Original Article

# The Effect of a Program to Promote Play to Reduce Children's Post-Surgical Pain: With Plush Toys, It Hurts Less

*Ana M. Ullán, PhD,*[*] *Manuel H. Belver, PhD,*[†] *Esperanza Fernández, MD,*[*,‡] *Felix Lorente, PhD,*[*,‡] *Marta Badía, PhD,*[*] *and Beatriz Fernández, MD*[*]

## Abstract:

**Various nonpharmacological strategies to relieve hospitalized children's pain propose play as a central element. Play is considered an essential resource to improve the negative psychosocial effects of the disease and the hospitalization itself. However, the empirical research of play in health settings has not received much attention. The goal of this study was to determine the effect of a program to promote play in the hospital on postsurgical pain in pediatric patients. The research hypothesis was that children will manifest less pain if they are distracted through play during the postsurgical period. We carried out a randomized parallel trial with two groups, an experimental group and a control group. The control group did not receive any specific treatment, only the standard attention contemplated in the hospital. The parents of the children from the experimental group received instructions to play with their children in the postsurgical period and specific play material with which to play. The results obtained support the research hypothesis. On average, the children from the experimental group scored lower on a pain scale than the children from the control group. This occurred in the three postsurgical measurements of pain. It is concluded that the program to promote play can decrease children's perception of pain.**



*From the *University of Salamanca, Salamanca; †Complutense University of Madrid, Madrid; ‡University Hospital of Salamanca, Salamanca, Spain.*

*Address correspondence to Ana M. Ullán, Facultad de Ciencias Sociales, Campus Miguel de Unamuno, 37007, Salamanca, Spain. E-mail: ullan@usal.es*

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Relieving children's pain is an essential aspect of pediatric healthcare. In the past decade, research on children's pain has increased considerably. As a consequence, the knowledge about the assessment and management of pain in these patients has also increased, and there has been a rapid development and expansion of the services that treat pediatric pain (Dowden, McCarthy, & Chalkiadis, 2008). The increasing public sensitivity towards children's rights in the health area has also contributed to this (Brennan-Hunter, 2001; Southall et al., 2000; Ullán & Belver, 2008). Children's right not to suffer unnecessarily is now

acknowledged and, consequently, so is the obligation of the health institutions to deal with all the aspects related to children's suffering. Standards and guidelines have been prepared to improve the practices of pain management in a large number of national and international professional settings (American Academy of Pediatrics et al., 2001; Schechter, Berde, & Yaster, 2003; Southall, et al., 2000). The key points of these standards are that pediatric pain should be taken seriously, treated aggressively, and managed by multimodel means. This includes nonpharmacological approaches to reduce children's pain, fear, and stress (Finley, 2006; McGrath & Unruh, 1993; Ross & Ross, 1988).

Various nonpharmacological strategies to relieve hospitalized children's pain and suffering propose play as a central element. Play is a crucial aspect of children's development because it contributes to the cognitive, physical, social, and emotional well-being of children and youth (Ginsburg, Communications, Child, & Health, 2007). For hospitalized children, play may be a powerful tool to reduce their tension, anger, frustration, conflict, and anxiety (Browmer, 2002; Haiat, Bar-Mor, & Schochat, 2003; Vessey & Mahon, 1990), improve their coping and mastery capacities, and their feelings of control, and their cooperation and communication with the clinical staff (Jesse, 1992). Play allows the expression of feelings, exchanging roles, and the control over materials, concepts, and actions. These aspects can reduce the negative impact of hospitalization on children (Bolig, 1990). Therefore, play is considered an essential resource to improve the negative psychosocial effects of the illness and of the hospitalization itself (Bolig, Yolton, & Nissen, 1991).

When children play, they can process emotions and develop a wide range of adaptive skills (Christian, Russ, & Short, 2011). Two aspects of play are especially relevant for pediatric pain: play may distract children and improve their mood (Landreth, 2002). When children play, they concentrate on the process of playing and are distracted from other stimuli, both external and internal. There is clear evidence that indicates that distraction is clinically effective in the reduction of pain in children (Cramer-Berness, 2007; DeMore & Cohen, 2005; Kleiber & Harper, 1999; Miller, Rodger, Bucolo, Greer, & Kimble, 2010; Vessey, Carlson, & McGill, 1994). Moreover, play offers the children a way to gradually assimilate the anxiety they are experiencing (Gariépy & Howe, 2003; Landreth, 2002). After reviewing the literature on the effect of play in hospitalized children, Rae and Sullivan, 2005 concluded that the programs of play for hospitalized children were effective in the reduction of children's hospital-related anxiety and fear, prevention of anxiety, and in the reduction of behaviors that indicate stress.

The goal of this study was to determine the effect of a program to promote play in the hospital on postsurgical pain in pediatric patients. The research hypothesis was that children will display less pain if they are distracted by play during the postsurgical period, after recovering from the anesthesia.

## METHODS

This is an analytical experimental study designed to determine the effect of a program to promote play on children's postsurgical pain. A randomized parallel trial was carried out with two groups, an experimental group and a control group.

### Participants

All patients between 1 and 7 years of age who underwent surgery in the University Hospital of Salamanca between May and September of 2011 were considered eligible to participate in this study. The following exclusion criteria were considered: (1) the child's parents or legal guardians did not give their consent for the child to participate in the study, (2) the child had been admitted in the Pediatric Intensive Care Unit after surgery, and (3) the child's operation had been performed in the evening or at night, and not during the normal consulting hours of the hospital, between 8 am and 1 pm. The study was approved by the Ethics Committee of the University Hospital of Salamanca.

### Procedure

The program to promote play that was used in this study consisted basically of providing the parents with: (1) information about the importance of distracting their children through play to relieve their distress and (2) play material to do so. The following procedure was used. Before the children from the experimental group went to the operating theater, a specialist in social education contacted the parents to inform them of the goals of the study and to request their consent for their child to participate. If the parents agreed, the same specialist discussed with them the importance of distracting the children through play to relieve their distress, and she provided them with a brief written summary of the main aspects addressed in the discussion. Figure 1 shows the written instructions provided to the parents. In addition to these written instructions, the parents were provided with play material to distract the children after they had undergone surgery. The play material consisted of a plush toy rabbit, dressed as a doctor, with a red cross on its chest. The toy was approximately 50 x 30 cm (Fig. 2). The plush toy was designed especially for use in this study. It was considered appropriate to design a cuddly, soft doll, in


**Figure 1.** ■ Instructions provided to the parents of the experimental group, along with the play material.

the shape of a "rabbit doctor" for two reasons. Firstly, because in the previous pilot studies, we had observed very good acceptance of this type of toy in the hospitalized children, who spontaneously displayed affectionate reactions towards this kind of doll (they hugged them, spoke to them, and refused to be parted from them). Secondly, we used a "medical uniform" for the dolls because there is evidence that children who play with toys that are symbolically related to medical contents, thoughts, or fantasies about medical procedures may manifest lower levels of anxiety in postoperatory situations than children who do not play with these toys (Burstein & Meichenbaum, 1979).

Each one of the children considered eligible for the study was randomly assigned either to the experimental group or to the control group. When the children in the study shared a room during their stay in the hospital, we avoided assigning one of them to the control group and the other to the experimental group, and instead, both were randomly assigned concurrently to the same group. The children assigned to the experimental group participated in the program of promotion of play described above. The children of the control group received the standard care provided by the hospital, and their parents received no special instructions or play material.

**Figure 2.** ■ Play material provided to the children from the experimental group.

### Assessment of Children's Pain/Measures

To assess the children's pain in both groups, we used the FLACC scale. This observational scale was developed as a simple and consistent tool to identify, describe, and assess small children's (between 2 months and 7 years) pain in clinical settings. It includes five categories of behavior (face, legs, activity, crying, and consolability). Each category is scored on a scale ranging from 0 to 2 points, and the total result of the scale ranges between 0 and 10 points (Merkel, 1997). The scale has shown high inter-judge reliability. Its validity was initially shown by the significant decrease observed in the scale scores when analgesics were administered to the children (Merkel, 1997). Its validity was also supported by the correlation of its scores with other measures of pain, specifically, the scores of the Objective Pain Scale (OPS) and the global scores of pain performed by the nursing staff (Merkel, 1997). The FLACC scale is recommended as the first choice to assess postsurgical pain in the hospital as an outcome measure in clinical trials (von Baeyer & Spagrud, 2007).

In this study, three measures of children's pain were taken using the FLACC scale, with a 1-hour interval between them. The first measurement was taken when the children had recovered consciousness after the operation, and the second measurement, an hour later. The third measurement was carried out approximately two hours after the first one. If the children were asleep when one of the measurements was supposed to be carried out, we tried to perform the measurement half an hour later, and if they were still asleep, these values were considered missing. All of the pain measurements were taken by the same person, who had been trained in the use of the scale. In addition to the measures of the children's pain, other variables were registered: gender, age, reason for admittance, and type and quantity of analgesic medication prescribed for each patient. Observations of the children's reactions and the parents' comments were also documented.

### Statistical Analyses

We calculated the descriptive statistics of the three measurements performed for both groups, experimental and control. We conducted an ANOVA to determine whether there were significant interactions between the effect of treatment and the children's sex or age. We examined the statistical significance of the differences of means between the measurements of the experimental and the control groups with a $t$ test. As we wished to verify whether the mean pain score in the experimental group was lower than that of the control group, we used one-tailed tests. Statistical significance was set at alpha value of .10. The sum of the three scores obtained was considered the outcome measurement and was used to compare the effect of the variables sex and age on the children's pain scores. We calculated the descriptive statistics of the sum of the participants' three measures and compared the girls' scores and boys' scores in the younger children (between 1 and 3 years) and in the older children (between 4 and 7 years). We calculated the statistical significance of the differences observed in the mean of the sum of the three measurements of pain between the groups of boys and girls and between the smaller and the older children. We used one-tailed tests and an alpha value of .10. The participants who presented extreme values in the sum of the three measures were considered atypical cases and not included in the analyses. This occurred in 3 cases, 2 from the experimental group and 1 from the control group. The statistical analyses were carried out with the SPSS v.15 (SPSS) and Aabel 3 (Gigawiz) programs.

## RESULTS

Figure 3 represents the participants' flow chart. Of the 124 eligible patients, 95 participated in the study; their distribution by age and sex are shown in Table 1. The mean age was 3.9 years (SD = 1.9). Sixty-nine percent of the participants were boys, and 31% were girls. Table 2 shows the reason for surgery of the participating patients in this study.

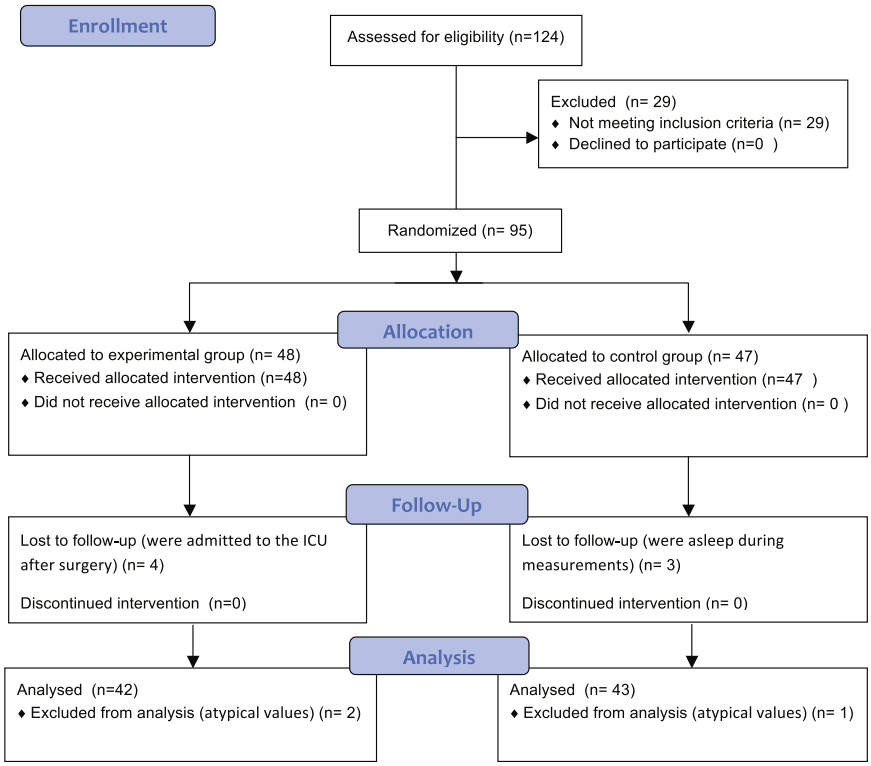


**Figure 3.** ■ Flow chart of the participants.

In the three measurements of pain carried out, the mean of the experimental group was lower than that of the control group. Figure 4 represents these means (the error bars represent the mean standard error). The statistical significance of these differences observed between the experimental group and the control group are shown in Table 3.

To determine the interaction between treatment and the patients' sex, an ANOVA was carried out, which was nonsignificant for all three measurements. The same occurred with the interaction between treatment and patients' age.

Considering the mean of the sum of the three measurements of pain in both groups (experimental group and control group), on average, the boys scored higher than the girls did. The younger patients (1, 2, and 3 years old) scored higher than the older patients (4, 5,

**Table 1.**
**Distribution of the Number of Subjects of the Sample by Age and Gender**

| | Group A (experimental, with plush toy) | Group B (control, without plush toy) |
|---|---|---|
| Gender | | |
| Boys | 32 | 34 |
| Girls | 16 | 13 |
| Age | | |
| Younger (between 1 and 3 years) | 24 | 23 |
| Older (between 4 and 7 years) | 24 | 24 |

**Table 2.**
**Number of Participants in the Study Who Underwent Each Type of Operation**

| | Total | Group A (experimental, with plush toy) | Group B (control, without plush toy) |
|---|---|---|---|
| Genital surgery | 22 | 11 | 11 |
| Ear, nose, and throat | 22 | 12 | 10 |
| Hernias | 19 | 8 | 11 |
| Trauma | 5 | 2 | 3 |
| Ophthalmology | 2 | 0 | 2 |
| Gastrointestinal surgery | 4 | 3 | 1 |
| Maxillofacial surgery | 3 | 1 | 2 |
| Plastic surgery | 2 | 2 | 0 |
| Other surgery | 16 | 9 | 7 |

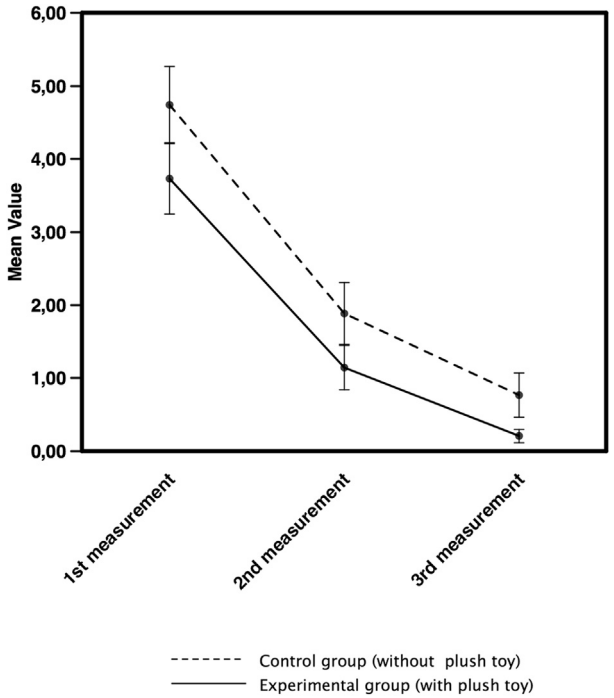


**FIGURE 4.** ■ Means of the experimental group and control group in the three measurements of pain carried out.

6, and 7 years old) did. The statistical significance of these differences is shown in Tables 4 and 5.

## DISCUSSION

The goal of this study was to determine the effect on postsurgical pediatric pain of a program to promote play in the hospital. The research hypothesis was that children will display less pain if they are distracted by play during the postsurgical period, after recovering from the anesthesia. The results obtained support the research hypothesis. The children from the experimental group, whose parents had received specific play material and instructions to play with them in the postsurgical period, in general, scored lower on the pain scale than the children from the control group, who had only received the standard attention provided by the hospital, and whose parents had not received any specific instructions to play with them or any play material. This occurred in all three postsurgical measurements of pain.

Two relevant mechanisms could explain these results. The first involves the effect of distraction on the perception of pain (Eldridge & Kennedy, 2010; Quevedo & Coghill, 2007; Wiech, Ploner, & Tracey, 2008). The second is related to the effect of mood on the perception of pain and to the transmission of emotions between the parents and the children in health settings (Goubert, Vervoort, Sullivan, Verhoeven, & Crombez, 2008). Probably, the most frequently studied psychological variable that modifies the experience of pain is the attentional state. Pain is perceived as less intense when people are distracted (Villemure & Bushnell, 2002). Especially in the case of acute pediatric pain produced by immunizations or by upsetting medical procedures, there is evidence that distraction can relieve the children's pain and distress (Cramer-Berness, 2007; DeMore & Cohen, 2005; Kleiber & Harper, 1999; Miller, et al., 2010; Vessey, et al., 1994). Playing with the plush toy, as proposed herein, may have captured the children's attention during the postsurgical period, which would explain the results obtained, at least partially.

In addition, play could have improved the children's and parents' mood, and the effects of patients' mood and attitudes on their perception of pain have been observed both in clinical and in experimental settings (Villemure & Bushnell, 2002). Play is a useful strategy to help children overcome situations of stress and emotional difficulty (Bratton, Ray, Rhine, & Jones, 2005; Reddy, Files-Hall, & Schaefer, 2005). Moreover, the therapeutic effect of play is more remarkable if

**TABLE 3.**
**Contrast of Differences of the Means of the Three Measurements Pain Carried Out in the Experimental Group and the Control Group**

| | Group | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Experimental | | | Control | | | | | | 95% CI | | |
| | n | M | SD | n | M | SD | t | df | *p* | LL | UL | Cohen's d |
| First measurement | 41 | 3.7 | 3.1 | 42 | 4.7 | 3.4 | −1.4 | 81 | .08 | −2.4 | .4 | .3 |
| Second measurement | 42 | 1.1 | 1.9 | 43 | 1.9 | 2.8 | −1.4 | 83 | .08 | −1.8 | .3 | .3 |
| Third measurement | 39 | .2 | .6 | 43 | 0.8 | 2.0 | −1.7 | 80 | .04 | −1.2 | .1 | .4 |

CI = confidence interval for the difference of means; LL = lower limit; UL = upper limit.

**Table 4.**
**Contrast of Differences of Means of Boys and Girls in the Sum of the Three Measurements of Pain, in the Experimental and Control Groups**

| | Boys | | | Girls | | | | | | 95% CI | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | n | M | SD | n | M | SD | t | df | *p* | LL | UL | Cohen's d |
| Experimental group | 30 | 5.8 | 4.9 | 12 | 3.7 | 3.5 | 1.3 | 40 | .10 | −1.1 | 5.1 | 0.4 |
| Control group | 31 | 7.4 | 5.3 | 12 | 5.2 | 6.2 | 1.1 | 41 | .13 | −1.6 | 6.0 | 0.3 |

CI = confidence interval for the difference of means; LL = lower limit; UL = upper limit.

the parents participate in the play sessions with the children (Bratton, et al., 2005; Leblanc & Ritchie, 2001). The capacity of play to distract children and to improve their mood could explain the lower scores in the pain scales of the children from the experimental group.

Great importance is attributed to play as a resource of well-being in hospitalized children (Bandstra et al., 2008; Ullán & Belver, 2008). Diverse investigations have assessed the efficacy of nonpharmacological techniques, directly or indirectly based on play, to decrease children's acute pain produced by medical procedures such as injections or venipuncture. These assessments have shown the effectiveness of distraction (Blount et al., 1992; Manne, Bakeman, Jacobsen, Gorfinkle, & Redd, 1994), toys (Smith, Barabasz, & Barabasz, 1996; Tüfekci, Çelebioglu, & Küçükoglu, 2009), music (Alegre, 2006), or the presence of the parents (Ross & Ross, 1984; Wolfram & Turner, 1996) to decrease the pain reported by the children. There is less research on nonpharmacological techniques for the management of postsurgical pediatric pain (Pölkki, Pietilä, & Vehviläinen-Julkunen, 2003; Pölkki, Pietilä, Vehviläinen-Julkunen, Laukkala, & Kiviluoma, 2008), but in general, play is considered a particularly significant element in the care for hospitalized children (Browmer, 2002; Gariépy & Howe, 2003; Haiat, et al., 2003; Rae & Sullivan, 2005; Ullán & Belver, 2006). In this sense, this work advances the knowledge about treatment of hospitalized children's pain from nonpharmacological perspectives, underlining two aspects thereof that, in our opinion, are important at a clinical level. The first one involves the ease of the intervention, and the second one is related to the importance of promoting parents' participation in the care of their children in medical settings. Despite the proliferation of standards, guidelines, and services dedicated to the treatment of children' pain, there is extensive evidence that, in practice, pain management in children is far from being optimal (Cummings, Reid, Finley, McGrath, & Ritchie, 1996; Ellis et al., 2002; Wolfe et al., 2000). Moreover, there are discrepancies between the beliefs and knowledge of the healthcare staff and the clinical practice (Abu-Saad & Hamers, 1997). One of the difficulties faced by pediatric services is how to integrate and deploy the findings of research and the standards in clinical practice. The research design used in this work allows a very simple transfer to clinical practice, which is compatible with the results of previously mentioned investigations and which matches the mandate of making children's rights effective within healthcare settings, among them, the right to play and to prevent unnecessary suffering (Parliament European, 1986; Southall, et al., 2000). In addition, the proposed intervention shows that, beyond pharmacological treatments of pain in

**Table 5.**
**Contrast of Differences of Means of Small Children and the Older Children in the Sum of the Three Measurements of Pain, in the Experimental and Control Groups**

| | Younger Children | | | Older Children | | | | | | 95% CI | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | n | M | SD | n | M | SD | t | df | *p* | LL | UL | Cohen's d |
| Experimental group | 21 | 6.5 | 4.5 | 21 | 3.9 | 4.4 | 1.9 | 40 | .03 | −.2 | 5.3 | .6 |
| Control group | 20 | 8.4 | 5.2 | 23 | 5.4 | 5.6 | 1.8 | 41 | .04 | −.3 | 6.4 | .6 |

CI = confidence interval for the difference of means; LL = lower limit; UL = upper limit.

children, there is margin for improvement in relieving pediatric pain, which should be addressed from multimodal perspectives. Lastly, we wish to underline the importance, at a clinical level, of promoting the parents' involvement in the active care of their hospitalized children. Recent research has confirmed parents' desire and expectations to participate in their children's care (Power & Franck, 2008). Parental participation is beneficial to children, parents, and health care facilities, but it depends on the existence of effective routines to facilitate adequate communication among all parties (Kristensson-Hallström, 2000). We believe that the design used in this work can serve to facilitate the establishment of this type of routine that promotes the parents' active involvement in the care of their hospitalized children.

The study presents several limitations, in our opinion. One involves the gender bias of the participants; another involves the possible effect of the experimenter's bias; and the last involves not having assessed the extent to which the parents of the experimental group correctly followed the instructions to distract their children through play. With regard to the first limitation, the disproportion observed between boys and girls in the participants reflects the disproportion of hospital admittances in the pediatric surgery service of the hospital, within the age range considered. But, as the proposed play—playing with plush toys—better matches the feminine stereotype of play, we do not think that the greater number of boys than of girls among the participants could reduce the significance of the results obtained. The second limitation seems more important to us. It was inevitable for the person who assessed the children's pain through the observational scale to perceive whether the child had received the play material; that is, whether the child belonged to the experimental group or to the control group. This could have induced a bias in the evaluator's observations in favor of the experimental hypothesis. Given the nature of the intervention, the possibility of performing blind trials is very limited. Another limitation, in our opinion, is that we did not assess the extent to which the parents of the experimental group played with their children differently from the parents of the control group. We can guarantee that they had more information than the parents of the children from the control group about the importance of play and, moreover, they had play material that was not available to the parents or the children from the control group. But this does not necessarily ensure that they followed the instructions. Even so, the data suggest the need to advance in the systematic assessment of nonpharmacological alternatives to relieve the pain and suffering of children in hospitals. The programs of play in hospitals are a possibility of intervention that, in our opinion, should be seriously considered. Everything indicates that it can contribute to the children's well-being, favoring a multimodal coping with pediatric pain and presenting no adverse side effects.

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