



Mini-Review

A conceptual review on pretreatment anxiety management in a dental setting using hypnosis and progressive muscle relaxation

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Received: 16 March, 2022

Accepted: 06 April, 2022

Published: 07 April, 2022

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Keywords: Dental anxiety; Anxiolysis; Hypnosis; Progressive muscle relaxation

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Abstract

Dental anxiety is associated with the thought or idea of seeing the dentist and undergoing dental procedures. Anxiety-associated problems in the dental setting include avoidance of appointments, inability to provide successful dental care, and delay in optimal recovery. Anxiolysis is important to the level of being mandatory for suitable administration of dental care. Since times immemorial, dentists have struggled to manage anxiety successfully by employing changing concepts and strategies over time. Pharmacological modalities to allay anxiety-like sedation and general anesthesia are popular yet associated with an added cost per patient, side effects, expensive armamentarium, documentation, and patient monitoring. Non-pharmacological modalities for anxiety management have been employed over time but have limited nature of success. The use of hypnosis as a therapeutic modality for healing and resolving anxiety is known for over five thousand years and has been a part of many cultures over time. Progressive Muscle Relaxation, which was documented first in 1908 is based on the principle of releasing neuromuscular tension in the body which creates a state of emotional equilibrium. In the present paper, an in-depth review of the techniques i.e. Hypnosis and Progressive Muscle Relaxation is provided from the perspective of a dental clinician from historical evolution to practical recommendations. Both Hypnosis and Progressive Muscle Relaxation hold promise to be adjunct tools in the modern dentist's armamentarium to manage anxiety.

Background

Dental anxiety is defined as anxiety associated with the idea or thought of visiting the dentist for preventive or therapeutic care (Agras, et al, 1969). Anxiety in a dental setting is a complex phenomenon with physical, mental as well as social aspects [1]. Dental anxiety has been cited as the fifth

most common reason for anxiety by Agras S, et al. [2]. Dental anxiety interferes with successful dental treatment by leading to avoidance of appointments and increased perceptions of pain after treatment thereby hindering optimal recovery [3,4]. Dental anxiety and pain may pose a hurdle to dental procedures resulting in substantial distress, avoidance or postponement of dental treatment, possible impairments on oral health, and

quality of life [5]. Since times immemorial, dental anxiety has been a challenging aspect faced by dentists as well as physicians [6].

Anxiolysis is defined simply as a reduction in anxiety [7]. Anxiolysis is a state of anxiety reduction achieved by non-pharmacological or pharmacological techniques or a combination of the two. During anxiolysis, patients respond adequately to verbal instruction, cognition and coordination may be mildly impaired whereas ventilatory and cardiovascular functions remain unaffected [8]. In ancient times during the second millennia BC, Greek, and Egyptian physicians used both plants (like papaver somniferum) and incubation (physiological healing process through sleep) to manage anxiety [6]. To allay anxiety, ancient Arab physicians used the 'Aleppo sponge' (steeped with a mixture of mandragora, black nightshade, opium, cannabis, hyoscyamus, and other plants containing tropane alkaloids) to induce sedation and general anesthesia [9].

Many times due to inability to manage anxiety leads to failure to complete treatment successfully or failed appointments altogether. Anxiolysis is important to the level of being mandatory for successful dental treatment. The American Dental Association stated that anxiolysis must be practiced for successful modern dentistry. Over time, problems associated with dental anxiety persisted, however, approaches and practices to manage dental anxiety kept evolving with time [8].

Non-pharmacological or psychotherapeutic techniques to allay anxiety are broadly grouped into communication and rapport building, behavior modification techniques, cognitive behavior therapy, and physical restraints. Among them, communication, rapport building, and tell-show-do techniques are employed routinely in the dental clinic. Audio analgesia, guided imagery, systematic desensitization, biofeedback, hypnosis, and relaxation are other psychotherapeutic interventions advocated for the management of dental fear and anxiety [10].

For children and adolescents displaying anxiety, non-pharmacological techniques may be preferable due to their conservative and non-invasive nature. However, most children with moderate or higher anxiety usually require the complementary application of pharmacological measures along with non-pharmacological techniques [11]. Failure of the non-pharmacological interventions leads to stressful situations which are usually dealt with using pharmacological measures. In a situation where the patient is unable to overcome anxiety despite using non-pharmacological measures; pharmacological therapy steps in [10]. Pharmacological therapy routinely includes sedation using benzodiazepines or nitrous oxide and general anesthesia. General anesthesia is typically recommended as the last resort [8].

However, the literature reveals that pharmacological measures be it sedation or general anesthesia were unable to overcome the long-term effects of dental anxiety, and patients reported years later with poor oral status [1]. Moreover, the

use of these measures is discouraged due to associated risks, higher costs, and the need for additional trained personnel [12-14].

Hypnosis is defined as an induced altered state of consciousness characterized by heightened suggestibility and responsiveness to the direction [15]. Despite its origin amidst myth, mystery, and science, its first use during an exodontia procedure was documented in 1829. Hypnosis was recognized by the American and British Medical Associations and holds its position today as a respectable therapeutic modality [16,17]. On the other hand, progressive muscle relaxation was first described in 1908 by an American physician, Edmund Jacobson at Harvard University and published subsequently in 1938 [18]. The theory of Progressive Muscle Relaxation is based on a psychobiological state referred to as neuromuscular hypertension which is believed to be the basis for a variety of negative emotional states and psychosomatic conditions. Jacobson asserted that relaxation of muscles would lead to the relaxation of the mind leading to emotional calmness and equilibrium [18]. Both these techniques i.e. hypnosis and progressive muscle relaxation are safe and non-invasive behavior modification techniques that require minimal armamentaria [10]. While hypnosis relies on the mind to induce relaxation via a cognitive pathway, progressive muscle relaxation utilised muscular tension-relaxation to relax the mind, meaning thereby that both techniques target different physiological pathways to induce relaxation states. [18]. This mode of action made these techniques interesting to review together. Moreover, there is limited use of these techniques in routine clinical settings. A Cochrane review on Paediatric Dentistry and Hypnosis includes only three well-designed Randomized Control Trials with 69 participants on this topic demonstrating limited knowledge of this area [19]. To the best knowledge of the authors, there is a lack of reviews on the use of relaxation techniques for the management of dental anxiety. Therefore, for the purpose of an in-depth understanding of these techniques i.e. Hypnosis and Progressive Muscle Relaxation-the historical evolution, applications in medical settings, applications in dental settings, and practical uses and methods for each technique have been discussed.

Hypnosis – history and evolution

The use of Hypnotic states has been a part of multiple cultures throughout time, wherein an inherent biological phenomenon i.e. sleep was used for healing. Over 5000 years ago, the ancient Greeks and Egyptians used temple sleep as a form of healing Association, 201 [17]. The Western world first became interested in hypnosis around 1770, when Franz Anton Mesmer, an Austrian physician, started investigating an effect he called 'mesmerism'. Mesmerism was based on the concept of an intrinsic magnetic force within all organisms which could have physical effects including healing. However, due to failed cooperation during an assessment by French aristocrats, the concept was disregarded [17].

The Scottish surgeon James Braid coined the term 'neuro-hypnotism', meaning sleep of the nerves which attempted to elucidate the mesmeric phenomena based on well-defined

laws of physiology and psychology) [20]. Sigmund Freud also studied hypnosis at the Charcot School of Hypnotherapy in Paris. Freud began practicing hypnosis in 1887, and hypnosis was crucial to his invention of the theory of psychoanalysis [17].

On 23 April 1955, the British Medical Association approved the practice of hypnosis in the areas of psychoneuroses and hypnosis-induced anesthesia for managing pain during childbirth and surgery. In 1958, the American Medical Association approved a report highlighting the medical uses of hypnosis [20]. Two years later, the American Psychological Association recognized hypnosis as a branch of psychology. Moving into the 21st century, Hypnosis has obtained a respectable position as a powerful therapeutic tool [21].

Applications of hypnosis in various aspects of the medical field

Overall, hypnosis has been employed and succeeded in various medical scenarios over the last three decades. Sletvold H, et al. [22] studied the effects of hypnotic inductions on blood pressure. Hypnosis was found to be effective in reducing blood pressure during the induction and adaptation phase in the study subjects as compared to the control group. Both systolic and diastolic blood pressure were found to respond similarly. The study included a small sample of healthy normotensive volunteers and thus would require further trials prior to clinical implementation of the study findings. Rapkin DA, et al. [23] used hypnosis pre-operatively in 15 patients with head and neck cancer surgery and found imagery in hypnosis to reduce the postoperative complications when compared to the control group. Post-hospital stays were found to be significantly shorter in the hypnosis group. Lower levels of blood loss were reported in subjects with high hypnotisability. This was an exploratory study that warrants further well-planned trials to better understand the area. Faymonville ME, et al. [24] reviewed the effectiveness of hypnosis for reducing perioperative discomfort during conscious sedation. Pre- and Perioperative anxiety, pain, and intra-operative discomfort were found to be reduced in the patients who underwent hypnotherapy. This review included author findings on over 14,000 patients who underwent surgery under hypnosis from 1992 onwards. The evidence presented is fundamental and based on enriched clinical experience. Further, controlled trials will enable a more comprehensive knowledge of the same.

Lang EV, et al. [25] studied the role of hypnosis in reducing discomfort and adverse effects during percutaneous vascular and renal procedures. The pain increased significantly ($P < 0.05$) with procedure time in the standard and attention groups. On the contrary, no significant increase in pain was seen in patients who underwent hypnosis. A decrease in anxiety was observed among all three groups. Drug use in the standard group (1.9 units) was significantly higher than in the attention and hypnosis groups (0.8 units and 0.9 units respectively). Anabar RD [26] studied the effect of self-hypnosis on anxiety in 17 children suffering from chronic dyspnoea. Children were trained to use self-hypnosis in one to two 15 to 45-minute workshop sessions. After one month of self-hypnosis by these children,

the majority of the children experienced an improvement in their symptoms meaning thereby that hypnosis has a positive effect on controlling dyspnoea. The study although promising included a small sample and depends directly on the patient compliance and comprehension of the technique.

Lioffi C, et al. [27] studied the effect of clinical hypnosis to alleviate pain in 80 pediatric cancer patients receiving regular lumbar punctures. The effects of hypnosis by direct suggestion, indirect suggestion, and attention controls alongside standard medical management were evaluated. It was observed that patients in both the hypnosis groups reported less pain and anxiety during lumbar punctures. These patients were rated as demonstrating less behavioral distress when compared to control groups. Direct and indirect hypnosis were equally effective while the efficacy declined when the patients were switched to self-hypnosis. Calipel S, et al. [28] evaluated the effect of hypnosis on anxiety and peri-operative behavioral disorders in 50 children aged 2-11 years with midazolam on a comparative basis. Pre-operative anxiety was recorded using the Modified Yale Preoperative Anxiety Scale (MYPAS) and postoperative behavioral disorders were evaluated using the Post-hospitalization Behavioural Questionnaire. The number of anxious children was significantly less ($P < 0.05$) during induction of anesthesia in the hypnosis group. Hypnosis was found to be more effective than midazolam in controlling anxiety. Post-operatively, hypnosis reduced the frequency of behavioral disorders approximately by half on day 1 and day 7. The summary of various applications of hypnosis in the medical field is depicted in Figure 1.

Applications of hypnosis in a dental clinic

There exist few trials which prove the efficacy of hypnosis towards pain and anxiety control in dental clinics. Enqvist B, et al. [29] studied the effect of hypnosis in 69 adult patients undergoing third molar extraction procedures. In the study, hypnotic suggestions were given using audiotape prior to anesthesia administration. Patients were instructed to listen to

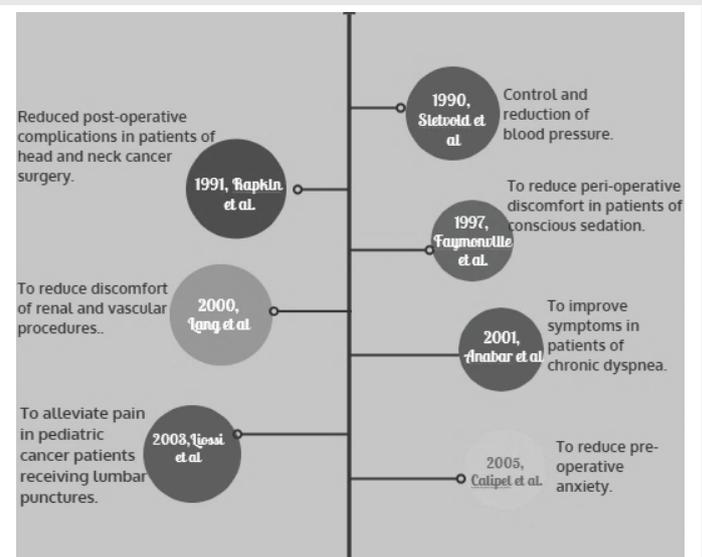


Figure 1: Successful applications of Hypnosis in various medical settings.



the 20-minute audiotape daily for one week to prepare for the surgery. The authors found significantly lower levels of anxiety and lower need for analgesics in the hypnosis group when compared to controls. The study recommends that hypnosis may become part of daily presurgical clinical routine. Hermes D, et al. [30] performed a study to assess the efficacy of tape-recorded medical hypnosis in 174 patients operated for oro-maxillofacial surgeries over a one-year period. It was found that hypnosis leads to increased patient compliance in 93% of the cases. Clinical controlled trials in the area would aid in a more objective knowledge of the above-mentioned findings. Dyas R [31] evaluated the effects of hypnosis in 20 patients undergoing oral surgery. All the patients had mandibular third molars removed by a single surgical team. The comparisons were drawn with 20 control subjects who were treated by the same team using sedation without hypnosis. Hypnosis was used before intravenous administration of midazolam and fentanyl for sedation. Heart rate and oxygen saturation were recorded throughout the procedures. The heart rate increase was significantly lower in patients treated using the Hypno-sedative approach. Less amount of intravenous sedation was required in the hypno-sedative group and recovery time was significantly shorter in this group when compared to controls. The study suggests the efficacy of hypnosis as an adjuvant to sedation for oral surgery procedures.

Trakyali G, et al. [32], performed a study to assess the efficiency of conscious hypnosis (self-hypnosis) on patient cooperation during cervical headgear wear. The subjects included 30 patients with skeletal Class II Division 1 malocclusion divided into hypnosis and control groups. Patients were treated using cervical headgear with a timer module. A statistically significant ($P < 0.05$) decrease in headgear wear time was noted in the control group from the first to sixth month. This result indicates that self-hypnosis is an effective method for improving orthodontic patient cooperation. Huet A, et al. [33] conducted a study to assess the role of hypnosis on anxiety and pain during dental extractions. Thirty children aged 5-12 years were randomly assigned to hypnosis and non-hypnosis groups. Anxiety was assessed using the MYPAS at various intervals during the procedure. Similarly, the pain was documented using the Visual Analog Scale and modified Operative Pain Score. Hypnotherapy was carried out by a single trained anesthesiologist. The median anxiety and pain scores were significantly lower in the hypnosis group than in the non-hypnosis group. The study demonstrates the favorable efficacy of hypnosis for anxiety and pain control in children. The authors recommend future studies to include a larger cohort including highly anxious children and study the long-term effects of hypnosis on a prospective basis.

Abdeshahi SK, et al. [34] conducted a study to evaluate the effect of hypnosis on the anxiety, pain perception, and control of hemorrhage among 24 adults undergoing third molar extraction. The patients were used as their controls wherein the third molar extraction of both sides was done with and without hypnosis respectively. No significant differences were observed in anxiety scores and hemorrhage control between the two groups. A significant improvement in pain control was seen in the hypnosis group wherein only 8.3% of

patients reported procedural pain in comparison to 33.3% on the control side. The need for analgesics postoperatively was found to be reduced to 41.7% in the hypnosis group compared to 91.7% in the control group. However, these areas require further planned trials to validate findings. Glaesmer H, et al. [5] evaluated the effect of hypnosis on anxiety in 102 patients during tooth removal. Patients were allocated into groups of Hypnosis and Treatment as Usual. Anxiety was assessed before, during, and after treatment. Anxiety was found to be highest pre-treatment and declined with time. The majority of the patients reported marked a mild reduction in anxiety during treatment in the hypnosis group. Post-treatment anxiety was similar in both groups. The study included 90% of patients with positive dental attitudes at baseline, therefore future studies should include a variety of patients including those with negative attitudes for an enhanced understanding.

Oberoi J, et al. [15] conducted a study on children to study whether hypnosis altered the physical and verbal resistance to local anesthesia. Hypnosis was done chairside by a single trained operator. The changes in heart rate and oxygen saturation before and after anesthesia were also assessed. Two hundred 6-16-year-old children were randomly assigned to a hypnosis or control group. Patients in the hypnosis group exhibited significantly less resistance to local anesthesia administration. There was a significant difference in pulse rate, attributable to the Hypnotic condition, but no significant difference was appreciable in oxygen saturation levels. The authors felt that since the procedure of local anesthesia administration does not affect the airway, the oxygen saturation remains unchanged. Ramírez-Carrasco, et al. [35] conducted a study to evaluate the effectiveness of Hypnosis combined with conventional behavior management techniques during infiltration of local anesthesia in children. The authors found a marginal decrease in heart rate under hypnosis and no significant difference in the physical or verbal resistance to anesthesia. A variation was seen in this study compared to others which may be attributed to the use of audiotape for hypnosis rather than personalized interaction of 5 to 9-year old children with an empathetic trained therapist. A summary of the various applications of hypnosis in the dental setting is depicted in Figure 2.

Therapeutic and operative uses in dentistry

Hypnosis may be applied to resolve a multitude of different dental problems both therapeutic and operative. Hypnosis is a state of focused attention that induces calmness and may be effective in controlling the anxiety associated with dental procedures and in modifying the pain threshold to reduce pain response [33]. Hypodontia is the use of hypnosis in dentistry, which was first documented in 1829 to facilitate a dental extraction. Within dentistry, hypnosis has both therapeutic and operative uses [16]. Therapeutically, uses include management of dental phobia and anxiety, extensive gag reflex, trigeminal neuralgia pain, benign chronic orofacial pain, temporomandibular joint dysfunction, adaption to dentures, behavior modification such as thumb sucking/bruxism, and as an adjunct to inhalation sedation. Operative uses include analgesia during surgery, control of hemorrhage/salivary flow, and faster postoperative recovery [16,36].

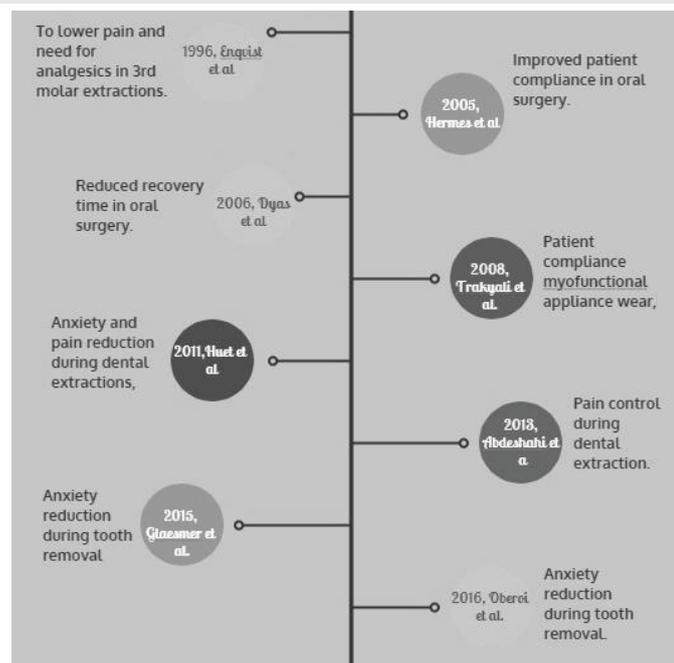


Figure 2: Successful applications of Hypnosis in various dental settings.

Hypnotic inductions used in the dental clinic may include relaxation with guided imagery, breathing induction, somatic awareness induction, and eye-roll [36]. Other inductions with children may include counting, finger spreading, or the use of objects like crystals or beads. Various hypnotic induction techniques and brief instructions for their use in a dental clinic are summarized in Table 1 in the **Appendix**.

Progressive muscle relaxation: History and evolution

Muscle relaxation has evolved over the last 8 decades and has become an important therapeutic technique in the modern management of anxiety disorders [37]. Yoga may be seen by many to be the forerunner of the muscle relaxation technique. While practicing, the Yogic 'Shavasana' pose, the whole body is placed flat on the ground and scanned for tension as relaxation and awareness move through the body (Singh G and Singh J, 201[38]). Jacobson's relaxation technique involves four main muscle groups which are commonly tensed and relaxed. These are 1) buttocks, thighs, calves, and feet; 2) biceps, forearms, and hands; 3) chest, stomach, and back; and 4) shoulders, throat, head, and face. It takes 15 to 20 minutes to practice the average relaxation technique [10,18]. Bernstein and Borkovec [39] described a detailed procedure for progressive muscle relaxation which has been subsequently used in many research trials. A sample of the standardized procedure for progressive muscle relaxation by Bernstein and Borkovec [39] is depicted in the **Appendix**, Table 2.

Applications of progressive muscle relaxation in the medical field

Progressive Muscle relaxation has been used to successfully control anxiety, and pain and improve the overall quality of life as a part of various medical trials. Conrad A and Roth WT. [37] reviewed the role of muscle relaxation techniques in generalized

anxiety states. The review illustrates evidence regarding the favorable efficacy of the PMR technique for the management of generalized anxiety disorder and panic disorder. Emery CF, et al. [40] conducted a study to evaluate the effect of Progressive Muscle Relaxation on Nociceptive Flexion Reflex (NFR). Results indicated that participants in the PMR group experienced a significant increase in the NFR threshold while participants in the no-treatment study group experienced no change in the NFR threshold. The results support the efficiency of PMR in reducing the nociceptive response. The potential utility of PMR in behavioral pain control strategies needs to be assessed in the future. Isa MR, et al. [41] conducted a study to determine the impact of applied progressive muscle relaxation training on the levels of anxiety, depression, and stress among prostate cancer patients. These measures were recorded using the Depression Anxiety Stress Scale-21. There was a significant improvement ($P < 0.001$) in the anxiety and stress levels in the PMR group. However, no significant difference in depression was appreciable between the groups. In the field of oncology, the practice of PMR may be encouraged in routine settings in the years to follow for reducing the psychological burden among cancer patients.

Chaudhari A, et al. [42] carried out a study using Progressive Muscle Relaxation on two hundred 25 to 35-year-old female healthcare workers. Progressive Muscle Relaxation training in these subjects for three months resulted in a significant decrease in blood pressure, resting heart rate, and stress levels (assessed using Perceived Stress Scale). There was a significant decrease in triglyceride, total cholesterol, and low-density lipoprotein in health workers after practicing PMR for a period of three months. The study was done among volunteers and calls for further research on patients in different settings. Parás-Bravo P, et al. [43] evaluated the impact of a relaxation protocol on the quality of life in a sample of 272 oncological patients. Among the PMR group, significant improvements ($P < 0.001$) for all subscales like functional well-being, emotional well-being, physical well-being, and in the social and family contexts were observed after a one-month follow-up.

Ramasamy S, et al. [44] studied the effect of progressive muscle relaxation technique (PMRT) on reducing anxiety and depression among 50 hospitalized leprosy affected patients in a tertiary care center. The findings revealed that PMR was successful in reducing anxiety significantly ($P < 0.001$) after six weeks. Similarly, a significant decline ($P < 0.001$) was noted in depression levels. Thus, PMR was found to be beneficial for the psychosocial wellbeing of leprosy patients. Harorani M, et al. [45] evaluated the effect of progressive muscle relaxation on anxiety and sleep quality in 80 burn patients. Patients were trained using Jacobson's PMR technique for 20 minutes over three consecutive days in the experimental group. During this period, the control group received routine standard care. Patients trained in PMR showed a statistically significant decline in anxiety ($P < 0.05$) assessed using the Spielberger State-Trait Anxiety Inventory. A significant enhancement ($P < 0.05$) in sleep quality in the experimental group was also observed. A summary of various applications of the technique in the medical field is depicted in Figure 3.

Applications of progressive muscle relaxation in the dental clinic

There is limited literature studying the muscle relaxation technique in dental practice. Berggren U, et al. [46] evaluated the efficacy of relaxation techniques in 112 patients with phobic dental fear. They compared relaxation-based therapies to cognitively oriented therapies. Pre-treatment general anxiety was assessed by the State-Trait Anxiety Inventory (STAI). Dental fear and dental anxiety were recorded using the Dental Fear Survey Schedule and Dental Anxiety Scale respectively. The decline in General anxiety was significantly more ($P < 0.05$) with the use of relaxation-based therapies. Overall, both treatments i.e. relaxation and cognitive therapies resulted in significant reductions in general and specific anxiety as well as in fear-related measures.

Park ES, et al. [4] conducted a study to determine whether progressive muscle relaxation therapy could relieve dental anxiety in periodontal surgery patients. The trial included 68 patients with dental anxiety scores over 13 who were randomly allocated to PMR and control groups. The PMR group was given a 20-minute therapy session once per week for four weeks. The intervention group exhibited significantly greater reductions ($P < 0.001$) in dental anxiety during both four weeks and three-month periods. They also exhibited a greater reduction in depression symptoms, pulse rate, blood pressure as well as salivary cortisol levels at both time intervals. In this study, the use of PMR requires an investment of time by both the clinician and the patient. Thus, its use in dentistry so far is by and large limited to practicing the therapy over a period of time. The efficacy of single-sitting PMR sessions used chair-side prior to short dental procedures has not been studied at length. Future studies may study the efficacy of short-duration PMR sessions which may be beneficial from the viewpoint of dental clinicians.

Therapeutic usage of the progressive muscle relaxation technique in dentistry

Although the evidence-based research is limited in literature, Progressive muscle relaxation may hold potential for various dental conditions. Progressive Muscle Relaxation may ease the neuromuscular tension and help in allaying anxiety associated with dental procedures. PMR may be of help as a strategy for pain control used in the dental office [10,37]. The use of the Progressive Muscle Relaxation technique has been advocated to manage dental anxiety [10,47]. Over-time various combinations and abbreviations have been found to be useful in different scenarios. Thus, Progressive Muscle Relaxation can be practiced using various methods with different target muscle groups and sequence combinations [38]. A standardized sample for progressive muscle relaxation by Bernstein and Borkovec [38] is summarized in Table 2 and pictorially depicted for ease of understanding in Figures 4,5. Despite the advent of the technique many decades ago, there is a lack of well-designed studies to identify its mechanism and advance clinical practice [36]. A wide variety of applications in the dental setting requires further study.

Limitations and future scope

The primary limitation which exists with hypnosis and progressive muscle relaxation is the lack of training due to the non-teaching of such techniques in the medical/dental curriculum [48-51]. The untrained mind would believe that these techniques are time-consuming, however, with proper training the techniques require between 5-30 minutes subject to the purpose for which they are being utilized (Finkelstein, 2017) The future scope of hypnosis and muscle relaxation is tremendous as they are non-invasive, holistic, and devoid of side effects. If adequately trained medical and dental personnel learn to employ these techniques successfully, it will be hugely beneficial to the physical, mental, and psychological well-being of patients in the long term. Although few well-designed research trials are available in the area, future research in the form of more well-planned trials and systematic reviews will increase the evidence-based literature on these techniques leading to accelerated acceptability in the medical and dental settings.

Conclusion

Successful anxiolysis is the mantra of modern dentistry. While no technique is ideal for anxiolysis in the dental setting; the present requirement is for a technique that is safe, effective, and devoid of side effects or high expenditure. Hypnosis and Progressive Muscle Relaxation are two such techniques that may hold tremendous future promise. Proper operator training, inclusion in the university curriculum, and

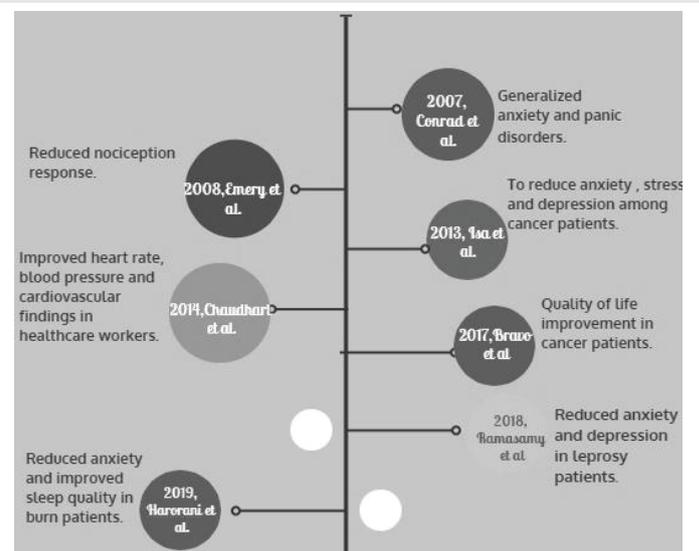


Figure 3: Successful applications of Progressive Muscle Relaxation in various medical fields.

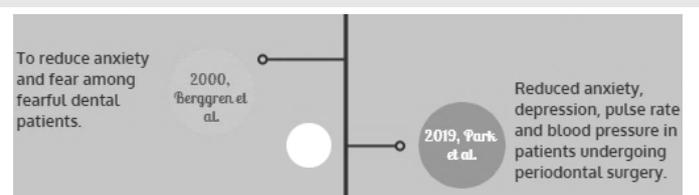


Figure 4: Successful applications of Progressive Muscle Relaxation in various dental settings.



Figure 5: Step-wise pictorial representation of a standardized Progressive Muscle Relaxation sequence based on technique by Bernstein and Borkovec (1973).

appropriate use of these techniques may increase the efficiency of anxiety management practices in dental clinics in the years to follow.

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