BULLETIN OF STOMATOLOGY AND MAXILLOFACIAL SURGERY
Volume 21, Issue 2

DOI: 10.58240/1829006X-2025.2-99

LITERATURE REVIEW

THE USE OF HYPNOSIS IN DENTISTRY IN ANXIOUS PATIENTS. SYSTEMATIC REVIEW OF THE LITERATURE OF THE LAST 5 YEARS

Pizzolante T[1] Botticelli G.[1] Severino M [2], Caporro G.[1], Rastelli S.[1]

[1]Department of Life, Health and Environmental Sciences, University of L'Aquila, L' Aquila, Italy

[2] School of Medicine, Department of Medicine, Odontostomatological University Centre: Chair Prof. Stefano Cianetti, University of Perugia, S. Andrea delle Fratte, Perugia, Italy

* ***Corresponding author:***Sofia Rastelli, Department of Life, Health and Environmental Sciences, University of L'Aquila, L' Aquila, Italy, email: sofia.rastelli@graduate.univaq.it

Received: Dec 5 22, 2024; Accepted: Dec 25 22, 2024; Published: Jan 15, 2025

Abstract

Background: Dental anxiety and odontophobia significantly impact patient care and oral health. These conditions stem from factors such as direct conditioning, vicarious learning, and psychological predispositions, often leading to somatic symptoms and severe avoidance behaviors. Hypnosis has emerged as an effective approach for managing dental anxiety, providing benefits such as reduced fear and pain perception, improved patient collaboration, and enhanced healing.

.

Materials and Methods: This systematic review followed PRISMA guidelines and analyzed studies retrieved from PubMed, Scopus, and Cochrane databases between 2019 and 2024. Randomized controlled trials, cross-sectional studies, and comparative analyses examining hypnosis for dental anxiety and phobia were included. The Newcastle-Ottawa Scale assessed study quality and risk of bias. Data extraction focused on study design, outcomes, and patient demographics.

.

Results: The search identified 75 papers, of which 56 were screened after removing duplicates. Following inclusion criteria, eight studies were analyzed. The risk of bias varied, with one high-quality study, two medium, and five low-quality studies. Evidence demonstrated hypnosis reduced anxiety, improved patient cooperation, and supported better oral health outcomes by addressing anticipatory anxiety and avoidance behaviors. **Conclusion:** Hypnosis, combined with techniques like hypnotic communication and iatrosedation, offers a non-pharmacological strategy to manage dental anxiety and phobia. These approaches establish trust, redefine negative past experiences, and personalize patient care, leading to improved dental experiences and psycho-oral health. Implementing these methods in dental practice can enhance patient well-being and treatment outcomes.

Keywords: odontophobia, dental anxiety, hypnosis, iatrosedation

INTRODUCTION

Anxiety is an adaptive emotional response to potentially threatening or dangerous situations. Dental anxiety relates to the fear, stress or dread induced before, during or after dental treatment.

Anxiety is a significant source of perioperative discomfort that affects the patient's quality of life by increasing pain perception. Inadequate management of postoperative pain is responsible for the onset of forms of anxiety and depression, generating a break between them. Preoperative anxiety and depression may therefore persist over time and well beyond the period of surgery.

Odontophobia is based on the dysregulation of the natural defenses of the individual, responsible forthe

transition from a physiological anxiety, directed towards a real danger, to a pathological anxiety, directed towards a dental treatment often totally devoid of pain. Odontophobia show severity of their physiological and psychological symptoms. Triggers of fear are the perception of the visual, olfactory, and sensory stimuli during dental treatment (sound of drill, dentist's chair). Odontophobia can be divided into Dental Anxiety, Dental Fear and Dental Phobia.

The American Psychological Association (APA) Division defines hypnosis as "a state of consciousness involving focused attention and reduced peripheral awareness characterized by an enhanced capacity for response to suggestion".

The phenomenology of hypnosis can be considered as the result of intentional introspective activity.
The good acceptance of hypnosis and the effectiveness in reducing anxiety in patients with dental phobia is reported by several authors. Positive effects of hypnosis in patients with dental phobias include reduction of fear and anxiety, prevention of avoidance behavior and the resulting lack of dental treatment, reduction of felt pain, less bleeding during tooth extractions, and better and faster wound healing.

Hypnosis is a powerful tool for the dental field because it can guarantee:

a) Effective and deep sedation and amnesia, while maintaining patient's collaboration;
b) Treatment of anxiety and dental phobia, helping the patient to overcome it, as well as for other associated anxiety disorders.

Materials and methods

Research question.

What is the effect of hypnosis for dental anxiety and dental phobia?

Protocol and registration

Following the formulation of the Research Questions, a research protocol was defined prior to the start of the review process. This protocol follows the reporting guidelines of the of the Preferred Reporting Items for Systematic Review and Meta-Analyses (PRISMA) model.

Search strategy

PubMed, Scopus and Cochrane databases were searched using "hypnosis AND dentistry" combination to retrieve the articles. The search included only articles published in English between 2019 and December 2024 with no location restrictions.

Study selection

Two observes were involved in article selection. In case of discrepancies between them, a third reviewer was consulted and consensus was sought through discussion. Articles were first imported from the databases to Excel to exclude the duplicates.

The remaining article were screened on Title and Abstract and included or excluded by the same reviewers according to inclusion criteria: randomized controlled trials, cross-sectional studies, comparative studies, validation studies and evaluation studies, reporting hypnosis effects for dental anxiety and phobia in patients of any age were searched and evaluated. (Table 1)

Table 1. General characteristics of the included studies

N	First Authors Name/Year of Publication [Reference Number]	Design	Country	Total, n	Mean age, years	Scores	Dental treatment	hypnosis type/ Study design
1	Tieri 2023	Case control	Italy	150	5-10	VAS, FLACC and Heart rate monitoring	Dental care	

2	Retrospective longitudinal study	Germany	311	5-12	Wong–Baker Scale	Dental care	Comparisonof compliance of children during dental treatments with midazolam or hypnosis techniques
3	Randomized control trial	Norway	1083	8-12	VAS, HR, and SPO 2	Extraction of tooth	Hypnosis and Progressive Muscle Relaxation in paediatric dentistry
4	Randomized clinical trial	*Iran*	66	6-10	Venham Clinical Anxiety Scale and the Venham Picture Test	Posterior primary tooth extraction	N2O/O2 inhalation and hypnosis are effective in reducing self-reported and observed anxiety and improving cooperationlevels in pediatric patients during dental extraction.

5	Erappa 2021	Randomized cross-sectional clinical trial	India	200	6-10	Pulse rate, respiratory rate and anxiety rate	Dental care	Assess and compare the efficacy of acupressure, hypnosis and audiovisual aids in reducing anxiety in children during the administration of local anesthesia
6	Moghadam 2021	Single-blind clinical trial	/	33	/	Pulse rate, respiratory rate and anxiety rate	Surgical third-molar removal, implant surgery, maxillary bone augmentation, and mucogingiva l surgery	This study aimed to investigate the impact of hypnosison relievingthe pain of injected dental infiltration anesthesia.

7	Girón 2023	Randomized controlled trial	Mexico	60	5-7	FLACC	Pulpotomy in the primary mandibularright or left first or second molar	Hypnosis to reduce anxiety andpain during dental treatment.
8	Hidoussi Sakly 2020	A Cross-SectionalStudy	Tunisia	200-300	26-60	VAS	Dental care	To assess the attitudes, experiences, training levels, and interest in future education regarding the use of hypnosis bydentists

The full text of the resulting articles was retrieved to and checked for final inclusion. The PRISMA flow chart (Figure 1) illustrates the selection process followed during this review.

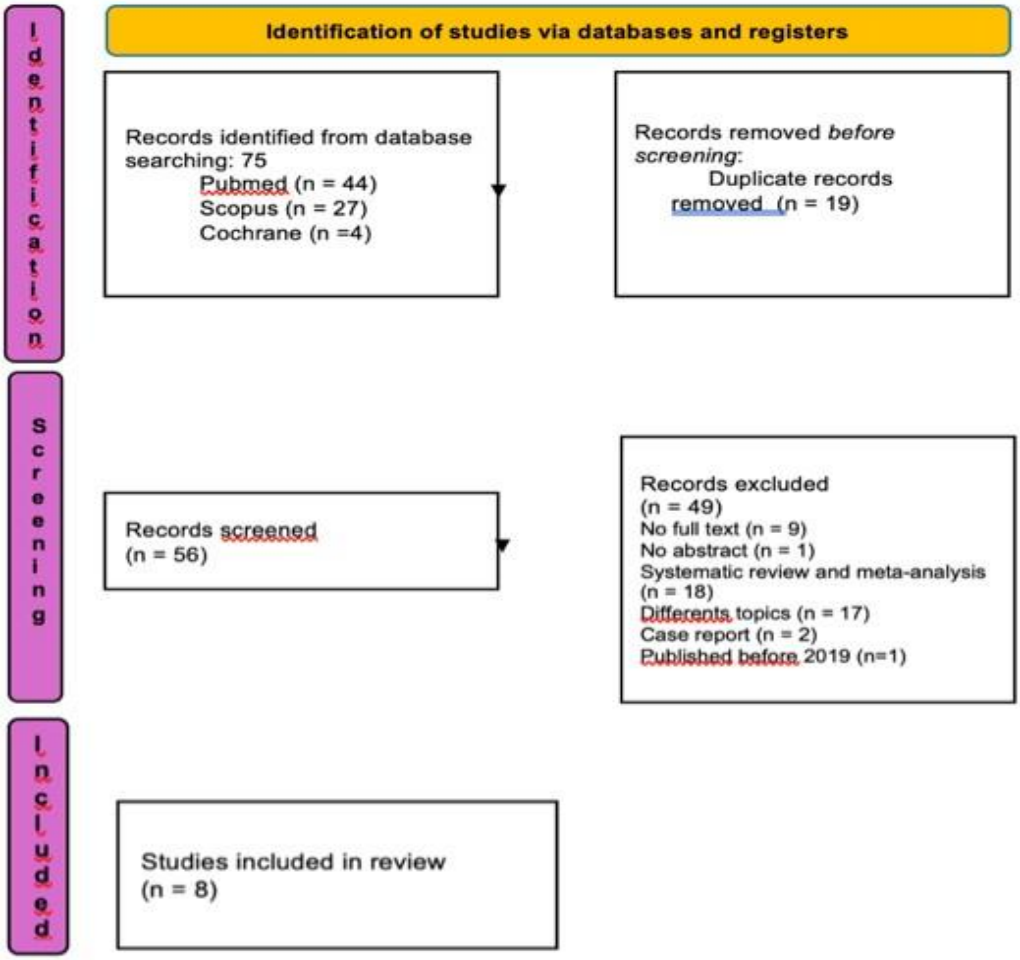

Figure 1. Summary of the search strategy employed in the qualitative analysis

Data collection and synthesis

Data extraction was made by two observers independently. For each paper, the following data were searched and recorded when available: author, year of publication, design, country, sample, mean age, scores, dental treatment and aim of the study.

Risk of bias of the included studies

The risk of bias assessment was conducted by the Newcastle-Ottawa Scale (NOS). Data extrapolated from the selected papers was divided into three sections: selection, comparability and outcome. Eachsection was analized by the official coding manual's questions. The NOS ranges from 0 (lowest) to 9 (highest), and studies with scores≥6 are considered high quality (Table 2).

Table 2. Quality of the studies

Author and year	Selection (maximum 4 stars)				Comparability (maximum2 stars)	Outcome (maximum 3 stars)		
	Rapresentativeness of the sample	Non-exposed	Ascertainment ofthe exposure	Outcome of interest was not present at start of the study	Comparability of cohorts	Assessment of outcome	Same method of ascertainment for cases and controls	Non-responserate
Tieri 2023	A*	C	B*	B	B*	A*	A*	C
Rienhoff 2022	B*	C	B*	A*	A*	A*	A*	B*
Sabherwal 2020	A*	A*	B	B	A*	B*	/	C
Motallebi 2024	B*	A*	B	A*	B*	B*	A*	C
Erapp a 2021	B*	C	A*	B	A*	B*	A*	B*

Mogha dam 2021	B*	C	A*	B	A*	C	A*	B*
Girón 2023	B*	C	A*	A*	A*	A*	A*	B*
Hidoussi Sakly 2020	C	C	B*	A*	/	D	B	B*
Authorand year	Selection (maximum 4 stars)				Comparability (maximum2stars)	Outcome (maximum 3 stars)		

	Rapresentativeness of the sample	Non-exposed	Ascertainment of the exposure	Outcome of interest was not present atstart of the study	Comparability of cohorts	Assessment of outcome	Same method of ascertainment for cases and controls	Non-responserate
Tieri 2023	A*	C	B*	B	B*	A*	A*	C
Rienhoff 2022	B*	C	B*	A*	A*	A*	A*	B*

Mogha dam 2021	B*	C	A*	B	A*	C	A*	B*
Girón 2023	B*	C	A*	A*	A*	A*	A*	B*
Hidoussi Sakly 2020	C	C	B*	A*	/	D	B	B*
Author and year	Selection (maximum 4 stars)				Comparability (maximum 2 stars)	Outcome (maximum 3 stars)		

	Rapresentativeness of the sample	Non-exposed	Ascertainment of the exposure	Outcome of interest was not present atstart of thestudy	Comparability of cohorts	Assessment of outcome	Same method of ascertainment for cases and controls	Non-response rate
Tieri 2023	A*	C	B*	B	B*	A*	A*	C
Rienhoff 2022	B*	C	B*	A*	A*	A*	A*	B*

Sabherwal2020	A*	A*	B	B	A*	B*	/	C
Motallebi 2024	B*	A*	B	A*	B*	B*	A*	C
Erapp a 2021	B*	C	A*	B	A*	B*	A*	B*

Moghadam 2021	B*	C	A*	B	A*	C	A*	B*
Girón 2023	B*	C	A*	A*	A*	A*	A*	B*
Hidoussi Sakly 2020	C	C	B*	A*	/	D	B	B*
	Selection (maximum 4 stars)				Comparability (maximum 2stars)	Outcome (maximum 3 stars)		
Author and year	Rapresentativeness of the sample	Non-exposed	Ascertainment of the exposure	Outcome of interest was not present at start of the study	Comparability of cohorts	Assessment of outcome	Same method of ascertainment for cases and controls	Non-response rate

Results

The search strategy identified 75 papers in the three databases; 56 were selected after removing duplicates. A total of 48 articles were excluded for inclusion criteria. The systematic reviews and meta-analyses were excluded but they were read (Figure 1).

Risk of bias

Based on NOS 1 study was scored as high level, 2 study was scored as medium and 5 was scored aslow level of bias.

Discussion

Dental phobia is a universally widespread and frequent phenomenon, although not always known, and underestimated by the dentist.

Recent epidemiological research suggests that its prevalence values are between 6-15% of the world's adult population. Significant differences are found between the various countries, mainly related to the socio-cultural status, which play an important role in the etiology and development of the problem. In western civilization, 3 to 5% of the adult population have a form of dental phobia, whileup to 30% report a moderate level of anxiety towards dental treatment. The female sex is most interested, with a male ratio: female approximately 1 to 2.

Knowing the causes of odontophobia allows to prevent the onset and progression if the phenomenonwas already present.

The odontophobia depends essentially on three factors that act independently of each other or combine increasing severity. These factors are:

- Direct packaging;
- Vicarious learning;
- General psychological state.

Direct conditioning is an unpleasant personal experience in the past. This experience represents a more or less intense pain at an early age in the dental practice. 50-60% of odontophobic people recognize this traumatic experience as the origin of their disorder.

The vicarious learning, typical of the childhood, is expressed through observation, identification and indirect suggestion of behavioral models. In fact, the odontophobiac patients come from families whose members have suffered adverse dental experiences characterized by hostile attitudes or fear towards the dentist.

As a child grows up, he records and irreversibly associates the ideas of pain and fear with the dentist, transforming them into an anxiety or phobic syndrome that will manifest itself in adulthood.

These first two factors are included in a model of odontophobia called "exogenous" in relation to the source of the disorder, ie situations or information external to the individual. The age range between 3 and 14 years is a critical period for the beginning of this typology, as it was observed an increased vulnerability to negative or particularly traumatic experiences.

The typology classified as "endogenous" finds a causal source within the subject, that is to say, its own psycho-pathological profile. Endogenous odontophobia is the expression of an organic disorder, and depends on the individual's vulnerability to anxiety disorders. This form of odontophobia is accompanied by a general state of high anxiety, intense multiple fears, mood disorders and stress.

Several studies have revealed the existence of an association between odontophobia and various types of phobic anxiety (agoraphobia, claustrophobia, social anxiety and panic attacks), nonspecific anxiety (tension, nervousness, difficulty in resting), paranoia (paranoid thoughts and ideas, suspicion, centrality, disappointment and loss of autonomy), obsessive-compulsive disorders and, more generally, psychological problems or psychiatric disorders. In this type of person, odontophobia tends to develop at a later age and its symptoms can be significantly more severe than those caused by an exogenous disorder.

The somatic component of the patient with dental anxiety is represented by a wide spectrum of symptoms on the neurovegetative system. Typically found is:

- Increased respiratory rate with dyspnea and tachypnea;
- Muscle tension, especially in the head, neck and back;
- Heart rate and palpitations accelerated;
- Tremors;
- Hypersensitisation, especially in the palms of the hands;
- Vasodilation.

These signs are perfectly recognizable by the dentist when he is about to treat an anxious patient. When affected by this symptomatology, the patient immediately stops treatment in panic, screamingand shaking on the chair, making it difficult to regain control and continue the treatment.

In the most serious patient, violent reactions can occur, with even aggressive attempts to escape.
The emotional component is fundamental in the patient's response to the phobic stimulus: the odontophobic patient subjectively lives the experience as an "existential threat". It is possible to distinguish two dimensions:

- "threat of breach" means the fear of being a victim of unforeseeable and tragic events such asunbearable pain, damage, permanent injury, scarring or mutilation due to operator errors. In this case,the patient is terrified at the thought of dental treatment
- the "loss of autonomy and independence", that is, the feeling of losing complete control overthe situation being experienced, the perception of being weak, vulnerable and defenceless. In general,the feeling of panic comes from being completely powerless towards the dentist.

Among the negative thoughts that afflict the patient we find the fear of being considered weak and infantile. It is therefore essential to predict and erase these thoughts in order to contain the patient's reaction during the course of treatment.

It is good to remember the phenomenon of anticipatory anxiety; when the patient feels safe from possible contacts with the phobic stimulus, odontophobia is asymptomatic. When the possibility of dental treatment becomes closer in time, the patient becomes persistently anxious. The days precedingthe dental visit are therefore characterized by a state of apprehension, with symptoms in the cognitivesphere and vigilance, insomnia and difficulty in falling asleep and physical ailments. As the appointment becomes imminent, anxiety becomes so intense and unbearable that in the most serious cases it leads to avoidance behavior. This situation can persist despite the presence of acute pain symptoms, as this is always lower than the extent of the phobia perceived by the patient. Dental problems are thus postponed and appointments postponed for many years.

The worst consequence of dental phobia is its impact on oral health and, in a direct way, on the quality of life associated with it. Numerous studies have been published to show that patients suffering from odontophobia represent a significant portion of the population for public health: this is due to phobiic patient avoidance behaviors that if prolonged, can lead to dental problems and serious general health issues such as facial osteomyelitis, intracranial extensions of periapical abscesses, sinusitis, sepsis, mediastinitis, fever, septicaemia, pneumonia and urinary tract infections.

Hypnotic communication

Hypnosis is based on the concept of communication. Hypnotic communication is a conscious communication technique that guides the patient in the perception of himself and the experience he is experiencing using the action of words at neuro- physiological level building reaction between the operator and the patient. To implement hypnotic communication is essential to establish a relationship of trust between doctor and patient, without it everything would be futile. To facilitate the establishment of such a relationship it is necessary to understand the cultural background of the subject in front of you, using a clear terminology that especially creates empathy and not discomfort.

Hypnotic communication, by making use of the conscious use of the tool of the word, can be used even without a change in the state of consciousness to lead to a state of trance.

The dentist manages good hypnotic communication with patients using the right communication channel.

The human species is characterized by its ability to build instruments, of which the main one is language; normally used to communicate thoughts and feelings given by the combination of sounds, Gestures, symbols written by our social structure. In literature, therefore, reference is made to the three main communication channels:

- Visual;
- Auditory;
- Kinesthetic.

Statistically, visual subjects represent 40% of the population. Auditory subjects represent about 20% of the population. Cinestesia represents about 40% of the population. It is therefore essential in any pre-talk to be able to recognize the preferred communication channel of the patient so that you can improve the establishment of a relationship.

A very useful technique is the "mirroring" in which the operator using the same predicates of the patient, repeat the same words of the interlocutor, trying to understand what systems of representation uses by checking if the language is of visual type, auditory or kinesthetic.

Finally, it is effective to use implicit commands with the aim of communicating directly with the unconscious mind; for example: "I am curious to know if you will learn to relax and get comfortable in the chair within a short time".

In hypnotic communication it is therefore essential to work on the convictions of the interlocutor, since these can have a potentiating or limiting action. For this reason, phrases like "I go to the dentistand feel sick" must be effectively changed by the dentist into "I go to the dentist and I'll be fine".

In hypnotic communication it is therefore essential to work on the convictions of the interlocutor, since these can have a potentiating or limiting action. For this reason, phrases like "I go to the dentistand feel sick" must be effectively changed by the dentist into "I go to the dentist and I'll be fine".

This method allows the dentist to obtain the necessary information to meet the needs and concerns ofthe patient, being able to reassure them about their fears so that they can plan the best possible treatment plan.

The main purpose of this methodology is to create a basis for establishing a relationship and creating a relationship of trust between doctor and patient.

Conclusions

Anxiety before the patient undergoes dental treatment is very common.

The dentist must create an empathic and trusting bond with the patient by modifying his or her previous experiences.

The therapy must be personalized for each patient according to the case assessments, in relation to the experience and skills of the dental practitioner, the age, the degree of collaboration and anxiety of the patient.

The ability to know how to highlight the right communication channel of the patient, giving importance to the pre-clinical talk paying attention to past experiences and the possibility of creating a new and different experience for the relationship of trust between dentist and patient.

Using iatrosedation and hypnotic communication, allows to improve both for the dentist and for the patient experience, eliminating old negative preconceptions and improving the quality of life of the patient understood as psycho-oral health.

DECLARATIONS

Conflict of Interest

The Authors declare that they have no conflict of interests.

Acknowledgements

None

Source of funding

The work was not funded.

REFERENCES

1. Abdeshahi SK, Hashemipour MA, Mesgarzadeh V, Shahidi Payam A, Halaj Monfared A. Effect of hypnosis on induction of local anaesthesia, pain perception, control of haemorrhage and anxiety during extraction of third molars: a case-control study. J Craniomaxillofac Surg. 2013 Jun;41(4):310-5.doi: 10.1016/j.jcms.2012.10.009.
2. Plasschaert AJ, Holbrook WP, Delap E, Martinez C, Walmsley AD; Association for Dental Education in Europe. Profile and competences for the European dentist. Eur J Dent Educ. 2005 Aug;9(3):98-107. doi: 10.1111/j.1600-0579.2005.00369.x.
3. Adinolfi B, Gava N. Controlled outcome studies of child clinical hypnosis. Acta Biomed.2013;1;84(2):94-7.
4. Falisi G, Di Paolo C, Rastelli C, Franceschini C, Rastelli S, Gatto R, Botticelli G. UltrashortImplants, Alternative Prosthetic Rehabilitation in Mandibular Atrophies in Fragile Subjects: A Retrospective Study. Healthcare 2021; 9: 175.
5. Armfield JM, Heaton LJ. Using elements of hypnosis prior to or during pediatric dental treatment.Aust Dent J. 2013 Dec;58(4):390-407; quiz 531. doi: 10.1111/adj.12118
6. Eitner S, Sokol B, Wichmann M, Bauer J, Engels D. Clinical use of a novel audio pillow with recorded hypnotherapy instructions and music for anxiolysis during dental implant surgery: a prospective study. Int J Clin

Exp Hypn. 2011;59(2):180-97.doi: 10.1080/00207144.2011.546196.
7. Facco E, Zanette G, Casiglia E. The role of hypnotherapy in dentistry. SAAD Dig. 2014Jan;30:3-6.
8. Facco E, Stellini E, Bacci C, Manani G, Pavan C, Cavallin F, Zanette G. Validation of visual analogue scale for anxiety (VAS-A) in preanesthesia evaluation. Minerva Anestesiol. 2013 ;79(12):1389-95.
9. Falisi G, Bernardi S, Rastelli C, Pietropaoli D, DE Angelis F, Frascaria M, Di Paolo C. "Allon short" prosthetic-implant supported rehabilitations. ORAL Implantol 2017; 10: 477-487.
10. Facco E, Zanette G, Favero L, Bacci C, Sivolella S, Cavallin F, Manani G. Toward the validation of visual analogue scale for anxiety. Anesth Prog. 2011 Spring;58(1):8-13.doi: 10.2344/0003-3006-58.1.8
11. Scarano A, Bernardi S, Rastelli C, Mortellaro C, Vittorini P, Falisi G. Soft tissue augmentation by means of silicon expanders prior to bone volume increase: a case series. J Biol Regul Homeost Agents 2019; 33: 77-84.
12. Quinzi V., Marchetti E., Guerriero L., Bosco F., Marzo G., Mummolo S. Dentoskeletal class II malocclusion: Maxillary molar distalization with no-compliance fixed orthodontic equipment Dentistry Journal;2020;8(1),art. no. dj8010026
13. Hammond DC. Hypnosis in the treatment of anxiety- and stress-related disorders. Expert Rev Neurother. 2010 Feb;10(2):263-73. doi: 10.1586/ern.09.140. PMID: 20136382.
14. Holden A. The art of suggestion: the use of hypnosis in dentistry. Br Dent J. 2012 Jun8;212(11):549-51.
15. Humphris GM, Freeman R, Campbell J, Tuutti H, D'Souza V. Further evidence for the reliability and validity of the Modified Dental Anxiety Scale. Int Dent J. 2000 Dec;50(6):367-70.doi: 10.1111/j1875595x.2000.tb00570x
16. Humphris GM, Morrison T, Lindsay SJ. The Modified Dental Anxiety Scale: validation and United Kingdom norms. Community Dent Health. 1995 Sep;12(3):143-50.
17. Jugé C, Tubert-Jeannin S. Effets de l'hypnose lors des soins dentaires [Effects of hypnosis in dental care]. Presse Med. 2013;42(4 Pt 1):11424.French.doi: 10.1016/j.lpm.2012.08.006.
18. Memè, L., Bambini, F., Pizzolante, T., Bianchi, A., Mummolo, S. Osteonecrosis of the jaw in patients with metastatic renal carcinoma: systematic review and meta-analysis. ORAL and Implantology, 2024, 16(2);79–87
19. Manani G, Alberton L, Bazzato MF, Berengo M, Da Corte Zandatina S, Di Pisa A, Favero G, Favero G, Floreani S, Guarda-Nardini L, Mazzuchin M, Parolin P, Sivolella S, Stellini E,Tonello S, Zanette G. Analysis of an anxiolytic technique applied in 1179 patients undergoing oral surgery. Minerva Stomatol.2005;54(10):551-68. English, Italian.
20. Manani, G., Baldinelli, L., Cordioli, G., Consolati, E., Luisetto, F., & Galzigna, L. Premedication with chlordemethyldiazepam and anxiolytic effect of diazepeam in implantology. Anesth.Prog.,1995;42.107-112.
21. Memè, L., Grilli, F., Pizzolante, T., Sampalmieri, F., Mummolo, S. Clinical and histomorphometric comparison of autologous dentin graft versus a deproteinized bovine bone graft for Socket Preservation. ORAL and Implantology, 2024;16(2);101–106
22. Severino, M., Caruso, S., Rastelli, S., Nota, A., Tecco, S. Hand-carried ultrasonography instrumentation in the diagnosis of temporomandibular joint dysfunction. Methods and Protocols, 2021, 4(4), 81
23. Peretz B, Bercovich R, Blumer S. Using elements of hypnosis prior to or during pediatric dental treatment. Pediatr Dent. 2013;;35(1):33-6.
24. Guerra, D., Severino, M., Caruso, S., Rastelli, S., Gatto, R. The importance of using physical tridimensional models for the management and planning of extended osseous odontogenic lesions Dentistry Journal. 2021.9(11);134
25. Pohjola V, Mattila AK, Joukamaa M, Lahti S. Anxiety and depressive disorders and dental fear among adults in Finland. Eur J Oral Sci.2011;119(1):55-60. doi: 10.1111/j.1600-0722.2010.00795.x..
26. Iacomino, E., Rastelli, S., Capogreco, M.,Grivetto, F., D'amario, M. Pterygoid

implants in severe posterior maxillary atrophy: a case report. ORAL and Implantology.2024;16(2); 88–94
27. Falisi, G., Qorri, E., Botticelli, G., Mondragon, M., Di Giacomo, P. Stabilization of the lower denture through the use of fine mini-implants: retrospective study. European Journalof Musculoskeletal Diseases, 2024;13(2); 1-7
28. Shapiro M, Melmed RN, Sgan-Cohen HD, Eli I, Parush S. Behavioural and physiological effect of dental environment sensory adaptation on children's dental anxiety. Eur J Oral Sci. 2007;115(6):479-83.doi: 10.1111/j.1600-0722.2007.00490.x.
29. Eitner S, Wichmann M, Paulsen A, Holst S. Dental anxiety--an epidemiological study on itsclinical correlation and effects on oral health. J Oral Rehabil. 2006;33(8):588-93. doi:10.1111/j.1365-2842.2005.01589.x.
30. Friedman N.Iatrosedation, in Emergencies in Dental Practice, ed McCarthy F. Friedman N. Iatrosedation: the treatment of fear in the dental patient. J. Dent. Educ. 1983;47;91–95.
31. Arcuri, C., Petro, E., Sollecchia, G., Mummolo, S., Marzo, G. Laser in periodontal pockets: In vivo and in vitro study. Journal of Biological Regulators andHomeostaticAgents;2020,34(3);139–146
32. Rastelli, S., Capogreco, M., D'amario, M.,Severino, M., Iacomino, E. PTERIGOID IMPLANTS: A viable alternative for the rehabilitation of the posterior sectors of the atrophic maxilla ORAL and Implantology.2024;16(1);38–43
33. Wolf TG, Schläppi S, Benz CI, Campus G. Efficacy of Hypnosis on Dental Anxiety and Phobia: A Systematic Review and Meta-Analysis.Brain Sci. 2022;20;12(5):521.doi: 10.3390/brainsci12050521..
34. Mummolo S., Nota A., Marchetti E., Capuano S., Tecco S., Marzo G., Campanella V.Histologic and histomorphometric analysis of maxillary sinus augmentation with different biomaterials. A pilot split-mouth human study.ORAL and Implantology;2018;11 (4);249-256
35. Merz AE, Campus G, Abrahamsen R, Wolf TG. Hypnosis on acute dental and maxillofacial pain relief: A systematic review and meta-analysis. J Dent. 2022;123:104184.doi: 10.1016/j.jdent.2022.104184.
36. Di Paolo, C., Qorri, E., Falisi, G., Inchingolo, F., Di Giacomo, P. RA.DI.CA. Splint Therapy in the Management of Temporomandibular Joint Displacement without Reduction Journal of Personalized Medicine, 2023;13(7);1095
37. Carinci F, Lauritano D, Bignozzi CA, Pazzi D, Candotto V, Santos de Oliveira P, Scarano A. A New Strategy Against Peri-Implantitis: Antibacterial Internal Coating. Int J Mol Sci 2019;20: 3897.
38. Rienhoff S, Splieth CH, Veerkamp JSJ, Rienhoff J, Krikken JB, Campus G, Wolf TG. Hypnosis and Sedation for Anxious Children Undergoing Dental Treatment: A Retrospective Practice-Based Longitudinal Study. Children (Basel). 2022 25;9(5):611. doi: 10.3390/children9050611.
39. Al-Moraissi EA, Conti PCR, Alyahya A, Alkebsi K, Elsharkawy A, Christidis N. The hierarchy of different treatments for myogenous temporomandibular disorders: a systematic review and network meta-analysis of randomized clinical trials. Oral Maxillofac Surg. 2022;26(4):519-533.doi: 10.1007/s10006-021-01009-y21.
40. Botticelli G., Severino M., Ferrazzano G.F., Vittorini Velasquez P., Franceschini C., Di Paolo C., Gatto R., Falisi G. Excision of lower lip mucocele using injection of hydrocolloid dental impression material in a pediatric patient: A case report Applied Sciences (Switzerland).2021; 1 (13;5819,
41. Enrico Facco;Christian Bacci, Edoardo Casiglia;Gastone Zanette. Preserved critical ability and free will in deep hypnosis during oral surgery. Am J Clin Hypn.2021;63(3):229-241.doi: 10.1080/00029157.2020.1797625.
42. Bernardi S., Mummolo S., Zeka K., Pajewski L., Continenza M.A., Marzo G. Use and Evaluation of a Cooling Aid in Laser-Assisted Dental Surgery: An Innovative Study Photomedicine and Laser Surgery.2016;34(6);258 - 262
43. Motallebi A, Fathi M, Mazhari F, Hoseinzadeh M, Parisay I. Hypnosis and nitrous oxide impact on the school aged patients' anxiety and cooperation candidate for tooth extraction: A randomized clinical

trial. Heliyon. 202426;10(15):e35223.doi: 10.1016/j.heliyon.2024.e35223
44. Pizzolante, T., Memè, L., Ciccariello, A.,Inchingolo, F., Mummolo, S. Complications of zygomatic implantology: observational clinical study Bulletin of Stomatology and MaxillofacialSurgery.2024;20(4);73–80
45. Pizzolante, T., Rasicci, P., Saggiomo, A.P., Capogreco, M., Mummolo, S. Buccal Fat PadFlap and Buccal Advancement Flap for Closure of Oroantral Fistula: A Systematic Review and a Case Report. ORAL and Implantology. 2024;16(2);50–61
46. McNeal S. Hypnotic Ego-strengthening: Where We've Been and the Road Ahead. Am J Clin Hypn. 2020;62(4):392-408.doi: 10.1080/00029157.2019.1709151.
47. Erappa U, Konde S, Agarwal M, Peethambar P, Devi V, Ghosh S. Comparative Evaluation of Efficacy of Hypnosis,Acupressure and Audiovisual Aids in Reducing the Anxiety of Children during Administration of Local Anesthesia. Int J Clin Pediatr Dent.2021;14(l2):186-192.doi: 10.5005/jp-journals-10005-2113.
48. Memè, L., Bambini, F., Pizzolante, T., Bianchi, A., Mummolo, S. Evaluation of a single non-surgical approach in the management of periimplantitis: glycine powder air-polishing versus ultrasonic device. ORAL and Implantology, 2024, 16(2);67–78
49. Falisi G, Foffo G, Severino M, Paolo C, Bianchi S, Bernardi S, Pietropaoli D, Rastelli S, Gatto R, Botticelli G. SEM-EDX Analysis of Metal Particles Deposition from Surgical Bursafter Implant Guid- ed Surgery Procedures. Coatings 2022; 12: 240.
50. Bird RS. Let's be more conscious about the misuse of nitrous oxide. Br Dent J. 2023 May;234(9):652-653. doi: 10.1038/s41415-023-5750-8.
51. Bernardi S, Qorri E, Botticelli G, Scarano A, Marzo G, Gatto R, Greco Lucchina A, Mortellaro C, Lupi E, Rastelli C, Falisi G. Use of electrical field for biofilm implant removal. Eur Rev Med Pharmacol Sci. 2023;27(3l):114-121.doi: 10.26355/eurrev_202304_31328.
52. Schmierer A, De Col L, Stöcker T, Wolf TG. A hypnotic turbo-induction technique for wisdom tooth extraction. Am J Clin Hypn.2023;65(4):314-326.doi: 10.1080/00029157.2022.2123774.
53. D'Amario M., De Angelis F., Vadini M., Marchili N., Mummolo S., D'Arcangelo C. Influence of a repeated preheating procedure on mechanical properties of three resincomposites. Operative Dentistry. 2015; 40 (2);181-189,
54. Biondi S, Mazza C, Orrù G, Monaro M, Ferracuti S, Ricci E, Di Domenico A, Roma P. Interrogative suggestibility in the elderly. PLoS One. 2020;16;15(11):e0241353.doi: 10.1371/journal.pone.0241353.
55. Mummolo S., Nota A., De Felice M.E., Marcattili D., Tecco S., Marzo G. Periodontal status of buccally and palatally impacted maxillary canines after surgical-orthodontic treatment with open technique (2018) Journal of Oral Science. 60 (4);552 – 556
56. Gurav KM, Kulkarni N, Shetty V, Vinay V, Borade P, Ghadge S, Bhor K. Effectiveness of Audio and Audio-Visual Distraction Aids for Management of Pain and Anxiety in Children and Adults Undergoing Dental Treatment- A Systematic Review And Meta-Analysis. J Clin Pediatr Dent. 2022;1;46(2):86-106. doi: 10.17796/1053-4625-46.2.2
57. Taharabaru S, Tamura T, Higashi M, Matsuda N, Satomoto M, Adachi YU, Sato AB, Okuda M. JM-1232(-) and propofol, a new combination of hypnotics with short-acting and non-cumulative preferable properties. Exp Anim. 2021;6;70(1):101-107. doi: 10.1538/expanim.20-0071.
58. Arcuri C., Petro E., Sollecchia G., Mummolo S., Marzo G. Laser in periodontal pockets: In vivo and in vitro study Journal of Biological Regulators and HomeostaticAgents.2020;34(3);139-146
59. Scarano A, Piattelli A, Polimeni A, Di Iorio D, Carinci F. Bacterial adhesion on commercially pure titanium and anatase-coated titanium healing screws: an in vivo humanstudy. J Periodontol 2010; 81: 1466-1471.
60. Queirolo L, Facco E, Bacci C, Mucignat C, Zanette G. Impairment of Hypnosis by Nocebo Response and Related Neurovegetative Changes: A Case Report in Oral Surgery. Int J Clin Exp

Hypn.2024;72(2):189-201. doi: 10.1080/00207144.2024.2311908
61. Botticelli G, Calabria E, Severino M, Foffo G, Petrelli P, Galli M, Calabria E, Giudice A, Gatto R, Falisi G. Ultrashort implant in the upper jaw, an alternative therapeutic procedureafter the failure of the sinus lift: a case report. Annali di Stomatologia 2020; XI: 28-32.
62. Wolf TG, Baumgärtner E, Peter B. Personality Styles of Dentists Practicing Hypnosis Confirm the Existence of the Homo Hypnoticus. Front Psychol. 2022 15;13:835200. doi: 10.3389/fpsyg.2022.835200.
63. Bernardi S., Mummolo S., Ciavarelli L.M., Li Vigni M., Continenza M.A., Marzo G.n Cone beam computed tomography investigation of the antral artery anastomosis in a population ofCentral Italy Folia Morphologica (Poland),.2016;75 (2);149 – 153
64. Weisfeld CC, Turner JA, Dunleavy K, Ko A, Bowen JI, Roelk B, Eissa R, Benfield E, Robertson K. Dealing with Anxious Patients: A Systematic Review of the Literature on Nonpharmaceutical Interventions to Reduce Anxiety in Patients Undergoing Medical or Dental Procedures. J Altern Complement Med. 2021;27(9):717-726.doi: 10.1089/acm.2020.0504.
65. Mummolo S, Botticelli G, Quinzi V, Giuca G, Mancini L, Marzo G. Implant-safe test in patients with peri-implantitis. J Biol Regul Homeost Agents 2020; 34: 147-153.
66. Weisfeld CC, Turner JA, Bowen JI, Eissa R, Roelk B, Ko A, Dunleavy K, Robertson K, Benfield E. Dealing with Anxious Patients: An Integrative Review of the Literature on Nonpharmaceutical Interventions to Reduce Anxiety in Patients Undergoing Medical or Dental Procedures. J Altern Complement Med. 2021 Sep;27(9):727-737.doi: 10.1089/acm.2020.0505.
67. Mummolo S, Sapio S, Falco A, Vittorini OL, Quinzi V. Management of pedodontic patients in moderate sedation in clinical dentistry: evaluation of behaviour before and after treatment. J Biol Regul Homeost Agents. 2020 J;34(1):55-62
68. Wolf TG, Kellerhoff KN, Schmierer A, Schmierer G, Halsband U. Caries treatment in a four-year-old boy using hypnosis - a case report. Am J Clin Hypn. 2021 Jan;63(3):217-228.doi: 10.1080/00029157.2020.1797624.
69. Marchetti, E., Pizzolante, T., Americo, L.M.,Quinzi,V.,Mummolo, S.Periodontology Part 4: Periodontal disease in children and adolescents. European Journal of Paediatric Dentistry.2022; 23(4);332–335
70. Kong X, Song N, Chen L, Li Y. Non-pharmacological interventions for reducing dental anxiety in pediatric dentistry: a network meta-analysis. BMC Oral Health. 2024;28;24(1):1151. doi: 10.1186/s12903-024-04919-x.
71. Mummolo S., Severino M., Campanella V., Barlattani A., Jr., Quinzi V., Marchetti E. Chlorhexidine gel used as antiseptic in periodontal pockets (2019) Journal of Biological Regulators and Homeostatic Agents.2019;33 (3);83- 88
72. Cozzolino M, Celia G, Rossi KL, Rossi EL. Hypnosis as Sole Anesthesia for Dental Removal in a Patient with Multiple Chemical Sensitivity. Int J Clin Exp Hypn. 2020;68(3):371-383. doi: 10.1080/00207144.2020.1762494..
73. Marchetti E., Mummolo S., Mancini L., Quinzi V., Pontieri E., Marzo G., Campanella V.Decontamination in the dental office: a comparative assessment of a new active principle [Decontaminazione nello studio odontoiatrico: Valutazione di un nuovo principio attivo) Dental Cadmos, 2021; 89(3);200 -206
74. Peter B, Roberts RL. Hypnotizability Norms may not be Representative of the General Population: Potential Sample and Self-Selection Bias Considerations. Int J Clin Exp Hypn. 2022;70(1):49-67.doi: 10.1080/00207144.2021.2003694
75. Campanella V., Mummolo S., Grazzini F., Barlattani A., Jr., Di Girolamo M. The effectiveness of endodontic sealers and endodontic medicaments on the elimination of Enterococcus faecalis: An in vitro study Journal of Biological Regulators and Homeostatic Agents.2019;33(3);97-102
76. Tecco S., Baldini A., Mummolo S., Marchetti E., Giuca M.R., Marzo G., Gherlone E.F. Frenulectomy of the tongue and the influence of rehabilitation exercises on the sEMG activity of masticatory

muscles Journal of Electromyography and Kinesiology.2015;25(4),619 – 628
77. Gibson, H. & Heap, M.. (2021). Hypnosis in Therapy. 10.4324/9781003163404.
78. Chen SC, Chen CY, Shen SJ, Tsai YF, Ko YC, Chuang LC, Lin JR, Tsai HI. Application of Bispectral Index System (BIS) Monitor to Ambulatory Pediatric Dental Patients under Intravenous Deep Sedation. Diagnostics (Basel). 2023 18;13(10):1789.doi: 10.3390/diagnostics13101789.
79. Phipps, Warwick. (2019). Waking Hypnosis as a Psychotherapeutic Technique. Sleep and Hypnosis. 21. 188-200. 10.5350/Sleep.Hypn.2019.21.0187.
80. Hidoussi, Emna & Grissa, Mohamed & Zoghlami, Sabri & Khayati, Ahmed & Zokkar, Neila. (2021). Assessment of Hypnosis Knowledge Among Dentists: A Cross-Sectional Study. Pesquisa Brasileira em Odontopediatria e Clínica Integrada. 21.10.1590/pboci.2021.047.Pesquisa Brasileira em Odontopediatria e Clínica Integrada. 21.10.1590/pboci.2021.047.
81. Bernardi, S., Mummolo, S., Zeka, K., ... Continenza, M.A., Marzo, G. Use and Evaluation of a Cooling Aid in Laser-Assisted Dental Surgery: An Innovative Study. Photomedicine and Laser Surgery, 2016, 34(6);258–262
82. De Stefano R. Psychological Factors in Dental Patient Care: Odontophobia. Medicina (Kaunas). 2019 Oct 8;55(10):678.doi: 10.3390/medicina55100678.
83. Wolf TG, Kellerhoff KN, Schmierer A, Schmierer G, Halsband U. Caries treatment in a four-year-old boy using hypnosis - a case report. Am J Clin Hypn.2021;63(3):217-228. doi: 10.1080/00029157.2020.1797624.
84. Newadkar UR, Chaudhari L, Khalekar YK. Knowledge, awareness, and practices of complementary and alternative medicine for oral health-care management among dental students. Int J Yoga. 2017;10(1):44-46. doi: 10.4103/0973-6131.194562.
85. Tecco, S., Baldini, A., Mummolo, S., Marzo, G., Gherlone, E.F. Frenulectomy of the tongue and the influence of rehabilitation exercises on the sEMG activity of masticatory muscles. Journal of Electromyography and Kinesiology.2015;25(4);619–628