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ORIGINAL ARTICLE

Effect of music on pain, anxiety, and patient satisfaction in patients who present to the emergency department in Turkey

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Abstract

Aim: The objective of this study is to evaluate the effect of music therapy on pain, anxiety, and patient satisfaction in patients who present to the emergency department in Turkey.

Methods: This controlled and experimental study was conducted in the emergency department of a hospital in Turkey between July and October 2012. The study sample consisted of 200 patients in total, 100 forming the intervention group and 100 being the control group, who fell under color code green in the triage system and came with complaints of pain due to nausea/vomiting and diarrhea, abdominal pain, headaches, and joint pain. A questionnaire, the State Anxiety Scale, and the Visual Analog Scale to measure the patients' level of pain were used in the study. The questionnaires of the intervention group were administered after playing the music.

Results: When the intervention and control groups were compared, it was observed that there was a significant decrease in the VASP and STAI-S scores in favor of the intervention group. It was observed that 21.0% of the patients in the intervention group were very pleased to hear music in the emergency department, 58% of them were moderately or at least a little pleased, and 21.0% were not pleased at all.

Conclusion: The results showed that music therapy had a positive effect in terms of reducing the severity of pain and the level of anxiety in patients, that only a very small portion of the patients were not pleased to listen to music in the emergency department.

Key words: anxiety, emergency department, music therapy, pain, patient satisfaction.

INTRODUCTION

Music therapy is defined as a branch of health care where music is used in various physical, functional, psychological, and educational settings to help treat the physiological and psychological effects of a disease or infirmity (Chang & Chen, 2005). The multifaceted effect of music on humans has caused it to be used in treatment and music has become an important part of medicine in recent years (Gallagher, Lagman, Walsh, Davis, & LeGrand, 2006).

Music therapy is a natural intervention whose administration and usage are not expensive; it has no side-effects and has an effective role in physical, psychological, social, emotional, and spiritual recovery (Chlan, 1999; Uyar & Korhan, 2011). According to the published work, music therapy should be used continuously for it to be an effective method. Administration of 25–90 min of music therapy daily is said to provide an adequate treatment period (Almerud & Peterson, 2003).

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When patients and their families who present to an emergency department encounter a sudden or unexpected situation and there is a number of symptoms such as pain, this can make them experience anxiety at various levels (Olgun & Kuğuoğlu, 2004). In emergency department services, which require a multidisciplinary team approach, all interventions and care to reduce the rate of mortality and morbidity should be accompanied with the monitoring of care results and ensuring patient satisfaction. For this reason, ensuring patient satisfaction and meeting patient expectations is a very sensitive determinant in reducing and eliminating complaints such as pain and anxiety (Taylor & Benger, 2004; Yildirim, Kocoglu, Goksu, Gunay, & Savas, 2005).

PAIN, ANXIETY, SATISFACTION AND MUSIC

Music therapy is a branch of health care dedicated to the use of music for emotional, physical, functional, and educational improvement in a broad range of settings and conditions (Korhan, Khorshid, & Uyar, 2011). Many studies conducted have demonstrated that music had positive effects on pain and anxiety and improved quality of life in ill and healthy individuals (Chan, Lee, Ng, Ngan, & Wong, 2003; McCaffrey & Freeman, 2003; Richards, Johnson, Sparks, & Emerson, 2007). In a study made by Evans (2002) where results of 29 studies were evaluated, it was found that music therapy was used to reduce individuals' perception of pain and anxiety, eliminate the side-effects of the care and treatment, and increase their satisfaction with the care. Chlan (1998) defined music therapy as the therapeutic use of music to promote health and well-being in patients. Researchers have examined the effectiveness of music in pain, stress management, and satisfaction in adults with musculoskeletal trauma (Tanabe, Thomas, Paice, Spiller, & Marcantonio, 2001), oncology patients (Franco & Rodrigues, 2009), stroke patients (Jun, Roh, & Kim, 2012), patients undergoing endoscopy of the upper gastrointestinal system (Uçan, Ovayolu, & Savaş, 2007), patients undergoing colonoscopy (Ovayolu *et al*., 2006), older people (Chan, Wong, Onishi, & Thayala, 2011), patients receiving mechanical ventilation (Lee, Chung, Chan, & Chan, 2005), and in hernia patients (Nilsson, Unosson, & Rawal, 2005).

Short and Ahern (2009) and Short, Ahern, Holdgate, Morris, and Sidhu (2010) found in their research that listening to music had a relieving effect on the levels of noise and stress in patients who presented to the emergency department. Also, Short *et al*. (2010) found that with patients who presented to the emergency department, the negative effect scores of the patients decreased and their positive effect scores increased or remained the same. Tanabe *et al*. (2001) found in their study that music therapy decreased the severity of pain in patients with musculoskeletal trauma who presented to the emergency department.

There is a limited number of studies in Turkey in both music therapy and patient satisfaction (Akkaya, Bulut, & Akkaya, 2012; Aslan, Aygin, & Sariyildiz, 2007; Doğan & Şenturan, 2012; Korhan, Khorshid, & Uyar, 2011; Ovayolu *et al*., 2006; Uçan *et al*., 2007). However, the authors have not encountered any study that evaluated the effect of music therapy on the pain, anxiety, and satisfaction of the patients who present to emergency departments. In addition, a limited number of studies examining the effects of music in emergency units has evaluated the effects of music on patient anxiety (Short & Ahern, 2009; Short *et al*., 2010) along with the pains of patients with musculoskeletal trauma and their satisfaction (Tanabe *et al*., 2001). However, in this study, a different approach was taken and patients who were entered as code green with pain complaints were taken and the effects of music on the pain, anxieties, and satisfaction of these patients were evaluated. Knowing that pain is the most frequent reason for the presentation of patients to emergency departments demonstrates the importance of this study. Due to all these reasons, the present authors aimed to evaluate the effect of music therapy on pain, anxiety, and patient satisfaction in patients who presented to the emergency department and make recommendations in line with the results obtained.

METHODS

Design and participants

This controlled and interventional study was conducted at the Emergency Department of Sahinbey Application and Research Hospital in Gaziantep University between July and September 2012. The study population consisted of all the patients who presented to the emergency department between the mentioned dates. The sample group of the study consisted of 100 experimental group patients and 100 control group patients, making a total of 200 patients who were entered as code green in the Turkey triage system during the specified dates with complaints of pain due to nausea/vomiting and diarrhea, abdominal pain, headaches, and joint pain. In the triage system, code green includes patients who are stable, who

are conscious and slightly injured, such as minor trauma, throat pain, otalgia, lower back pain, chronic joint pain, light headache, chronic constipation, or soft tissue injury (Yenal, 2013).

The sample was not selected on the basis of the number of daily patients as the music was played through a central system. Therefore, using the random numbers table, the authors determined on what days the music would be played and not played. Two groups were formed for the study, one to hear the music, the other not to hear it. Patients who came to the emergency department on the days when music was playing and who met the inclusion criteria of the study were included in the intervention group, and those who came to the emergency department on the days when music was not playing and who met the inclusion criteria of the study were included in the control group. The criteria for inclusion in the study were: (i) falling under color code green; (ii) having only the complaints of pain due to nausea/vomiting and diarrhea, abdominal pain, headache, or joint pain; (iii) not having had any analgesic or anesthetic drugs in another hospital; (iv) not having any auditory, visual, or speech problems; (v) not having any mental confusion or any psychiatric problems; (vi) being 18 years old or older; and (vii) having volunteered to take part in the study.

Data collection

The study data were collected using a questionnaire containing 14 questions that investigated the sociodemographic data, disease-related data, and satisfaction statuses of the patients, and the State Anxiety Scale (STAI-S) and the Visual Analog Scale to measure the patients' level of pain (VASP). Before initiating the study, verbal and written consent was obtained from each patient for administering the questionnaire. Because the music was played via a central system, the patients in the intervention group were able to listen to the music as soon as they presented to the emergency department. The data collection tools were administered to the patients in the control group following the procedures of bedding them in the observation unit to perform their monitoring and treatment. Similarly, the tools were administered to the patients in the intervention group after the procedures of bedding them in the observation unit to perform their monitoring and treatment and listening to music.

It has been stated that individuals are affected more by music of their own culture because they can interact more comfortably and that there is diversity due to their cultural structure and education (Koç *et al.*, 2009). The previous studies carried out in the authors' country have used classical Turkish music "maqams" of Hicaz (Koç *et al.*, 2009), Nihavend, and Buselik (Bekiroğlu, Ovayolu, Ergün, & Ekerbiçer, 2013), and some studies have used classical Turkish music but these studies did not state specifically which maqam was used (Arslan, Ozer, & Ozyurt, 2008; Sezer, 2011; Yildirim & Gurkan, 2007). However, when preparing the music to be played in this study, the opinion of an expert from the Turkish Music State Conservatory was obtained and, in line with this opinion, the Turkish Music Research and Promotion Group (TMRPG) was contacted. Turkish classical music ("Acemaşiran" in Turkish) was used in the study, as recommended by this group. This music, which had been used in traditional medicine and is still being used today for music therapy for patients, is said to have pain relieving and antispasmodic qualities and an effect helpful in reducing anxiety and relaxation (Guvenc, 2011). There is a currently active organization in Turkey called the TMRPG which was established in 1976 to investigate and present the origin, development, repertoire, and instrumental diversity of Turkish music (Doğan & Şenturan, 2012).

Instruments for evaluation

Questionnaire form

This form was prepared by the researchers in line with the information in the published work (Jecklin & Emerson, 2010; Krout, 2001; McCaffrey & Freeman, 2003; Ovayolu *et al.*, 2006). The sociodemographic data were collected through seven questions covering age, sex, marital status, education, employment, social security, and living place, and the data on the disease were collected through five questions covering diagnosis, complaint at presentation, way of presentation, emergency department visits in the last 2 years, and length of stay in the emergency department.

Anxiety was measured with the Turkish version of the State–Trait Anxiety Inventory to measure anxiety. The State–Trait Anxiety Inventory was developed by Spielberger, Gorsuch, and Lushene (1970) to determine the state and trait anxiety levels of individuals separately, and its confidence coefficients were found to be between 0.94 and 0.96. The State–Trait Anxiety Inventory consists of a State Anxiety Scale (STAI-S) and a Trait Anxiety Scale (STAI-T). The inventory was tested for its validity and reliability in Turkish by Oner and Le Compte and its internal consistency values were found to be between 0.83 and 0.87, its test–retest reliability

between 0.71 and 0.86, and its item-by-item reliability between 0.34 and 0.72 (Civan, Özdemir, Taş, & Çelik, 2012; Öner & Le Compte, 1998). Only the STAI-S was used in this study. The STAI-S is a self-evaluation scale containing 20 expressions and it involves an individual's description of how he/she feels at a certain moment and under certain conditions in consideration of his/her emotions related to the situation he/she experiences. The emotions or behaviors expressed in the STAI-S items are answered by marking one of the choices of (i) not at all, (ii) somewhat, (iii) moderately so, and (iv) very much so, according to the extent of this type of experience. The total score to be obtained from the scale may range between 20 and 80. Higher scores indicate higher levels of anxiety (Öner & Le Compte, 1998). Cronbach's alpha reliability coefficient of STAI-S was 0.92 for this clinical trial.

Pain was measured with the VASP. The VASP, which was tested for validity and reliability by Price, McGrath, Rafii, and Buckingham (1983), is an easily applied measurement instrument administered to at least 50 respondents from each culture to measure the severity of pain in patients. Marks are made on a 10 cm line with 0 = no pain at one end indicating that the patient is in a good condition and 10 = very severe pain at the other end indicating that the patient is in a very bad condition. All patients were asked to plot the intensity of their pain on a 10 cm horizontal line. The distance from the lowest end of the line (0 = no pain) and the point marked is measured and the numerical value found indicates the severity of pain in the patient.

Patient satisfaction was measured on a 5 point Likert type question with answers varying from "I am very satisfied" to "I am not satisfied" asked to all the patients in order to evaluate their satisfaction related to musical therapy in the emergency department. The patients were asked to reply to this question with one of the choices of 1 = "I am very satisfied", 2 = "moderately satisfied", 3 = "slightly satisfied", 4 = "low satisfaction", and 5 = "I am not satisfied". This question was asked only to the experimental group that listened to music.

Procedures

The subjects were briefly informed by the same researcher on the purpose and methods of the research as well as the questionnaire and the scale. The questionnaire and the scale were administered by way of face-to-face interviews after the written and verbal consent of the subjects had been taken. The questionnaire took approximately 10–12 min to complete.

Data analysis

For the continuous variables, normality assumption was confirmed by Kolmogorov–Smirnov test. First, univariate analyses were performed to compare baseline characteristics. Student's *t*-tests (for continuous variables) and χ^2-tests (for categorical variables) were used to compare the two implementation groups. Second, linear regression models were used for the calculation of the adjusted coefficients. Multicollinearity was checked by calculating variance inflation factors. All analyses were performed in SPSS for Windows version 11.5 (SPSS, Chicago, IL, USA). A two-sided *P*-value of less than 0.05 was defined as statistically significant.

Ethical consideration

Written permission was obtained from the Scientific Ethics Committee (no. 19) of Gaziantep University, Faculty of Medicine, and the chief physician of the same institution. Before data collection, all participants gave their written and informed consent. All the patients were informed about the aim of the study and were assured of confidentiality and anonymity. Participants were also assured of their right to refuse participation and that all the information obtained would be used for research purposes only.

RESULTS

Sample characteristics

When the demographic characteristics of the patients comprising the study sample were evaluated, it was found that the mean age of the patients in the intervention group was 30.15 ± 13.18, 51% of them were male and 49% female. Forty-six percent were university graduates, 53% were single, and 45% were married. Forty-one percent of them presented to the emergency department with a complaint of headache, 35% with nausea/vomiting, and 25% with abdominal pain. The mean age of the patients in the control group was 34.71 ± 14.14, 55% of them were male and 45% female, 37.0% were high school graduates, 39% were single, and 53% were married. Forty-two percent of them presented to the emergency department with a complaint of headache, 36% with joint pain, and 34% with abdominal pain. There were significant differences between the two groups in terms of age, education level, marital status, and joint pain (Table 1). The intervention and control groups used in the research had similar features, such as emergency department visits in the last 2 years and length of stay during the emergency.

Table 1 Sociodemographic characteristics of the patients and reasons for applying to the emergency room

	Intervention group ($n = 100$)	Control group ($n = 100$)	*P*-value
Age (years) (mean ± SD)	30.15 ± 13.18	34.71 ± 14.14	0.019*
Sex (*n* [%])			
Male	51 (51.0)	55 (55.0)	0.571
Female	49 (49.0)	45 (45.0)	
Educational level (*n* [%])			
Illiterate	4 (4.0)	6 (6.0)	0.002*
Literate	4 (4.0)	7 (7.0)	
Primary education (age 7–11 years)	17 (17.0)	19 (19.0)	
Secondary education (age 12–14 years)	7 (7.0)	13 (13.0)	
High school (age 15–17 years)	22 (22.0)	37 (37.0)	
University	46 (46.0)	18 (18.0)	
Marital status (*n* [%])			
Married	45 (45.0)	53 (53.0)	0.041*
Single	53 (53.0)	39 (39.0)	
Widowed	2 (2.0)	8 (8.0)	
Reasons for applying to the emergency room† (*n* [%])			
Nausea/vomiting	35 (35.0)	31 (31.0)	0.547
Abdominal pain	25 (25.0)	34 (34.0)	0.163
Abdominal sensitivity	11 (11.0)	19 (19.0)	0.113
Headache	41 (41.0)	42 (42.0)	0.886
Vertigo	13 (13.0)	16 (16.0)	0.547
Diarrhea	7 (7.0)	7 (7.0)	1.000
Joint pain	11 (11.0)	36 (36.0)	0.001*
Total	100 (100.0)	100 (100.0)	

*$P < 0.05$. †More than one answer. Percentage was taken accepting N as 143 (intervention group) and 185 (control group). SD, standard deviation.

Table 2 Difference of VASP and STAI-S scores between intervention and control groups

Scores	Intervention group (mean ± SD)	Control group (mean ± SD)	*P*-value
Pain severity (VASP)	4.63 ± 2.08	6.00 ± 1.74	0.001*
STAI-S	38.96 ± 3.70	43.31 ± 5.70	0.001*

*$P < 0.05$. SD, standard deviation; STAI-S, State Anxiety Scale; VASP, Visual Analog Scale to measure the patients' level of pain.

Difference in VASP, STAI-S scores, and satisfaction between intervention and control group

When the intervention and control groups were compared in terms of pain severity (VASP) and anxiety level (STAI-S), there was a significant decrease in the VASP scores (intervention group, 4.63 ± 2.08; control group, 6.00 ± 1.74) and the STAI-S scores (intervention group, 38.96 ± 3.70; control group, 43.31 ± 5.70) in favor of the intervention group ($P = 0.001$) (Table 2).

As a result of the regression model designed to reveal the factors affecting pain severity (VASP), it was found that age ($P = 0.002$) and music ($P = 0.001$) had a statistically significant effect on it. It was observed that as age advanced, the severity of pain increased ($\beta = 0.044$) and pain severity was higher in the control group than in the intervention group ($\beta = 1.200$) (Table 3).

As a result of the regression model which aimed to reveal the factors affecting the level of anxiety (STAI-S), it was found that music had a statistically significant effect ($P = 0.001$) and the level of anxiety was higher in the control group than in the intervention group ($\beta = 4.410$) (Table 4).

When the effect of music on satisfaction was evaluated, it was found that 21% of the patients in the intervention group were very pleased to listen to music in the emergency department, 18% of them were

Table 3 Linear regression model results for VASP score levels

	Unstandardized coefficients		Standardized coefficients	
	β	SD	β	*P*-value
Constant	1.105	1.484		0.457
Age	0.044	0.014	0.301	0.002*
Group	1.200	0.298	0.295	0.001*
Educational level	0.136	0.132	0.099	0.303
Pain severity (VASP)	0.009	0.028	0.023	0.751

*$P < 0.05$. SD, standard deviation; VASP, Visual Analog Scale to measure the patients' level of pain.

Table 4 Linear regression model results for STAI-S score levels

	Unstandardized coefficients		Standardized coefficients	
	β	SD	β	*P*-value
Constant	36.608	2.776		0.001*
Age	–0.050	0.037	–0.130	0.181
Group	4.401	0.731	0.419	0.001*
Educational level	–0.173	0.339	–0.049	0.611
STAI-S	0.058	0.184	0.023	0.751

*$P < 0.05$. SD, standard deviation; STAI-S, State Anxiety Scale.

somewhat pleased, 27% were moderately pleased, 13% were a little pleased, and 21% were not pleased at all.

DISCUSSION

Music started to be used in the hospital environment in the first half of the 20th century (Cunningham, Monson, & Bookbinder, 1997) and its therapeutic use has increased in hospitals and various clinical areas in the last decade (Metzger, 2004). In this study, music therapy was used as a non-pharmacological nursing intervention to help reduce pain and anxiety and to assess satisfaction in patients who presented to the emergency department.

The emergency department is a noisy environment by nature and may cause anxiety in patients (Short & Ahern, 2009; Welland *et al*., 2011). Moreover, although emergency departments are the least suitable environment to meet the specific and specialized needs of patients, they are the most frequently visited units for patients in pain seeking medical care (Woodhouse, Peterson, Campbell, & Gathercoal, 2010). Although there are various studies exploring the effect of music therapy on pain and anxiety, the authors have not come across any research on this matter that involves patients presenting to the emergency department. Short and Ahern (2009) found in their study that playing music in emergency departments, which are noisy and stressful environments, was effective in reducing the level of noise and stress and Tanabe *et al*. (2001) found in their study that music therapy decreased the severity of pain in patients with musculoskeletal trauma who presented to the emergency department. Short *et al*. (2010) found in their study that listening to music had a relieving effect on the levels of noise and stress in patients who presented to the emergency department, while the negative effect scores of patients decreased and their positive effect scores increased or remained the same. The results of the authors' study are parallel to those of the aforementioned studies. The present authors found that music therapy had a positive effect on reducing the severity of pain and the level of anxiety, and both the severity of pain and the level of anxiety were less in the intervention group than in the control group. Although some findings of this study showed that music had a positive effect on some outcomes, one should consider the limitations of this study while interpreting the results. To eliminate the effect of the differences between some characteristics such as educational level and age (Table 1), the authors performed multiple

regression analysis. The adjusted regression coefficients of VASP and STAI-S scores are given in Tables 3 and 4 respectively. The reason that pain severity was greater in the control group compared with the intervention group may be that the mean age was higher and the education level was lower in the control group compared with the intervention group. In the published work it is shown that pain severity is positively correlated with age and negatively correlated with education level (Koçoğlu & Özdemir, 2011).

The positive effect of music on anxiety and pain has been demonstrated in different departments and on different patient groups by the results of a limited number of research studies (Jecklin & Emerson, 2010; Kenyon, 2007; Krout, 2001; Nilsson, 2008). Therefore, with the results of this research, the authors think that it will be significant to discuss the effect of music on pain and anxiety. In their study with patients diagnosed with fibromyalgia, Onieva-Zafra, Castro-Sanchez, Mataran-Penarrocha, and Moreno-Lorenzo (2010) found that the patients in the intervention group who listened to music for 60 min had a lower mean pain severity score than those in the control group who did not listen to music, and the difference was statistically significant. McCaffrey and Freeman (2003) found that music played for 20 min to patients with osteoarthritis was effective in reducing the pain of these patients. Smolen, Topp, and Singer (2002) and Chan *et al.* (2003) reported that music played during colonoscopy significantly decreased the level of pain and anxiety in patients. Siedlecki (2009) found that music played for 60 min reduced the severity of perceived pain in patients with chronic non-malignant pain, and Franco and Rodrigues (2009) and Huang, Good, and Zauszniewski (2010) found that music played for 20–30 min had the same effect on cancer patients.

Patient satisfaction is included in the seven indicators determined for healthcare organizations in the definition made by the American Nurses Association in the published work (Meisenheimer, 1998). It is stated that there is a positive relationship between music therapy performed in a healthcare environment and patient satisfaction (Richards *et al.*, 2007). In the present study, 21% of the patients in the intervention group who listened to music were very pleased to hear music in the emergency department, 21% were not pleased at all, and the rest of them were moderately or at least a little pleased to listen to music in the emergency department. This result shows us that the level of satisfaction from any practice or service may change from individual to individual. In fact, patient characteristics such as age, sex, education level, income status, and diagnosis are reported to affect patient satisfaction (Özer & Çakil, 2007; Soleimanpour *et al.*, 2011; Yildirim *et al.*, 2005). However, no statistically significant difference was found in the present study between the sociodemographic data of the patients and their level of satisfaction. Although there are studies where the effects of care, waiting time or providing information on patient satisfaction in patients who presented to the emergency department have been investigated, there is only one study where the effect of music distraction on patient satisfaction was evaluated. In a study conducted by Tanabe *et al.* (2001) where they investigated the effect of music therapy on patient satisfaction in patients with musculoskeletal trauma, they found that listening to music increased the level of patient satisfaction, but those patients with a high level of pain severity were less satisfied than the patients with a low level of pain severity. There is only a limited number of studies where the effect of music therapy on patient satisfaction is evaluated in different patient groups. In a study conducted by Ovayolu *et al.* (2006) on patients undergoing colonoscopy therapy, it was found that listening to classical Turkish music decreased the level of anxiety and pain and increased the level of satisfaction in patients. Uçan *et al.* (2007) found that music played during gastrointestinal endoscopy significantly increased patient satisfaction.

CONCLUSION

The authors' goal was to demonstrate the impact of music listening on patient outcomes. In the present study, it can be concluded that listening to music in emergency patients resulted in a decreased pain and anxiety score and an increased satisfaction score. The authors suggest that playing music, which is an invasive and inexpensive method, in emergency departments results in improving the patient health outcomes such as pain and anxiety scores.

Limitations

The present study has a number of limitations. First, because the authors' study sample consisted of patients who presented to a university hospital in only one region of Turkey, these results cannot be generalized for patients who presented to hospitals in other geographical regions. Second, because this study was administered to patients who presented to the emergency department, the pain of the patients at the time of their presentation and their pain after the music therapy were not

compared. Only the levels of pain and anxiety in the patients after completion of the procedures for bedding them in the observation unit where they would be monitored and treated were assessed and compared to those of the control group. Third, the music played to the patients was chosen by the trial staff and only one type of music was offered to the patients.

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CONFLICT OF INTEREST

The authors have no conflict of interest.

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