

ORIGINAL ARTICLE

PAIN: FEAR OR FORTITUDE - ASSESSMENT OF PAIN AND ANXIETY DURING MANUAL AND ULTRASONIC SCALING

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ABSTRACT

Background: The aim of the study is to evaluate the Dental anxiety and Pain perception during Scaling using Ultrasonic and hand instruments. **Methods:** Thirty subjects with chronic gingivitis were enrolled in the study. The samples were divided into two groups. GROUP A receives manual scaling and GROUP B with Ultrasonic scaler on the Mandibular anterior teeth. Patients pain perception were assessed with a Visual Analog Scale (VAS) and dental anxiety were measured using Questionnaires from Corah's Dental Anxiety scale (DAS) and Dental fear survey (DFS). **Results:** There was no statistically significant difference in VAS between manual scaling (21.33 ± 18.84) and ultrasonic scaling (17.33 ± 13.34) ($P = 0.701$). The dental anxiety score (DAS) also shows no significant differences between manual (13.66 ± 4.30) and ultrasonic scaling (13.66 ± 4.09) ($P = 0.771$)

Keywords: Anxiety, DAS, DFS, Scaling, Pain.

INTRODUCTION

The fundamental aspects of periodontal therapy is to reduce the supragingival and subgingival plaque and calculus and thereby preventing the recolonization of pathogenic bacteria in the periodontal pockets. Mechanical non-surgical therapy such as Scaling and Root planning (SRP) is the common procedure used to treat periodontal disease.^[1]

Hand scalers, air powder abrasive scalers, ultrasonic instruments, diamond burs and lasers are employed to remove the calculus.^[2] The initial and essential phase is supragingival debridement before subgingival scaling.^[3] Painful sensations are reported by the patients during supragingival calculus removal procedures.^[2] So, these procedures may be perceived as painful.^[1]

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According to International association of pain, pain is defined as an “Unpleasant sensory and emotional experience associated with actual or potential tissue damage or described by the patient in terms of such damage.”^[4] Pain can occur within the central or peripheral nervous systems if there is ongoing inflammation or nociception, functional or structural alterations or psychologic factors.^[3]

The intensity of nociceptive stimulation of pain is not simply determined.^[3] The effect of fear and anxiety on pain reactivity in humans was evaluated by Rhudy and Meagher (2000) and found that the study supported the fact that emotional stress modulate human pain reactivity.^[5]

The common problem in dental health care is anxiety.^[6] Patients negative reactions are due to anticipation of pain in dentistry.^[6] So dental anxiety is one of the major barrier in those who require dental treatment.^[7]

Dental anxiety is defined as a state of apprehension that something dreadful is going to happen in relation to dental treatment or mandibular anterior teeth with no complaints of dentin sensitivity to air stimulation, periodontal sulcus depth <4mm and absence of restorations (root canal treatment, composite, amalgam, esthetic or prosthetic restorations) in mandibular anterior teeth.

The exclusion criteria are patient’s refusal to give informed consent; a medical or psychologic disorder that might affect pain thresholds, use of pain or anxiety medication; acute periodontal pain, pulpitis, abscesses or other acute infections, root hypersensitivity that might cause tooth sensitivity.

Procedure

Full mouth plaque index, gingival index, probing depth, clinical attachment level was recorded and the calculus index on the mandibular anterior teeth was recorded. Thirty patients were randomly divided in to two groups. Group A receives manual scaling and Group B with ultrasonic scaler on the mandibular anterior teeth without any topical or local anesthesia. After supragingival scaling of the mandibular anteriors, patients

were informed of the study protocol and written informed consent was obtained from the patient for their participation in the study. The patients were asked to indicate their level of pain on a 100mm horizontal Visual Analog Scale (VAS) which is a valid, simple and reliable tool for evaluating dental pain where ‘0’ meant ‘no pain and discomfort’ and ‘100’ meant ‘the worst possible pain and discomfort’. The Visual Analog Scale score was recorded as the distance in millimetres from the beginning of the scale.

Two anxiety measurement scales were used to measure dental anxiety. One of the questionnaires was the Dental Anxiety Scale (DAS)^[8] which consists of four questions and the other was the Dental Fear Survey (DFS)^[9] which consists of twenty questions. The Dental Anxiety Scale and Dental Fear Survey was evaluated by Karadottir et al^[10] and found that all four DAS questions and only three of the 20 DFS questions correlated with patients response to instrumentation. Therefore, in our study patients completed a questionnaire consisting of these seven questions as was done by Chung et al^[11] and Guzeldemir et al^[3] previously. After completing the questionnaire, complete ultrasonic scaling was done for each patients.

Dental Anxiety Questionnaire Sheet

How much anxiety/fear or discomfort does each of these cause you? Please use the numbers from the scale for the first three questions. 1 2 3 4 5 none at all, a little, somewhat, much, very much

1. Being seated in dental chair
2. Having your teeth cleaned
3. All things considered, how fearful are you of having dental work done?
4. If you had to go to the dentist tomorrow, how would you feel about it?
 - a. I would look forward to it as a reasonably enjoyable experience.
 - b. I wouldn’t care one way or another.
 - c. I would be a little uneasy about it.
 - d. I would be afraid that it would be unpleasant and painful.

- e. I would be very frightened of what the dentist might do.
5. When you are waiting in the dentist's office for your turn in the chair, how do you feel?
- Relaxed
 - A little uneasy
 - Tense
 - Anxious
 - So anxious that I sometimes break out in a sweat or almost feel physically sick
6. When you are in the dentist's chair waiting while she gets the drill ready to begin working on your teeth, how do you feel?
- Relaxed
 - A little uneasy
 - Tense
 - Anxious
 - So anxious that I sometimes break out in a sweat or almost feel physically sick
7. You are in the dentist's chair to have your teeth cleaned. While you are waiting and the dental assistant is getting out the instruments that the periodontist will use to clean your teeth around the gums, how do you feel?
- Relaxed
 - A little uneasy
 - Tense
 - Anxious
 - So anxious that I sometimes break out in a sweat or almost feel physically sick

Questions 1 through 3 originate from the DFS, and Questions 4 through 7 are from Corah's DAS



Statistical analysis

The collected data were subjected to statistical analysis using Statistical Package for Social Sciences (SPSS Inc., Chicago, IL, USA, Version 17.0 for Windows). Normality was tested with the Shapiro Wilks test and then data was found to be in non normal distribution.

The Mann-Whitney U test was used to compare between plaque index, gingival index, probing depth, CAL and VAS score. The chi square test was used to analyze frequencies between categorical variables, such as gender and calculus index. The Spearman rank correlation was used to analyze the relationship between the VAS and the dental anxiety scores. The chi square test was used to analyze association between categorical variables, such as gender and DAS. P values <0.05 were considered statistically significant.

RESULTS

Thirty patients (16 women and 14 men) of mean age, 27.93 ± 9.10 years participated in the study. The mean VAS score for the entire group was 19.33 ± 16.17 and the interquartile range (IQR) was 20. The mean VAS scores for manual and ultrasonic scaling were 21.33 ± 18.84 and 17.33 ± 13.34 respectively and the interquartile range were 30 and 20 respectively. There was no statistically significant difference between manual and ultrasonic scaling ($P = 0.701$) (Table 1, Graph 1). The mean VAS scores for women and men were 20.62 ± 16.52 and 17.86 ± 16.25 respectively and the median values were 20 and 10 respectively. The difference in mean VAS scores between women and men was not statistically significant ($P = 0.56$).

The mean anxiety score for the entire group was 13.66 ± 4.13 . The interquartile range (IQR) was 5.25. The mean DAS scores for manual and ultrasonic scaling were 13.66 ± 4.30 and 13.66 ± 4.09 respectively and the interquartile range were 7 and 5 respectively. There was no statistically significant difference in DAS scores between manual and ultrasonic scaling ($P = 0.771$). The anxiety score was significantly higher in women (15.50 ± 3.75) than men (11.57 ± 3.58) ($P = 0.014$). The median was 15.5 for women and 11.5 for men (Table 2, Graph 2).

The relationship between patients' responses to pain for scaling indicated by the VAS and dental anxiety scores were evaluated and there was a significant weak correlation except for question number 1, 2 and 4 (Table 3)

TABLE 1: Mean VAS and DAS scores for manual and ultrasonic scaling

	SCALING	N	Mean	Std. Deviation	Std. Error Mean	Median	IQR	P value
Visual Analog Scale in mm	MS	15	21.33	18.848	4.866	20	30	0.701*
	US	15	17.33	13.345	3.446	10	20	
DAS score	MS	15	13.6667	4.30393	1.11127	14	7	
	US	15	13.6667	4.09994	1.05860	15	5	0.771*

*No significant difference (Mann whitney U test)

TABLE 2: Mean VAS and DAS scores among genders

	SEX	N	Mean	Std. Deviation	Median	IQR	P value
VISUAL ANALOG SCALE IN MM	M	14	17.86	16.257	10	25	0.56
	F	16	20.62	16.520	20	20	
DAS score	M	14	11.5714	3.58875	11.5	7.25	0.014*
	F	16	15.5000	3.75943	15.5	5.25	

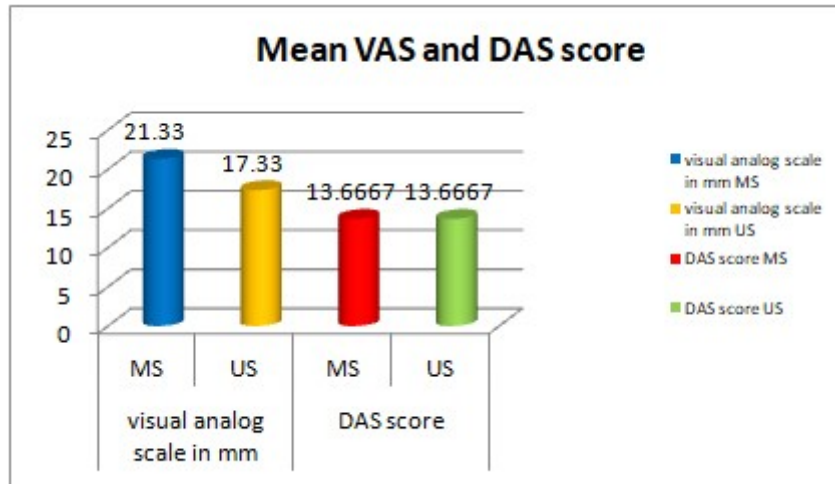
*Shows ($p < 0.05$) (Mann whitney U test)

TABLE 3: Correlation between Dental Anxiety score and Visual Analog Scale for the entire group

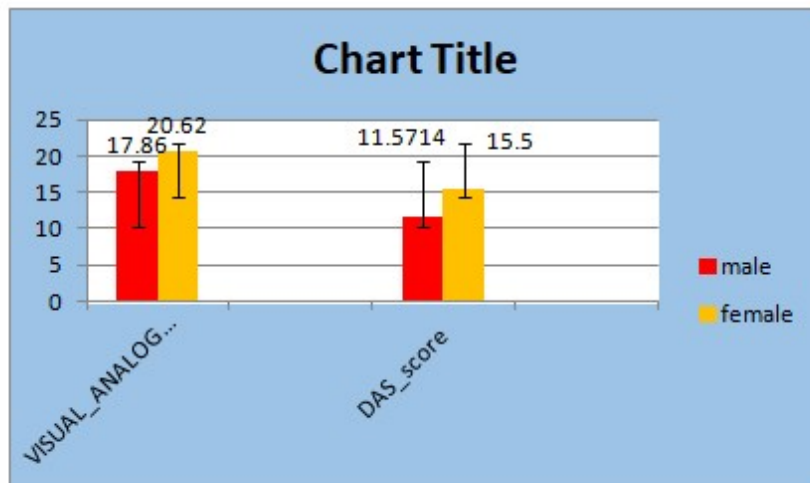
DAS	VISUAL ANALOG SCALE correlation coefficient (r value)
Question 1	0.316 (.089)
Question 2	0.323 (0.081)
Question 3	0.410* (.024*)
Question 4	0.093 (.625)
Question 5	.459* (.011*)
Question 6	.453* (0.012*)
Question 7	0.394 (0.031*)
DAS score	0.473 (0.008*)

*. Correlation is significant at the 0.05 level (2-tailed). Shows weak correlation

GRAPH 1:



GRAPH 2:



DISCUSSION

The present study evaluates the intensities of pain and dental anxiety compared during scaling using manual and ultrasonic instruments. The common reason that prevents the patients from seeking dental treatment is the fear of pain. An important outcome for successful periodontal therapy is to control pain as the patient recall and periodontal maintenance depend on pain perception.^[1]

In our study, supragingival calculus was evaluated only at the mandibular anterior region, as the formation of calculus is most common on the lingual surface of the lower

anterior and on the buccal surface of the upper first and second molars where these sites coincide with the openings of the major salivary glands (Addy and Koltai 1994).^[12]

The density of nerve endings seems to be greater in the anterior region than the posterior gingival tissues of the mouth.^[3] The interpatient variability is minimized by including medically healthy patients because an individual's response to noxious stimulus were also shown to be modified by systemic factors.^[3]

The patients were asked to participate in the study only after scaling had been done

in lower anterior teeth and before full mouth fear and pain tend to overestimate the scaling to avoid exaggerated responses, because the patients could have been sensitized to pain by knowing that they were participating in a study.^[3] Also, they were not yet relieved of anxiety and fear as they knew that the treatment was not finished.^[4]

The results showed that there was no statistically significant difference in VAS scores between manual and ultrasonic scaling and between males and females. The mean VAS score for the entire study group was 19.33 ± 16.17 . Karadottir et al^[10] reported that the mean VAS score was 15.1 and 10.8 for scaling and root planing (SRP) and Chung et al^[11] reported the mean VAS scores as 10.6 where as Canakci and Canakci^[13] reported this score as 15.2. In another study of men and women these scores were 15.8 and 17.1 respectively. Guzeldemir et al^[3] reported a mean VAS of 19.91 and found a significant difference existed in pain perception between Gracey curette and ultrasonic scaler regardless of EMLA cream used. In our present study the mean VAS score obtained was similar to these scores.

There was no statistically significant difference in dental anxiety scores (DAS) between manual and ultrasonic scaling but there was significant difference in DAS scores in females when compared with males ($P = 0.014$), women were more anxious than men as shown in previous studies.^[3] Women reported more dental anxiety universally than men. Conversely, Eli et al reported that men were more anxious than women.^[14] A weak correlation existed between VAS and each question and total dental anxiety score except for question numbers 1, 2 and 4.^[4]

Anxiety can be defined as a subjective state or feeling, the source of which may be found in the unconscious; it is a reaction to an unknown danger.^[15] Most approaches to managing the dentally anxious patient are to 1) investigate the basis for the anxiety and devise coping strategies for behaviour modification or 2) utilize the most effective pharmacotherapeutic means for behaviour modification.^[15] The intensity of

fear and pain tends to overestimate the anxious patients. A patient with a high DAS score responses are more likely to present a high pain than with a lower DAS score patients (Canakci et al 2007)^[13]. Other studies also found that patients with high DAS scores reported more pain after dental treatment.^{[16], [17]}

The measurement of pain is difficult as it has both physical and psychologic aspects. Also, to evaluate subjective pain, standardized and controlled clinical conditions are essential. The pain perception was potentially influenced by environmental factors such as temperature, noise and timing of treatment (McGrath et al 1994).^[18] A perfectly controlled environment was not warranted despite efforts to keep the environment as homogenous as possible and this may have served as a limitation of the study. Though the VAS was simple, reliable and valid (McGrath et al 1986)^[19], VAS scores did not include time as a variable and pain was assessed only in a retrospective manner and this caused the pain being recorded imprecisely (Tammaro et al 2000).^[20] Therefore, for short procedures like probing, the VAS might be appropriate. A manometer is used to assess pain sensations correlated with the exact time during the whole treatment procedure (McGrath et al 1994).^[18] During treatment, pain can be recorded at intervals of 0.5 seconds with the manometer using an intermodal intensity comparison. To evaluate more precise pain perception, the use of a manometer should be considered in future studies.

Many factors like destructive behaviour, economic factors, stressful events in their life, fear, health beliefs and unpleasant experience with dentists affects the patients' compliance to dental treatment. The dentists' assurance to prevent pain is the most important behaviour in anxiety reduction. Friendliness, empathy, being calm and giving moral support are closely related to patient satisfaction.^[4]

CONCLUSION

Higher levels of dental anxiety can change patient's pain perception and fear of pain during treatment prevents them from seeking dental care. Therefore, to avoid noncompliance, delivering dental care with minimal patient discomfort should be an essential part of a clinician's skills. For successful treatment and maintenance care, with the increasing demand for stress-free and painless treatment, clinicians should have the ability to reduce patients' fear, discomfort and pain.^[4]

CONFLICT OF INTEREST

There was no conflict of interest.

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