

Original Article

Effectiveness of the tell-play-do technique in comparison to the tell-show-do technique for the management of anxious children: A randomized controlled trial.

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Abstract

Aim: This study aimed to evaluate the effectiveness of the tell-play-do technique compared to the tell-show-do technique in managing anxious children. **Methodology:** Thirty-four children aged 4-6 years were included in the current study. Children were randomly assigned to intervention (Tell-play-do technique) and control groups (Tell-show-do technique). The level of dental anxiety was assessed using a finger pulse oximeter at three intervals during the procedure. The operator evaluated the child's behavior during the procedure in each group using the FLACC (Face, Leg, Activity, Cry, Consolability) behavioral pain assessment scale. The ease of handling the patient (during the procedure) and the ease of carrying out the procedure by the pediatric dentist after using the two behavior modification techniques were assessed by using a questionnaire. **Results:** After behavior management and at the end of the visit, the control group had a significantly higher heart rate than the intervention group ($p=0.016$ and $p < 0.001$), respectively. Behavior evaluation results reported a significant difference between both groups ($p < 0.001$). Both groups had a significant difference ($p < 0.001$) regarding the ease of handling patients and the ease of doing the procedure in favor of the intervention group. **Conclusion:** Tell-play-do technique was more successful than the Tell-show-do technique in reducing the children's anxiety. Most of the children in the tell-play-do group were relaxed and comfortable compared to those in the tell-show-do group, which showed mild discomfort. The tell-play-do group revealed better results regarding the ease of handling the patient and the ease of doing the procedure by the operator.

Keywords: Tell-play-do, Tell-show-do technique, anxiety, and children

I. INTRODUCTION:

Anxiety is a significant issue in pediatric and adolescent dental care. Dental anxiety and fear affect 5 to 33 percent of children worldwide, making it the fourth most common fear (Bradt & Teague, 2018; Abbasi et al., 2021).

Various pharmacological and non-pharmacological behavior management techniques are available to improve communication, eliminate inappropriate behavior, or reduce anxiety. The American Academy of Pediatric Dentistry recommended more focus on

nonpharmacologic intervention in future studies (Nazzal et al., 2021; AAPD, 2022).

Behavior management techniques are methods designed to increase a child's coping skills, secure full acceptance of dental care, and lessen the child's perception that the appointment will be stressful or harmful. The pediatric dentist has a variety of behavior management strategies, such as the tell-show-do method, desensitization, modeling, positive reinforcement, voice control, distraction, parental presence or absence, restraint/protective stabilization, nonverbal communication, hand-over-mouth sedation, and general anesthesia (Gómez-Polo et al., 2021).

The cornerstone of a child's education and behavior management is the "Tell-show-do" method. Tell-show-do includes the verbal explanation of procedures in a way that the child could understand (tell); presentation of the procedure's visual, auditory, olfactory, and tactile aspects is carefully done without being threatening (show); and finally, the procedure has to be performed without deviating from explanation and demonstration (do) (Vijayakumar et al., 2020).

The tell-show-do technique was modified into the tell-play-do (TPD) technique, using the concept of learning by doing to reduce children's fear and anxiety about dental treatment and promote adaptive behavior (Shekhar et al., 2022).

In the tell-play-do technique, children were asked to play with toys that imitate dental devices, such as a saliva ejector, a mouth mirror, dental probe, and air/ water syringe (Kevadia et al., 2020).

A child's uncooperative behavior can hinder the effective administration of dental care. Therefore, despite the exceeding availability of behavior management techniques, there is a need to find a psychological behavior management strategy that successfully reduces fear and anxiety during dental treatment and induces a change in a child's attitude toward the treatment and is also acceptable by the parents (Kohli et al., 2022).

Because of the significant challenges facing pediatric dentists in controlling patient anxiety and convincing them to accept dental treatment, many types of research have been done in the field of behavior management (Manley, 2021).

However, in search of the literature, a few studies could be found on managing pediatric patients using the TPD technique (Kevadia et al., 2020). Therefore, this study aimed to assess the effectiveness of the tell-play-do technique compared to the tell-show-do technique in managing anxious children.

II. PARTICIPANTS AND METHODS

A. Study design

This study is a prospective, randomized, controlled clinical trial with a 1:1 allocation ratio. The Research Ethics Committee, Faculty of Dentistry, Cairo University, examined and approved the study protocol with number 23-6-20 on the scientific content and compliance with applicable research and human subjects rules. This study was registered on www.clinicaltrials.gov with ID: NCT04262063.

B. Sample size

An effect size of (1.00) was calculated based on the results of (Adeen & Alrshah, 2014) and on expert's opinion, which estimated the mean difference between the two methods

to be (10). By adopting an alpha (α) level of 0.05 (5%), a beta (β) level of 0.20 (20%), i.e., power=80%, and using the calculated effect size ($d=1.00$), the predicted sample size (n) was found to be a total of (34) cases, i.e. (17) for each group. The sample size was calculated using PS Power version 3.02 (Dupont & Plummer, 1990).

C. Study setting

Children participating in this study were recruited from the outpatient clinic of Pediatric Dentistry and Dental Public Health Department - Faculty of Dentistry - Cairo University. The principal investigator carried out dental procedures in the postgraduates' clinic of the Pediatric Dentistry and Dental Public Health Department – Faculty of Dentistry - Cairo University, Egypt. Screening of the attending children continued until the planned sample size was achieved.

D. Eligibility criteria

- Inclusion criteria:
 1. Age 4- 6 years old.
 2. Children with Frankl's behavior rating score of Frankl I (Definitely negative: Refusal of treatment, forceful crying, fearfulness, or any other overt evidence of extreme negativism) or Frankl II (Negative: Reluctance to accept treatment, uncooperative, some evidence of negative attitude but not pronounced (sullen, withdrawn) (Frankl et al. 1962).
 3. Patients with no previous dental experience (First dental visit).
 4. Patients not suffering from cognitive or mental problems.
 5. Children with primary molars indicated for extraction.
- Exclusion criteria:
 1. Medically compromised patients or special health care needs children (SHCN).
 2. Patients refused to participate in the study.

E. Informed consent

The aim of the study, the procedures in detail, and the potential side effects were all

explained to the parents in straightforward terms. The parent or legal guardian signed informed consent, and verbal assent was acquired from each child participating in the research.

F. Randomization and allocation concealment

Children were randomly assigned into intervention and control groups using simple randomization with an allocation ratio of 1:1. The assistant supervisor concealed the allocation sequence from the principal investigator in sequentially numbered opaque sealed envelopes.

The participants were divided into two equal groups. Group A ($n=17$) represented the intervention (Tell play do group), while Group B ($n=17$) represented the control group (Tell show do group).

G. Intervention

- Diagnostic procedures:

The principal investigator performed an extra-oral, intra-oral, and radiographic examination to confirm adherence to eligibility criteria.

- Intraoperative procedure

Group A (TPD group) (Intervention group): (Radhakrishna et al., 2019)

The child was introduced to the operating room and seated on the dental chair. Adjustment of the position of the dental chair and the headrest was made; for maxillary teeth, the maxillary occlusal plane of the child is 60° with the floor, and for mandibular tooth extraction, the patient was seated in the dental chair with the mandibular occlusal plane parallel to the floor. The height of the dental chair was adjusted so that the child's mouth was at or below the elbow level of the operator. The principal investigator sat behind the patient at 8 o'clock to get optimal accessibility and visibility. The pulse oximeter measured the

heart rate level before behavior management (before starting any procedure).

The operator used a plastic dental model, told the child in simple words the extraction steps, and introduced all the materials used in this procedure. Then the patient was shown how to extract the tooth on the plastic dental model. The child was informed that we were playing a game, and he will play with the customized dental carton model and extract the dental carton model teeth if the child passed the dental procedure well. The patient was asked to play with a piece of slime to reduce his stress during anesthesia. After using the behavior management technique pre-operatively, the child's heart rate was measured using the pulse oximeter for the second time.

Before the dental treatment began, the chair was tilted to a semi-supine posture. The injection site was dried with a cotton pellet and applied a topical anesthetic gel for one minute. Over 30 seconds, the local anesthetic solution was gradually applied. Then, the child started to play with the bubble toy for 1-2 minutes until his mouth began to numb. Supplemental anesthesia was administered if the child complained of pain during the extraction procedure. The child was asked to bite on a sterile piece of cotton firmly for at least 30 minutes.

The child played with a plastic toy while the tooth was extracted to distract him. The operator evaluated the child's behavior during extraction using the FLACC (Face, Leg, Activity, Cry, Consolability) behavioral pain assessment scale. (Merkel et al., 1997). The child could extract the cartoon model tooth using artificial forceps at that stage. This step was considered the first prize for the child, as he overcame his fears and showed remarkable cooperation throughout the treatment.

The heart rate was re-measured for the third time after finishing the treatment at the end of the visit (Post-operative). The ease of handling the patient (during extraction) and the ease of carrying out the extraction procedure by

the pediatric dentist after using the behavior management technique were assessed using a questionnaire. The child took his certificate of participation and was asked to choose a gift.

Group B (TSD group) (Control group): (Radhakrishna et al., 2019)

In group B all the preparatory, clinical procedures, and scale measurements were done as previously mentioned steps in the TPD group. However, psychological preparation of the child was performed using the Tell show do technique to prepare the child for treatment.

H. Assessments of the Outcomes

1. Level of anxiety

The level of anxiety was assessed using pulse oximetry to evaluate the children's heart rate (Shindova et al., 2022).

In this study, heart rate was measured at three intervals:

- 1- First time: before starting any procedure (Before behavior management).
- 2- Second time: pre-operatively (After behavior management).
- 3- Third time: post-operatively (At the end of the visit).

2. Behavior evaluation during extraction:

Behavior evaluation during extraction was assessed using the FLACC scale. Based on the total score of the scale, the pain is categorized into the following four levels: Relaxed and comfortable (Score = 0), Mild discomfort (Score = 1–3), Moderate Pain (Score = 4–6), Severe discomfort/pain or both (Score = 7–10) (Merkel et al., 1997).

3. Ease of handling patients and ease of doing the procedure

Ease of handling patients during extraction and ease of doing the extraction procedure were evaluated using a questionnaire based on (Radhakrishna et al., 2019), for the operator. The responses were answered by a 5-point Likert scale ranging from strongly agree to strongly disagree.

I. Addressing the potential sources of bias

Different types of bias were avoided in the following ways:

- Selection bias: Selection bias was avoided in this study through randomization, sequence generation, and allocation concealment.
- Performance bias: Performance bias was avoided in this study through blinding of study participants.
- Ascertainment bias: The ascertainment bias was avoided in this study through blinding during data collection by the outcome assessors.
- Reporting bias: Reporting bias was avoided in this study by reporting all the assessed outcomes.

J. Statistical analysis

Data were analyzed using an independent t-test for intergroup comparisons and repeated measures ANOVA followed by bonferroni post hoc test for intragroup comparisons. Categorical data were analyzed using fisher's exact test. Ordinal data were analyzed using the Mann-Whitney U test for intergroup comparisons. The significance level was set at $p \leq 0.05$ within all tests. Statistical analysis was performed with R statistical analysis software version 4.1.2 for Windows1.

III. RESULTS

1-Demographic data of the participants

A total of 34 children were included in the current study. There were 8 (47.1%) males and 9 (52.9%) females in group A, while in group B, there were 9 (52.9%) males and 8 (47.1%) females. The difference between both groups was not statistically significant ($p=1$). The mean age in group A was (5.35 ± 0.70), and in group B, it was (5.06 ± 0.83). There was no significant statistical difference between both groups regarding age ($p=0.272$). In both groups, 8(47.1%) cases were from Cairo, and

9(52.9%) were from Giza, with no significant statistical difference between groups ($p=1$).

2-Level of anxiety

2.1. Intragroup comparison of heart rate for different intervals:

Regarding both A and B groups, there was a significant difference between heart rate values measured at different intervals ($p < 0.001$). In group A, the highest value was recorded before behavior management (116.06 ± 12.64), followed by after behavior management (94.53 ± 6.80). In contrast, the lowest value was measured at the end of the visit (82.35 ± 5.18). All post hoc pairwise comparisons were statistically significant ($p < 0.001$). Regarding group B, the highest value was recorded before behavior management (106.41 ± 11.43), followed by after behavior management (103.18 ± 12.32). While the lowest value was measured at the end of the visit (101.06 ± 10.46). Post hoc pairwise comparisons showed the value measured before behavior management to be significantly higher than values measured at other intervals ($p < 0.001$).

2.2. Intergroup comparison of heart rate for different groups:

Before behavior management, the mean heart rates in group A were (116.06 ± 12.64) compared to (106.41 ± 11.43) in group B. Group A had a significantly higher heart rate than group B ($p=0.026$).

While after behavior management, the mean heart rates in group A were (94.53 ± 6.80) compared to (103.18 ± 12.32) in group B. Group B had a significantly higher heart rate than group A ($p=0.016$). At the end of the visit, the mean heart rates in group A were (82.35 ± 5.18) compared to (101.06 ± 10.46) in group B. Group B had a significantly higher heart rate than group A ($p < 0.001$).

3. Behavior evaluation

Intergroup comparison of behavior evaluation using (FLACC Scores) during extraction

The frequency and percentage values for FLACC scores in different groups are presented in Table (1). There was a significant difference in behavior change between both groups ($p < 0.001$), with most of the cases in group A [10(58.8%)] being relaxed and comfortable and most of the cases in group B [7(41.2%)] having mild discomfort during extraction.

4-Ease of handling patients

The frequency and percentage values for ease of handling patients in different groups are presented in Table (2). Regarding the ease

of handling patients during extraction, there was a significant difference between both groups ($p < 0.001$), with the majority of the cases in group A [15(88.2%)] having "strongly agree" scores and most of the cases in group B [9(52.9%)] being "Neutral".

5-Ease of doing the procedure

The frequency and percentage values for ease of doing the procedures in different groups are presented in Table (3). There was a significant difference between both groups ($p < 0.001$) regarding ease of doing the procedures during extraction, with the majority of the cases in group A [15(88.2%)] "strongly agree", and most of the cases in group B [12(70.6%)] being "Neutral".

Table (1): Frequency and percentage values for FLACC score in different groups.

Parameter		Group A	Group B	p-value
Relaxed and comfortable	n	10	0	<0.001*
	%	58.8%	0.0%	
Mild discomfort	n	7	7	
	%	41.2%	41.2%	
Moderate pain	n	0	6	
	%	0.0%	35.3%	
Severe discomfort/pain	n	0	4	
	%	0.0%	23.5%	

*; significant ($p \leq 0.05$) ns; non-significant ($p > 0.05$)

Table (2): Frequency and percentage values for ease of handling in different groups.

Parameter		Group A	Group B	p-value
Very good	n	15	0	<0.001*
	%	88.2%	0.0%	
Good	n	2	2	
	%	11.8%	11.8%	
Average	n	0	9	
	%	0.0%	52.9%	
Not bad	n	0	6	
	%	0.0%	35.3%	
Bad	n	0	0	
	%	0.0%	0.0%	

*; significant ($p \leq 0.05$) ns; non-significant ($p > 0.05$)

Table (3): Frequency and percentage values for ease of doing the procedures in different groups.

Parameter		Group A	Group B	p-value
Very good	n	15	0	<0.001*
	%	88.2%	0.0%	
Good	n	2	2	
	%	11.8%	11.8%	
Average	n	0	12	
	%	0.0%	70.6%	
Not Bad	n	0	2	
	%	0.0%	11.8%	
Bad	n	0	1	
	%	0.0%	5.9%	

*; significant ($p \leq 0.05$) ns; non-significant ($p > 0.05$)

IV. DISCUSSION:

Tell-Play-Do (TPD) is a recently developed behavior modification strategy. It is believed to be a variant of the tell-show-do method (TSD). Play therapy is a dynamic interpersonal relationship between the child and the therapist that helps the child handle negative emotions and pressures. While dealing with stressful conditions, play therapy can be utilized as a coping method to give the child a sense of control over the issue (**Bahrololoomi et al., 2022**).

There is limited availability of information regarding the use of the tell-play-do technique to reduce anxiety (**Safar & Alfares, 2022**). Therefore, the current study was conducted to assess the effectiveness of the tell-play-do technique in comparison to the tell-show-do technique in the management of anxious children.

The tell-show-do technique was selected as the comparator in the present study as it is one of the children's most commonly used methods for behavior control. Since then, it has been the technique that is most frequently used and compared to other behavior control strategies, and it is still the most commonly used technique globally (**Al-Khotani et al., 2016; Khandelwal et al., 2018**).

According to Piaget's classification, children between the ages of 4 and 7 are in the preoperational stage. Their growing vocabulary, attention spans, and capacities for concentration throughout this period indicate their preparation for social communication. Consequently, this age group is perfect for evaluating behavior modification approaches and their impacts on children (**Radhakrishna et al., 2019**). Agreeing with **Sahebalam et al., 2020**, the study population was limited to pre-schoolers to eliminate the confounding effect of school on children's behavior and cognitive development.

Frankel's behavioral rating scale was used in the current study to categorize children's

behavior. Only children with Frankl's behavior rating score of 1 or 2 were included in the current study. The Frankel rating scale is one of the most commonly used behavior rating scales in pediatric dentistry through which the child's attitude and cooperation during dental visits are assessed (**Frankl et al., 1962; Riba et al., 2017**).

Only children without previous dental experience (first dental visit) were eligible since painful experiences can register in their memory, affecting their subsequent pain perception and behavior. Patients with past negative experiences suffer increased anxiety due to switching to another dental office and facing the same unpleasant situation again (**Mendoza et al., 2015; Noel et al., 2017**).

According to **Shah and Bhatia, 2018**, patients with prior dental histories were also excluded. A negative dental experience in the past might make children more fearful and anxious about future treatment appointments and possibly cause them to act out negatively or disruptively while getting treatment (**Sahebalam et al., 2020**).

On the other hand, medically compromised patients and those suffering from cognitive or mental problems were excluded from this study because patients with personal experiences of a mental illness frequently report feeling ignored and rejected, which has been recognized as a key obstacle to accessing treatment and lead to increased anxiety (**Knaak et al., 2017**).

This study also included children whose primary molars needed to be extracted. Pediatric patients may experience worry and anxiety during invasive operations like extractions, which may affect how they react to treatment. To keep the patient comfortable and improve the child's cooperation for subsequent dental visits, the dentist must execute procedures with minimal pain and employ various behavior management techniques (**Sivakumar, 2019**).

Eligible children were randomly assigned into intervention and control groups using simple randomization with an allocation ratio of 1:1. Randomization and allocating the participants to the experimental or control Group are employed to reduce the possibility of bias. Allocation concealment assists in the prevention of selection bias by preserving the assignment sequence until the trial groups receive the appropriate intervention (**Jayaraman, 2020**).

The pulse oximeter was used to record the patient's heart rate before behavior management, after behavior management and at the end of the visit. Since anxiety can result in physiological changes like releasing certain hormones like adrenaline and increased respiratory and heart rates. Before behavior management, taking the child's pulse to document their baseline heart rate was essential. Additionally, data was collected during the dental treatment to see whether the management technique reduced or raised the patient's anxiety. Additionally, the final record provided an overall assessment of whether the child had a positive experience and will return for future dental visits (**Adel Zakhary et al., 2020**).

The operator used the FLACC (Face, Leg, Activity, Cry, Consolability) behavioral pain assessment scale to grade the child's behavior. Anxiety/pain were assessed with the FLACC scale. It exhibits high reliability and validity during and after procedures that cause pain in small and older children (**Merkel et al., 1997; Ramírez-Carrasco et al., 2017**).

Ease of handling patients during extraction and ease of doing the extraction procedures were evaluated using a questionnaire based on (**Radhakrishna et al., 2019**) for the operator. The responses were answered by a 5-point Likert scale ranging from strongly agree to strongly disagree. The Likert scale is an ordinal scale used to rate the degree of agreement or disagreement with a statement. As a result, a range of opinions can be obtained

using a Likert scale rather than a simple yes or no question. A Likert-type scale assumes that an experience's strength/intensity is linear and that attitudes can be measured (**Riba et al., 2017**).

Regarding the present study results, the demographic data statistics showed non-statistical significance between both groups regarding the mean age, gender, or location. Therefore, the two groups were comparable (**Al-Khotani et al., 2016**).

Because the children had never received dental care, they may have had a greater heart rate before behavior management because they frequently experience a fear of the unknown (**Elicherla et al., 2019**). The autonomic nervous system controls the pulse rate, indicating whether a person is stressed or relaxed. The sympathetic nervous system may be stimulated, and catecholamines may be released in anticipation of the injection, accounting for the heart rate increase. By various means of communication, patients can communicate their fears and anxieties. The tell-play-do behavior management strategy can help reduce anxiety by having the dentist establish rapport with the patient by being receptive to their fears and fostering two-way communication with empathy (**Shekhar et al., 2022**).

Concerning the change in the heart rate, after behavior management and at the end of the visit, the control group had a significantly higher heart rate than the intervention. These findings are consistent with **Vishwakarma et al., 2017**, who found that the mean heart rate at different treatment intervals was significantly lower in TPD than in the comparator group. Also, **Radhakrishna et al., 2019** found that after treatment, there was a significant reduction in mean pulse rate for both TPD and smartphone dentist game groups, indicating lower anxiety levels in these two groups when compared to the TSD group. The study results also matched those of **Kevadia et al., 2020**, where the mean heart rates were significantly

lower among children in group II (with the tell-play-do technique) than among those in group I (who watched a film about various dental procedures) and III (who used a mobile application) during the first and the second visits, after intervention and during restoration.

This might be explained by the fact that the TSD technique lacks the joyful, interactive, and distractive manner involved in the TPD technique. The tell-play-do method is based on learning theory, where exchanging ideas and two-way information happens while receiving dental care on toys that mimic real teeth. This helps the child grasp the dentist's perspective, feel more at ease, and exhibit cooperative behavior. This helped patients become accustomed to the dentist's environment, lessen their nervousness, create a bridge for future communication, and prepare for treatment sessions (Vishwakarma et al., 2017; Elicherla et al., 2019).

Concerning behavior evaluation, there was a significant statistical difference in the frequency and percentage values for FLACC score between both groups, with most cases in intervention 10(58.8%) being relaxed and comfortable. Most cases in the control group 7(41.2%) had mild discomfort. Similarly, the FLACC scores in Radhakrishna et al. 2019 study showed that more patients were relaxed in the smartphone dentist game and the Tell- -Play-do groups compared to the Tell-Show-Do group with statistical significance. This finding might be because Smartphone dentist games and Tell- -Play-do educate child patients about the use of common dental equipment, reducing dental fear or apprehension and giving children a first-hand experience of their usage and clinical effects obtained (Sahebalam et al., 2020).

Regarding the ease of handling patients during extraction, there was a significant difference in the frequency and percentage values for ease of handling between both groups, with the majority of the cases in the intervention 15(88.2%) strongly agreeing, and

most of the cases in the control group 9(52.9%) feeling neutral. According to Radhakrishna et al., 2019, handling the patient during treatment and performing the dental procedure in the Tell-Play-do group was significantly easier than in the TSD group. The children were introduced to a Play-do dental model and allowed to play with a battery-operated toy drill. They were given a funny demonstration of the air motor, suction, and air-water syringe. This helped patients become comfortable to the dental environment, minimized their fear, created a bridge for future communication, and helped them be ready for subsequent treatment sessions (Sahebalam et al., 2020).

Regarding the ease of doing the extraction procedure, there was a significant difference in the frequency and percentage values for ease of doing the extraction procedure between both groups ($p < 0.001$), with the majority of the cases in the intervention 15(88.2%) Very good, and most of the cases in the control group 12(70.6%) feeling Average. These findings might be because children were previously familiar with all the procedures. The findings of Radhakrishna et al., 2019 and Kevadia et al., 2020 supported this study results.

Study limitations

First dental visit and extraction were the significant limitations in this study as other procedures should be done in the first visit other than extraction, such as full examination of the teeth, gentle cleaning, and polishing, but extraction was chosen as it was an emergency procedure. Another drawback of this research was that the operator could not be blinded. Also, children's home environment and parents' attitudes and behavior could impact the child's behavior, and these factors were not studied in the current work.

V. CONCLUSIONS

1- Both tell-play-do and tell-show-do techniques reduced the children's anxiety levels. However, the tell-play-do behavior

management technique was more successful than the tell-show-do technique in reducing the children's anxiety.

2- Most of the children in the tell-play-do group were relaxed and comfortable compared to those in the tell-show-do group, which showed mild discomfort.

3- The tell-play-do group revealed better results regarding the ease of handling the patient and the ease of doing the procedure by the operator.

4- The tell-play-do technique could be an alternate behavioral modification technique to the tell-show-do in pediatric dentistry.

CONFLICT OF INTEREST

The authors declare no conflicts of interest.

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