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ORIGINAL ARTICLE

NURSING TECHNIQUES AND PERIPHERAL VENOUS CATHETERISM IN PEDIATRICS*

TÉCNICOS DE ENFERMAGEM E CATETERISMO VENOSO PERIFÉRICO EM PEDIATRIA

TÉCNICAS DE ENFERMERÍA Y CATETERISMO VENOSO PERIFÉRICO EN PEDIATRÍA

Alex-sandra Barbosa da Costa[1], *Luan Nogueira Bezerra de Medeiros*[2], *Amanda Dacal Neves*[3], *Maria Manuella de Barros Barbosa*[4], *Rubiane Gouveia de Souza e Silva*[5], *Rutheanne Melo de Siqueira*[6]

ABSTRACT

Objective: to identify the practice and level of knowledge of nursing technicians about peripheral venous catheterization in pediatrics. ***Method:*** this is a quantitative, descriptive, cross-sectional study with 154 nursing technicians. Data was collected through a questionnaire, analyzed by SPSS. ***Results:*** it was identified that the professionals have an adequate level of knowledge about the need for hand hygiene before handling devices, as well as affirming the importance of wearing gloves during peripheral venipuncture, however, in relation to the practice, there were deficit in knowledge and practice in relation to vesicant products and type of coverage used in the service. ***Conclusion:*** it is concluded that most participants have adequate knowledge and practice regarding the majority of care with venous catheterization in Pediatrics, however, the deficient points found can increase the risks of infection related to care. ***Descriptors:*** Pediatric Nursing; Knowledge; Nursing Care; Catheterization, Peripheral; Catheter-Related Infections; Cross Infection.

RESUMO

Objetivo*:** identificar a prática e o nível de conhecimento de técnicos de enfermagem sobre cateterismo venoso periférico na pediatria. ***Método: trata-se de um estudo quantitativo, descritivo, transversal, com 154 técnicos de enfermagem. Coletaram-se os dados por meio de questionário, analisando-os pelo *SPSS*. ***Resultados:*** identificou-se que os profissionais têm um nível de conhecimento adequado sobre a necessidade de higienização das mãos antes da manipulação de dispositivos, assim como afirmaram a importância de usar luvas durante a punção venosa periférica, no entanto, em relação à prática, houve *déficit* no conhecimento e prática em relação a produtos vesicantes e tipo de cobertura utilizada no serviço. ***Conclusão:*** conclui-se que a maior parte dos participantes possui conhecimento e prática adequados quanto à maioria dos cuidados com cateterismo venoso na Pediatria, entretanto, os pontos deficientes encontrados podem elevar os riscos de infecção relacionada à assistência**.** ***Descritores:*** Enfermagem Pediátrica; Conhecimento; Cuidados de Enfermagem; Cateterismo Periférico; Infecções Relacionadas a Cateter; Infecção Hospitalar.

RESUMEN

Objetivo: identificar la práctica y el nivel de conocimiento de los técnicos de enfermería sobre el cateterismo venoso periférico en pediatría. ***Método:*** este es un estudio cuantitativo, descriptivo, transversal, con 154 técnicos de enfermería. Los datos fueron recolectados a través de un cuestionario, analizado por SPSS. ***Resultados:*** se identificó que los profesionales tienen un nivel adecuado de conocimiento sobre la necesidad de higiene de las manos antes de manipular los dispositivos, así como afirman la importancia de usar guantes durante la punción venosa periférica, sin embargo, en relación con la práctica, hubo *déficit* de conocimiento y práctica en relación con los productos vesicantes y el tipo de cobertura utilizada en el servicio. ***Conclusión:*** se concluye que la mayoría de los participantes tienen el conocimiento y la práctica adecuados con respecto a la mayoría de la atención con cateterismo venoso en pediatría, sin embargo, los puntos deficientes encontrados pueden aumentar los riesgos de infección relacionada con la atención. ***Descriptores:*** Enfermagem Pediátrica; Conocimiento; Atención de Enfermería; Cateterismo Periférico; Infecciones Relacionadas con Catéteres; Infección Hospitalaria.

[1,5]Professor Fernando Figueira Institute of Integral Medicine/IMIP. Recife (PE), Brazil. [1]https://orcid.org/0000-0003-1923-0001 [5]https://orcid.org/0000-0002-8483-462 [2]Federal University of Rio Grande do Norte/UFRN. Natal (RN), Brazil. [2]https://orcid.org/0000-0002-4902-3014 [3,4,6]Pernambucana College of Health/FPS. Recife (PE), Brazil. [3]https://orcid.org/0000-0002-6347-0355 [4]https://orcid.org/0000-0003-4245-7335 [6]https://orcid.org/0000-0003-4374-3763

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INTRODUCTION

In Pediatrics, peripheral venipuncture is considered one of the most common procedures performed during the hospitalization of children in order to assist in various treatments, such as hydroelectrolytic imbalances, blood losses, dysfunctions of multiple organs, among others.[1] For this procedure, peripheral venous catheters are used, which are devices on the needle type, with two access routes and generally made of polyurethane, since it provides better adaptation of the catheter to the anatomy of the venous network, which may reduce the occurrence phlebitis due to mechanical irritation.[2]

For the use of the peripheral venous catheter in pediatrics, it is essential to use an appropriate technique in order to avoid complications.[3] The following can be mentioned as care: hand hygiene before and after insertion of catheters and for any type of device manipulation; selection of the correct catheter, according to the intended objective; perform adequate skin antisepsis; fixing with sterile tape type material; perform correct flushing in order to guarantee the catheter's functioning; evaluate the peripheral catheter insertion site and adjacent areas for inflammatory signs by visual inspection and palpation and remove the peripheral catheter when there are signs of infection or other complications.[4]

However, it is warned that, despite being widely used, peripheral venous catheterization can cause some complications, such as: phlebitis; infiltration; bruise; in addition to signs of phlogistics such as erythema around the insertion, pain and edema.[5]

In addition, in relation to the complications caused by peripheral venous catheters, the occurrence of Primary Bloodstream Infections (PBSI), which are the most common ones related to health care.[6] PBSI can, in more severe cases, lead to a Bloodstream Infection (BSI),[7] as well as a Health Care Related Infection (HCRI).[8]

The nurse, in assisting venipuncture and care, becomes a professional who must develop skills in order to improve the strategies of supervision and team training in relation to measures to prevent possible complications related to peripheral catheters, but most assignments, in most cases, do not perform the basic care necessary for peripheral puncture.[4] These duties are assigned to the nursing technician in relation to the care related to peripheral catheters.[7]

It is important to ensure, considering the context presented, that the peripheral venous catheterization procedure and its care performed by nursing technicians are performed with the necessary technical rigor to avoid complications. Thus, it is believed that it is important to know the practice and level of knowledge of nursing technicians who perform this procedure frequently and, in this study, in sectors of Pediatrics. Thus, the leading question was generated: "How is the practice and what is the knowledge of nursing technicians about peripheral catheterization in Pediatrics?".

It is understood that carrying out this study in sectors of Pediatrics is relevant, because, many times, this procedure is performed without following national and international practical guidelines, which may pose risks to the child's health and because it is one of the most performed procedures during pediatric hospitalizations.[9]

OBJECTIVE

- To identify the practice and level of knowledge of nursing technicians about peripheral venous catheterization in pediatrics.

METHOD

This is a quantitative, descriptive, cross-sectional study. It is reported that quantitative studies have contributed a lot in Nursing as a science.[10] This study was carried out at the Professor Fernando Figueira Institute of Integral Medicine (IMIP), which is a teaching hospital in Recife-PE, a philanthropic institution referring to child care, in pediatric wards, which are divided into cardiology, surgical, third and fourth floor of the pediatric general practice and pediatric emergency, accounting for a total of 214 beds. It is detailed that IMIP is a non-governmental philanthropic institution, of private law, non-profit, where all its services are performed by the Unified Health System (UHS), acting as a Reference Center of the Ministry of Health in areas of medical and social assistance, teaching, research, training and community outreach, being a reference in maternal and child care.

The study population was composed of 154 nursing technicians who are part of the health team and work in the five sectors of Pediatrics.

It is noted that the sampling was probabilistic and simple random. It is added, based on the number of technicians working in the sectors of Pediatrics and performing a sample calculation considering the error of 5% and confidence level of 95%, where the number (sample) of nursing technicians investigated was 111.

The inclusion criteria for the sample composition were defined as: nursing technicians who work in the Pediatrics sectors and affirm that, in their practice, they perform peripheral venipuncture. Exclusion criteria were: nursing technicians with less than one year of experience in Pediatrics and employees on vacation, leave and other leave.

The data collection form used in the study was composed of 34 questions divided into three parts: the first, to investigate socioeconomic data (eight items); the second, to assess the interviewees' practice in relation to peripheral venipuncture (13 items), with answers to the frequency of performance, containing, as options to mark, items as always, almost always, sometimes and never and yes or no; and the third assessed knowledge about care during and after peripheral venous catheterization (13 items), with yes or no answers. The form was constructed by the researcher in light of the recommendations for peripheral catheters in the Anvisa IRAS Prevention Manual.[7]

Participants were approached in person, informing them of the study, its risks and benefits and, after agreeing to participate, responded to the form in an estimated 20 minutes. The collection was carried out from September to November 2018 by the researchers involved.

It is noteworthy that it was recommended, to the participants, to read the Free and Informed Consent Term (FICT) and, only after signing, fill out the form.

The data was stored in the database of the Statistical Package for Social Science (SPSS) program and, soon after, they were stratified, performing the descriptive analysis to obtain the frequency of each variable, analyzing the findings, which are presented below in tables.

The study was approved by the Research Ethics Committee (REC) of the Professor Fernando Figueira Institute of Integral Medicine under opinion No. 2,807,372 and CAAE: 94020618.8.0000.5201. Respeitaram-se, assim, todos os preceitos éticos em pesquisa com humanos, conforme Resolução 466/2012.

RESULTS

♦ Profile of the participants

Table 1 shows the socioeconomic characteristics of the participants.

Table 1. Socioeconomic characteristics of nursing technicians. Recife (PE), Brazil, 2018.

Characteristics of Participants	N=111	f(%)
Ge groupa		
18 to 23	3	2.7
24 to 29	9	8.1
30 to 35	19	17.1
> 35	80	72.1
Sex		
Female	108	97.3
Male	3	2.7
Marital Status		
Single	43	38.7
Married	43	38.7
Divorced	10	9
Stable Union	14	12.6
Widow/er	1	1.0
Profession time		
1 to 3 years	12	10.8
4 to 7 years	19	17.1
8 to 11 years	14	12.6
> 11 years	65	58.6
Not informed	1	0.9
Practice in Pediatrics		
1 to 3 years	19	17.1
4 to 7 years	27	24.3
8 to 11 years	11	9.9
> 11 years	52	46.8
Not informed	2	1.9
Employment bond		
One	83	74.8
Two	26	23.4
Three or more	2	1.8
Monthly Family Income		
1 to 2 minimum wages	71	64
3 to 4 minimum wages	36	32.4
Equal or greater than 5	4	3.6
Race/Color		
White	26	23.4
Non white	85	76.6

♦ **Knowledge and practice**

In tables 2 and 3, data on the knowledge of nursing technicians about peripheral venous catheterization in children were collected; tables 4 and 5 present data on the practice of nursing technicians.

Table 2. Distribution of nursing technicians' self-reported knowledge about peripheral venous catheterization in children. Recife (PE), Brazil, 2018.

Knowledge	Yes		No	
	n	%	n	%
Hand Hygiene				
It is necessary to wash your hands before and after insertion of peripheral catheters and handling any device	111	100	0	0
It is important to wash your hands before using gloves for procedures	103	92.79	8	7.21
It is important to wear gloves during peripheral puncture	100	111	0	0
Skin preparation				
It is correct to touch the puncture site to try to feel the vein after using alcohol	2	1.8	109	98.2
It is necessary, after applying alcohol, to wait some time before puncture	85	77.6	26	22.4
It is correct to reuse the same jelco after a puncture on the same child in a new puncture site	0	0	111	100
Covers				
It is correct to fix the peripheral venous catheter with tape	102	91.9	9	8.1
Definition of vesicant medication	3	2.7	108	97.3
Care of the insertion site				
It is necessary to examine the catheter insertion site before administering intravenous drugs	110	99.1	1	0.9
It is correct, when identifying hyperemia or edema at the catheter insertion site, to administer medication or venoclysis	3	2.7	108	97.3
Catheter removal				
It is correct to change the peripheral catheter after 96h even if it is patent and without signs of infection	78	70.3	33	29.7

Table 3. It is correct to change the peripheral catheter after 96h even if it is patent and without signs of infection. Recife (PE), Brazil, 2018.

Knowledge	Hand veins		Veins of the forearm		Arm		Antecubital area		Saphenous vein	
	n	%	n	%	n	%	n	%	n	%
Catheter selection and insertion site										
Correct sequence, for pediatric patients, of the puncture sites, if the venous network is preserved	95	85.6	6	5.4	2	1.8	4	3.6	4	3.6

Table 4. Distribution of self-reported practice by nursing technicians on peripheral venous catheterization in children. Recife (PE), Brazil, 2018.

Practice	Always		Almost always		Sometimes		Never	
	%	n	%	n	%	N	%	n
Hand Hygiene								
Sanitizes hands before and after insertion of peripheral catheters	74.8	83	20.7	23	4.5	5	0	0
Sanitizes hands before and after any type of manipulation	79.3	88	16.2	18	4.5	5	0	0
Before using gloves for procedures, perform hand hygiene	48.6	54	29.7	33	18.9	21	2.7	3
Wear a glove during peripheral venipuncture	51.4	57	27	30	20.7	23	0.9	1
Skin preparation								
After using alcohol before the puncture, touch the area to try to feel the vein	18.9	21	2.7	3	12.6	14	65.8	73
Reuses the same jelco after a puncture on the same child at a new puncture site	0	0	0.9	1	3.6	4	95.5	106
Covers								
Fix the catheter with tape	94.6	105	2.7	3	0.9	1	1.8	2
Changes the PVA cover when it is wet, loose or dirty	76.6	85	9	10	8.1	9	6.3	7
Care of the insertion site								

Examines the catheter insertion site before administering intravenous medications	91.9	109	4.5	5	1.8	2	1.8	2
If you identify hyperemia or edema at the catheter insertion site, administer the medication	0.9	1	0	0	0.9	1	98.2	109
Catheter removal								
Performs the replacement of the peripheral catheter after 96h, even if patent and without signs of infection	21.6	24	13.5	15	24.8	27	40.5	45

Table 5. distribution of self-reported practice by nursing technicians about the puncture site and how long to wait after alcohol application. Recife (PE), Brazil, 2018.

Practice	Upper limbs		Lower limbs	
	n	%	n	%
Catheter selection and insertion site				
Which puncture site usually punctures preferentially, if the venous network is preserved	103	92.8	8	7.2
	Yes		No	
	n	%	n	%
Skin preparation				
After applying alcohol, wait some time before performing venipuncture	69	62.2	42	37.8

♦ **Hand hygiene**

It was demonstrated, by all professionals interviewed (100%), to have adequate knowledge about the need for hand hygiene before any type of device manipulation, however, only 79.3% reported putting this knowledge into practice.

It was found that, of the 111 participants, 92.79% stated that it is important to wash their hands before wearing gloves, however, only 48.6% of them performed this practice.

It was found, regarding the use of gloves during peripheral venipuncture, that 100% responded that it was important to use them, however, only 51.4% put this procedure into practice.

Catheter selection and insertion site

It is observed, for the location of choice to perform the venipuncture, when the venous network is preserved, that 92.8% answered upper limbs; already in the knowledge, when asked about the correct sequence of venipuncture sites in Pediatrics and which one would avoid, 85.6% of the participants answered that they selected the veins of the hand and 1.8% reported avoiding the veins of the arm.

It is noteworthy that, when inquiring whether the participants knew how to define what vesicant medication was, the 2.7% who answered yes stated that they were medications that cause phlogistic signs and/or necrosis.

♦ **Skin preparation**

It should be noted that, although 98.2% of the sample stated that it is not correct to touch the catheter insertion site after applying the antiseptic, 18.9% reported that they still perform this practice.

It is pointed out that, if, after applying alcohol, wait for some time before performing the venipuncture, 69 (62.2%) said yes; already in knowledge, 77.6% said it was necessary.

Regarding the reuse of the same jelco in a new insertion site, it is indicated that, of the 100% who stated that it is not correct to reuse, only 0.9% almost always carry out this practice and 3.6%, sometimes.

♦ **Covers**

It was found, regarding the use of tape to fix the catheter, that 91.9% said it was correct and 94.6% use this type of coverage in the service.

Care of the insertion site

It was found, regarding the evaluation of the catheter insertion site before the administration of intravenous drugs, that 99.1% of the professionals stated that it is necessary to carry out this evaluation, as well as 91.9% perform this procedure.

It was found that, of the research participants, 97.3% stated that it is not correct to administer medication at the insertion site when identifying hyperemia or edema and 98.2% do not perform this procedure.

♦ **Catheter removal**

Regarding the removal of the catheter, it was found that 70.3% stated that it is correct to change the catheter after 96 hours even if it is patent and without signs of infection and 21.6% perform this procedure on a daily basis.

It was investigated, on the item that addresses the change in the coverage of peripheral venous access when it is wet, loose or dirty, that 76.6% of participants always perform this procedure.

DISCUSSION

The results presented above indicate that the professionals participating in this research are mature people, mostly female, with experience in

the profession for over 11 years, as well as in the area of Pediatrics, having only one professional relationship and, for this reason, have a family income of one to two minimum wages.

In Brazil, a survey was carried out on the profile of Nursing, revealing that Nursing technicians and assistants make up the majority of the Nursing team (77%), but the increase in male participation over time is evident, being mostly female (85.1%), with the majority in the profession within the age group between 31-35 years and in the second phase of professional life, which concerns the professional maturity.[11] It is suggested by these data that the participants have considerable experience in Pediatrics and that, for this reason, they must have already experienced and practiced situations that are related to peripheral venous catheterization several times.

The Assistance-Related Infection Prevention Measures Manual[8] recommends actions for peripheral catheters that must be carried out step by step in order to prevent infections that may cause irreparable damage. In this context, regarding hand hygiene, in particular, it must be performed before and after the insertion of catheters and for any type of device manipulation. It was seen that, in the research, all the interviewed professionals demonstrated adequate knowledge to this need, however, few still do not put this procedure into practice. It was evidenced, by data from a research on care provided by the Nursing team during the peripheral venipuncture procedure, the importance of hand hygiene before and after contact with the insertion site or any care involving the handling of catheters.[7]

It was also demonstrated by the survey that most of the participants stated that it is important to wash their hands before wearing gloves, however, it was seen that less than half of them performed the practice. Research was carried out with nursing technicians in a medium-sized general hospital in the interior of São Paulo, also demonstrating that professionals recognize the importance of hand washing and the use of gloves, however, these measures are not always placed in practice.[12]

Regarding the use of gloves during peripheral venipuncture, it was affirmed by all participants, the importance of performing venipuncture with them, however, only 51.4% do it on a daily basis. It was revealed, in a study, that for the performance of Nursing procedures and the use of gloves, of 510 opportunities observed, there was an absence of use in 29% of the times and 25% reused the gloves.[13] Health professionals perceive the risks that the incorrect use of personal protective equipment can present, but they do not effectively adhere to its use.[14] Thus, there is a risk of causing work accidents by sharps and contaminating the catheter or insertion site. In another study, the importance of hand hygiene practice was emphasized, since it is indicated before touching the patient, performing procedures, after risk of exposure to body fluids, after touching the patient and touching surfaces close to him. It is also noteworthy that this measure is recognized as the most effective in preventing HCRI.[15]

It is recommended, regarding the location of choice for performing the venipuncture, in Pediatrics, when the venous network is preserved, the selection of the vessel with the greatest probability of duration of all the prescribed therapy, considering, thus, the veins of the hand, forearm and arm (armpit region), as well as avoiding the anti-cubital area[8]. The same was followed by the research professionals, in which the majority preferred upper limbs and reported that, in the correct sequence, the ideal is to choose the veins of the hand first.

It is also recommended not to use peripheral catheters for the continuous infusion of vesicant products[8], however, 97.3% of the participants were unable to define or give examples of these products. They are defined by chemical substances that, in contact with the skin and mucous membranes, can cause tissue necrosis when they leak, which can cause serious and persistent injuries. Nursing professionals present difficulties regarding the knowledge of vesicant medications and care with them. Therefore, permanent education is recommended for them.[16]

It was seen, regarding the preparation of the skin, that most of the interviewees stated that it is not correct to touch the insertion site after the application of the antiseptic, as well as also only 62.2% wait sometime after applying the alcohol before to perform venipuncture. It is recommended that 70% alcohol is the antiseptic of choice and that the catheter insertion site cannot be touched after the application of the antiseptic and that it is necessary to wait 1.5 to 2.0 minutes before proceeding to the puncture.[8]

It is also recommended that for each puncture attempt in the same patient, a new peripheral catheter should be used[8], what was seen by nursing technicians when they stated that the reuse of the same jelco in a new insertion site is not correct. The importance of limiting puncture attempts for each nursing professional is emphasized, given that a maximum of two attempts per professional and a maximum of four in total are indicated[8]. Difficulties in patient care are generated by multiple puncture attempts, such as: pain; complications, such as vessel involvement, which can lead to phlebitis and, in the future, to an BSI; costs in relation to materials and delayed treatment prescribed. Complications are evident in relation to the insertion of the peripheral venous catheter in Pediatrics, although

there are few productions that describe other factors in detail. [1]

It was stated, in relation to the covers, by the majority, that the use of plaster was correct for the fixation of peripheral venous catheters, however, the use of non-sterile adhesive tapes of the plaster and micropore type to fix and stabilize them is not recommended, which must be made with a transparent and sterile adhesive device.[17] It is warned that the use of this type of coverage does not guarantee an adequate visualization of the ostium of insertion of the catheter, as well as a correct inspection as to the phlogistic signs and good fixation, however, the recommended adequate coverage was not available in the service, justifying the percentage of employees who used tape to cover.

Most of the participants in this study demonstrate knowledge about the evaluation of the catheter insertion site before the administration of intravenous drugs, which is reiterated in the literature, which recommends, for pediatric patients, the evaluation of the insertion site of the catheter. peripheral catheter and adjacent areas at least twice per shift, as well as for the presence of inflammatory signs.[18] It is therefore important to use validated assessment tools for peripheral venous catheters as a way of preventing complications and monitoring the quality of access and catheters.[19]

It is pointed out, already in relation to the removal of the catheter, that 70.3% affirms that the replacement of the catheter after 96 hours is correct, but this recommendation is no longer a consensus, since, currently, it is known that, for pediatric patients, the peripheral venous catheter should only be removed when there are signs of infection or other complications. It is emphasized that, in order to be able to assess these signs of infection early, it is important that there is the type of adequate coverage, which has already been mentioned previously, and as presented in recommendations.[20] In addition, a phlebitis risk assessment score can be used to prevent it and maintain the maximum time of use of the device.[21]

CONCLUSION

It is concluded that the nursing technicians have adequate knowledge in relation to almost all the care with venous catheterization in Pediatrics, however, when it comes to the practice, there are still deficiencies in certain aspects, which are essential to reduce the risk of infection related to assistance.

It is understood that the practice of peripheral venipuncture in Pediatrics is, in short, a simple procedure, however, there are precautions that must be known by the professional who will perform it and, in addition to knowing, putting all of them into practice, step by step, aiming at the patient's well-being. Thus, it is necessary to intensify educational activities in order to seek more and more the updating of nursing professionals, as well as their qualification in carrying out the procedures. It is also suggested, as a way to promote the care due with peripheral venipuncture, posters or notices posted on murals in the sectors that contain step-by-step reminders during the procedure, as well as checklists posted on clipboards, which can be used by nursing technicians.

It is also suggested to provide adequate material for peripheral venipuncture, especially with regard to fixation in Pediatrics, due to the fact that it is a select group with greater difficulty in obtaining venous access, with less quantity of vessels in extension and caliber appropriate for the puncture, in addition to being a customer who hardly cooperates during the procedure, making it even more difficult.

Further research on this topic should also be developed in order to improve the quality of care in Pediatrics.

CONTRIBUTIONS

All authors contributed equally in the design of the research project, collection, analysis and discussion of data, as well as in the writing and critical review of the content with intellectual contribution, and in the approval of the final version of the study.

CONFLICT OF INTERESTS

Nothing to declare.

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Corresponding author
Alex-sandra Barbosa da Costa
Email: alex-sandra-jesus@hotmail.com

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