



## Development of a Tooth Extraction-Anxiety Scale: A Proposal of New Scale

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### Abstract

**Background:** Different dental procedures have different levels of anxiety, and the tooth extraction is in the top list of most frightening dental procedures. This anxiety should carefully managed physically and psychologically. Although there are several scales available to measure anxiety from dental treatment, a scale for measuring anxiety related to tooth extraction is still absent. The aim of the study was to develop a new scale; the tooth extraction anxiety (TEA) scale; that is specifically measure anxiety in patients undergoing tooth extraction.

**Materials and Methods:** Two hundred and ninety two patients who presented for simple tooth extraction were recruited from two specialized dental centers in Mosul, Iraq. Each participant completed two self-administrated questionnaires; The Short version of Dental anxiety inventory (s-DAI) and the TEA scale. Moreover, Candidates asked to rate the amount of their anxiety toward tooth extraction on 11- point Numeric Rating Scale (NRS).

**Results:** Cronbach's  $\alpha$  for the present sample was 0.84 and all items of the scale are relevant (Cronbach's  $\alpha$  values if any item deleted ranged between 0.811- 0.846). Correlations with the s-DAI and the NRS were 0.44,  $P < 0.01$  and 0.48,  $P < 0.01$  respectively. The results indicated that the TEA scale has good reliability and acceptable validity.

**Conclusion:** This study developed and validated the TEA scale. It is easy to administer in general dental practices.

**Key words:** Tooth extraction, Anxiety, Scale

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### Introduction

Anxiety toward unpleasant stimuli are common psychological responses of patients seen in dental practice.<sup>[1]</sup> Anxiety is a psychological and physiological state that prepare a person for actual or potential threatening situations.<sup>[2]</sup> Previous studies<sup>[3,4]</sup> found that the prevalence of mild dental anxiety among population were about 40-43%. Anxiety related to dental treatment is associated with reduced dental visits, deteriorated oral health, more functional and esthetic impairment, and subsequently a reduced quality of life.<sup>[5,6]</sup> Researchers found that different dental procedures have different levels of anxiety, and the tooth extraction is in the top list of most frightening dental procedures.<sup>[7,8]</sup> Similarly, Oosterink et al.<sup>[9]</sup> reported that dental patients considered oral surgery to be the most fearful procedure among other dental interventions. Moreover, up to 91% oral surgery procedures was tooth extraction.

Tooth extraction is an invasive procedure with pre and postoperative anxiety, so it needs attention from the psychological point of view with special preparation and mood modification.<sup>1</sup> As it is difficult for dentists to deal with anxious patients, evaluation of the patient's psychology along with special preparation are required.<sup>[10]</sup>

Although there are several scales available to measure anxiety from dental treatment like the Short version of Dental anxiety inventory

(s-DAI)<sup>[11]</sup>, the Dental anxiety inventory (DAI)<sup>[12]</sup>, and the Corah' Dental anxiety scale<sup>[13]</sup>, however, a scale for measuring anxiety related to tooth extraction is still absent. Therefore, the present study aimed to develop a new scale; the tooth extraction anxiety (TEA) scale; that is specifically measure anxiety in patients undergoing tooth extraction.

**Materials and Methods**

**Subjects**

We studied patients who presented to the departments of the oral surgery in the specialized dental centers, Mosul, Iraq, for simple tooth extraction. A local ethics committee approved the study (19/53-183),

and all the patients provided written informed consent.

Exclusion criteria were patients <18 years old, cognitive or mental disability, illiteracy, and those who refused to participate.

Fifteen highly experienced dental surgeons were asked to list at least five factors, from the most to least important, involved in causing anxiety in patients undergoing tooth extraction. The authors of the present study judged the clarity and relevance of the factors. They selected the nine most reported factors to be considered as items of the new scale; the tooth extraction anxiety (TEA) scale (Fig. 1).

Item	Questions
1	How anxious are you about the possibility of having pain while having dental anesthesia? ○-----○-----○-----○-----○ Not anxious at all   Little anxious   Fairly anxious   Highly anxious   Extremely anxious
2	How anxious are you about the possibility of having pain during tooth extraction? ○-----○-----○-----○-----○ Not anxious at all   Little anxious   Fairly anxious   Highly anxious   Extremely anxious
3	How anxious are you about the possibility of tooth fracture during tooth extraction? ○-----○-----○-----○-----○ Not anxious at all   Little anxious   Fairly anxious   Highly anxious   Extremely anxious
4	How anxious are you about the possibility of bleeding after tooth extraction? ○-----○-----○-----○-----○ Not anxious at all   Little anxious   Fairly anxious   Highly anxious   Extremely anxious
5	How anxious are you about the possibility of having pain after tooth extraction? ○-----○-----○-----○-----○ Not anxious at all   Little anxious   Fairly anxious   Highly anxious   Extremely anxious
6	How anxious are you about the possibility that a part of tooth will remain after tooth extraction? ○-----○-----○-----○-----○ Not anxious at all   Little anxious   Fairly anxious   Highly anxious   Extremely anxious
7	How anxious are you about the possibility of having swelling after tooth extraction? ○-----○-----○-----○-----○ Not anxious at all   Little anxious   Fairly anxious   Highly anxious   Extremely anxious
8	How anxious are you about the experience of the dentist who will perform tooth extraction? ○-----○-----○-----○-----○ Not anxious at all   Little anxious   Fairly anxious   Highly anxious   Extremely anxious
9	How anxious are you about the possibility of having infection after tooth extraction? ○-----○-----○-----○-----○ Not anxious at all   Little anxious   Fairly anxious   Highly anxious   Extremely anxious

**Figure 1:** The tooth extraction- anxiety scale

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## Procedure

Research assistants, with a request to participate, approached subjects in the waiting room. Candidates asked to rate the amount of their anxiety toward tooth extraction on a 0 (no anxiety) to 10 (extreme anxiety) Numeric Rating Scale (NRS)<sup>[14]</sup>, in addition to answering questions of s-DAI and the TEA scales. Both scales consists of 9 items, each rated on a 5-point Likert type scale, scored from 1 (no anxiety at all) to 5 (extreme anxiety) with a total score range of 9-45. Finally, patients were asked to determine which set of questions that were easiest to answer.

## Statistical analysis

Mean scores and standard deviations of each item of TEA scale were computed separately. Cronbach alpha and average inter-item correlation were used to assess the reliability of the TEA scale. In addition, Spearman's correlation was used to study the validity of TEA scale by evaluating its relation with the two self-reported scales; the s-DAI and the pre-extraction patients' anxiety values recorded on NRS.

## Results

Of the 292 patients enrolled, 263 (90.07%) filled-out the questionnaires completely, 144 (54.8%) of whom were male and 119 (45.2%) female. Patients mean age (SD) was 28.57(9.95) years, range18-71. One hundred

and forty seven (55.9%) patients aged between 18-25 years and the rest (116, 44.1%) were older than 25 years.

Questionnaires used in this study were highly reliable with Cronbach alpha values of 0.773 and 0.839 for s-DAI, TEA scale respectively.

For TEA scale items, the mean score and standard deviation are shown in Table (1). The total mean score was 24.82 (SD=7.22). The mean of scores for female was 25.46 (SD=7.73) and slightly higher than for male patients 24.35 (SD=6.83) but with no significant difference between genders (P=0.243). The picture is different when considering the age groups and the mean of scores was significantly higher (P=0.000) in the younger age group (26.26; SD=7.11) than in older group of patients (23; SD=6.96).

The average inter-item correlation and the lowest corrected inter-total correlations were 0.346 and 0.029 respectively. Moreover, the Cronbach's  $\alpha$  values if any item deleted ranged between 0.811- 0.846 (Table 1).

The TEA scale correlated significantly with the s-DAI and NRS (0.44,  $P<0.01$  and 0.48,  $P<0.01$  respectively).

With regard to the easiest set of questions in the answer, 25.7 % of respondents chose the s-DAI and 28.6% the TEA scale, and the difference in ease of use was not significant (P=0.339). However, the rest of patients (45.7%) did not find a difference between scales.

**Table 1:** Statistical summary for TEA scale items

Item	Mean (SD)	Corrected Item-Total Correlation	Cronbach's alpha if item deleted
1	2.58 (1.09)	.294	.846
♀ subgroup	2.71 (1.09)		
♂ subgroup	2.54 (1.12)		
2	2.97 (1.08)	.503	.827
♀ subgroup	3.11 (1.12)		
♂ subgroup	2.85 (1.04)		
3	2.97 (1.28)	.593	.817
♀ subgroup	3.08 (1.32)		
♂ subgroup	2.88 (1.23)		
4	2.74 (1.31)	.616	.814
♀ subgroup	2.85 (1.31)		
♂ subgroup	2.65 (1.31)		
5	2.74 (1.14)	.610	.816
♀ subgroup	2.89 (1.09)		
♂ subgroup	2.61 (1.17)		
6	2.93 (1.35)	.618	.814
♀ subgroup	2.83 (1.42)		
♂ subgroup	3.01 (1.29)		
7	2.69 (1.31)	.580	.819
♀ subgroup	2.84 (1.29)		
♂ subgroup	2.56 (1.33)		
8	2.59 (1.30)	.474	.831
♀ subgroup	2.59 (1.30)		
♂ subgroup	2.58 (1.30)		
9	2.58 (1.14)	.660	.811
♀ subgroup	2.71 (1.17)		
♂ subgroup	2.48 (1.11)		

♀ = Female, ♂ = Male, SD= standard deviation

## Discussion

Tooth extraction is invasive surgical procedure with pre and intra-operative anxiety that should carefully managed psychologically.<sup>15</sup> Therefore, it is important to have a scale that can quickly assess patients' anxiety related to tooth extraction. In this study, the TEA scale was developed. A discussion about the validity of scale items may be raised. These items are the most common anxious aspects of tooth extraction based on surgeons' experience. It is possible for the surgeon to notice patient's psycho-emotional state before, during, or after the procedure, even if the patient does not report any negativity. So, surgeons' opinion are considered to make the scale more relevant. In dental practice, there are different anxiety measurement scales. We use the 11-point NRS to assess the level of pre-operative anxiety. It is simple, quick, widely used, and its scores are suitable for parametric analysis.<sup>[16]</sup> Moreover, in order to identify the anxiety-related factors, the 9 items s-DAI was used. It is easier to use in general dental practice than the original 36-item DAI, and has shown to be reliable and valid.<sup>[17,18]</sup> However, only two items of questionnaire are directly related to tooth extraction. This study provide a data on the possible factors contributing in anxiety related to dental extraction.

The new scale has good internal consistency (Cronbach's  $\alpha = 0.84$ ) and all items of the scale are relevant (Cronbach's  $\alpha$  values if any item deleted ranged between 0.811- 0.846). In contrast, the correlation with the s-DAI showed acceptable validity, which might indicate that, tooth extraction anxiety does not necessarily match with general dental anxiety. In the same context, mild correlation of TEA scale with the 10-point NRS showing that anxiety toward tooth extraction is multifactorial.

The results showed that female scored slightly higher anxiety than male patients did. This is in agreement with the findings of other studies.<sup>[18,19]</sup> This can be attributed to the fact that females are more interactive to stimulus than males as reported before 20 or males may have tried to hide their dental anxiety because they believe in their leading gender role.<sup>[21]</sup>

Another point for discussion is why young patients scored significantly higher than the old patients? This may be explained by the fact that dental anxiety is negatively correlate to age.<sup>[11,22]</sup> The young patients were relatively have no or low experience with different dental procedures and expected to overestimate their anxiety towards tooth extraction.<sup>[11,23]</sup>

In the present study, the sample size add limitations in age groups and socio-economic status, which may affect the final response to scale items. It is accepted that peoples with different age groups and cultures had different life experiences that affect their anxiety towards tooth extraction.<sup>[24,25]</sup> This may negatively affect the reliability and validity of the scale. Therefore, English-speaking patients should considered in other settings to assess the cross-cultural stability of TEA scale. The integration between TEA scale and these factors could result in scale that is more comprehensive.

To conclude, our data suggests that TEA scale is a good alternative to the s-DAI as it focused on factors related to tooth extraction only. It is easy to use as indicated by some of our patients, and a suitable tool for diagnosing and assessing extraction anxiety in general population.

## Conflicts of interest

The authors declare that there is no conflict of interest related to this study.

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