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Which maternal personality traits affect child behaviour during dental treatment

ABSTRACT

Aim Maternal personality traits affect child dental behaviour and have a potential link with dental treatment methods. This study aims to evaluate which maternal personality traits affect child dental behaviour.

Materials and methods Research was carried out upon 60 children aged between 3–12 years, who had been admitted to our clinic for tooth extraction. All children were evaluated by means of the Frankl Behavior Scale (FBS): degrees I and II represent negative behaviour, while III and IV positive behavior. Thirty children with FBS degree III and IV were assigned to Group I and 30 children with FBS degree I and II were assigned to Group II. Children in Group I underwent tooth extraction with local anaesthesia. Children in Group II underwent tooth extraction under deep sedation. During the first visit, the mothers were tested with the Minnesota Multiphasic Personality Inventory to evaluate personality traits. All mothers in Group I and half the mothers in Group II filled a complete and valid test.

Results Group I and II mothers were compared according to the test results: scores of the Minnesota Multiphasic Personality Inventory (MMPI) test were significantly higher in Group II ($p < 0.05$).

Conclusion We hypothesize that character features of mothers of children with negative dental behaviour and positive dental behaviour are different and affect child dental behaviour.

Keywords Child dental behaviour; Dental anxiety; Maternal personality traits.

Introduction

Child anxiety levels and behaviour characteristics affect dental treatment choices; while cooperative children undergo dental treatment with local anaesthesia, uncooperative children usually undergo dental treatment with general anaesthesia or sedation [Folayan et al., 2004, Klinberg and Broberg, 2007, Goumans et al., 2004, Wilson, 2013, Coulthard, 2013]. Various factors are reported to cause negative behaviour in children, during dental treatment [Klinberg and Broberg, 2007, Paryab and Hosseinbor, 2013, Arnrup et al., 2002]. One of these factors is the parent who has an impact on their children's behaviour [Rowe, 1990]. In psychology literature it was initially suggested by Belsky [1984] that negative child behaviour could be associated with parental personality traits. Today it is known that maternal personality traits affect child behaviour [van Aken et al., 2007] and maternal anxiety is considered as a major factor, which affects dental interventions [Johnson and Baldwin, 1968]. Knowing and eliminating factors that cause negative dental behaviour in the paediatric age group, may affect dental treatment [Beringer et al., 2014, Ogle and Hertz, 2012]. This study aims to investigate the relationship between child dental behaviour and maternal personality traits. Furthermore this study focused on which maternal personality traits were related to children's negative dental behaviour.

Materials and methods

Ethical approval for the study was obtained from Ankara University Faculty of Dentistry Ethics Committee. During a period of 6 months, 87 children aged 3 to 12 years, who had been admitted to our clinic for tooth extraction, and their parents were interviewed about the study. Of them, 27 children and their parents were excluded because they did not give their consent for the study. The study was carried out upon 60 children. Inclusion criteria were absence of systemic diseases, no history of dental treatment (including filling, fluoride applications, etc.), being accompanied by both parents, low risk of complicated tooth extraction and willingness to be included in the study. Parents of children admitted to our clinic for tooth extraction were informed about the study and written consents were obtained. Child dental behaviour was evaluated by the oral surgeon with Frankl Behavior Scale (FBS) (Table 1) [American Academy on Pediatric Dentistry, 2008-2009] during the first visit to all of the children: degree I and II represent negative behaviour, degree III and IV represent positive behaviour. Children were then given to the custody of their fathers and meanwhile a psychologist, blinded to the group of the child, administered the Minnesota Multiphasic Personality Inventory (MMPI) test to the mothers in a quiet environment. Mothers whose MMPI test scored a invalid results were excluded from the study.

The same psychologist evaluated the tests of all the mothers who completed the MMPI.

All children completed a valid FBS test. Among the subjects who exhibited a positive behaviour, 30 children were assigned to Group I, and underwent tooth extraction in the clinic with local anaesthesia (Ultracain® D-S, Sanofi Aventis, Istanbul, Turkey) administered by the same oral surgeon. Tooth extractions of children in Group II were attempted in the clinic but none of them complied. After 3 days another attempt was made and 30 children who did not comply were randomly chosen and assigned to Group II and underwent tooth extraction in the operating room under deep sedation (according to University of Michigan Sedation Scale) provided by an anaesthesiologist. Tooth extractions of Group II children were performed under deep sedation (UMSS Level 3) [Malviya et al., 2002], which was provided with intravenous 1 to 5 mg/kg-1 ketamine (Ketalar®, Parke Davis, Eczacıbası, Istanbul, Turkey). The same oral surgeon carried out all tooth extractions, without complications, under deep sedation or local anaesthesia.

Statistical analysis

Statistical analyses were made with SPSS 17.0 package (SPSS Inc, Chicago, IL, USA). Student’s-t test was used in the independent groups to determine if there was a significant difference between the groups. Demographics were evaluated using the chi-square or Fisher’s exact chi-square tests. The statistics is presented as mean±standard deviation (min-max, per cent). The significance level was considered $p<0.05$ for all statistical analyses.

Personality Traits Test

The Minnesota Multiphasic Personality Inventory (MMPI) is one of the most frequently used tests for personality assessment. It was developed in 1943 as a screening tool for psychopathology and assessment of personality [Hathaway and McKinley, 1943]. It consists of 566 self-report true/false questions, which are scored for 8 clinical scales of psychopathology, 2 scales of personality dimensions (masculinity-femininity) and social introversion, and 3 scales of validity. At the MMPI assessment, validity subtests were primarily evaluated and the profile was assessed based on these results. The criterion for invalidity was not to complete the test or internal inconsistency. While assessing a valid MMPI, 70 T-score points and above obtained from the subscales were considered pathological [Porath and Kaemmer, 1992]. Each subtest of the MMPI was individually included in the analyses in order to investigate the hypothesis that the MMPI profiles of the mothers of the children with a high level of anxiety would provide a more pathological MMPI profile than that of the mothers of the children with a low level of anxiety. Since the primary goal of the test is to be used in a clinical setting, the first nine tests were sorted according to the psychiatric diagnosis groups. These subtests were Hs (Hypochondriasis), D

1	Definitely negative (-)	Refusal of treatment (procedures). Forceful crying, fearfulness, or any other overt evidence of extreme negativism
2	Negative (-)	Reluctance to accept treatment (procedures), uncooperative, some evidence of negative attitude but not pronounced (sullen, withdrawn)
3	Positive (+)	Acceptance of treatment (procedures); cautious behavior at times; willingness to comply with the dentist, at times with reservation, but patient follows the dentist’s directions cooperatively
4	Definitely Positive (++)	Good rapport with the dentist, interested in the dental procedures, laughter and enjoyment

TABLE 1 Frankl Behavioral Scale.

(Depression), Hy (Hysteria), Pd (Psychotic Deviate), Mf (Masculinity-Femininity), Pa (Paranoia), Pt (Psychasthenia), Sc (Schizophrenia), and Ma (Hypomania). Subsequently, the Social Introversion (Si) test was developed and added to the standard test profile as well. Besides the clinical subtests, there were three validity subtests called L (Lie), F (Frequency or Infrequency), and C (Correction).

Results

There was no statistically significant difference in age, body weight, and gender characteristics between the two groups (Table 2). The study included a total of 60 children with a negative dental behaviour (FBS degree I-II: 30, Group II) or positive dental behaviour [FBS degree III-IV: 30, Group I]. While the MMPI tests of all the mothers in Group I (n=30) were valid, 50% of those of the mothers in Group II (n=15) were not complete or had internal inconsistency and therefore were scored as invalid and excluded from evaluation. The mean score of the clinical subtests of the 45 mothers whose tests were valid (Group I, n=30, Group II, n=15), is presented in Table 3. It appears that the mean score of the mothers from the MMPI subtests is below 70 T-score points. This suggests that the group of the participant mothers generally did not show psychopathology based on the MMPI findings (III). There were pathological findings (≥ 70 points) in the MMPI profiles of 16 participants. When the mothers with higher scores were examined, 9 (60%) belonged to Group II and 7 (23.3%) to Group I ($p\leq 0.05$).

A statistically significant difference was found between the mothers of Group I and Group II in the Hy, D, Hs, Pd, Ma and Si subtests; test scores of the mothers in Group II were higher than those of the mothers in Group I ($p<0.04$ for D, and $p<0.0001$ for Hy, Hs, Pd, Ma, and Si) (Table 4). When we examined the mean scores of all mothers, the highest mean was obtained from the Pd subtest and the second from the Si subtest.

	Group I (n=30)	Group II (n=30)	P
Age (years)	6.96 ± 2.70 (3-12)	6.97 ± 2.95 (3-12)	0.999
Body weight (kg)	22.45 ± 8.30 (10-40)	25.10 ± 13.02 (9-52)	0.357
Gender (F/M)	16 (53.3) / 14 (46.7)	14 (46.7) / 16 (53.3)	X ² =0.151 0.698

TABLE 2 Demographical data of children [Mean ± SD (Min-Max), (n,%)].

Subtests psychiatric diagnosis groups	Group I+II n=45 Mean ±SD/Min-Max
Hypochondriasis (Hs)	54.15±10.45 (35-79)
Depression (D)	53.06±9.43 (39-72)
Hysteria (Hy)	54.60±11.22 (31-76)
Psychotic Deviate (Pd)	52.22±11.89 (30-85)
Masculinity/Femininity (Mf)	55.66±8.22 (42-72)
Paranoia (Pa)	54.80±9.48 (34-92)
Psychasthenia (Pt)	58.95±11.35 (32-75)
Schizophrenia (Sc)	56.53±11.76 (35-82)
Hypomania (Ma)	54.51±9.38 (37-71)
Social Introversion (Si)	57.71±8.35 (35-77)

TABLE 3 The Scores of Mothers MMPI Test in Terms of Clinical Subtests (Mean, SD).

Subtests by the psychiatric diagnosis Groups	Group I n=30 Mean/Min-Max.	Group II n=15 Mean/Min-Max.	P
Hypochondriasis (Hs)	45.23 (35-76)	72.00 (38-79)*	<0.0001
Depression (D)	48.22 (39-72)	63.12 (42-72)*	<0.04
Hysteria (Hy)	46.23 (35-73)	71.35 (31-76)*	<0.0001
Psychotic Deviate (Pd)	39.02 (36-82)	78.32 (30-85)*	<0.0001
Masculinity/Femininity (Mf)	56.66 (42-66)	53.66 (46-69)	0.950
Paranoia (Pa)	49.00 (34-69)	62.45 (43-92)	0.007
Psychasthenia (Pt)	56.31 (32-69)	64.53 (53-75)	0.218
Schizophrenia (Sc)	52.67 (39-78)	64.25 (35-82)	0.102
Hypomania (Ma)	45.54 (37-71)	62.45 (45-70)*	<0.0001
Social Introversion (Si)	52.55 (41-75)	73.37 (35-77)*	<0.0001
*P<0.05			

TABLE 4 Scores of mothers MMPI test as groups (mean/min-max).

Discussion

Dental treatment under local anaesthesia of children

with severe dental anxiety and aggressive behaviour can be difficult or sometimes impossible [Zhou et al., 2011; Kuşçu et al, 2014; Crego et al., 2014]. The dentists' effective assessment of the patient for the existing anxiety levels facilitates the treatment planning and also saves valuable clinical time. Various methods can be used to determine dental anxiety in children such as physiological, projective, and psychometric tests, as well as behavioural scoring [Klinberg and Broberg, 2007; American Academy on Pediatric Dentistry, 2008-2009]. The latter is frequently used to determine positive or negative behaviour during dental treatment. The FBS is a commonly used test for this purpose because it is not time consuming and it allows objective scoring and interpretation [American Academy on Pediatric Dentistry, 2008]. In the present study, children's behaviour was assessed by the FBS and dental interventions were performed under local anaesthesia if the degree was III and IV (Group I), or under deep sedation in the case of degree I and II and if child could not go through dental treatment two times in a row within a 3-day interval (Group II).

There are many studies investigating the effect of age, gender, and socio-demographic factors, family pattern, the family's socioeconomic status and educational status on children dental anxiety, which is related to dental behaviour [Folayan et al., 2004, Paryab and Hosseinbor, 2013, Arrrup et al., 2002, Zhou et al., 2011, Alwin et al., 1991, Litman et al., 1993, Messeri et al., 2004, Folayan et al., 2002, Klinberg, 1995, Shaw, 1975]. Alwin et al. [1991], in their study argued that there was a poor correlation between child and parent dental anxiety, and that children could not have learned dental anxiety from their families. In literature there are also studies that associate the parent's and children's anxiety levels. Such studies demonstrate that the mother's level of anxiety had a greater effect than that of the father. Litman et al. [1993] conducted a study with 600 parents and found that "state anxiety" mean scores of the mothers are higher than the fathers. Messeri et al. [2004] found that the "state anxiety" and "trait anxiety" due to minor paediatric surgery procedures were significantly higher in the mothers than in fathers, and that there was a correlation between the anxiety scores of parent and children anxiety. Folayan et al. [2002] evaluated the anxiety level in 81 children during their first dental examination using the Dental Subscale of the Child Fear Survey Schedule, and reported that children anxiety levels might be associated with maternal anxiety levels. Klinberg [1995] and Shaw [1975] reported similar results as well. Previous studies have demonstrated that maternal dental anxiety negatively affects child behaviour during dental treatment since children spend more time with their mothers during the social learning period [Klinberg and Broberg, 2007]. However, we did not come across studies that associated maternal personality traits with the child negative dental behaviour. Therefore, the present study included only the mother as the parent, and investigated the effect of maternal personality traits on child behaviour.

The MMPI is a test that assesses personality traits using objective and scientific criteria, and evaluates the personality of the subject as well as the identification of psychopathological problems [Ceyhun and Oral, 2003]. In a study conducted by Kutsal et al. [2011], aimed at providing preliminary findings on the validity of the Child Abuse Potential Inventory on a Turkish sample, the MMPI was also used as a valid tool. In the present study, a valid Minnesota Multiphasic Personality Inventory test was obtained from all mothers of the children in Group I by a psychologist. These children were treated under local anaesthesia because they had a positive dental behaviour, whereas only half (50%) of the mothers of the children from Group II – who had dental treatment under deep sedation due to their negative dental behaviour scored a valid test. The MMPI tests of 15 (50%) mothers of Group II were considered invalid because they were incomplete or exhibited internal inconsistency. There were pathological findings in 16 of the 45 mothers with a valid MMPI test (≥ 70 points). The pathological findings were identified in 7 of 30 mothers in Group I, and in 9 of 15 mothers in Group II ($p < 0.05$). The comparisons based on the total scores and the scores from the subscales revealed that there was an intergroup difference in the Hy, D, Hs, Pd, Ma and Si subscale, which were significantly higher in Group II ($p < 0.05$). The highest mean of the MMPI subtests was found in Pd in Group II. The personality traits of such individuals are: being anxious, worried, nervous, uneasy and perfectionist; having high standards for themselves and others, becoming easily agitated, and having feelings of concern and stress when they encounter insignificant problems. Additionally, the individuals displaying this profile tended to see themselves as people who are incapable and have feelings of inferiority. It was found that people in Si, which had the second highest mean score again in Group II, were socially introverted, extreme in accepting authority, pessimistic, prone to anxiety and nervous. How these personality traits affect child behaviour should be investigated in further studies. Dental anxiety, fear and negative behaviour are considered universal problems in children and affect treatment method. It is well known that parent personality traits affect child behaviour, and past researches indicated a potential link between anxiety and parenting styles that are characterised by control and rejection [Hudson and Rapee, 2001]. In our research, maternal personality traits (Hy, D, Hs, Pd, Ma and Si) were also related to child negative dental behaviour. We determined that personality traits of mothers of children presenting negative and positive behaviour were not the same. Mothers of children presenting negative behaviour scored higher in the MMPI Hs, D, Hy, Pd, Ma and Si subtests. We had some limitations during this study. The study group consisted of healthy children aged between 3-12 years who had no previous dental experience, in which dental anxiety could be common. The behaviour expected for children aged 3 could be different from the behavior expected for children aged 12. These children

could be separated to different groups in further studies. Reasons for the invalid tests should be more thoroughly examined. The patient number was reduced to half when invalid tests were excluded from the study therefore larger groups of subjects should be examined.

Conclusion

We are in the opinion that maternal personality traits affect children's dental behaviour and that this can be related to the dental treatment method. We believe that corrective actions in the maternal personality traits and behavioural profiles will provide positive contributions to the children's psychosocial development and affect the treatment approaches used during treatments accordingly. More detailed research should be made with larger series of children divided into appropriate age groups.

References

- › Alwin NP, Murray JJ, Britton PG. An assessment of dental anxiety in children. *Br Dent J* 1991;171:201-07.
- › American Academy on Pediatric Dentistry Clinical Affairs Committee-Behavior Management Subcommittee; American Academy on Pediatric Dentistry Council on Clinical Affairs. Guideline on behavior guidance for the pediatric dental patient. *Pediatr Dent* 2008-2009;30(7 Suppl):125-33.
- › Arnrup K, Broberg AG, Berggren U, Bodin L. Lack of cooperation in pediatric dentistry: The role of child personality characteristics. *Pediatr Dent* 2002;24:119-28.
- › Belsky J. The determinants of parenting: A process model. *Child Development* 1984;55:83-96.
- › Beringer RM, Segar P, Pearson A, Greampet M, Kilpatrick N. Observational study of perioperative behavior changes in children having teeth extracted under general anesthesia. *Paediatr Anaesth* 2014; 24(5):499-504.
- › Ceyhun B, Oral N. Minnesota Çok Yönlü Kişilik Vanterini De erlendirme Kitabı. *Çizgi Tıp Kitabevi* 2003;1-152.
- › Coulthard P. The indicator of sedation need (IOSN) *Dent Update* 2013;40(6):466-8, 470-1.
- › Crego A, Carrillo-Diaz M, Armfield JM, Romero M. From public mental health to community oral health: the impact of dental anxiety and fear on dental status. *Front Public Health* 2014;28(2):16.
- › Folayan MO, Adekoya-Sofowora CA, D Otuyemi O, Ufomata D. Parental anxiety as a possible predisposing factor to child dental anxiety in patients seen in a suburban dental hospital in Nigeria. *Int J Paediatr Dent* 2002;12(4): 255-9.
- › Folayan MO, Idehen EE, Ojo OO. The modulating effect of culture on the expression of dental anxiety in children: a literature review. *Int J Paediatr Dent* 2004;14:241-5.
- › Goumans C, Veerkamp JS, Aartman IH. Dental anxiety and behavioural problems: what is their influence on the treatment plan? *Eur J Paediatr Dent* 2004;5(1):15-8.
- › Hathaway SR, McKinley JC. Manual for the Minnesota Multiphasic Personality Inventory. New York: Psychological Corporation; 1943.
- › Hudson JL, Rapee RM. Parent-child interactions and anxiety disorders: an observational study. *Behav Res Ther* 2001;39(12):1411-27.
- › Johnson R, Baldwin DC Jr. Relationship of maternal anxiety to the behavior of young children undergoing dental extraction. *J Dent Res* 1968;47(5):801-5.
- › Klinberg G, Bröberg 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;17:391-406.
- › Klinberg G. Dental fear and behaviour management problems in children. *Swedish Dental Journal* 1995;103:1-78.
- › Ku çu OO, Çalar E, Sandallı N. Parents' assessments on the effectiveness of nonaversive behavior management techniques: A pilot study. *J Dental Sciences* 2014;9(1):29-34.
- › Kutsal E, Paşlı F, Isikli S, Sahin F, Yılmaz G, Beyazova U. Preliminary Validation of the Child Abuse Potential Inventory in Turkey. *J Interpersonal Violence* 2011;26(14):2856-2865.
- › Litman RS, Perkins FM, Dawson SC. Parental knowledge and attitudes toward discussing the risk of death from anesthesia. *Anesth Analg* 1993;77(2):256-60.
- › Malviya S, Voepel-Lewis T, Tait AR, Merkel S, Tremper K, Naughton N. Depth of sedation in children undergoing computed tomography: validity and reliability of the University of Michigan Sedation Scale (UMSS). *Br J Anaesth* 2002;88(2):241-5.
- › Messeri A, Caprilli S, Busoni P. Anaesthesia induction in children: a psychological evaluation of the efficiency of parents' presence. *Paediatr Anaesth* 2004;14(7):551-6.
- › Ogle OE, Hertz MB. Anxiety control in the dental patient. *Dent Clin North Am* 2012;56(1):1-16.
- › Paryab M, Hosseinbor M. Dental anxiety and behavioral problems: a study of prevalence and related factors among a group of Iranian children aged 6-12. *J Indian Soc Pedod Prev Dent* 2013;31(2):82-6.
- › Porath YS, Kaemmer B. Minnesota Multiphasic Personality Inventory-Adolescent Version (MMPI-A). Manual for administration, scoring and interpretation. Minneapolis (MN): University of Minnesota Press; 1992.
- › Rowe DC. As the twig is bent? The myth of child-rearing influences on personality development. *J Counseling Development* 1990;68:606-611.
- › Shaw O. Dental anxiety in children. *British Dental Journal* 1975;139:134-139.
- › van Aken C, Junger M, Verhoeven M, van Aken MA, Dekovi M, Denissen JJA. Parental personality, parenting and toddlers' externalising behaviours. *European Journal of Personality* 2007;21(8):993-1015.
- › Wilson KE. Overview of paediatric dental sedation: 2. Nitrous oxide/oxygen inhalation sedation *Dent Update* 2013;40(10):822-4.
- › Zhou Y, Cameron E, Forbes G, Humphris G. Systemic review of the effect of dental staff behaviour on child dental patient anxiety and behaviour. *Parent Education and Counseling* 2011;10(85):4-13.