Relationship between trait anxiety, dental anxiety and DMFT indexes of Turkish patients attending a dental school clinic

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العلاقة بين صفة القلق والقلق السني ومنسب الأسنان المحشوة والمفقودة والمنخورة لدى المرضى الأتراك في عيادة سنية مدرسية

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الخلاصة: هدفت هذه الدراسة إلى تقييم العلاقة المحتملة بين صفة القلق، والقلق السني، والعدد الكلي من الأسنان المحشوّة والمفقودة والمنخورة (منسب الأسنان المحشوّة والمفقودة والمنخورة) لدى مرضى يراجعون عيادة طب الأسنان في المدارس. وشملت الدراسة عينة تتألّف من 558 مريضاً أجري عليهم تحري بالمسح بالإخراجة التركية من قائمة جرد صفة القلق المنسوبة لشبيلبرغر، وبسلم قياس القلق السني. وحسب الباحثون منسب الأسنان المحشوّة والمفقودة والمنخورة بالفحص السريري والشعاعي. ولاحظوا ترابطاً خطياً يعتد به إحصائياً بين الصفة وبين القلق السني، ولم يكن هناك ترابط بين منسب الأسنان المحشوّة والمفقودة والمنخورة وصفة القلق والقلق السني. إن صفة القلق لها تأثير على القلق السني، ولكنها لا تؤثّر على منسب الأسنان المحشوّة والمفقودة والمنخورة.

ABSTRACT The aims of this study were to evaluate possible relationships between trait anxiety, dental anxiety and the total number of decayed, missing and filled teeth (DMFT) index of patients attending a dental school clinic. A sample of 558 patients was surveyed with the Turkish version of the Spielberger Trait Anxiety Inventory and Dental Anxiety Scale. DMFT index was calculated by clinical and radiographic examination. A significant linear correlation was observed between trait and dental anxiety, but there was no correlation between DMFT index, trait anxiety and dental anxiety. Trait anxiety has an impact on dental anxiety, but does not affect the DMFT index.

Rapport entre le trait d'anxiété, l'anxiété dentaire et l'indice CAO chez les patients turcs consultant dans un centre dentaire universitaire

RÉSUMÉ L'objectif de cette étude était d'évaluer les éventuelles relations entre le trait d'anxiété, l'anxiété dentaire, et le nombre total de dents de lait cariées, absentes ou obturées (indice CAO) chez les patients consultant dans un centre dentaire universitaire. La version turque de la partie de l'inventaire de Spielberger concernant le trait d'anxiété et l'échelle d'anxiété dentaire ont été utilisées pour évaluer un échantillon de 558 patients. L'indice CAO a été calculé sur la base d'examens cliniques et radiographiques. Une corrélation constante significative a été observée entre le trait d'anxiété et l'anxiété dentaire, mais aucune relation n'a été établie entre l'indice CAO, le trait d'anxiété et l'anxiété dentaire. Le trait d'anxiété a un effet sur l'anxieté dentaire, mais n'a aucune incidence sur l'indice CAO.

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Introduction

Anxiety disorders are composed of state and trait anxiety. State anxiety is a transitory emotional condition that varies in intensity and fluctuates over time, whereas trait anxiety is a personality trait which remains relatively stable over time [*1*]. State anxiety is used to determine an individual's present level of anxiety, while trait anxiety is used to describe an individual's long-term anxiety level [*2*].

Dental anxiety is described as state anxiety as it occurs due to the dental treatment procedure and is said to be related with negative expectations which are often linked to earlier traumatic experiences, negative attitudes in the family [*3*], fear of pain and trauma and perceptions of an unsuccessful and/or a painful previous dental treatment [*4*].

Dental anxiety can affect the dental health status of the individual and the dentist–patient relationship, leading to misdiagnosis and delay in treatment [*5*]. Locker and Liddell reported that, compared with non-phobic individuals, dentally anxious people who were dentate, had the same values of overall decayed, missing and filled teeth (DMFT), caries level and periodontal status, but were 4.6 times more likely to need immediate treatment for the relief of dental pain or infection [*6*].

The relationship between trait anxiety and dental anxiety has been researched in different countries [*7–10*]. In addition, the association between the DMFT index and dental anxiety has been established in several studies [*11–13*], but to our knowledge, the relationship between, trait anxiety, dental anxiety and the DMFT index have not been assessed in Turkey. Therefore, the aim of this study was to evaluate the relationship between trait anxiety, dental anxiety and DMFT indexes of patients attending the oral diagnosis clinic of a dental school in Ankara, the capital of Turkey.

Methods

The study was carried out between October 2006 and March 2007 at the oral diagnosis clinic of Gazi University Dental School, a university that serves a large group of patients consisting of civil servants, employees and their dependants (housewives or self-employed). A total of 600 patients, selected from patients attending the clinic, were informed about the purpose and method of the research and were asked to participate in the study. We selected 100 patients attending the clinic each month, 600 patients during the 6-month period. These were the first 10 patients with an even dental examination number (2nd patient, 4th patient to 20th patient) attending the clinic on Monday to Friday in the second and third weeks of each month (October to March).

Some of the patients refused to participate due to severe toothache, not having sufficient time or not agreeing to complete the questionnaires; therefore 558 patients (301 females and 257 males) were finally included in the study. Written consent was obtained from the participants.

The participants were surveyed with the Corah Dental Anxiety Scale (DAS) [*14*] and the Turkish version of the Spielberger Trait Anxiety Inventory (STAI-T), introduced by Oner and Le Compte [*15*], based on the original developed by Spielberger et al. [*16*], for the determination of dental and trait anxiety levels before intraoral examination.

The DAS consists of 4 questions with 5 possible answers having scores ranging from 1 to 5. A total score for each individual is calculated by summing the values given for all questions. This scale scores range from 4 to 20. The DAS was translated into Turkish and then retranslated into English before the study for the determination of the consistency of the scale.

The Turkish version of the STAI-T consists of 20 questions, 7 items indicting trait anxiety absent and 13 indicating trait anxiety present. Each item is rated on a 4-point scale: 1 (almost never), 2 (sometimes), 3 (often) and 4 (almost always). Anxiety-absent items are scored in reverse during the calculation of individuals' total scores. The total score of the scale ranges from 0 to 60. Higher scores reflect higher levels of trait anxiety and lower scores reflect lower levels. This scale has been widely used for the evaluation of anxiety in various clinical contents [*2,15*].

After the patients had completing the questionnaires, 2 experienced dentists performed intraoral examinations. The examinations were carried out using visual examination techniques with the aid of a dental unit light, compressed air and water from an air–water syringe and a standard dental mirror without magnification. Calibration sessions were made for the dentists before the examination periods with patients who did not participate in the research to assess methodology and intra-inter reliability.

Bitewing radiographs were taken from the patients who required these. The radiographs were taken with Ektaspeed Plus films (Kodak Rochester, New York) with an X-ray machine (Trophy CCX, France), operating at 70 kVp, 8 mA, having 2.5 eq aluminium filtration and a 0.8 × 0.8 mm focal spot, according to the manufacturer's exposure recommendations and were processed in an automatic roller transport processor machine (Velopex Extra-X Medivance Instruments Limited, England) with fresh chemicals. The radiographs were evaluated by the dentists who performed the clinical examinations.

The DMFT index was calculated by the summation of the number of decayed, filled and missing permanent teeth which were diagnosed by clinical and radiographic examination. Teeth which were extracted due to caries were evaluated as missing teeth. Third molars were excluded during the calculation of the index.

The statistical analysis of the data was made using *SPSS*, version 10.0. Descriptive statistics [mean and standard deviation (SD)], Pearson correlation test, Student *t*-test and kappa test were used for analysis of data. $P < 0.05$ was considered statistically significant.

Results

The mean age of the total sample was 32.9 (SD 12.6) years (range 15–76 years); for females it was 33.2 (SD 12.8) years (range 15–76 years) and for males it was 32.5 (SD 12.3) years (range 16–65 years).

The mean STAI-T, DAS and DMFT scores were 32.61 (SD 7.9), 8.38 (SD 4.1) and 7.89 (SD 4.7) respectively for the total sample. Females had significantly higher STAI-T and DAS scores than males (*t*-test, $P < 0.05$). The DMFT scores showed no significant difference between the sexes ($P > 0.05$) (Table 1).

A significant linear correlation was found between STAI-T and DAS scores, indicating that increasing trait anxiety correlates with increased dental anxiety. This was observed for females, males and the total sample. Age had a correlation with trait anxiety ($P < 0.05$) and the DMFT index ($P < 0.01$) in the total sample. No significant linear correlation was found between STAI-T, DAS and the DMFT index ($P > 0.05$) in the total sample. Age was associated with the DMFT index for both sexes ($P < 0.01$) (Table 2).

In the total sample, 78.3% ($n = 437$) of the patients had both low trait and dental anxiety levels (both STAI-T < 40 and DAS < 13), while 21.7% had both high trait and dental anxiety levels (both STAI-T ≥ 40 and DAS ≥ 13). Although a significant linear correlation was present between STAI-T and DAS, this correlation was only fair (0.33) (Table 3).

Discussion

Some individuals who have dental anxiety are reported to have a constitutional vulnerability to anxiety disorders, as evidence by the presence of multiple fears, generalized anxiety or panic disorders [*17*]. According to the results of this study, some Turkish patients with baseline anxiety also had dental anxiety. Several studies have investigated the relationships between trait anxiety and dental anxiety and found conflicting results. A significant positive correlation was reported between trait anxiety and dental anxiety in a study conducted in Amsterdam by Hakeberg et al. with the same questionnaires used in the present study among patients who were consulting specifically for dental anxiety [*7*]. Similarly, Hägglin et al. found a significant relationship between dental anxiety and trait anxiety in Sweden, although they used different scales from the ones used in our study [*8*]. In Canada, Locker et al. reported that young individuals having higher levels of dental anxiety had higher rates of psychological disorders, and that psychological disorders were related to the maintenance of dental anxiety over time [*17*]. On the other hand, Benjamins et al. reported no significant relationship between trait and dental anxiety in Amsterdam [*9*] and Schuurs et al. reported

Table 1 Mean age and scores of decayed, missing and filled teeth (DMFT), Corah Dental Anxiety Scale (DAS) and the Turkish version of the Spielberger Trait Anxiety Inventory (STAI-T) ($n = 558$ patients: 301 females and 257 males)

Variable	Mean (SD)	Range	*t*-value	*P*-value
Age (years)				
Female	33.3 (12.8)	15–76	–0.979	0.328
Male	32.2 (12.5)	16–65		
Total	32.9 (12.6)	15–76		
STAI-T score[a]				
Female	33.3 (8.5)	7–55	–2.029	0.043
Male	31.8 (8.0)	4–59		
Total	32.6 (7.9)	4–59		
DAS score[b]				
Female	8.82 (3.0)	4–19	–3.269	< 0.001
Male	7.87 (3.7)	4–20		
Total	8.38 (4.1)	4–20		
DMFT score				
Female	7.74 (5.1)	1–24	0.748	0.455
Male	8.07 (5.2)	1–26		
Total	7.89 (4.7)	1–26		

[a]*STAI-T scale score range 0–60.* [b]*DAS scale score range 4–20.*

Table 2 Pearson correlations for scores of decayed, missing and filled teeth (DMFT), Corah Dental Anxiety Scale (DAS) and the Turkish version of the Spielberger Trait Anxiety Inventory (STAI-T)

Variable	DMFT score	DAS score	STAI-T score
	r	*r*	*r*
Age			
Female	0.52**	0.15*	0.12*
Male	0.47**	–0.06	0.11
Total	0.49**	0.07	0.12*
DMFT score			
Female	–	0.11	0.09
Male	–	–0.10	0.04
Total	–	0.02	0.06
DAS score			
Female	–	–	0.34**
Male	–	–	0.30**
Total	–	–	0.33**

*$P < 0.05$; **$P < 0.01$.

similar findings according to a study conducted in a Dutch town [*10*].

Females had both higher trait and dental anxiety levels than males. This may be due to real differences in anxiety levels between the sexes, a greater readiness among females to acknowledge feelings of anxiety or maybe a combination of both factors [*18*].

Age had an impact on trait and dental anxiety. Fabian et al. reported that age influenced trait anxiety and that girls had higher dental anxiety and trait anxiety levels [*19*]. Daini et al. assessed the trait and dental trait anxiety levels in 16–20-year-old adolescents and found that girls were more anxious than boys [*20*]. Armfield et al. reported that age influenced anxiety and that adults aged between 40 and 64 years had the highest dental anxiety levels [*21*].

Sex and age were found to have an effect on the DMFT index. This is an expected result as individuals tend to have more decayed, missing and filled teeth with advancing age. For both sexes, dental anxiety and trait anxiety levels had no effect on the DMFT index, as there was no significant correlation between patients having high and low trait anxiety levels. The DMFT index is a summation of the state of an individual's teeth and we did not evaluate the number(s) of decayed, filled and missing teeth separately; this is a limitation of the study that could be assessed in further research.

A number of studies have evaluated the DMFT index of patients having high and low anxiety levels. Schuller et al. reported no significant difference in the DMFT index between individuals having high and low anxiety levels, but dentally anxious patients had more extracted and fewer filled teeth [*11*]. Taani et al. demonstrated no association between dental anxiety and DMFT index among 12–15-year-old children [*12*]. Eitner et al. reported no significant difference between the DMFT indexes of dentally anxious and non-phobic patients, but that phobic individuals had a higher number of carious teeth and a lower number of extracted and filled teeth [*13*]. To our knowledge there is no study in which the relation between trait anxiety and the DMFT indexes were compared and therefore we could not compare our results.

Dental anxiety could be related to negative expectations linked to traumatic experiences. Furthermore, the DMFT index could be affected by knowledge, attitudes and practices of oral health but, as the aim of this study was to assess possible relationships between trait anxiety, dental anxiety and DMFT index, only this aspect was evaluated in the present study. Dental treatment history, as well as duration of treatment and oral health practices of the patients, should be evaluated in future studies.

Anxiety could lead to some difficulties for both patients and dentists during dental treatment procedures, such as missing appointments [*22*], increases in treatment time or decreases in treatment quality [*23*], leading to misdiagnosis and delay in treatment [*5*]. Dental patients' state and trait anxiety were also reported to be related to discomfort and greater worry about dental visits [*24*]. An understanding of the presence of anxiety could help dentists to understand what these patients feel about dental treatment procedures and aid dentists' efforts to improve patient care.

Table 3 Distribution of patients with both low trait and dental anxiety levels and high trait and dental anxiety levels, as measured by Corah Dental Anxiety Scale (DAS) and the Turkish version of the Spielberger Trait Anxiety Inventory (STAI-T) (*n* = 558 patients: 301 females and 257 males)

Sex	Low trait and dental anxiety[a]		High trait and dental anxiety[b]		Kappa-value
	No.	%	No.	%	
Female	226	75.1	75	24.9	0.380
Male	211	82.1	46	17.9	0.328
Total	437	78.3	121	21.7	0.334

[a] *STAI-T < 40 and DAS < 13.*
[b] *STAI-T ≥ 40 and DAS ≥ 13.*

The findings of the present study indicate that dentists need to be aware of the possibility that patients having dental anxiety could also have constitutional vulnerability to generalized anxiety which remains stable over time. Approximately 22% of the patients attending our dental clinic had high levels of both dental and trait anxiety. As the chances of encountering these patients in a clinic are fairly high, dentists should be aware of the possible problems associated with anxiety and what these patients feel about dental treatment procedures.

Although general trait and dental anxiety are different phenomena, we conclude that there was a relationship between trait and dental anxiety, suggesting that patients with higher trait anxiety levels have higher dental anxiety levels. On the other hand, the DMFT index was not correlated with dental and trait anxiety among Turkish patients attending this dental school clinic.

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