxed) and 10 (severe pain).^[38]

Anxiety was assessed in nine of the studies and the most popular tools were Spielberger State-Trait anxiety inventory (26.3%),^[18,19,21,24] and dental anxiety score (15.8%).^[19,24,27] Other tools used included modified Geer Fear Score,^[19] revised Iowa dental control index,^[24] and modified Yale preoperative anxiety scale.^[25]

Clinical research on the use of hypnosis in dentistry is mainly focused on pain and anxiety. However, Traklyali *et al.*^[29] show us that hypnosis can also be used to increase motivation in wearing orthodontic

appliance and Satzl *et al.*^[26] showed that it could be used to control salivary flow during dental treatment. All the studies which assessed pain and anxiety showed favorable effects of hypnosis. However, Ghoneim *et al.*^[18] reported vomiting as a side effect among patients undergoing surgical removal of third molar under local anesthesia and hypnosis. The authors were unable to explain why an increase in postoperative vomiting was noted. This effect was not reported in any of the other studies which are included in this paper. Hypnosis is also shown to effective in managing tooth hypersensitivity.^[30]

Although hypnosis is known to help with gag reflex cases, available literatures are limited to case reports. More research needs to be conducted in this area as hypnosis may have the potential of being a useful, inexpensive, and safe tool for carrying out dental treatment in patients with severe gag reflex. Similarly, the use of hypnosis for increasing motivation for maintenance of good oral hygiene should be investigated as this would be a beneficial tool for prevention of oral diseases.

This paper highlights the various hypnosis techniques which were used in the clinical studies. It is evident that there remain many scripts and methods which are yet to be studied with regard to its effectiveness in reducing anxiety and pain in dental treatment. The suitability of specific scripts for different age groups also deserves attention and more clinical studies.

The limitations encountered in this review are the inability to review papers which were not in the English language. Although the authors are proficient in Malay and Hindi, no relevant papers were found in these languages.

CONCLUSION

Hypnosis has the potential to be a useful tool in the management of children and adults. The current trend in research related to hypnosis leans toward the use of pre-recorded hypnotic scripts for the management of anxious patients. The use of hypnosis also has the potential to reduce postoperative pain in dental treatment involving surgery. More clinical research should be conducted to study the effectiveness of various techniques and scripts used for patients.

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CONFLICTS OF INTEREST

There are no conflicts of interest.

AUTHORS CONTRIBUTIONS

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Not applicable.

PATIENT DECLARATION OF CONSENT

Not applicable.

DATA AVAILABILITY STATEMENT

Not applicable.

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