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PROFILE OF CHILDREN SUBMITTED TO THE TREATMENT OF FOREARM

PERFIL DE CRIANÇAS SUBMETIDAS AO TRATAMENTO DE FRATURA DE ANTEBRAÇO PERFIL DE NIÑOS SOMETIDOS AL TRATAMIENTO DE FRACTURA DEL ANTEBRAZO

FRACTURE

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ABSTRACT

Objective: to trace the profile of children submitted to surgical treatment of forearm fracture. *Method:* this is a quantitative, descriptive, cross-sectional study. Twenty children from zero to 11 years old were studied. The data were collected daily, through case follow-up and questionnaires. After the tabulation of the collected data, statistical, descriptive and inferential analysis functions were performed, with results presented in topics, with numbers and / or percentages in the form of tables and figures. *Results:* 13 patients were studied, the majority being male, between seven and eight years, and the period with the highest incidence of events was the evening; 61.54% of occurrences occurred during leisure activities; the children were mostly unaccompanied, and the left forearm was the most affected (53.85%). *Conclusion:* it is revealed that forearm fractures in children occur mostly with boys between the ages of seven and eight years, during the afternoon, during leisure activities and not being accompanied. It becomes the knowledge of these data fundamental to improve the process of caring, with strategies of prevention and health promotion that meet the peculiarities of this population. *Descriptors:* Health Profile; Child; Surgical Procedures; Internal Fixation of Fractures; Injuries to the Forearm; Nursing.

RESUMO

Objetivo: traçar o perfil de crianças submetidas a tratamento cirúrgico de fratura de antebraço. *Método*: trata-se de estudo quantitativo, descritivo, transversal. Estudaram-se 20 crianças de 0 a 11 anos. Coletaram-se os dados diariamente, por meio de acompanhamento dos casos e aplicação de questionários. Exerceram-se, após a tabulação dos dados coletados, funções de análises estatísticas, descritiva e inferencial, com os resultados apresentados em tópicos, com números e/ou porcentagens em forma de tabelas e figura. *Resultados*: resultaram-se da pesquisa 13 pacientes, sendo a maioria do sexo masculino, entre sete a oito anos, sendo que o período com maior incidência de eventos foi o vespertino; 61,54% das ocorrências aconteceram durante atividades de lazer; as crianças estavam desacompanhadas, em sua maioria, e o antebraço esquerdo foi o mais acometido (53,85%). *Conclusão*: revela-se que as fraturas de antebraço na criança ocorrem, em sua maioria, com os meninos entre sete e oito anos, no período da tarde, durante atividades de lazer e não estando acompanhados. Torna-se o conhecimento desses dados fundamental para aperfeiçoar o processo de cuidar, com estratégias de prevenção e promoção à saúde que atendam às particularidades dessa população. *Descritores*: Perfil de Saúde; Criança; Procedimentos Cirúrgicos Operatórios; Fixação Interna de Fraturas; Traumatismos do Antebraço; Enfermagem.

RESUMEN

Objetivo: trazar el perfil de niños sometidos a tratamiento quirúrgico de fractura del antebrazo. *Método:* se trata de un estudio cuantitativo, descriptivo, transversal. Se estudiaron 20 niños de 0 a 11 años. Se recolectaron los datos diariamente, por medio de seguimiento de los casos y aplicación de cuestionarios. Se realizaron, después de la tabulación de los datos recolectados, funciones de análisis estadístico, descriptivo e inferencial, con los resultados presentados en tópicos, con números y / o porcentajes en forma de tablas y figura. *Resultados:* resultaron de la investigación 13 pacientes, siendo la mayoría del sexo masculino, entre siete a ocho años, siendo que el período con mayor incidencia de eventos fue el vespertino; El 61,54% de las ocurrencias ocurrieron durante actividades de ocio; los niños estaban desacompañados, en su mayoría, y el antebrazo izquierdo fue el más afectado (53,85%). *Conclusión:* se revela que las fracturas de antebrazo en el niño ocurren, en su mayoría, con los niños entre siete y ocho años, durante la tarde, durante actividades de ocio y no estando acompañados. Se convierte en el conocimiento de estos datos fundamental para perfeccionar el proceso de cuidar, con estrategias de prevención y promoción a la salud que atiendan a las particularidades de esa población. *Descriptores:* Perfil de Salud; Niño; Procedimientos Quirúrgicos Operativos; Fijación Interna de Fracturas; Traumatismos del Antebrazo; Enfermería.

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INTRODUCTION

It is now perceived with the advancement of knowledge about human development and pathological processes that the concern for guaranteeing the integral development of the child has increased, and the recognition of prevention as a major ally in the care process arouses the investment interest in this phase of life.¹

It is observed that, due to the vast activity performed by children, they are commonly affected by multiple fractures, among them, forearm fracture, which covers 33-37% of all pediatric fractures.² It is reported that the forearm is primarily responsible for rotating the upper limb when the shoulder is abducted; bones and soft tissue facilitate hand positioning and orientation, so poor performance can lead to loss of forearm rotation, joint pain and instability.³

It is noted that the risk factors for the occurrence of fractures vary between genetic bone formation, birth weight malnutrition, and obesity has also been noted because bone mineral density is reduced, increasing the chances of invoices, and that obese children tend to be more likely to fall during activities. It presents the child's bone with greater porosity, thus avoiding the propagation of the fracture, resulting in a lower incidence of fragmentation. On the other hand, the resistance of the bones is smaller than the resistance of the ligaments, being more common in childhood the fractures and not only the sprain.4

Forearm fractures are called fractures at the level of the radius and ulna, which may be of both or only one, distal or proximal, and the distal fractures of the radius usually come from a fall with the outstretched hand. 5 More rarely, the so-called floating elbow fracture, which is the combination of the fracture of the humerus and the forearm, where the elbow is disconnected from the bones, occurs generally in high-impact trauma, of more than three meters in height.⁶ It is known that the intercondular fracture of the humerus is uncommon and is a fracture resulting from high impact activities, such as a fall during physical activity. It is specified that the indication for its treatment is, for the most part, surgical, with a good prognosis in children.7

It is known that infant fractures occur mostly between male children (61-63%) and, in the minority, female (37-39%), with a mean age of nine to ten years. It can be seen that fractures occur more frequently linearly, from birth to puberty, and this is because at

puberty, there is a decline of bone growth and, thus, less overload occurs to the new tissue.2 It is noted that younger children tend to have a better prognosis because of bone periosteum thicker and relative flexibility, resulting in greater stability.8 In children, the alignment may accept a larger fracture as a function of bone remodeling capacity with growth, and it is also more difficult to elbow stiffness.9 It is explained that as the bones of the children adhere faster than those of the adults, any residual angular deformity and/or displacement may be acceptable, as the bone grows, it returns to the ideal shape⁵

The most common causes of trauma origin are known: these are falls, followed by accidents during sport/physical activity and occur more frequently in summer and less frequently in winter.² The physical sport is highly recommended for children because of the benefits offered, however, the risk of fractures is significantly increased, and the higher incidence of fractures occurs with the puerperal spurt and may be related to the greater bone remodeling during the growth phase. It is added, therefore, that heavy activities, even if they can avoid fractures in adults, in the child, can cause an increased risk of fracture.¹⁰

Most of these fractures are detected by simple radiography of the traumatized limb, ¹¹ and can also be detected by ultrasonography, which demonstrates high accuracy and reliability, with the advantage of being free of radiation for children. ¹²

It is known that the child is a growing human, leading to a successful life, and changes in its development process can directly interfere with the health conditions of the adult population. It is warned that the child needs to leave the invisible scenario of therapy that has been put to him and move to the focus of prevention and health promotion, and changes in the attention to children's health are necessary. It is necessary to change behavior in the development of educational actions, and the focus of the school as an educator needs to be rethought and adapted to the needs pointed out, with training in conjunction with the child, family and caregivers, with exchanges of experiences of each individual, 1 having the advantage of bringing the family closer to the school and simultaneous actions promoting of responsibility, encompassing the process of teaching and learning with health $promotion.^{13}\\$

From the subject discussed, it is necessary to draw a profile of the children who need

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surgical treatment of forearm fracture in order to recognize the weaknesses existing in this phase and to act in the prevention of occurrences. It becomes the knowledge of these data fundamental to improve the process of care, with prevention strategies and health promotion that meet the particularities of this population.

OBJECTIVE

• Tracing the profile of children undergoing surgical treatment of forearm fracture.

METHOD

This is a quantitative, descriptive, crosssectional study developed at the Orthopedic Trauma Center (OTC), in the city of São José do Rio Preto, São Paulo. Included in the study were all children aged zero to 11 years, 11 months and 29 days, victims of forearm fracture who underwent surgical correction and concluded treatment at the orthopedic trauma center in the period of February/2018 to May/2018. As exclusion criteria, children suffering from forearm fractures who did not require a surgical procedure for correction were listed as exclusion criteria. Data was collected daily by the researcher herself, through case follow-up and questionnaires previously structured and applied to children and their relatives/caregivers.

The data was collected and, tabulation, two statistical analysis functions were applied: descriptive and inferential. Results are presented in topics, with numbers or percentages identifying representativeness of each theme illustrating examples each approach. Descriptive and inferential statistics methods were used, analyzing the probabilities of a population based on the sample data. In some cases. given the need for better understanding, the following methods were used: average; median; fashion; standard deviation; maximum value; minimum value;

Spearman correlation; R squared; standard error and significance.

The hypothesis test was performed using multivariate linear regression, in which the behavior of the square R value (R²), the correlations between the variables analyzed and the degree of explanation of the dependent variable in relation to the independent variables of the sample.

The profile of the studied sample was described in a descriptive way, considering the analyzed variables and their unfolding. The data were replicated in an absolute and relative way. The analysis of independence and prediction among the variables proposed in the scope of work was drawn as a statistical objective in the inferential domain. To that end, the multiple linear regression test.

The results of independence, among the variables proposed, were obtained by the analysis of P values (significance). All analyzes were performed using the SPSS Statistics software (version 23) linked to the features of the Excel tool (version 2016).

The work was approved by the Ethics and Research Committee of the School of Medicine of São José do Rio Preto (FAMERP) under Opinion No. 2,491,068.

RESULTS

For this study, information was collected from 13 patients, treated as a sample of an existing population of approximately 20 children attending the Orthopedic Traumatology Center. For this purpose, the data were separated, considering the following studied variables: age; sex; period; activity performed; companion; local.

It was demonstrated that 13 patients were attended, the majority (61.54%) being male, with ages varying from seven to eight years, according to table 1.

Table 1. Socio-demographic analysis of the sample with respect to sex. São José do Rio Preto (SP), Brazil, 2018.

	Up	to 4 years	5 t	to 6 years 7 to 8 years		to 8 years	>	8 years	Total		
	N	%	N	%	N	%	N	%	N	%	
Sex											
Male	0	0.00	1	50.00	5	83.33	2	66.67	8	61.54	
Female	2	100.00	1	50.00	1	16.67	1	33.33	5	38.46	
TOTAL	2	100.00	2	100.00	6	100.00	3	100.00	13	100.00	

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It was observed, according to table 2, that the period with the highest incidence of events.

Table 2. Sociodemographic analysis of the sample in relation to the intercurrent period. São José do Rio Preto (SP), Brazil, 2018.

	Up	Up to 4 years		5 to 6 years		o 8 years	>	8 years	Total		
	N	%	Ν	N %		%	Ν	N %		%	
Period											
Morning	0	0.00	0	0.00	2	33.33	0	0.00	2	15.38	
Afternoon	0	0.00	1	50.00	4	66.67	3	100.00	8	61.54	
Night	2	100.00	1	50.00	0	0.00	0	0.00	3	23.08	
TOTAL	2	100.00	2	100.00	6	100.00	3	100.00	13	100.00	

Table 3 shows data on the activity

performed.

Table 3. Socio-demographic analysis of the sample regarding the activity performed. São José do Rio Preto (SP), Brazil, 2018.

	Up	Up to 4 years		5 to 6 years		7 to 8 years		> 8 years		Total	
	N	%	N	%	N	%	N	%	N	%	
Activity											
Physical activity	1	50.00	1	50.00	3	50.00	0	0.00	5	38.46	
Leisure	1	50.00	1	50.00	3	50.00	3	100.00	8	61.54	
TOTAL	2	100.00	2	100.00	6	100.00	3	100.00	13	100.00	

It was observed, according to table 4, in the period of the occurrence, the relation to the companion.

Table 4. Socio-demographic analysis of the sample in relation to the companion. São José do Rio Preto (SP), Brazil, 2018.

	Up	Up to 4 years		5 to 6 years		to 8 years	>	8 years	Total		
	N			%		N		%		N	
Companion											
With companion	1	50.00	2	100.00	1	16.67	1	33.33	5	38.46	
Without companion	1	50.00	0	0.00	5	83.33	2	66.67	8	61.54	
TOTAL	2	100.00	2	100.00	6	100.00	3	100.00	13	100.00	

Information on the fracture site was shown

in Table 5.

Table 5. Sample Sociodemographic Analysis of the fracture site. São José do Rio Preto (SP), Brazil, 2018.

	-	-									
	Up	Up to 4 years		5 to 6 years 7		7 to 8 years		> 8 years		Total	
	N	%	N	%	N	%	N	%	N	%	
Fracture location											
Right Forearm	1	50.00	1	50.00	0	0.00	3	100.00	5	38.46	
Left forarm	1	50.00	1	50.00	5	83.33	0	0.00	7	53.85	
Right and left forearms	0	0.00	0	0.00	1	16.67	0	0.00	1	7.69	
TOTAL	2	100.00	2	100.00	6	100.00	3	100.00	13	100.00	

The inferential analysis part of the sample obtained in the field survey was used to verify the degree of dependence of the sample data, as well as to establish the possible combinations of statistical crossings of the records. The statistical tests that fit the profile of the sample raised and the multiple linear regression test were used to analyze the behavior of R² and the dependence coefficients between the independent variables and the dependent variable.

It was verified, at the junction of the "age group" with the "identification", that the square R (R^2) generated a value of 0.214. When using the multiple linear regression test, it can be seen that the model has a low level of explanation, therefore, it can be stated that the independent variables present an index of 21.40% of explanation in relation to the dependent variable, leaving 78.60% of the explanation at random and considering other external factors, and the value of p = 0.112 has no statistical evidence.

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It was observed that crossing the "age range" with "occurrence data", the value of R^2 was 0.361, that is, 36.10% of statistical significance versus 63.90% for random or external factors. The age group was presented a value of p = 0.025, resulting in significant statistical evidence of dependence and, in relation to the predictor variables, "performed activities" and "companions", the P values were p = 0.136 ep = 0.622, respectively.

It was observed that the value of R was equal to 0.396, with a low level of statistical evidence (39.60%) versus 60.40% for random or to other external factors. It was shown in the inferential analysis that, of the predictor

variables, the only one with statistical evidence of dependence was the "stay time with the wires" (p = 0.010).

The Spearman test was used in the correlation analysis. It is inferred that the only variable that demonstrated statistical correlation with the variable "age group" was "period of occurrence", with a moderate level of correlation (0.569) and a level of significance of 0.043. It is concluded that the older the child, the greater the possibility of occurrence at the end of the day.

Inferential Crossings:	
Dependent Variable: Age Group	
	Multiple Linear Regression
Age group x Sex:	There is no statistical evidence of dependence
Age group x Period:	There is statistical evidence of dependence
Age group x Activity carried out:	There is no statistical evidence of dependence
Age group x Companion:	There is no statistical evidence of dependence
Age group x Location:	There is no statistical evidence of dependence

Figure 1. Summary of results obtained after crosses. São José do Rio Preto (SP), Brazil, 2018.

DISCUSSION

It was demonstrated, through the results, that 13 patients were attended, the majority (61.54%) being males, ranging in age from seven to eight years. It is added, in agreement with the findings in the literature, that the gender most affected by fractures in childhood is the male. 14-8 It was revealed in a study carried out with five participants that there were three boys and two girls, however, with a mean age of 9.4 years.6 The mean age of the study was found in Nigeria, similar to that of this study, being seven years and maintaining the male/female ratio of 2:1.19 Gender equality was identified only in a study carried out in Finland, with half of the children being boys, with a mean age of 8.6 years and the other half of girls, with an average of 8.2 years.20

In this study, ages ranging from zero to 11 years, 11 months and 29 days, were considered for both genders. She enrolled in a retrospective study in Malaysia between March 2012 and March 2013, the age of up to 10 years for girls and up to 12 years for boys. A minimum of four years of remaining growth was prioritized in the study, and the predominant gender was male (81.8%), the youngest age at fracture was five years and the oldest 12 years.²¹ The highest mean age was 11 years old, but the population considered ranged from six to 16 years.²²

It was identified in the examination of all

analyzes by gender that fractures occur twice more commonly in men than in women, with a rate of 201 to 239/10,000/year and 124 to 157/10,000/year, respectively, with their peak reached between ten and 11 years old, in girls, and at age 14, in boys. Up to puberty, this rate is slightly higher and thereafter it is significantly higher than that of girls.²

It was observed that the period with the highest incidence of events was the evening, with 61.54% of occurrences, and the age group most affected was over eight (100%). The incidence of fractures in childhood is varied, since it depends on the place of occurrence, on how old the child has and whether it is a boy or a girl. It is known that children who are overweight are more likely to fall during their daily activities because they have difficulty in balance and are therefore more prone to fractures than children with healthy body weight.4 It is reported that the occurrence of fracture in this phase is almost double that in the adult phase, being reached again only in women of advanced age (over 85 years), when the prevalence passes from the male audience to the female audience.2 It was shown, in a literature research, a shortage of studies addressing the period of higher incidence of fractures in children, making it difficult to correlate with the afternoon being the most conducive to accidents.

It was found that the results of this study showed that 61.54% of occurrences occur during leisure activities, since it is in

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accordance with the publications found where the majority of fractures occurred during leisure activities, almost that exclusively by accidental falls, ¹⁴ being falling during sports^{2,7,16} or fall of height.^{6,17,23-4} It was found, in a study carried out in Nigeria, that the main cause of fracture was different from that found in this study; of the 86 fractures studied, more than half (52.4%) occurred due to traffic accidents, including cars, motorcycles and tricycles, followed by falls in height (40.0%).¹⁹

In this study, in the analysis of the period of the occurrence, in leisure and physical activities, the results showed that, in most cases, the children were unaccompanied (61.54%), with the most affected age being between seven and eight years (83.33%); of the publications studied, only one reported that an 11-year-old boy was supervised while practicing gymnastics, and the moment of fracture. On the other hand, it was identified that the majority (61.54%) of the children were not accompanied at the moment of the fracture.

It was determined in this study that the site of the fracture was in the left forearm (53.85%) and in the age group of seven to eight years (83.33%). All fractures in childhood were found, in terms of anatomical location, mostly in the upper limb (73-82.2%), with forearm fractures being the most frequent (32.9-37%) and, among these, the most common is the fracture of the distal part of the forearm.2 It can be seen that, in the literature, the prevalence of fracture in the right or left upper limb is not clearly described, with reports of prevalence in the left upper limb (LUL) 6,14 and right upper limb (RUL). 18,22-4 It is stated, in only one study, the non-occurrence of a bilateral fracture20 differently from this study, in which case.

It was pointed out in this study that one of the great challenges in the treatment of fractures in children is their discernment in relation to their current situation, and it is difficult to change their lifestyle during the process of recovery and rest, including the need for clarification to the victim and his / her relatives about the importance of their collaboration throughout the treatment. However, many times, when these guidelines are given, the family is in a state of acceptance and often does not absorb the information provided, generating doubts and may even occur improper activities, damaging the recovery and, in the worse, requiring a new surgical procedure. It should be pointed out that one of the advances provided by this study in the identification of the greatest difficulties during the postoperative period of children submitted to surgical treatment of forearm fracture was to propose the elaboration of a protocol of care after the surgical treatment of forearm fracture.

CONCLUSION

It was concluded, in view of the findings obtained with this research, that forearm fractures in the child occur mostly with boys aged between seven and eight years, in the afternoon, during leisure activities and not being accompanied. It is through the vulnerability presented by the children, the knowledge of these data is fundamental to improve the caring process, with strategies of prevention and health promotion that meet the particularities of this population, enabling families, schools or caregivers to better plan the actions and care, preventing accidents from happening.

It is understood that the theoretical and practical implications for the members of this will be research indirect. since information collected will provide subsidies for the construction of knowledge in Health and Nursing, as well as for new researches to be developed on this subject, besides alerting the family possibility of unexpected changes in recovery. It is believed that other benefits are the knowledge of the reality of this involvement in the child population and the possibility that measures of promotion, prevention and treatment can be effected with greater effectiveness and efficiency, with consequent decrease of this infantile event.

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