

JOANA RAMOS-JORGE

**SINAIS E SINTOMAS ASSOCIADOS COM A ERUPÇÃO
DE DENTES DECÍDUOS: ESTUDO LONGITUDINAL**

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Dissertação apresentada ao Programa de Pós-Graduação da Faculdade de Odontologia da Universidade Federal de Minas Gerais como requisito parcial para obtenção do grau de Mestre em Odontologia - área de concentração em Odontopediatria

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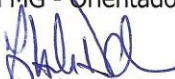
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UNIVERSIDADE FEDERAL DE MINAS GERAIS
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 Programa de Pós-Graduação em Odontologia


Dissertação intitulada "**Sinais e sintomas associados com a erupção de dentes decíduos: estudo longitudinal**", área de concentração em **Odontopediatria**, apresentada por **Joana Ramos-Jorge**, para obtenção do grau de **Mestre em Odontologia**, **APROVADA** pela Comissão Examinadora constituída pelos seguintes professores:


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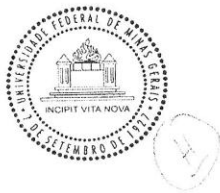

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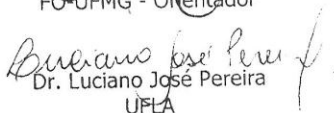
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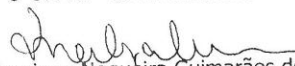
Ata da Comissão Examinadora para julgamento da Dissertação de Mestrado em Odontologia, área de concentração em **Odontopediatria**, da candidata **Joana Ramos-Jorge**.

Aos 27 de julho de 2010, às 09:00 h, na sala de Pós-Graduação (3418) da Faculdade de Odontologia, reuniu-se a Comissão Examinadora, composta pelos professores Dr. Saul Martins de Paiva, Dra. Isabela Almeida Pordeus, Dr. Luciano José Pereira e Dr. Mauro Henrique Nogueira Guimarães de Abreu. O Professor Dr. Saul Martins de Paiva, Orientador da Dissertação, na qualidade de Presidente da sessão, apresentou a Comissão Examinadora e declarou abertos os trabalhos. À candidata foi dado o tempo de até 50 (cinquenta) minutos para fazer a exposição oral sobre o seu trabalho **"Sinais e sintomas associados com a erupção de dentes decíduos: estudo longitudinal"**. Encerrada a exposição, foi iniciada a argüição, dentro do limite de tempo de 30 (trinta) minutos, pelos Professores Dr. Luciano José Pereira, Dr. Mauro Henrique Nogueira Guimarães de Abreu e Dr. Saul Martins de Paiva, com limite de 30 (trinta) minutos para a resposta. Terminadas as argüições, o Presidente suspendeu os trabalhos por 10 minutos para que os examinadores pudessem decidir pelo resultado a ser dado à candidata. A Comissão Examinadora opta pela *aprovação* da candidata. Para constar, lavrou-se a presente ata, que vai assinada por mim Dr. Saul Martins de Paiva, Presidente e pelos demais membros desta comissão examinadora. Belo Horizonte, 27 de julho de 2010.


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RESUMO

Sinais e sintomas associados com a erupção de dentes decíduos: estudo longitudinal

RESUMO

A associação entre erupção de dentes decíduos e a manifestação de sinais e sintomas em bebês é tema controverso na literatura. Ainda não há evidência científica que suporte essa associação, entretanto pais e profissionais de saúde continuam acreditando que a erupção de dentes decíduos é causa da manifestação de sinais e sintomas em bebês. Assim, este estudo teve como objetivo avaliar a associação entre erupção de dentes decíduos e manifestação de sinais e sintomas em bebês. Foi realizado um estudo longitudinal com 47 bebês, que ainda não apresentavam todos os incisivos erupcionados e sem história de doenças crônicas ou distúrbios capazes de provocar aumento dos sinais e sintomas avaliados. Aferições das temperaturas timpânica e axilar e exame clínico bucal foram realizados diariamente, ao longo de um período de oito meses. Por meio de entrevista às mães, foi investigada a presença de 14 sinais e sintomas associados com a erupção de dentes decíduos e apresentados pelos bebês nas últimas 24 horas. A erupção de dentes decíduos esteve associada à elevação da temperatura timpânica no dia da erupção ($P=0.004$) bem como à ocorrência de outros sinais e sintomas. Os sinais e sintomas mais frequentemente associados à erupção dos dentes decíduos foram irritabilidade ($P<0.001$), aumento da salivação ($P<0.001$), coriza ($P<0.001$) e perda de apetite ($P<0.001$). Além desses, diarreia, brotoeja e distúrbios de sono também estiveram associados à erupção dos dentes decíduos. Portanto, este estudo contribui para fortalecer o conceito de que não se pode atribuir à erupção de dentes decíduos a ocorrência de sinais e sintomas graves, como febre.

ABSTRACT

Signs and symptoms associated with the primary teeth eruption: longitudinal study

ABSTRACT

The association between eruption of primary teeth and manifestation of signs and symptoms in infants is a controversial issue in literature. There is still no scientific evidence that supports this association. However, parents and health professionals continue to believe that eruption of primary teeth is because of the manifestation of signs and symptoms in infants. Thus, the aim of this study was Assess the association between primary tooth eruption and the manifestation of signs and symptoms in infants. A longitudinal study was carried out with 47 non-institutionalized infants between five and 15 months of age in the city of Diamantina, Brazil. The non-randomized convenience sample was based on a registry of infants provided by the Municipal Secretary of Health. Eligible participants were infants with between zero and seven erupted teeth and no history of chronic disease or disorders that could cause an increase in the symptoms assessed in the study. Tympanic and axillary temperature readings and clinical oral exams were performed daily. A daily interview with the mothers was carried to investigate the occurrence of 14 signs and symptoms associated to teething presented by the infants in the previous 24 hours. Teething was associated to a rise in tympanic temperature on the day of the eruption ($P=0.004$) as well as the occurrence of other signs and symptoms. Maximal tympanic and axillary temperature was 36.8 °C and 36.6 °C, respectively. The most frequent sign and symptoms associated to teething were irritability ($P<0.001$), increased salivation ($P<0.001$), runny nose ($P<0.001$) and loss of appetite ($P<0.001$). Signs and symptoms, such as irritability, increased salivation, runny nose, loss of appetite, diarrhea, rash and sleep disturbance, were associated to primary

tooth eruption. The present study supports the concept that the occurrence of severe signs and symptoms, such as fever, is not attributed to teething.

LISTA DE ABREVIATURAS

BD	Becton Dickinson
SPSS	<i>Statistical Package for Social Sciences</i>
UFMG	Universidade Federal de Minas Gerais
USA	<i>United States of America</i>
Incoterm	Indústria de Termômetros
CNPq	Conselho Nacional de Desenvolvimento Científico e Tecnológico
FAPEMIG	Fundação de Amparo à Pesquisa do Estado de Minas Gerais
COEP	Comitê de Ética em Pesquisa

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CONSIDERAÇÕES INICIAIS

CONSIDERAÇÕES INICIAIS

A associação entre erupção de dentes decíduos e o aparecimento de manifestações orgânicas locais e gerais em bebês tem sido debatida há mais de 5000 anos. O relato dessas manifestações na literatura varia desde sintomatologia simples, como a salivação excessiva, até uma sintomatologia mais grave, como a convulsão. Em 1839, mais de cinco mil mortes de bebês na Inglaterra e País de Gales foram atribuídas à erupção de dentes decíduos (Dally, 1996).

A erupção é um processo fisiológico normal, definido como um processo em que o dente se move de sua posição de desenvolvimento dentro do osso até a sua emergência na cavidade bucal (Kardos, 1996; Craddock., 2004).

Por ser definida como processo fisiológico, a erupção de dentes decíduos associada à manifestação de sinais e sintomas é assunto controverso no meio médico e odontológico.

Estudos realizados em diferentes países revelaram que a maioria dos pais e profissionais de saúde associou a erupção de dentes decíduos ao aparecimento de sinais e sintomas. Wake et al. (1999) verificaram por meio da aplicação de questionário que, dentre 92 pais de bebês, apenas um acreditava que a erupção de dentes decíduos não causava sintomatologia. A maioria (70-85%) associou a erupção de dentes decíduos com febre, dor, irritabilidade, distúrbios de sono, aumento da salivação e vermelhidão da face.

Owais et al. (2010), em recente estudo, verificaram que aproximadamente 72% da amostra composta por pais de bebês relacionavam a erupção de dentes decíduos a

episódios de diarreia e quase 85% acreditavam que a erupção podia causar febre. Esses resultados estão de acordo com os achados de Cunha et al. (2004), que verificaram que 95% dos pais relataram a ocorrência de manifestações locais e sistêmicas em seus filhos durante a erupção dos dentes decíduos.

Alguns profissionais de saúde têm destacado que os sinais e sintomas, quando presentes devido à erupção dentária, são de baixa gravidade e mais relacionados a um desconforto do que à ocorrência de doença (Sarrell et al., 2005). Em estudo realizado por Jaber et al. (1992), foi constatado um aumento da temperatura durante a erupção do primeiro dente decíduo. No entanto, o intervalo de confiança mostrou que, em 95% dos casos, a temperatura variou de 37,33°C a 37,86°C. Esses autores concluíram que a febre acima de 38,5°C não deve ser atribuída apenas à erupção dentária.

Em uma avaliação de 50 bebês que foram levados ao hospital pelos pais com sinais e sintomas relacionados à erupção dentária, verificou-se que 48 apresentavam outras causas que poderiam levar ao quadro clínico apresentado (Lloyd, 1996).

Entretanto, a maior parte dos estudos realizados é retrospectiva e demonstra a visão dos pais e profissionais da saúde frente ao processo de erupção de dentes decíduos. Portanto, não avalia a possível associação da erupção dentária com a manifestação de sinais e sintomas.

Essa associação foi também testada em estudos prospectivos. Um deles foi realizado com 111 bebês com média de idade de quatro meses ao início do estudo. Os pais mediram a temperatura timpânica e observaram a presença ou ausência de 18 sintomas diariamente, até o momento em que os bebês completassem 12 meses. Nesse período, foi observada a erupção de 475 dentes. Os sintomas mais frequentes nos períodos de erupção foram: aumento da salivação, irritabilidade, diminuição do apetite

para alimentos sólidos e elevação da temperatura média (Macknin et al., 2000). Em outro estudo, os examinadores realizaram avaliações de temperatura timpânica e exame clínico dos bebês. A associação entre sintomas e erupção dentária não foi confirmada (Wake et al., 2000).

Em revisão sistemática da literatura, Tighe e Roe (2007) concluíram que não existem evidências científicas suficientes para indicar que determinado sinal ou sintoma ocorra devido exclusivamente à erupção de dentes decíduos. Sugeriram que o profissional deve considerar outras patologias orgânicas ao atender uma criança doente. Isso é relevante uma vez que a erupção dos dentes decíduos ocorre geralmente em um período em que os bebês apresentam freqüentes episódios de doenças de baixa gravidade (Jarman e Kohlenberg, 1991).

Dessa forma, o presente estudo tem como objetivo verificar a associação entre erupção de dentes decíduos e manifestação de sintomatologia.

Diante da importância da publicação de pesquisas para o desenvolvimento científico, esta dissertação foi estruturada na forma de artigo.

Signs and symptoms associated to primary tooth eruption: A longitudinal study

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Abstract

Objective: Assess the association between primary tooth eruption and the manifestation of signs and symptoms in infants.

Patients and Methods: A longitudinal study was carried out with 47 non-institutionalized infants between five and 15 months of age in the city of Diamantina, Brazil. The non-randomized convenience sample was based on a registry of infants provided by the Municipal Secretary of Health. Eligible participants were infants with between zero and seven erupted teeth and no history of chronic disease or disorders that could cause an increase in the symptoms assessed in the study. Tympanic and axillary temperature readings and clinical oral exams were performed daily. A daily interview with the mothers was carried to investigate the occurrence of 14 signs and symptoms associated to teething presented by the infants in the previous 24 hours.

Results: Teething was associated to a rise in tympanic temperature on the day of the eruption ($P=0.004$) as well as the occurrence of other signs and symptoms. Maximal tympanic and axillary temperature was 36.8 °C and 36.6 °C, respectively. The most frequent sign and symptoms associated to teething were irritability ($P<0.001$), increased salivation ($P<0.001$), runny nose ($P<0.001$) and loss of appetite ($P<0.001$).

Conclusions: Signs and symptoms, such as irritability, increased salivation, runny nose, loss of appetite, diarrhea, rash and sleep disturbance, were associated to primary tooth eruption. The present study supports the concept that the occurrence of severe signs and symptoms, such as fever, is not attributed to teething.

INTRODUCTION

Tooth eruption has been held responsible for a variety of systemic manifestations in infants. The association between teething and irritability, increased salivation, sleep disturbance, fever, diarrhea and loss of appetite remains unclear, since the onset of these disorders may simply coincide with the teething. Moreover, some of these signs and symptoms may imply more serious conditions.¹ Studies involving parents, pediatricians and other healthcare professionals have associated teething with signs and symptoms.²⁻⁹ However, prospective studies have offered contradictory findings.^{10,11}

In a study involving 21 children between six months and two years of age institutionalized at day care centers in Melbourne, Australia, tympanic temperature readings and clinical oral exams were carried out and the results did not confirm any association between tooth eruption and disturbances.¹¹ However, such an association was found in a study carried out in the city of Cleveland (USA) involving 111 infants between three and 5.6 months of age at the beginning of the data collection period. The parents read the tympanic temperature and observed the presence or absence of 18 symptoms on a daily basis until the infants reached 12 months of age. The eruption of 475 teeth was observed in this period and the following were the most frequent symptoms: increased salivation, irritability, loss of appetite for solid foods and rise in mean temperature.¹⁰ However, these studies had limitations, such as which parents and caregivers read the temperature and performed the exam of the infant's oral cavity.

Currently, there is not enough scientific evidence to indicate that certain signs or symptoms occur only because the eruption of primary teeth.¹² Thus, the aim of the present prospective longitudinal study was to investigate the association between tooth

eruption and a range of signs and symptoms of teething while minimizing the limitations found in previous studies.

METHODS

Subjects

The study was carried out over an eight-month period and involved 47 non-institutionalized infants (i.e., received care at home) between five and 15 months of age in the city of Diamantina, Brazil. The non-randomized convenience sample was based on the registry of infants in this age range provided by the Diamantina Secretary of Health. The study sample size was based on data on the mean and SD scores of previous study.¹³ Estimating that clinically significant difference between two groups would be 1SD and adopting a effect size of 0.5 ($\mu_1 - \mu_2 / SD$, i.e. mean of temperature in non eruption day = 36.9°C – mean of temperature in eruption day = 37.4°C/1), a sample size of 44 would give 90% power to detect this a difference at a significance level of 0.05. Due to the possibility of losses, fifty-three babies were actually recruited.

Eligible participants were infants with up to seven erupted incisors and no history of chronic disease or disorders that could cause an increase in the signs and symptoms assessed in the study.

Data Collection

The pilot study was carried out with seven infants between six and 15 months of age selected by convenience in the city of Diamantina; these infants did not make up part of the main study. The pilot study was performed was to test the data collection process and ascertain the applicability of the instruments. The data from this pilot study demonstrated that there was no need to modify the methods proposed for the study.

Data collection was performed daily at the residences of the infants over an eight-month period. The visits were scheduled beginning at 4 pm in order to minimize the variation in the child's temperature throughout the day. The visits time was previously arranged with the mother in order to avoid temperature readings during baths or sleep. The possible occurrence of signs and symptoms during the eruption of primary incisors was assessed. Data collection began prior to the eruption of at least one of the incisors and ended one week following the eruption of the last incisor.

Eleven validated dentists trained in handling the thermometers and performing the examination of the oral cavity carried out clinical exams on the infants to determine tooth eruption. The calibration exercise consisted of two steps: the theoretical step involved discussion on the criteria for the diagnosis of tooth eruption and an analysis of photographs. A specialist in pediatric dentistry (gold standard in this theoretical framework) coordinated this step, instructing general dentists on how to perform the examination and determine temperature. In the clinical step, the dentists examined seven previously selected infants between six to 15 months of age. The dentist with the best level of intra-examiner and inter-examiner agreement in the theoretical step was considered the gold standard in the clinical step. Inter-examiner agreement was tested comparing each examiner with the gold standard. A one-day interval between evaluations was used to test the intra-examiner agreement so that the diagnosis of tooth eruption was performed under similar conditions, as a greater interval between evaluations could compromise the calibration and, consequently, the reliability of the study. Both inter-examiner and intra-examiner kappa values were 1.0. The dentists were also calibrated for the use of axillary and tympanic thermometers, achieving kappa values greater than 0.8.

The clinical exam was performed with the aid of a head lamp (PETZL[®], Tikka XP, Crolles, FR) to provide a standardized light source for the visual exam and with palpation using the index finger on the alveolar ridge. Temperature was read using an infrared auricular thermometer (Incoterm[®], Porto Alegre, RS, Brazil) and a digital axillary thermometer (BD[®], São Paulo, SP, Brazil); tympanic and axillary temperatures were assessed as continuous variables. If an infant's temperature exceeded 37.5 °C, the child would be referred to the nearest children's medical care service. Mothers were interviewed to investigate the occurrence of signs and symptoms in the previous 24 hours, such as increased salivation, rash, runny nose, diarrhea, loss of appetite, cold, irritability, fever, smelly urine, constipation, vomiting, colic and seizure. Signs and symptoms were recorded daily on a standardized chart. The mean frequency of signs and symptoms was calculated on days of non-eruption, on the day of eruption and on the days prior to and following the eruption of primary incisors. The data collection sequence was as follows: 1) reading of tympanic and axillary temperature; 2) interview; and 3) clinical exam.

Erupted teeth not assessed on the day of eruption or on the days prior to and following eruption were excluded from the analysis. The day of eruption was defined as the first day on which the incisor edge emerged in the oral cavity without being completely covered by gingival tissue.

Statistical analysis

Statistical analysis was performed using the Statistical Package for the Social Sciences (SPSS for Windows, version 15.0, SPSS Inc, Chicago, IL, USA). Mean, standard deviation, median, minimum and maximum values were calculated for each variable quantitative and frequency analysis was calculated for the variable qualitative.

Since tympanic and axillary temperature and the frequency of signs and symptoms scores were not normally distributed (Shapiro-Wilk test), a non-parametric test for repeated measures was used (Wilcoxon test). For each continuous variable (tympanic temperature, axillary temperature, mean frequency of signs and symptoms), comparisons were made between days of non-eruption, day of eruption and days prior to and following eruption of the primary incisors (Wilcoxon test). The mean frequency of signs and symptoms was calculated based on the following formula: number of days on which the infant exhibited a sign or symptom divided by the total number of days evaluated. This formula was applied separately for the non-eruption day, eruption day, previous day and following day.

Based on the Bonferroni correction, P -values equal to or less than 0.016 were considered significant. Bonferroni correction is a method used to address the problem of multiple comparisons. The correction is based on the idea that if an experimenter is testing n dependent or independent hypotheses on a set of data, then one way of maintaining the error rate is to test each individual hypothesis at a statistical significance level of $1/n$ times what it would be if only one hypothesis were tested. So if one wants the significance level for the whole family of tests to be at most α then the Bonferroni correction would be to test each of the individual tests at a significance level of α/n . Statistically significant simply means that a given result is unlikely to have occurred by chance assuming the null hypothesis is actually correct (i.e., no difference among groups, no effect of treatment, no relation among variables). Thus, the significance value adopted ($p = 0.016$) is the result of $0.05/3$ [$\alpha=0.05$; 3 multiple comparisons (1: non-eruption vs previous day; 2: non-eruption vs eruption; 3: non-eruption vs following day)].¹⁴

Ethical considerations

The present study received approval from the Human Research Ethics Committee of the Universidade Federal de Minas Gerais (Brazil). All parents received information regarding the objectives of the study and signed informed consent forms.

RESULTS

A total of 53 infants were initially enrolled in the study, 47 (88.7%) of whom participated through to the end of the study. The following were the main reasons for dropouts: moving away from the city; no tooth erupted; impossibility of assessment on the day of eruption or previous/following day. A total of 231 teeth erupted throughout the study. The mean number of teeth per infant was nearly five (range: 2 to 8). Table 1 displays the descriptive information on the infants and their mothers.

Mean tympanic and axillary temperature determined by dentists on non-eruption days, day on which eruption occurred and the days prior to and following incisor eruption are displayed in Table 2. There were statistically significant differences in tympanic temperature between non-eruption days and the day of eruption ($P=0.004$), previous day ($P=0.012$) and following day ($P<0.001$). Regarding axillary temperature, there was a statistically significant difference only between non-eruption days and the day following eruption ($P=0.007$). Mean tympanic and axillary temperature rose 0.12 °C and 0.01 °C on days of eruption in relation to non-eruption days.

The associations between signs and symptoms reported by mothers and tooth eruption were statistically significant. Sleep disturbance ($P=0.016$), increased salivation ($P<0.001$), rash ($P=0.003$), runny nose ($P<0.001$), diarrhea ($P<0.001$), loss of appetite ($P<0.001$) and irritability ($P<0.001$) were associated with tooth eruption. The analysis of mean frequencies revealed that the most common symptoms on days of eruption were irritability, increased salivation, runny nose and loss of appetite (Table 3). As no

infant experienced seizure or colic and reports of vomiting were rare throughout the study, these signs and symptoms were not included in Table 3. The mean number of symptoms occurring on days of eruption (2.69) was nearly twofold that of non-eruption days (1.43); this difference was statistically significant ($P < 0.001$) (Table 3).

DISCUSSION

The design adopted makes the present study unique and original. This is the first prospective study in which temperature readings and clinical oral exams were performed on a daily basis by trained examiners. The decision was made to investigate non-institutionalized infants, as viral and bacterial infections are rapidly disseminated in day care centers and could affect the frequency of signs and symptoms.^{15,16} Moreover, a previous study carried out in Brazil found that, at public and private daycare centers, the proportion of caregivers to children aged zero to two years is 1:6 and 1:9, respectively,¹⁷ which could have a negative effect on the validity and reliability of the data. The aim of assessing the day prior to and following eruption was based on previous studies reporting that infants exhibit signs and symptoms on days surrounding the day of eruption that can may be associated with teething.^{10,18}

Methods were employed in order to minimize observer bias. The data collection sequence (temperature reading, followed by interview with mother and, lastly, the clinical exam) was designed so that mothers would not be biased with regard to communicating more signs and symptoms when it was determined that a tooth was erupting. However, it is possible that such bias occurred on the day following tooth eruption. Another limitation of the present study is the non-use of objective measures of signs and symptoms such as irritability, loss of appetite and increased salivation.

The present study confirms the findings of previous studies that tooth eruption is associated to a slight rise in body temperature.^{10,18} Significant differences were found in mean tympanic temperature between non-eruption days and day of eruption, one day prior to eruption and one day following eruption. However, there was a significant difference in axillary temperature only between non-eruption days and one day following eruption. Despite these statistically significant associations, maximal tympanic (36.8 °C) and axillary (36.6 °C) temperature did not characterize fever, as the variation in temperature remained within the range of normality.¹⁹ There was a mean temperature increase of 0.12 °C between non-eruption days and the day of eruption. A previous prospective study found a greater temperature increase between these evaluation times (0.5 °C). However, the authors assessed rectal temperature and the readings were performed by caregivers.

Tympanic temperature was higher than axillary temperature in the present study. Tympanic thermometers are more accurate than axillary thermometers in young children when compared with reference standards of pulmonary artery temperature under controlled conditions.¹⁹ Moreover, reading tympanic temperature is a fast, easily executed technique.²⁰ The importance of assessing axillary temperature resides in the fact that this type of reading is widely used by parents and healthcare professionals for the diagnosis of fever.

The results of the present study reveal a greater frequency of systemic manifestations (sleep disturbance, increased salivation, rash, runny nose, diarrhea, loss of appetite and irritability) on the day of eruption and one day following eruption in comparison to non-eruption days. The aforementioned study carried out in Cleveland also reports an association between teething and increased salivation, irritability, sleep

disturbance and loss of appetite on the day of eruption.¹⁰ Some of these signs and symptoms may be explained by the increase in inflammatory cytokine levels in the gingival crevicular fluid surrounding the teeth. High levels of IL-1 β and TNF α have been correlated with fever, gastrointestinal disturbance, sleep disturbance and appetite disturbance.¹⁸ Unlike the Cleveland study,¹⁰ the present study found a statistically significant association between teething and diarrhea. However, the study carried out in Australia found no associations between teething in institutionalized infants and signs and symptoms.¹¹ The conclusion of all prospective studies is that no specific symptoms can reliably predict the emergence of a tooth. Furthermore, signs and symptoms that can be attributed to teething are not serious; thus, the presence of fever (> 38.5 °C) or other clinically important symptoms is very unlikely to be caused by tooth eruption.

CONCLUSION

The results demonstrate associations between teething and sleep disturbance, increased salivation, rash, runny nose, diarrhea, loss of appetite, irritability and a slight rise in temperature. These associations were significant on the day of eruption and one day following eruption. Therefore, it is not possible to predict eruption through the observation of signs and symptoms, as there were no associations with the day prior to eruption. The findings of this study contribute toward supporting the concept that teething is not associated to severe signs and symptoms. Thus, health professionals involved in the care of infants should seek other causes before attributing severe signs and symptoms to teething.

ACKNOWLEDGEMENTS

This study was supported by the Brazilian fostering agencies National Council for Scientific and Technological Development (CNPq) and State of Minas Gerais Research Foundation (FAPEMIG).

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Table 1: Descriptive analysis of characteristics of infants, mothers and number of data collection days

Variable	Minimum	Maximum	Mean	SD
Number of teeth assessed	2	8	4.9	2.3
Birth weight	2500	3740	3248.2	286.6
Age of infant (months)	5	15	8.9	2.7
Age of mother (years)	16	41	27.8	6.8
Mother's schooling (years)	7	11	9.5	1.5
Number of collection days	38	178	106.1	33.5
Gender n (%)				
Female	18 (38.3)			
Male	24 (61.7)			

Table 2: Descriptive analysis and comparison of tympanic and axillary temperature determined by dentists on non-eruption days, day prior to eruption, day of eruption and day following eruption

Temperature	Mean (SD)	Median	Minimum	Maximum	Wilcoxon test
Tympanic					
Non-eruption	36.39 (0.26)	36.46	35.8	36.8	Non-eruption vs Previous day- $P = 0.004$
Previous day	36.47 (0.23)	36.60	36.0	36.7	Non-eruption vs Eruption- $P = 0.012$
Eruption	36.51 (0.20)	36.60	36.0	36.8	
Following day	36.49 (0.22)	36.60	36.0	36.7	Non-eruption vs Following day- $P < 0.001$
Axillary					
Non-eruption	35.98 (0.36)	36.04	35.4	36.6	Non-eruption vs Previous day- $P < 0.001$
Previous day	35.99 (0.26)	35.93	35.7	36.6	Non-eruption vs Eruption- $P = 0.516$
Eruption	35.99 (0.46)	36.06	35.2	36.5	
Following day	35.80 (0.37)	35.90	35.0	36.4	Non-eruption vs Following day- $P = 0.007$

Table 3: Descriptive analysis and comparison of signs and symptoms reported by mothers on non-eruption days, day prior to eruption, day of eruption and day following eruption

Symptoms	Mean (SD)	Median (25th, 75th)	Wilcoxon test
Sleep disturbance			
Non-eruption	0.16 (0.15)	0.09 (0.02, 0.35)	Non-eruption vs Previous day- $P = 0.028$
Previous day	0.09 (0.17)	0.00 (0.00, 0.38)	Non-eruption vs Eruption - $P = 0.016$
Eruption	0.29 (0.36)	0.00 (0.00, 0.40)	Non-eruption vs Following day- $P = 0.001$
Following day	0.29 (0.35)	0.25 (0.00,0.50)	
Increased salivation			
Non-eruption	0.31 (0.32)	0.40 (0.12, 0.50)	Non-eruption vs Previous day- $P = 0.788$
Previous day	0.49 (0.37)	0.25 (0.00, 0.50)	Non-eruption vs Eruption - $P < 0.001$
Eruption	0.51 (0.35)	0.50 (0.22, 0.80)	Non-eruption vs Following day - $P < 0.001$
Following day	0.31 (0.22)	0.50 (0.00, 0.80)	
Rashes			
Non-eruption	0.12 (0.23)	0.00 (0.00, 0.37)	Non-eruption vs Previous day - $P = 0.051$
Previous day	0.27 (0.38)	0.00 (0.00, 0.39)	Non-eruption vs Eruption - $P = 0.003$
Eruption	0.27 (0.38)	0.00 (0.00, 0.50)	Non-eruption vs Following day- $P = 0.003$
Following day	0.17 (0.23)	0.00 (0.00, 0.50)	
Runny nose			
Non-eruption	0.27 (0.35)	0.30 (0.12, 0.40)	Non-eruption vs Previous day- $P = 0.390$
Previous day	0.52 (0.31)	0.25 (0.00, 0.38)	Non-eruption vs Eruption - $P < 0.001$
Eruption	0.49 (0.35)	0.50 (0.00, 0.75)	Non-eruption vs Following day - $P < 0.001$
Following day	0.27 (0.19)	0.50 (0.25, 0.75)	
Diarrhea			
Non-eruption	0.14 (0.21)	0.10 (0.00, 0.36)	Non-eruption vs Previous day- $P = 0.224$
Previous day	0.13 (0.22)	0.00 (0.00, 0.35)	Non-eruption vs Eruption - $P < 0.001$
Eruption	0.28 (0.37)	0.00 (0.00, 0.50)	Non-eruption vs Following day - $P = 0.911$
Following day	0.12 (0.17)	0.00 (0.00, 0.30)	
Loss of appetite			
Non-eruption	0.29 (0.32)	0.10 (0.00, 0.32)	Non-eruption vs Previous day- $P = 0.025$
Previous day	0.41 (0.39)	0.10 (0.00, 0.66)	Non-eruption vs Eruption - $P < 0.001$
Eruption	0.48 (0.43)	0.50 (0.00, 1.00)	Non-eruption vs Following day - $P < 0.001$
Following day	0.18 (0.22)	0.37 (0.00, 0.76)	
Cold			
Non-eruption	0.12 (0.22)	0.00 (0.00, 0.35)	Non-eruption vs Previous day - $P = 0.507$
Previous day	0.18 (0.24)	0.00 (0.00, 0.39)	Non-eruption vs Eruption- $P = 0.073$
Eruption	0.16 (0.24)	0.00 (0.00, 0.42)	Non-eruption vs Following day- $P < 0.001$
Following day	0.12 (0.17)	0.00 (0.00, 0.50)	
Irritability			
Non-eruption	0.39 (0.29)	0.40 (0.25, 0.52)	Non-eruption vs Previous day- $P = 0.807$
Previous day	0.53 (0.26)	0.50 (0.00, 0.61)	Non-eruption vs Eruption - $P < 0.001$
Eruption	0.62 (0.34)	0.60 (0.25, 1.00)	Non-eruption vs Following day - $P = 0.023$
Following day	0.39 (0.16)	0.50 (0.50, 0.69)	
Fever			
Non-eruption	0.02 (0.05)	0.00 (0.00, 0.03)	Non-eruption vs Previous day - $P = 0.042$
Previous day	0.04 (0.08)	0.00 (0.00, 0.09)	Non-eruption vs Eruption- $P = 0.065$
Eruption	0.04 (0.09)	0.00 (0.00, 0.05)	Non-eruption vs Following day- $P = 0.212$
Following day	0.03 (0.05)	0.00 (0.00, 0.07)	
Smelly urine			
Non-eruption	0.06 (0.15)	0.00 (0.00, 0.08)	Non-eruption vs Previous day- $P = 0.011$
Previous day	0.02 (0.06)	0.00 (0.00, 0.22)	Non-eruption vs Eruption- $P = 1.000$
Eruption	0.02 (0.07)	0.00 (0.00, 0.08)	Non-eruption vs Following day- $P = 0.256$
Following day	0.02 (0.08)	0.00 (0.00, 0.06)	
Constipation			
Non-eruption	0.04 (0.14)	0.00 (0.00, 0.00)	Non-eruption vs Previous day- $P = 0.059$
Previous day	0.00 (0.00)	0.00 (0.00, 0.00)	Non-eruption vs Eruption- $P = 0.083$
Eruption	0.00 (0.00)	0.00 (0.00, 0.00)	Non-eruption vs Following day - $P = 0.083$
Following day	0.00 (0.01)	0.00 (0.00, 0.00)	
Number of symptoms			
Non-eruption	1.43 (0.97)	1.20 (0.76, 2.20)	Non-eruption x Eruption- $P < 0.001$
Eruption	2.69 (1.90)	2.00 (1.50, 3.00)	
Total	6.73 (2.31)	7.00 (4.00, 9.00)	

* Bonferroni Correction, $P < 0.016$

CONSIDERAÇÕES FINAIS

CONSIDERAÇÕES FINAIS

Tem sido muito discutida na literatura a preocupação com a integridade física da criança, uma vez que doenças graves podem ser subestimadas devido à ocorrência da erupção dentária (Tighe e Roe, 2007).

Diante da revisão realizada neste estudo, fica evidente que os bebês desenvolvem sinais e sintomas que seus pais e/ou responsáveis atribuem à erupção de dentes decíduos. Uma variedade de sinais e sintomas pode simplesmente coincidir com o período de erupção de dentes.

A dúvida de que a erupção de dentes decíduos possa causar sintomatologia está presente até mesmo em profissionais da área de saúde. Não é raro encontrar a descrição de sintomatologia associada à erupção de dentes em livros texto de Pediatria e Odontopediatria.

No entanto, a crença de que a erupção de dentes decíduos está associada à manifestação de sinais e sintomas pode contribuir para o adiamento da tomada de decisão clínica em casos de doenças de maior gravidade, como gastroenterites, infecções urinárias, meningites entre outras. Além disso, essa crença também pode estimular o uso excessivo de medicamentos em bebês mascarando assim uma sintomatologia que pode ser importante para um diagnóstico preciso.

Este estudo contribui para esclarecer que os sinais e sintomas associados à erupção de dentes decíduos não são graves e também demonstra que a presença de febre não pode estar associada à erupção de dentes. Esse é resultado que deve ser divulgado tanto para a comunidade acadêmica, como também para toda a população.

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APÊNDICE A

CARTA DE APRESENTAÇÃO

Diamantina, ... de 2009.

Prezado Pai/Mãe/Responsável Legal sou Joana Ramos Jorge, aluna do Programa de Pós-Graduação em Odontologia, área de Odontopediatria, da Universidade Federal de Minas Gerais (UFMG). Gostaria que você lesse esse documento com atenção, pois, o objetivo dele é firmar acordo por escrito, mediante a sua autorização para a sua participação e a de seu filho nesta pesquisa.

- Qual é o objetivo da pesquisa?

Estamos querendo avaliar se problemas de saúde geral podem estar associados com a cavidade bucal do bebê.

- Por que estamos realizando esta pesquisa?

Até o momento ainda não podemos afirmar se existe associação entre febre, gripe, diarreia e outros sintomas com a erupção de dentes de leite no bebê. Esta pesquisa é importante para a orientar os médicos e cirurgiões-dentistas durante o atendimento da criança com esses sintomas.

- Como vai ser a pesquisa?

Todos os dias um examinador irá à sua casa para examinar o bebê e você vai responder a umas perguntas sobre o estado de saúde da criança. São respostas que levarão pouco tempo para responder. É importante destacar que não haverá desconforto ou qualquer risco para o seu filho.

APÊNDICE B**TERMO DE CONSENTIMENTO LIVRE E ESCLARECIDO**

Eu, _____,

Pai/mãe/responsável

por _____,

concordo e autorizo a participação de meu filho (a) no estudo “SINAIS E SINTOMAS ASSOCIADOS COM A ERUPÇÃO DE DENTES DECÍDUOS: estudo longitudinal” que será executado pela Mestranda Joana Ramos Jorge, sob orientação do(a) Prof(a). Dr. Saul Martins de Paiva, do Programa de Pós-Graduação em Odontologia, UFMG. Concordo e autorizo com a utilização dos dados coletados desde que seja mantido o sigilo de sua identificação conforme normas do Comitê de Ética em Pesquisa desta Universidade. Autorizo ainda a realização de fotografias dos dentes e da cavidade bucal do bebê, para utilização como material didático para aulas expositivas, apresentação em eventos científicos ou para publicação de artigo em revista científica da área da saúde, nacional e/ou internacional.

Diamantina, ____ de _____ de 2009

Assinatura do pai/mãe/responsável

APÊNDICE C**Formulário 1 – Identificação**

Nome do bebê _____

Nome do responsável _____

Peso ao nascimento (g) _____ Idade (meses) _____

Data de nascimento ____/____/____

Escolaridade da mãe (em anos de estudo) _____ Idade da mãe _____

Endereço _____

Telefone _____

História Médica

Observações durante a coleta de dados

Responsável pela coleta _____

ANEXO A**COEP**

**UNIVERSIDADE FEDERAL DE MINAS GERAIS
COMITÊ DE ÉTICA EM PESQUISA - COEP**

Parecer nº. ETIC 0445.0.203.000-09

**Interessado(a): Prof. Saul Martins de Paiva
Departamento de Odontopediatria e Ortodontia
Faculdade de Odontologia - UFMG**

DECISÃO

O Comitê de Ética em Pesquisa da UFMG – COEP aprovou, no dia 19 de novembro de 2009, após atendidas as solicitações de diligência, o projeto de pesquisa intitulado **"Sinais e sintomas associados com a erupção de dentes decíduos: um estudo longitudinal"** bem como o Termo de Consentimento Livre e Esclarecido.

O relatório final ou parcial deverá ser encaminhado ao COEP um ano após o início do projeto.

A handwritten signature in black ink, appearing to read 'M. T. Marques Amaral', is written over a horizontal line.

**Profa. Maria Teresa Marques Amaral
Coordenadora do COEP-UFMG**

ANEXO B

NORMAS DE PUBLICAÇÃO DO PERIÓDICO *PEDIATRICS*

Author Guidelines

Pediatrics is the official peer-reviewed journal of the American Academy of Pediatrics. *Pediatrics* publishes original research, clinical observations, and special feature articles in the field of pediatrics, as broadly defined. Contributions pertinent to pediatrics are also included from related fields such as nutrition, surgery, dentistry, public health, child health services, human genetics, basic sciences, psychology, psychiatry, education, sociology, and nursing.

The journal, published monthly, has a circulation of 66,000 and is translated into six different languages. Its 2008 impact factor was 4.789.

Pediatrics has been continuously published by the American Academy of Pediatrics since January 1948.

When submitting to *Pediatrics*, authors must attest that the manuscript is being submitted only to *Pediatrics*, that it will not be submitted elsewhere while under consideration, and that it has not been published elsewhere.

When preparing the manuscript for *Pediatrics*, authors must first determine the manuscript type, and then select the appropriate manuscript preparation instructions from the types listed below. Authors must also become familiar with journal style and correct preparation of figures, tables, and multimedia before submitting a manuscript.

Acceptance Criteria

Relevance to readers is of major importance in manuscript selection. *Pediatrics* will consider manuscripts in the following categories: reports of original research, particularly clinical research; review articles; special articles; and case reports.

Generally, all papers will be reviewed by at least two outside consultants who are selected by the editors based on their expertise in the topic of the manuscript.

A report of original research will be judged on the importance and originality of the research, its scientific strength, its clinical relevance, the clarity with which it is presented, and the number of submissions on the same topic. The decision to publish is not based on the direction of results.

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If your manuscript is accepted, the editors reserve the right to determine whether it will be published in the print edition (which includes electronic publication) or only in the electronic edition of *Pediatrics*.

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All aspects of the manuscript (tables, illustrations, and references) should be prepared according to the International Committee of Medical Journal Editors (ICMJE) requirements.

Grammar, Punctuation, and Usage. Grammar, punctuation, and scientific writing style should follow the most current edition of the *AMA Manual of Style*.¹

Author Listing. All authors' names should be listed in their entirety. All authors must clearly present institutional/professional affiliations and degrees held.

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Authors submitting manuscripts or letters to the editor involving adverse drug or medical device events or product problems should also report these to the appropriate governmental agency.

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The title page must include author names, degrees, and institutional/professional affiliations, a short title, abbreviations, keywords, financial disclosure, and conflict of interest. Please include the contact information for the corresponding author (eg, address, telephone, fax, and e-mail address).

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- 2) Drafting the article or revising it critically for important intellectual content; and
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Article length: 3,000 words or fewer

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Structured Abstract. A structured abstract must include headings such as Objective, Patients and Methods, Results, and Conclusions. The objective should clearly state the hypothesis; patients and methods, inclusion criteria and study design; results, the outcome of the study; and conclusions, the outcome in relation to the hypothesis and possible directions of future study.

Introduction. A 1- to 2-paragraph introduction outlining the wider context that generated the study and the hypothesis.

Patients and Methods. A "Patients and Methods" section detailing inclusion criteria and study design to ensure reproducibility of the research.

Discussion. An expanded discussion highlighting antecedent literature on the topic and how the current study changes the perception of a disease process.

Conclusion. A concluding paragraph presenting the impact of the study and possible new research directions on the subject.

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Authors should number figures in the order in which they appear in the text. Figures include graphs, charts, photographs, and illustrations. Each figure should be accompanied by a legend that does not exceed 50 words. Use abbreviations unless these have not been expanded in the text. If a figure is reproduced from another source, authors are required to obtain permission from the copyright holder, and proof of permission must be sent to the editorial office in Burlington, VT, at initial submission. Authors are also required to provide level of magnification for histology slides. Figure arrays should be clearly labeled, preassembled, and submitted to scale according to the width and depth of a journal page (40 picas wide by 56 picas deep). Figure parts of an array should be clearly marked in capital letters in 10-point Helvetica font in the upper left-hand corner of each figure part. Figures should be submitted separately from the text file.

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Tables should be numbered in the order in which they are cited in the text and include appropriate headers. Tables should not reiterate information presented in the Results section, but rather should provide clear and concise data that further illustrate the main point. Tabular data should directly relate to the hypothesis. Table formatting should follow the most current edition of the *AMA Manual of Style*.

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