Management of Dental Anxiety via Distraction Technique

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Disclaimer: The voluntary, fully informed consent of the subjects used in this research was obtained as required by 32 CFR 219 and DODI 3216.02_AFI 40-402. The views expressed are those of the authors and do not reflect the official views or policy of the Uniformed Services University, Department of Defense, or its Components. The authors do not have any financial interest in the companies whose materials are discussed in this manuscript.

Outline

- Background
- Objective
- Materials and Methods
- Results
- Discussion
- Conclusion

Outline

Background

Brainstorming

Dental Anxiety

Prevalence of moderate to high dental anxiety was 19% of population

- White 2017

Dental Anxiety

“an excessive dread of anything being done to the teeth”

-Coriat 1946

“a special kind of fear, apparently beyond voluntary control, which will not respond to reason”

- Lautch 1971

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Proprioception Pathway

Pain Experience

“reduce pain thresholds”

-Rhudy et al. 2000

“elevated pain intensity”

-Kain et al. 2006

- Seidman et al. 2014

Cognitive Refocusing

“neurocognitive model of attention, pain perception could be decreased by increasing the cognitive load”

-Legrain 2011

Cognitive Refocusing

Distraction diverts pain perception

Distraction Technique

Proven techniques during dental treatment

- Music- Appukuttan 2016

Distraction Technique

Proven techniques during dental treatment

- Virtual reality- Furman 2009

Distraction Technique

Stress Ball

- Statistically significant in Medical Settings

Dental Setting

Scaling and root planing procedure under local anesthetic

Evaluation Technique

Galvanic Skin Response (GSR)

Evaluation Technique

Pre and post procedural assesments

- Modified Dental Anxiety scale (MDAS)
- Six-item short form of the Spielberger State Trait Anxiety Inventory (STAI)

Pt preference questionnaire

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Objective

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The purpose of this study is to evaluate the use of stress balls as a distraction technique and how it affects stress levels of patients undergoing routine scaling and root planing procedures under local anesthetic.

…when compared to traditional scaling and root planing without distraction

Null Hypotheses

There will be no significant difference in

1. Anxiety assessments
2. Galvanic skin response

…during scaling and root planing procedures with and with out distraction technique

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Materials and Methods

Materials and Methods

A randomized, split-mouth design, prospective clinical trial

- *20 subjects*
  - *Split design maxillary and mandibular left vs right*
- Recruited from Dunn Dental Clinic, JBSA-Lackland
- The sequence of treatment was randomized
  - Using a random number generator, treatment (with/without squeeze balls) and order (left vs. right side) was randomized per appointment visit.

Materials and Methods

Inclusion criteria

- AD or DOD beneficiaries 18 years or older who were treatment planned to receive routine scaling and root planing
- Selected from a pool of patients available for treatment at Dunn Dental Clinic
- In good health as indicated by ASA I or II

Materials and Methods

Exclusion Criteria:

- Dental patients with a chronic pain condition
- Dental patients with acute dental pain

Materials and Methods

Dental screening

- Confirming treatment plan needs 4 quadrants of scaling and root planning.

Subjects, serving as their own control, completed a pre-procedural Modified Dental Anxiety Scale (MDAS) and a six-item short form Spielberger State-Trait Anxiety Inventory (STAI) before each procedure at each appointment.

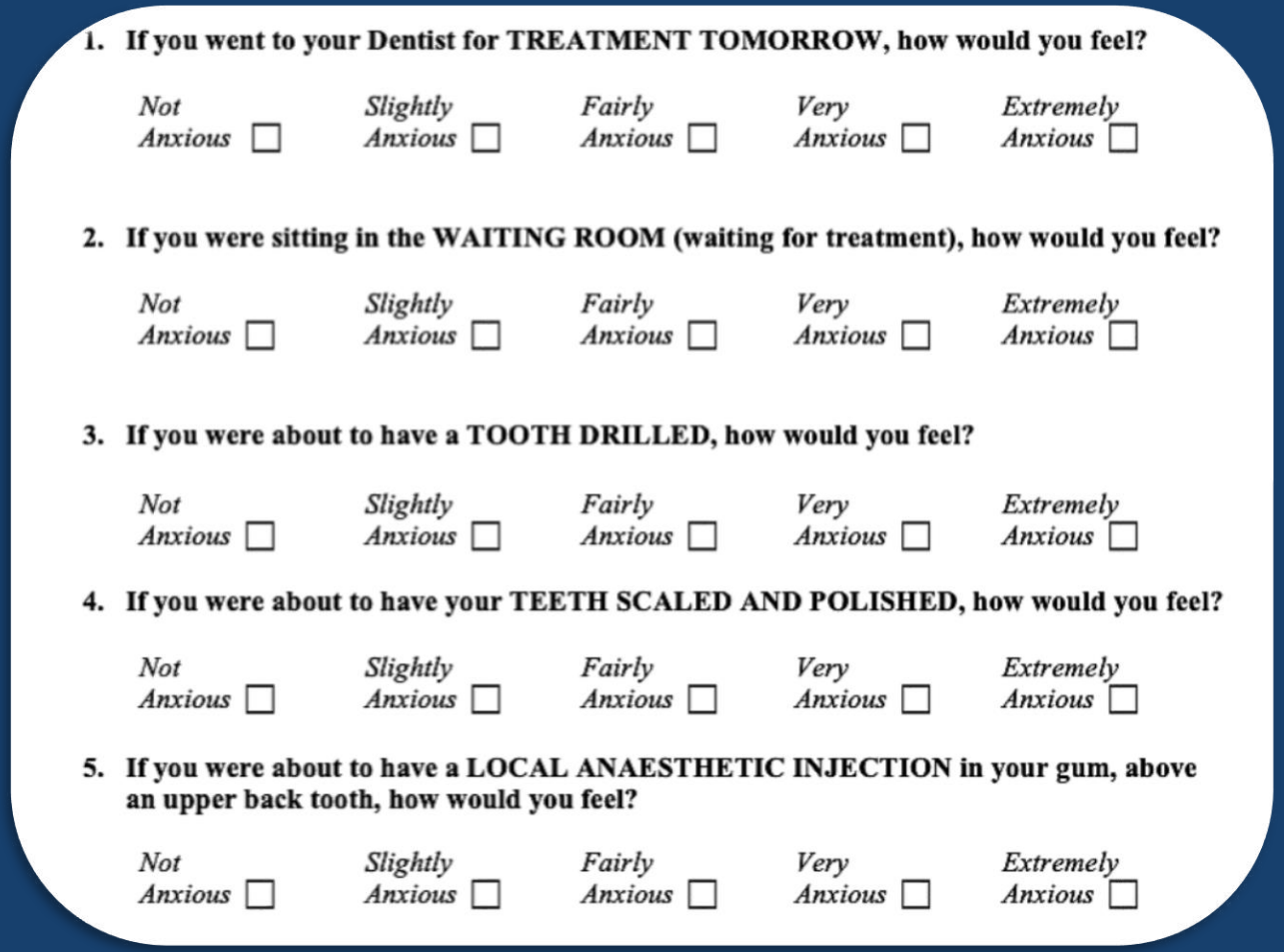
Materials and Methods

Standard of care Sc/RP

- The topical anesthetic Benzocaine and 2% Lidocaine with 1:100,000 epi.
- Via inferior alveolar nerve block for mandible and local infiltration for maxillary.
- Sc/RP was performed using hand and ultrasonic scalers.

Materials and Methods

Modified Dental Anxiety scale (MDAS)



1. **If you went to your Dentist for TREATMENT TOMORROW, how would you feel?**

Not Anxious ☐ *Slightly Anxious* ☐ *Fairly Anxious* ☐ *Very Anxious* ☐ *Extremely Anxious* ☐

2. **If you were sitting in the WAITING ROOM (waiting for treatment), how would you feel?**

Not Anxious ☐ *Slightly Anxious* ☐ *Fairly Anxious* ☐ *Very Anxious* ☐ *Extremely Anxious* ☐

3. **If you were about to have a TOOTH DRILLED, how would you feel?**

Not Anxious ☐ *Slightly Anxious* ☐ *Fairly Anxious* ☐ *Very Anxious* ☐ *Extremely Anxious* ☐

4. **If you were about to have your TEETH SCALED AND POLISHED, how would you feel?**

Not Anxious ☐ *Slightly Anxious* ☐ *Fairly Anxious* ☐ *Very Anxious* ☐ *Extremely Anxious* ☐

5. **If you were about to have a LOCAL ANAESTHETIC INJECTION in your gum, above an upper back tooth, how would you feel?**

Not Anxious ☐ *Slightly Anxious* ☐ *Fairly Anxious* ☐ *Very Anxious* ☐ *Extremely Anxious* ☐

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Materials and Methods

Modified Dental Anxiety scale (MDAS)

Instructions for scoring (remove this section below before copying for use with patients)

The Modified Dental Anxiety Scale. Each item scored as follows:

Not anxious	=	1
Slightly anxious	=	2
Fairly anxious	=	3
Very anxious	=	4
Extremely anxious	=	5

Total score is a sum of all five items, range 5 to 25: Cut off is 19 or above which indicates a highly dentally anxious patient, possibly dentally phobic

Materials and Methods

Six-item short form of the Spielberger State Trait Anxiety Inventory (STAI) assessments.

Measure:

Name ..... *Date* .....

A number of statements which people have used to describe themselves are given below. Read each statement and then circle the most appropriate number to the right of the statement to indicate how you ***feel right now, at this moment****. There are no right or wrong answers. Do not spend too much time on any one statement but give the answer which seems to describe your present feelings best.*

	Not at all	Somewhat	Moderately	Very much
1. I feel calm	1	2	3	4
2. I am tense	1	2	3	4
3. I feel upset	1	2	3	4
4. I am relaxed	1	2	3	4
5. I feel content	1	2	3	4
6. I am worried	1	2	3	4

Measure:

Name ..... *Date* .....

A number of statements which people have used to describe themselves are given below. Read each statement and then circle the most appropriate number to the right of the statement to indicate how you ***feel right now, at this moment****. There are no right or wrong answers. Do not spend too much time on any one statement but give the answer which seems to describe your present feelings best.*

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Materials and Methods

Six-item short form of the Spielberger State Trait Anxiety Inventory (STAI) assessments.

Calculation:

To calculate the total STAI score (range 20 - 80):

- reverse scoring of the positive items (calm, relaxed, content) so 1=4, 2=3, 3=2 and 4=1;
- sum all six scores;
- multiply total score by 20/6;
- refer to Spielberger's manuals to interpret scores (a 'normal' score is approx. 34 - 36) or **Bekker HL**, Legare F, Stacey D, O'Connor A, Lemyre L. *Is anxiety an appropriate measure of decision aid effectiveness: a systematic review?* Patient Education and Counselling. 2003; 50: 255-262.

Materials and Methods

Additionally, subjects were asked after the second appointment to give a rating from 1-3:

1. They like the first procedure more
2. No preference between each procedure
3. They preferred the second procedure the most

Materials and Methods

Galvanic Skin Response (GSR)

Materials and Methods

Galvanic Skin Response (GSR)

Materials and Methods

The stress ball was simply squeezed with the dominant hand, opposite the hand containing the sensor and may be squeezed at any time during the procedure.

Data Analysis

A sample size of 20 subjects provided 80% power to detect a 0.67 standard deviation difference when using a continuous outcomes for a 2-sided test with a significance level α of 0.5

Statistical Analysis

Wilcoxon Signed Rank Test (alpha=0.05)

- STAI
- MDAS
- GSR

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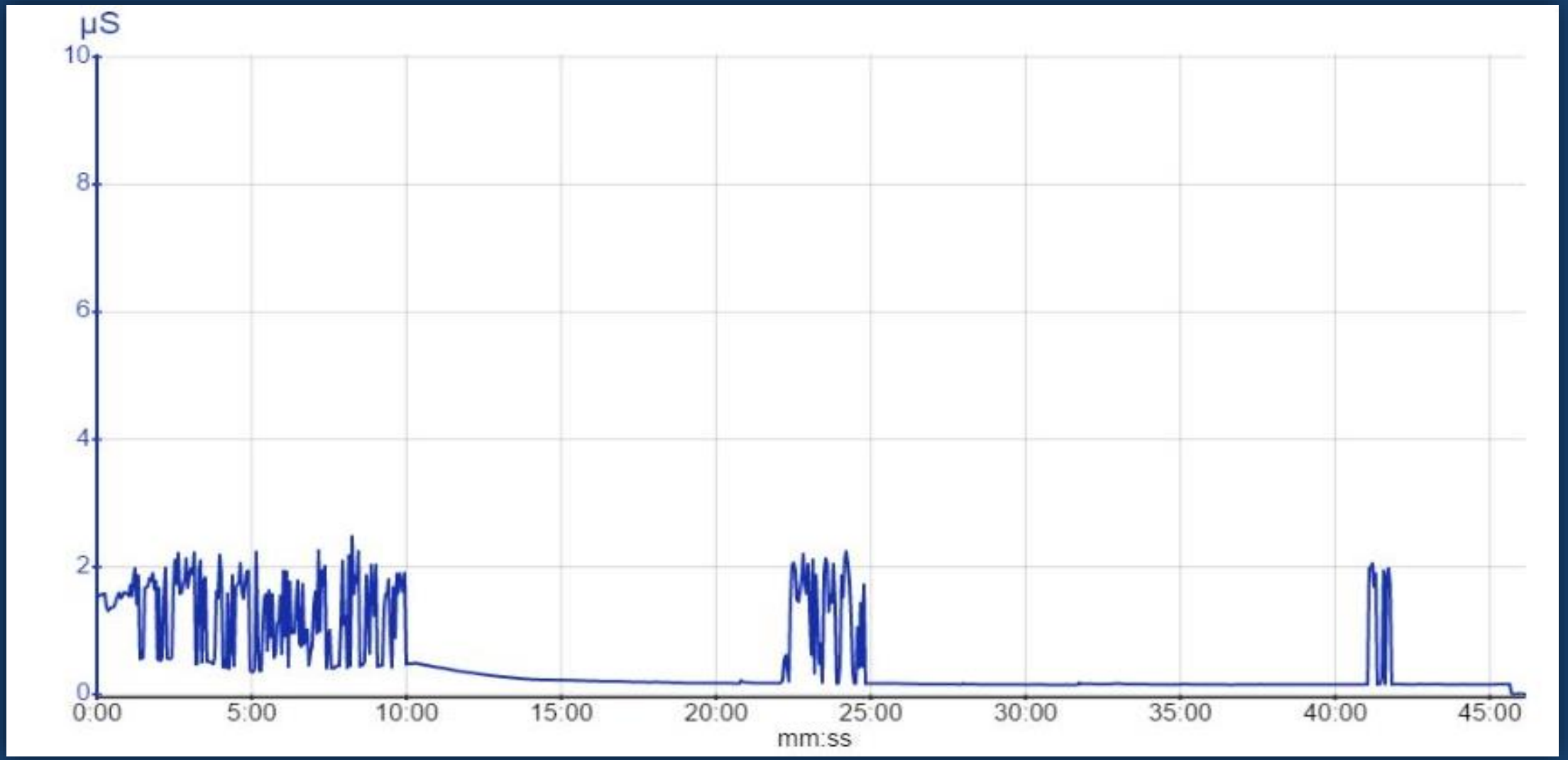
Results

Results

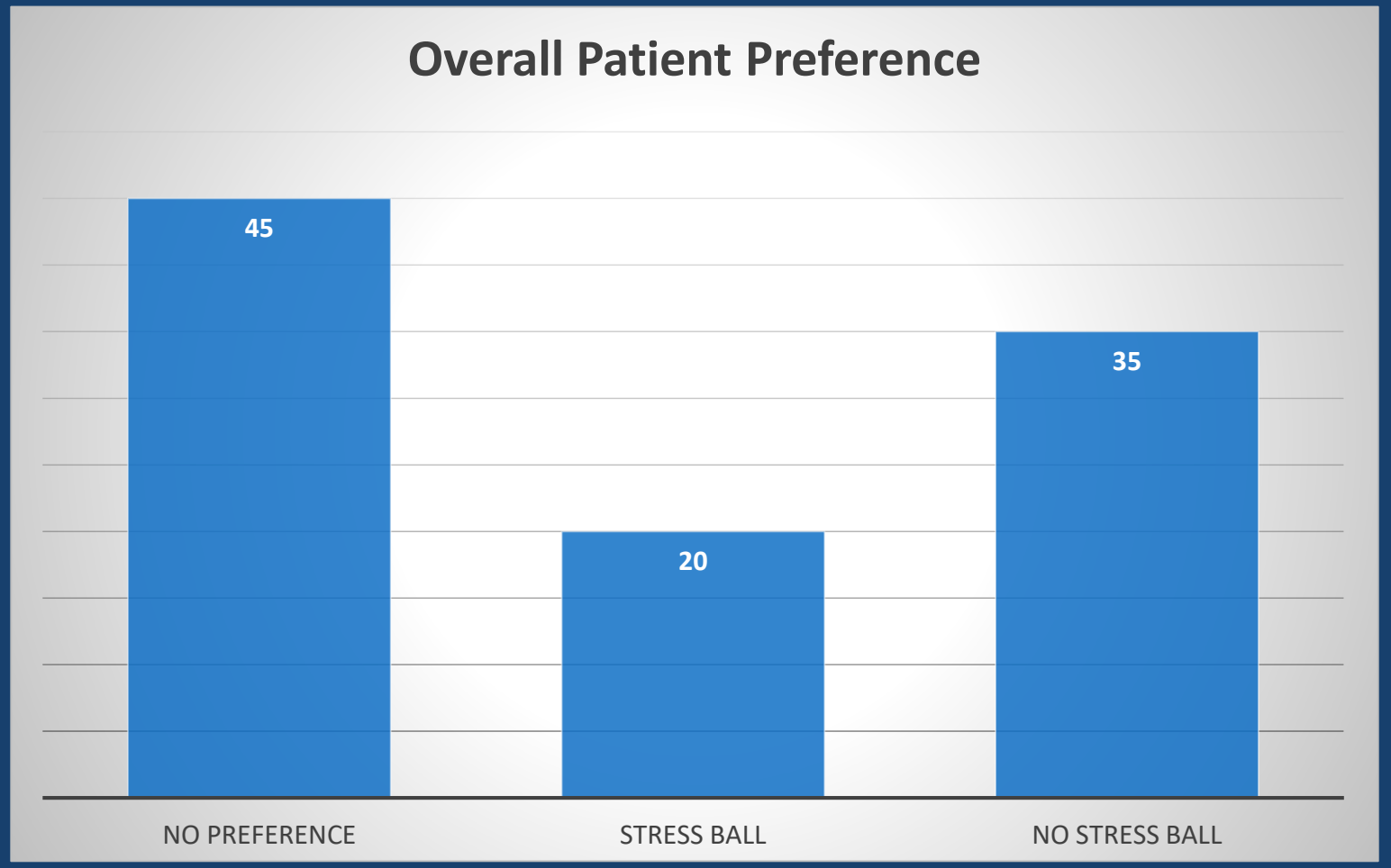
Galvanic Skin Response (Median, IQR)			
	No Stress Ball	Stress Ball	P value
GSR	0.80 (0.77)	0.74 (0.83)	0.14


µS
10
8
6
4
2
0
0:00
5:00
10:00
15:00
20:00
25:00
30:00
35:00
40:00
45:00
mm:ss

Results

Spielberger State-Trait Anxiety Inventory and Modified Dental Anxiety Scale (Median, IQR)						
	No Stress Ball		P value	Stress Ball		P value
	Before	After		Before	After	
STAI	28.3 (28.2)	30.0 (23.0)	0.13	30.0 (12.6)	25.0 (19.2)	0.33
MDAS	11.0 (6.0)	10.0 (5.5)	0.16	11.0 (4.5)	10.5 (5.8)	0.72

Results


Overall Patient Preference
45
20
35
NO PREFERENCE
STRESS BALL
NO STRESS BALL

Results

Subjective findings:

- 30% of patients that stated the stress ball helped with administration of local anesthetic
- Of the 10 Patients that started with the use of the stress ball, 20% attempted to request the stress ball at the second session

Results

The results of this study found that the use of a stress ball as a distraction technique did not result in any significant reduction in stress levels in subjects undergoing scaling and root planing with local anesthetic.

Results

Failed to reject Null Hypothesis

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Discussion

Discussion

Neurocognitive model of attention

Discussion

Previous Research

- Aydin- 2016: Children undergoing Venipuncture
  - Average age 9 years old
  - Blood draw
  - 10cm soft ball
  - Instructed to squeeze and release
  - No significant results

Discussion

Previous Research

- Hudson- 2015: Conscious venous surgery
  - 398 patients
  - Average age 50 years old
  - Thermoablation, phlebectomies
  - Evaluated several methods of distraction
  - Pre- and post-procedural STAI used

Discussion

Previous Research

- Hudson- 2015: Conscious venous surgery
  - Touch= stress balls
  - Distraction via the use of stress balls found to be statistically significant
  - No continuous data collected
  - Patients own control, potentially increasing power

Discussion

Previous Research

- Appukuttan- 2016 literature review: GSR valid took for measuring anxiety
- Caprara 2003- Objective measurement of anxiety via GSR
  - Statistically significant correlation between GSR and dental anxiety
- GSR and MDAS cross evaluated
  - Higher GSR readings correlated with higher MDAS scores

Discussion

Previous Research

- Najafpour-2017: GSR and MDAS cross evaluated
  - Higher GSR readings correlated with higher MDAS scores

Discussion

Previous Research

- Humphris-1995, 2000: MDAS
  - 800 patients
  - 3 different countries
  - High validity and consistency

Discussion

Previous Research

- Marteau and Bekker-1992: STAI
  - Original STAI 40 items
  - Extensively used in medical settings
  - Shortened to six items with correlation coefficients great than 0.90
- Tluczeck- 2009
  - Re-visited Marteau and Bekker's STAI
  - 268 subjects
  - Followed up at 2, 6, 12 months
  - Results correlation coefficients greater than 0.90

Discussion

Limitations

- Rate of anesthetic administration
- Severity of periodontitis
- Extent of probing depths
- Size of stress ball

Discussion

Future Research

- Evaluate the use of stress balls as a distraction approach only during administration of local anesthetic.

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Conclusion

Conclusion

The results of this study found that the use of a stress ball as a distraction technique did not result in any significant reduction in stress levels in subjects undergoing scaling and root planing with local anesthetic.