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Evaluate the Relationship between Dental Anxiety, State Anxiety and Procedure Pain during Maxillary Local Anesthesia in Saudi Arabia 2024

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Abstract:
Background: The successful anesthesia is an essential factor for dental treatment. Fear of local anesthesia is a significant barrier to dental care as many patients delay or avoid treatment to prevent pain. It is important to evaluate the relationship between dental anxiety, state anxiety and procedure pain during maxillary local anesthesia.**The study aimed:** Toevaluate the correlation between dental anxiety, state anxiety and pain after dental injection. **Methods:** A cross sectional study was utilized. Before receiving treatment, every one of the 120 children who scored highly on the Frankle behavior measure had a maxillary injection. The Children Fear Scale was used to measure dental fear, while the Children fear Questionnaire was used to measure state anxiety. Pain following dental injection was measured using the FLACC Scale and the Wong Baker Scale. **Results:** No statistically significant differences were found in anxiety level scores between genders and age groups with p-value > 0.05. A statistically significant difference in the postoperative pulse rate between males and females, with females having a greater mean pulse rate (pvalue=0.024). A positive correlation was found between each dental anxiety and procedural pain and state anxiety and procedural pain.**Conclusion:** Reducing anxiety in young patients improves their quality of life and health care by lowering the expected and procedural pain that they endure.
Keywords: Dental Anxiety, State Anxiety and Procedure Pain

Introduction:

Dental anxiety is a patients' response to stress in a dental setting [(1)]. Medical procedures cause a feeling of fear, inability, as well as anxiety[(2)]. It can be provoked due to multiple factors, such as previous negative or traumatic experience, sensory triggers such as sights of needles and air-turbine drills, sounds of drilling and screaming, vicarious learning from anxious people, patients' personality characteristics and their coping strategies[(3-8)].A patient's reaction to an unknown risk that makes them fearful that something severe is going to happen during dental treatment is known as dental fear and anxiety (DFA), and it's frequently associated with a feeling of helplessness[(9)]. A number of reasons contribute to the high prevalence of dental anxiety in young patients, which is reported to range from 5.7% to 20.2%[(10)].

According to Morgan and Porritt, (2017)[(11)], dental anxiety and fear are normal aspects of a teenager's cognitive development, albeit they typically have less of an impact on an older child. The development of dental anxiety and fear in children is influenced by a number of interrelated personal and environmental factors, which together make up the multifactorial etiology of dental anxiety and dread[(12)]. Gender and age are contentious variables that influence the onset of dental anxiety. Since there was no correlation between the age at the initial visit and the emergence of dental dread, ShindovaandBelcheva, (2021) [(13)] found that age had no impact in the development of dental fear and anxiety.

According to a comprehensive review by Murad et al., (2020) [(14)], there is a relationship between age and DFA levels; younger children had greater DFA levels than older patients. In terms of gender, study conducted by Morgan and Porritt, (2017) [(11)] have generally shown that women report higher levels of DFA than men do, as well as more particular fear and anxiety related to drilling, local anesthesia, and pain. Pain is a major element that is thought to be a high risk factor for developing dental anxiety. According to the IASP, pain is an unpleasant emotional and sensory experience that is connected to or expressed in terms of existing or potential tissue damage[(15, 16)]. However, the relationshipbetween anxiety and pain is reciprocal due tothe multifactorial etiology of DFA and themultiple dimensions of pain[(17, 18)].

Patients who have had severe dental pain are more likely to report greater DFA levels, which are linked to prior painful oral experiences[(19)]. Furthermore, a number of studies have found that when receiving invasive treatment, anxious patients typically perceive pain worse than non-anxious patients[(20-22)]. According to a systematic review by Heaton, (2017) [(23)]revealed that anxiety levels did not differ between surgical and nonsurgical procedures, but dental anxiety significantly

affects expected pain, pain during dental treatment, and pain after treatment. State anxiety significantly affects pain perception and pain during procedures only.

Studies have shown a strong link between procedural pain and anxiety in pediatric patients[24, 25]. Studies on dental treatment have demonstrated that lowering dental anxiety using a variety of techniques, including procedural sedation, virtual reality, and the buzzy system; can successfully lessen patients' perceptions of pain during dental treatments[26].Hence, the aim of the study was toevaluate the relationship between dentalanxiety, state anxiety and procedural pain inschool-aged children during dentalanesthesia administration.

Methods:

This observational a cross-sectional study wasutilized toevaluate the correlation between dentalanxiety and pain during local anesthesiaadministration. This study conducted from January to July2024. Children who visited the pediatric dental department of a hospital in Jeddah, Saudi Arabia, were chosen at random to participate in the study. All procedures were followed in compliance with the Declaration of Hospital and all applicable rules and regulations. The University's Ethical Committee also granted ethical approval. Additionally, before the data gathering process began, formal informed consent was acquired from the guardians of each participant.

The sample size was determined withG-power software v3.1.9.7 and based onsimilar previous studies[23, 24]. A total of 120children aged 6-10 years who visited thedentist for the first time and needed dentaltreatment in the maxillary arch includingadministration of local anesthetic, wereincluded in this study. Patients withcommunication disabilities, or medical orpsychological disorders that may have aneffect on the pain threshold were excluded.Moreover, patients with severe dental pain oracute abscess and children with a negative orabsolutely negative ranking according to theFrankle Behavior Rating Scale were alsoexcluded.

Each patient was seated in the dentalchair, and then 20% benzocaine gel wasapplied at the injection site prior to anesthesiafor 1 minute via a sterile cotton swab.Afterwards, a 1:80000 lidocaine infiltrationinjection was administered in the maxillaryarch.Pain and anxiety were assessed usingseveral measures: children's state anxietywas assessed by the Child AnxietyQuestionnaire (CAQ) developed by Garcia etal., (2020) [27] a tool driven by the State –Trait AnxietyScale. This accumulative scale was used tomeasure state anxiety before and aftertreatment. 4-6 points referred to no anxiety ormild anxiety, while 7-9 points describedmoderate anxiety, with 10-12 pointsindicating severe anxiety or phobia. Fordental anxiety, the Children Fear Scale (CFS)was used to assess pre- and postoperative fearamong patients undergoing a painful medicalprocedure[28]. This is a self-reported assessmenttool consisting of 5 faces representingdifferent levels of fear, with 0 indicating nofear and 4 indicating the worst feeling of fear.

Additionally, changes in the physiologicalpulse rate were recorded before and after theadministration of anesthesia using a fingerpulse oximeter the first time was 5 minutesafter the patient was seated in the dentalchair, second time was 5 minutes after thedental injection. Regarding pain, the childwas asked to choose a face from the WongBaker scale (WB that matches his feelingsafter receiving the injection). In addition, thechild's behavior during the administration oflocal anesthesia was recorded on video usinga mobile phone camera attached to the dentalchair, andwas subsequently assessed by two externalobservers according to the Faces-LegsActivity-Cry-Consolability scale (FLACC).

In this study, descriptive data,including means, frequencies andpercentages, were calculated for boys andgirls. For the quantitative variables, theKolmogorov-Smirnov test was used to assessnormality. Normality was found for the pulserate scores.The collected data were analyzedusing IBM SPSS software v. 28. P value of less than 0.05was considered significant, and the power ofthe study was set at 95%. The Mann-WhitneyU test was performed to compare CFS, andCAQ scores and WB, and FLACC scoresbetween males and females, while simple t-test was used to compare pulse rate meanbetween gender and age groups. Moreover,the correlations between CAQ score, CFSscores and FLACC, and WB scores werestudied using Spearman's rank correlationwith a level of significance of 0.01.

Results:

For this study, 120 patients in all were enrolled. **Table (1)** shows that the average age of the 60 males and 60 females were 7.7 ±1 years.No statisticallysignificant difference was found betweenmales and females with regard to mean age (pvalue =1.34).

In addition, no statistically significant differencewas found between males and females in CFSscores (p value=0.349), as 46.66% of malepatients and 33.33% of female patients hadno fear at all (table 1). CFS scores wereevaluated for the following age groups: 6- <8years and 8≤ -10 years. There was nostatistically significant difference betweenthese age groups (p value= 0.621),Moreover, there was no correlation betweenage and anxiety level (p value > 0.05).(**Table1**)

Table (1): Mann-Whitney results for CFS scores for gender and age groups.

CFS	**gender**			**age**		
	Male	**Female**	**Total**	***6-<8***	***8≤-10***	**Total**
0	46.7%	33.3%	40%	43.4%	37.31%	40%
1	35%	51.7 %	43.3%	39.6%	46.2%	43.3%
2	11.7%	10%	10.8%	11.3%	10.44%	10.8%

769

CFS	**gender**			**age**		
	Male	**Female**	**Total**	***6-<8***	***8≤-10***	**Total**
3	5%	1.66%	3.3%	3.7%	2.9%	3.3%
4	1.7 %	3.3 %	2.5%	1.8%	2.9%	2.5 %
N	60	60	120	53	67	120
p-value	0.349			0.621		

* p- Value is significant at < 0.05

Table (2) shows that CAQ scores did not differ betweenmale and female patients (p value=0.642),with 87.5% of the total patients diagnosedwith mild state anxiety and 2.5% of patientssuffering from high state anxiety (p value=0.062).

Table (2): Mann-Whitney results for CAQ scores for gender and age groups.

CAQ	**GENDER**			**AGE**		
	Male	**Female**	**Total**	**6-<8**	**8≤-10**	**Total**
Mild (4-6)	86.6%	88.3%	87.5%	92.5%	8.5%	87.5%
Moderate (7-9)	10%	10%	10%	1.88%	16.41%	10%
High (10-12)	3.3%	1.7 %	2.5%	5.7%	0%	2.5%
N	60	60	120	53	67	120
P-VALUE	0.642			0.062		

* p- Value is significant at < 0.05

Table (3) shows that the mean FLACC scores were 0.88for males and 0.97 for females, but nostatistically significant difference was foundbetween gender groups (p value =0.753), orbetween age groups (p value= 0.836), as themean score for those aged 6- <8 years was0.91 and for those aged 8≤ -10 years was 0.94.

Table (3): Mann-Whitney results for FLACC scores for gender and age groups

	FLACC					
	gender			**age**		
	male	**female**	**Total**	**6-<8**	**8≤-10**	**total**
Mean	0.88	0.97	0.92	0.91	0.94	0.92
N	60	60	120	53	67	120
Std.Deviation	0.783	0.901	0.842	0.838	0.851	0.842
P VALUE	0.753			0.836		

* p- Value is significant at < 0.05

Table (4) shows that more malepatients reported greater pain levels thanfemale patients did but no statisticallysignificant difference was found (p value=0.701), additionally, older patients reportedgreater pain levels than younger patients did,with no statistically significant differencebetween them (p value= 0.836).

Table (4): Mann-Whitney test for the Wong Baker scores for gender and age groups

	WongBaker					
	Gender			**Age**		
	Male	**Female**	**Total**	**6-<8**	**8≤-10**	**Total**
opain (0)	22	23	45	18	27	45
Hurts littlebit (2)	32	33	65	31	34	65
Hurts little more(4)	6	4	10	4	6	10
N	60	60	120	53	67	120
P VALUE	0.701			0.836		

* p- Value is significant at < 0.05

Table (5) shows that there was astatistically significant difference in the pulserate between males and females, with femaleshaving a greater mean pulse rate (p value=0.024). During anesthesia, the pulse rates didnot differ significantly between males andfemales (p value= 0.981). Moreover, nosignificant differences in pulse rates wereobserved between the age groups eitherpreoperatively or during anesthesia.

Table (5): t-test results for pulse rate mean for gender and age groups

	Pulseratemean					
	Gender			**Age**		
	Male	**Female**	**Pvalue**	**6-<8**	**8≤-10**	**Pvalue**
Preoperative	95.42	97.02	0.024*	96.62	95.90	0.615
Duringanesthesia	99.08	99.77	0.981	100.36	98.69	0.192

* p- Value is significant at < 0.05

The relationships between patients'pain responses to dental injection, indicatedby the Wong Baker scale and FLACC scale,and their dental anxiety and state anxietyscores were evaluated by Spearman's rankcorrelation coefficient. There was astatistically significant correlation betweenthe WB, and FLACC scores and both the CFSand CAQ scores (P < 0.01) (Table 6).

Table (6): correlation between dental anxiety, state anxiety and procedural pain measures

SpearmanCorrelation				
	Male		**Female**	
	Correlation coefficient	**P-value**	**Correlation coefficient**	**P-value**
CAQ/ FLACC	0.382	0.003**	0.589	0.000**
CFS/Wong-baker	0.501	0.000**	0.435	0.001**
CFS/ FLACC	0.386	0.002**	0.636	0.000**
CAQ/ Wong-Baker	0.390	0.002**	0.454	0.000**

** Correlation is significant at 0.01 level

Discussion:

Pain is as much a cognitive and emotional construct as it is a physiological experience[29]. Thus, emotional states, such as anxiety and fear, can affect the severity of pain32. Some studies have demonstrated that patients with a high anxiety level experience difficult anesthesia and more pain during different dental treatments [30, 31]. Dental patients usually expect more pain than their previous experiences, and perception of pain is an essential factor in this regard. According to the

771

literature, people with a high anxiety score tend to exaggerate their level of pain and fear[32].

Dental anxiety and fear originate from unpleasant past experiences, and as anxiety and pain perception were proven to be positively correlated in adult patients, high DFA levels make patients feel more pain[22]. Furthermore, despite the fact that research has demonstrated the effectiveness of DFA in reducing pain during dental procedures, this link has not been thoroughly evaluated in young patients[33]. The aim of this study was to evaluate the relationship between procedural pain, dental anxiety, and state anxiety during the administration of a local anesthetic before dental treatment. Because pain and anxiety have both physical and psychological components, it is challenging to quantify them[34].

As a result, the evaluation of pain and anxiety requires a controlled and regulated setting. In the current study, all patients were treated by a single, skilled pediatric dentist in a calm, distraction-free setting while sharing a single dental chair. Children in school were selected for the study due to their competent cognitive development, which can help them explain their feelings and report them more accurately than younger children[35]. Additionally, Abdelrazk et al., (2024)[36] state that a child's initial attitudes regarding dental care are known to develop around this age range.

In pediatric dentistry, local anesthetic and needle phobia are major issues because they affect children's compliance, treatment results, and anxiety levels[37]. Consequently, this technique was selected because to its ability to influence both pain and anxiety. There is debate in the literature regarding the connection between sex and dental anxiety[38, 39]. However, other research have found that dental anxiety is more common in women than in men[38, 40]. According to Popescu et al., (2024)[41] and Abanto et al., (2017)[42], there was no difference in the CFS and CAQ scores between boys and girls in the current study.

There were not significant differences in the anxiety levels between the two age groups. This might be explained by the fact that every patient scored well on the Frankl behavior rating scale. Age and anxiety levels also did not correlate, although the association between DFA and age cannot be regarded as stable because it can be influenced by exposure to different social and cultural events as well as dental health state[43].Men and women did not significantly differ in how much pain they reported, which is consistent with research by Ghanei et al., (2018)[44] and Naoumova et al., (2012)[45].

In both genders, there was a positive relationship between dental anxiety and procedural pain as well as between state anxiety and procedural pain, and patients who were nervous expressed higher levels of pain than those who were not. In a relevant finding, Sanikop et al. (2011)[22] found that when patients' dental anxiety levels were greater, they anticipated more pain than they actually felt. This conclusion highlights the significance of DFA management in reducing pain, which ultimately enhances children's opinions of dental care and its results.

Conclusion:

Anxiety and dental fear are linked to procedural pain; lowering anxiety helps children feel less pain and have a better dental experience, which improves their oral health and quality of life.Although a high level of anxiety is an indication of sedation in the patients, proper interventions, such as informing patients about anesthesia, dental treatment procedures, regular and periodic visits to the dentist, as well as using psychotherapeutic techniques to reduce dental anxiety before anesthesia, could play an essential role in the success of anesthesia.

References:

1. Corah NL, Gale EN, Illig SJ. Assessment of a dental anxiety scale. J Am Dent Assoc. 1978 Nov;97(5):816-9. doi: 10.14219/jada.archive.1978.0394.
2. Newton JT, Buck DJ. Anxiety and pain measures in dentistry: a guide to their quality and application. J Am Dent Assoc. 2000 Oct;131(10):1449-57. doi: 10.14219/jada.archive.2000.0056.
3. Locker D, Shapiro D, Liddell A. Overlap between dental anxiety and blood-injury fears: psychological characteristics and response to dental treatment. Behav Res Ther. 1997 Jul;35(7):583-90. doi: 10.1016/s0005-7967(97)00016-8.
4. Benjamins C, Schuurs AH, And TK, Hoogstraten J. Self-reported and physiologically measured dental anxiety, coping styles and personality traits. Anxiety Stress Coping. 1996;9(2):151-62. doi: 0.1080/10615809608249398.
5. Öst L-G, Hugdahl K. Acquisition of blood and dental phobia and anxiety response patterns in clinical patients. Behav Res Ther. 1985;23(1):27-34. doi: 10.1016/0005-7967(85)90139-1.
6. Oosterink FM, De Jongh A, Aartman IH. What are people afraid of during dental treatment? Anxiety-provoking capacity of 67 stimuli characteristic of the dental setting. Eur J Oral Sci. 2008 Feb;116(1):44-51. doi: 10.1111/j.1600-0722.2007.00500.x.
7. Walsh LJ. Anxiety prevention: implementing the 4 S principle in conservative dentistry. Auxilliary. 2007;17(5):24-6.
8. Hmud R, Walsh LJ. Dental anxiety: causes, complications and management approaches. J Minimum Interv Dent. 2009;2(1):67-78.
9. 9Klingberg G, Broberg AG. Dental fear/anxiety and dental behaviour management problems in children and adolescents: a review of prevalence and concomitant psychological factors. Int J Paediatr Dent. 2007; 17(6):391-406.
10. 10Grisolia BM, Dos Santos APP, Dhyppolito IM, Buchanan H, Hill K, Oliveira BH. Prevalence of dental anxiety in children and adolescents globally: A systematic review with meta-analyses. Int J Paediatr Dent. 2021; 31(2):168-83.
11. 11 Morgan AG, Porritt J. Background and prevalence of dental fear and anxiety. In: Porritt J, editor. Dental fear and anxiety in pediatric patients. 1st ed. Cham: Springer Nature; 2017.
12. 12Alasmar AA, Aldossari GS, Aldossary MS. Dental anxiety in children: A review of the contributing factors. J Clin

Diagn Res. 2018; 12–SG03.

13. 13Shindova MP, Belcheva AB. Dental fear and anxiety in children: a review of the environmental factors. Folia Med (Plovdiv). 2021;63:177-82.
14. 14 Murad MH, Ingle NA, Assery MK. Evaluating factors associated with fear and anxiety to dental treatment: A systematic review. J Family Med Prim Care. 2020;9:4530-5.
15. 15 Raja SN, Carr DB, Cohen M, Finnerup NB, Flor H, Gibson S, et al. The revised International Association for the Study of Pain definition of pain: concepts, challenges, and compromises. Pain. 2020;161(9):1976-82.
16. 16 Coolidge T, Kotsanos N. Child dental fear, communication and cooperation. In: Kotsanos N, Coolidge T, editors. Pediatric Dentistry. 11th ed. Cham: Springer Nature; 2022.
17. 17 Oliveira MM, Colares V. The relationship between dental anxiety and dental pain in children aged 18 to 59 months: a study in Recife, Pernambuco State, Brazil. Cad Saude Publica. 2009;25(4):743-50.
18. 18 Talbot K, Madden VJ, Jones SL, Moseley GL. The sensory and affective components of pain: are they differentially modifiable dimensions or inseparableaspects of a unitary experience? A systematic review.*Br J Anaesth*. 2019;123(2):263-72.
19. 19 Murillo-Benítez M, Martín-González J, Jiménez-Sánchez MC, Cabanillas-Balsera D, Velasco-OrtegaE, Segura-Egea JJ. Association between dental anxietyand intraoperative pain during root canal treatment: across-sectional study. *Int Endod J*. 2020;53(4):447-54.
20. 20 Yu J, Jiang R, Nie EM, Zhang CY, Li X. Theprevalence of dental anxiety associated with painamong Chinese adult patients in Guangzhou. *Pain ResManag*. 2021;2021(1):7992580.
21. 21 Fernandez-Aguilar J, Guillén I, Sanz MT, JovaniSancho M. Patient's pre-operative dental anxiety isrelated to diastolic blood pressure and the need forpost-surgical analgesia. *Sci Rep*. 2020;10(1):9170.
22. 22Sanikop S, Agrawal P, Patil S. Relationshipbetween dental anxiety and pain perception duringscaling. *J Oral Sci*. 2011;53(3):341-8.
23. 23 Heaton LJ. Self-reported dental anxiety isassociated with both state anxiety and dentalprocedure–related pain. *J Evid Based Dent Pract*.2017;17(1):45-7. doi:10.1016/j.jebdp.2017.01.007.
24. 24 Vest E, Armstrong M, Olbrecht VA, Thakkar RK,Fabia RB, Groner JI, et al. Association of preprocedural anxiety with procedure-related pain duringoutpatient pediatric burn care: a pilot study. *J Burn Care Res*. 2023;44(3):610-7.
25. 25Fussek-Styga U, Błaszczyk A, Trojan S, Kwieciński J, Miszuda S, et al. Virtual Reality as a method to reduce pain and anxiety in pediatric patients: a review. *J Educ Health Sport*. 2023;31(1):80-93.
26. 26D'Arro C. Harnessing the power of gate control: interventions for proceduralpain and anxiety. *Int J Whole Person Care*. 2022;55-5.
27. 27 Garcia de Avila MA, Hamamoto Filho PT, Jacob FL, Alcantara LR, Berghammer M, JenholtNolbris M, et al. Children's anxiety and factors related to the COVID-19 pandemic: an exploratory study using the children's anxiety questionnaire and the numerical rating scale. *Int J Environ Res Public Health.* 2020;17(16):5757.
28. 28 McMurtry CM, Noel M, Chambers CT, McGrath PJ. Children's fear during procedural pain: preliminary investigation of the Children's Fear Scale. *Health Psychol*. 2011;30(6):780.
29. 29Maggirias J, Locker D. Psychological factors and perceptions of pain associated with dental treatment. Community Dent Oral Epidemiol. 2002 Apr;30(2):151-9. doi: 10.1034/j.1600-0528.2002.300209.x.
30. 30Rhudy JL, Meagher MW. Fear and anxiety: divergent effects on human pain thresholds. Pain. 2000 Jan;84(1):65-75. doi: 10.1016/s0304-3959(99)00183-9.
31. 31Liau FL, Kok S-H, Lee J-J, Kuo R-C, Hwang C-R, Yang P-J, et al. Cardiovascular influence of dental anxiety during local anesthesia for tooth extraction. Oral Sur Oral Med Oral Pathol Oral RadiolEndod. 2008 Jan;105(1):16-26. doi: 10.1016/j.tripleo.2007.03.015.
32. 32Guzeldemir E, Toygar HU, Cilasun U. Pain perception and anxiety during scaling in periodontally healthy subjects. J Periodontol. 2008 Dec;79(12):2247-55. doi: 10.1902/jop.2008.080152.
33. 33 Monteiro J, Tanday A, Ashley PF, Parekh S, Alamri H. Interventions for increasing acceptance of local anaesthetic in children and adolescents having dental treatment. *Cochrane Database Syst Rev.* 2020; 2020(2).
34. 34Ceniza-Bordallo G, Fraile AG, Martín-Casas P, López-de-Uralde-Villanueva I. Cross-cultural adaptation and psychometric properties of Spanish Child Pain Anxiety Symptoms Scale. *AnPediatr (Engl Ed).* 2023;99(1):14-25.
35. 35 Pereira AI, Barros L, Mendonça D, Muris P. The relationships among parental anxiety, parenting, and children's anxiety: the mediating effects of children's cognitive vulnerabilities. *J Child Fam Stud*. 2014;23:399-409.
36. 36AbdelRazek, R., Abd El Rahman, D., El-ElhossinyAbdelbasir, R., Abd El-Aziz, A. A Cross-Sectional Study on the Impact of Children's Intelligence Quotient on Their Behavior and Anxiety in a Dental Setting. *Ain Shams Dental Journal*,2024;34(2):57- 67.doi: 10.21608/asdj.2024.275306.1224

37. 37Belevcikli M, Halenur A, Osman De. Effect of the new needle-free injection system on pain perception and dental anxiety during anesthesia: randomized controlled split-mouth study. *J Dent Anesth Pain Med*. 2023; 23(1):1.

38. 38Kakkar M, Wahi A, Thakkar R, Vohra I, Shukla AK. Prevalence of dental anxiety in 10-14 years old children and its implications. *J Dent Anesth Pain Med*. 2016; 16: 199-202.

39. 39İlhan U, Bengi A, Aslı TA. Evaluation of the risk factors of dental anxiety in children. *J Pediatr Res*.2022;9(2):99-104. doi:10.4274/jpr.galenos.2022.79990.

40. 40Rajwar AS, Goswami M. Prevalence of dental fear and its causes using three measurement scales among children in New Delhi. *J Indian Soc PedodPrev Dent*. 2017;35:128-33.

41. 41 Popescu SM, Dascălu IT, Scrieciu M, Mercuţ V, Moraru I, Ţuculină MJ. Dental anxiety and it association with behavioral factors in children. *Curr Health SciJ*.2014;40(4):261-4. https://doi.org/10.12865/CHSJ.40.04.05

42. 42Abanto J, Vidigal EA, Carvalho TS, Sá SNC de, Bönecker M. Factors for determining dental anxiety in preschool children with severe dental caries. *Braz Oral Res*. 2017;31:13

43. 43 Ortiz S, Yoon M, Gibson M, Kornerup I, Zeinabadi MS, Lai H. Children's Anxiety Levels and Their Perspectives on Dental Experiences in Students' Clinical Evaluation. *Int J Clin Pediatr Dent.* 2023;16(Suppl 2):206–12. doi: 10.5005/jp-journals-10005-2620.

44. 44Ghanei M, Arnrup K, Robertson A. Procedural pain in routine dental care for children: a part of the Swedish BITA study. *Eur Arch Paediatr Dent*. 2018;19(5):365–72. doi: 10.1007/s40368-018-0368-2.

45. 45Naoumova J, Kjellberg H, Kurol J, Mohlin B. Pain, discomfort, and use of analgesics following the extraction of primary canines in children with palatally displaced canines. *Int J Paediatr Dent.* 2012