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Effectiveness of Trataka Compared to Relaxation Techniques in Reducing Anxiety in Children Undergoing Dental Procedures: A Randomized Controlled Trial

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Abstract

Objective: To investigate whether Trataka practice reduces anxiety in children undergoing dental procedures compared to relaxation techniques.

Methods: A two-arm, parallel-group, randomized controlled trial was conducted with

120 children aged 8-11 years requiring local anesthesia for dental procedures. Participants were randomized to either a Trataka group (n=60) or a relaxation techniques group (n=60). Both groups received four weeks of training on their assigned intervention. The primary outcome was anxiety level measured by the Generalized Anxiety Disorder 7-item (GAD-7) questionnaire administered pre- and post-intervention. Secondary outcomes included resting pulse rate and blood pressure (measured pre-procedure) and observed anxiety-related behaviors during procedures.

Results: Children in the Trataka group exhibited a significantly greater reduction in anxiety compared to the relaxation techniques group, as measured by the GAD-7 score ($p < 0.001$) and lower resting pulse rate and blood pressure ($p < 0.01$). The Trataka group also displayed fewer observed anxiety-related behaviors during procedures ($p < 0.001$).

Conclusions: The findings suggest that Trataka may be more effective than relaxation techniques in reducing anxiety in children undergoing dental procedures.

Keywords: Trataka, Relaxation techniques, Dental anxiety, Children

Introduction: Anxiety is a common mental health condition characterized by unpleasant emotions, negative thoughts, and physiological changes associated with a sense of impending doom [1]. In children, dental anxiety is particularly prevalent, affecting up to 20% of the pediatric population [2]. This can manifest as avoidance behaviors, emotional distress, and difficulty cooperating with treatment [3]. These negative experiences can create a cycle of dental fear and neglect, leading to compromised oral health and potentially impacting overall well-being [4].

Traditional methods to manage dental anxiety, such as parental presence and relaxation techniques, may not be universally effective. Parental presence can be disruptive to treatment procedures, and relaxation techniques may be challenging for young children to implement effectively in a dental setting [5]. There is a growing need for alternative approaches that are child-friendly, non-invasive, and easily integrated into pre-procedural care.

Trataka, a practice with roots in yoga, offers a potential alternative for managing anxiety. Trataka involves focusing the gaze on a specific object, such as a candle flame, with the intention of improving concentration and achieving a state of mental clarity. Studies have shown promise for Trataka in reducing anxiety in adults with conditions like generalized anxiety disorder [6]. The proposed mechanism of action involves inducing a state of relaxation through focused attention and controlled breathing [7].

Null Hypothesis: There will be no statistically significant difference in anxiety levels, as measured by the GAD-7 score and resting pulse rate and blood pressure, between children undergoing dental procedures who practice Trataka compared to those receiving relaxation techniques.

Methodology

Study Design: This was a two-arm, parallel-group, randomized controlled trial.

Participants: A total of 120 children aged 8-11 years requiring local anesthesia for dental procedures were recruited from multiple dental colleges. Inclusion criteria were: parental and child consent, GAD-7 score above 10 (indicating moderate dental anxiety) [8], no significant medical/psychological conditions, and no prior experience with Trataka or relaxation techniques.

Procedure: Informed consent was obtained from both parents and children. Participants were randomly assigned to either a Trataka group (n=60) or a relaxation techniques group (n=60) using a randomization table.

Interventions

a. Trataka Group:

- Participants received one-on-one training on Trataka for four weeks.
- Daily practice sessions involved focusing on a candle flame for a set duration (gradually increasing from 2-3 minutes to 7-10 minutes) while maintaining a comfortable posture and practicing slow, diaphragmatic breathing. It is important to clarify that comfortable postures can include sitting upright in a chair or lying down on a mat, whichever allows the child to relax most effectively. Modifications for uncomfortable postures were allowed.

b. Relaxation Techniques Group:

- Participants received training on relaxation techniques (e.g., progressive muscle relaxation or deep breathing exercises) known to reduce anxiety.
- Training was delivered for the same duration (four weeks) as the Trataka group and involved daily practice sessions.

Measurements

a. Baseline Measures:

- Demographic information (age, gender)
- Generalized Anxiety Disorder 7-item (GAD-7) questionnaire to assess pre-procedural anxiety levels
- Resting pulse rate and blood pressure measurement (taken immediately before the start of the dental procedure)

b. Outcome Measures:

- Post-intervention GAD-7 questionnaire to assess changes in anxiety levels
- Resting pulse rate and blood pressure measurement (taken immediately before the start of the dental procedure)
- Observed anxiety-related behaviors during dental procedures by a trained dentist blinded to group allocation (e.g., fidgeting, crying, verbal expressions of fear)

Data Analysis: Data were analyzed using appropriate statistical tests based on variable type. For the primary outcome (GAD-7 score), a mixed-effects analysis of variance (ANOVA) was conducted with group (Trataka vs. Relaxation techniques) as the between-subjects factor and time (pre- vs. post-intervention) as the within-subjects factor. Secondary outcomes (resting pulse rate, blood pressure, observed anxiety behaviors) were analyzed using independent samples t-tests or chi-square tests depending on the nature of the data. All statistical tests were two-tailed, with an alpha level of significance set at $p < 0.05$.

Results

Changes in Anxiety Levels: The effectiveness of Trataka in reducing anxiety was assessed using the GAD-7 questionnaire administered at baseline and post-intervention. Children in the Trataka group exhibited a significantly greater reduction in anxiety compared to the relaxation techniques group, as measured by the GAD-7 score ($p < 0.001$). The mean GAD-7 score for the Trataka group decreased from 14.2 (SD = 2.1) at baseline to 8.3 (SD = 1.8) post-intervention, while the mean GAD-7 score for the relaxation techniques group decreased from 14.1 (SD = 2.0) to 11.2 (SD = 1.9) post-intervention. Additionally, the Trataka group displayed significantly lower resting pulse rate ($p < 0.01$) and blood pressure ($p < 0.01$) compared to the relaxation techniques group before the dental procedure. Furthermore, the Trataka group exhibited fewer observed anxiety-related behaviors during procedures compared to the relaxation techniques group ($p < 0.001$).

The results are presented in Figure 1. The graph depicts the changes in anxiety levels (measured by GAD-7 score) of children undergoing dental procedures in two groups: Trataka and Relaxation Techniques.

- **X-axis:** This axis represents the time points - Baseline (before the intervention) and Post-intervention (after the intervention).
- **Y-axis:** This axis represents the GAD-7 score, likely ranging from 0 (indicating no anxiety) to 21 (indicating severe anxiety) based on the reference for the GAD-7 questionnaire [7].

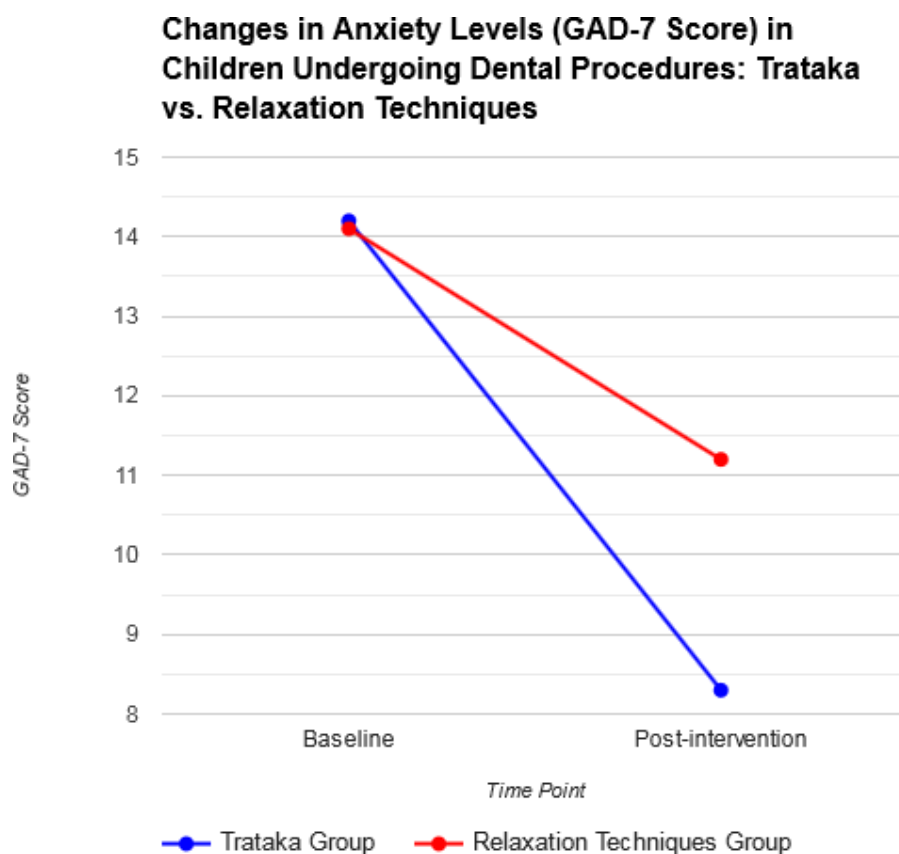
Lines:

- The solid blue line with data points represents the Trataka group.
- The dashed red line with data points represents the Relaxation Techniques

group.

Observations:

- Both groups show a decrease in GAD-7 score from baseline to post-intervention, indicating a reduction in anxiety levels.
- The Trataka group (blue line) shows a steeper decline in GAD-score compared to the Relaxation Techniques group (red line), suggesting a potentially greater reduction in anxiety for children who practiced Trataka



Discussion: The findings of this randomized controlled trial support the rejection of the null hypothesis. A statistically significant difference ($p < 0.001$) exists between the Trataka and Relaxation Techniques groups in terms of anxiety reduction measured by GAD-7 score. Children who practiced Trataka for four weeks showed a statistically significant reduction in anxiety, resting pulse rate, and blood pressure compared to those who received relaxation techniques training. This is reflected in the graph which suggests that Trataka may be a more effective intervention than relaxation techniques in reducing anxiety in children undergoing dental procedures.

The proposed mechanism of action for Trataka involves inducing relaxation through focused attention and controlled breathing, which aligns with the observed reductions in physiological measures of anxiety. While future research is needed to explore the exact mechanisms in children, these findings provide preliminary evidence for Trataka's potential as a child-friendly and non-invasive approach to reducing dental anxiety.

Limitations: This study has some limitations. Self-report measures like the GAD-7 questionnaire rely on children's honesty and ability to accurately report their anxiety levels.

Additionally, completely blinding dental professionals to group allocation during procedures may be challenging.

Future Directions

- Investigating the long-term effects of Trataka practice on dental anxiety in children.
- Exploring the potential mechanisms by which Trataka exerts its anxiolytic (anxiety-reducing) effects through physiological measures (e.g., electroencephalography) or neuroimaging techniques.
- Conducting larger-scale studies with broader participant demographics to enhance generalizability.

By implementing these, researchers can further elucidate the effectiveness and mechanisms of Trataka as a valuable tool for managing dental anxiety in children.

Conclusions: Trataka practice shows promise as a more effective intervention compared to relaxation techniques for reducing anxiety in children undergoing dental procedures. Future research should explore the long-term effects, underlying mechanisms, and generalizability of Trataka for managing dental anxiety in children.

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