

# Does breastfeeding position influence the onset of nipple trauma?\*

A POSIÇÃO DE AMAMENTAR DETERMINA O APARECIMENTO DO TRAUMA MAMILAR?

¿LA POSICIÓN DEL AMAMANTAMIENTO DETERMINA LA APARICIÓN DEL TRAUMA DEL PEZÓN?

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## ABSTRACT

The aim of the study was to identify the breast feeding position and holding variables related to nipple trauma. This case-control study assessed the onset of nipple trauma among women hospitalized at a University Hospital in the city of São Paulo, in 2004 and 2005. Subjects were puerperae diagnosed with unilateral or bilateral nipple trauma. Data analysis was performed using chi-square, Student's t, and odds ratio tests (CI= 95%) and correspondence analysis. Participants were 146 puerperal women and their newborns, being 73 cases and 73 controls. Statistically significant position and holding variables for causing lesions were the following: newborns with their necks bent/contorted, chin away from the breast and lip-related defect (turned inward). Trauma prevention at the beginning of breast feeding is crucial for continuing this practice. Following adequate positioning is decisive for establishing effective and prolonged breast feeding.

## KEY WORDS

Breast feeding.  
Nipples.  
Case-control studies.  
Women's health.  
Obstetrical nursing.

## RESUMO

O estudo buscou identificar as variáveis de posicionamento e pega, durante a amamentação, relacionadas aos traumas mamilares. Estudo caso-controlado que investigou o aparecimento do trauma mamilar entre mulheres internadas em um hospital Universitário de São Paulo, em 2004 e 2005. Os casos foram puérperas com diagnóstico de trauma mamilar uni ou bilateral. Para a análise dos dados, foram aplicados os testes qui-quadrado, t de Student, razão de chances (IC= 95%) e análise de correspondência. Foram estudadas 146 puérperas e seus recém-nascidos, sendo 73 casos e 73 controles. As variáveis de posicionamento e pega, estatisticamente significativas para a ocorrência da lesão, foram: criança com pescoço torcido, queixo longe da mama e lábio inferior virado para dentro. A prevenção do trauma, no início da amamentação, é decisiva para a continuidade desta prática. O acompanhamento do posicionamento adequado é determinante para o estabelecimento da amamentação efetiva e prolongada.

## DESCRIPTORIOS

Aleitamento materno.  
Mamilos.  
Estudos de casos e controles.  
Saúde da mulher.  
Enfermagem obstétrica.

## RESUMEN

El estudio buscó identificar las variables de posición y agarre, durante el amamantamiento, relacionadas a los traumas del pezón. Se trata de un estudio de caso y control que investigó el aparecimiento del trauma del pezón en mujeres, internadas en un hospital Universitario de San Pablo, en 2.004 y 2.005. Los casos fueron puerperales, con diagnóstico de trauma del pezón unilateral o bilateral. Para el análisis de los datos, fueron aplicadas las pruebas chi-cuadrado, t de Student, razón de probabilidades (IC= 95%) y análisis de correspondencia. Fueron estudiadas 146 mujeres en el estado puerperal y sus recién nacidos, siendo 73 casos y 73 controles. Las variables de posición y agarre, estadísticamente significativas para la ocurrencia de la lesión, fueron: niño con el cuello torcido, mentón lejos del pezón de la mama e labio inferior virado para dentro. La prevención del trauma, en el inicio del amamantamiento, es decisiva para la continuidad de esta práctica y el acompañamiento de la posición adecuada es determinante para el establecimiento del amamantamiento efectivo y prolongado.

## DESCRIPTORIOS

Lactancia materna.  
Pezones.  
Estudios de casos y controles.  
Salud de la mujer.  
Enfermería obstétrica.

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## INTRODUCTION

Breastfeeding (BF) is a practice that must be considered as a healthcare promotion strategy, and its interruption requires the understanding of several determining factors. Scientific studies have pointed out that exclusive maternal breastfeeding is the best nourishment infants can receive; besides contributing to biological and emotional development<sup>(1)</sup> it provides protection against infections during the first year of the infant's life, and decreases the incidence of chronic diseases in adult life<sup>(2)</sup>.

Studies carried out in urban Brazil showed that the prevalence of exclusive breastfeeding is quite below the recommendation, indicating that only 53.1% of infants aged 0-30 days were exclusively fed with maternal milk; from this point in time on, there is a drastic index reduction to 21.6% for infants between 91-120 days, and to 9.7% between 151-180 days, with average length of 23 exclusive maternal breastfeeding days and 296 non-exclusive maternal breastfeeding days<sup>(3)</sup>.

In the State of Sao Paulo, the exclusive maternal breastfeeding index in infants in their first four months of life showed levels that reached just over 30%. The indicated risk factors for this status were: lack of maternal education, poor access to the Children's Friend Hospital Program, primiparity, and precocious motherhood<sup>(4)</sup>.

These results partially match a study performed in a maternal breastfeeding ambulatory care center which assisted 100 women and children in the period between October 2001 and July 2003, examining the same above-mentioned characteristics. In that case, exclusive maternal breastfeeding was

present around the third and fourth months in only 36% of women<sup>(5)</sup>. When the first postnatal consultation is performed, on average between the seventh and the tenth day of the infant's life, 23% of them were already receiving water, tea, or artificial milk. Besides these identified occurrences, others also contributed to weaning processes, among them nipple trauma and the use of pacifiers<sup>(5)</sup>.

Nipple trauma can be defined as a condition of discontinuity of the nipple or areola that is caused by fissure, scrape, erosion, lacerations, and vesicles, thus hampering the breastfeeding process as a result of discomfort and pain<sup>(6)</sup>.

The list of researched causes of nipple trauma occurrence identifies socio-demographic characteristics related to pregnancy, condition of the breasts, type of delivery, neonatal factors, and breastfeeding<sup>(6)</sup>.

It is worth highlighting that the baby's positioning and attachment to the breast during breastfeeding are fundamental aspects towards the occurrence of different sorts of trauma; however, very few studies endorse this fact<sup>(4,7-9)</sup>. Improper suction is also described as a source of trauma; if corrected, it can become a protective factor<sup>(9-14)</sup>.

As per the characteristics of the correct breastfeeding position, the infant's body has to be close to and directed at the mother, his buttocks must be supported, his head and body must be aligned with the mouth, on the same horizontal line to the breast, facing the areola<sup>(9,15)</sup>(Figure 1). The correct attachment to the nipple-areola region is an important step to trigger the breastfeeding process. The infant's lips must be turned outwards, his mouth wide open, round cheeks, and the chin must touch the mother's chest<sup>(7)</sup> (Figure 2).



**Figure 1** - Correct infant position at breastfeeding.



**Figure 2** - Correct infant attachment at breastfeeding.

Efficient suction is directly related to a satisfactory attachment, and this action can certainly prevent breastfeeding trauma, dental arch wire alteration, mouth breathing syndrome, atypical swallowing, and phonoarticulatory alterations<sup>(16)</sup>.

As we believe that preventive actions are able to contribute to the minimization of breastfeeding abandonment, the basis of this investigation was to identify the factors related to the infant's position during breastfeeding and nipple attachment to the development of nipple trauma.

## **OBJECTIVE**

Identify the variables related to position and attachment during the breastfeeding process related to the emergence of nipple trauma.

## **METHOD**

This is a control case, epidemiologic-based study that allows for the recognition of exposures to researched and identified risk factors suspected of being related to the condition of nipple trauma. The initial phase deals with the identification and selection of subjects; next, it sets comparable controls.

The present study analyzed unilateral or bilateral nipple trauma during the puerperium, the first week after delivery, and maternal breastfeeding. The study considered that women who presented a skin discontinuity in the nipple-areola region<sup>(6)</sup> displayed nipple trauma. Lack of unilateral or bilateral trauma was considered to be the selected control group, aiming at being similar to the cases, with regards to age and puerperium day, thus preventing the promotion of confusing factors. One control was selected for each case.

All mothers in the puerperal stage and their newborns hospitalized in the nursing wards of an Obstetrics Unit in the period between September 2004 and May 2005, and who were breastfeeding, were included. The following women were excluded from the sample: those who were breastfeeding more than one child; those whose children displayed persistent suction and nipple attachment difficulties; those whose children presented malformation in the palatal and tongue regions; and those women who were breastfeeding with only one breast (unilateral mastectomy).

Therefore, the study population was comprised of 146 binomials (mother-child), comprising 73 cases and 73 controls.

Data collection commenced immediately following the study's approval by the Ethics Committee in Research of the Federal University of Sao Paulo (CEP #0785/04), and the signing of the Consent Form by participants. Potential participants were identified daily, and those who could participate in the research were selected. Interviews were carried out for the purpose of data collection of the mothers' characteristics (age, education, pregnancy, parity, day of puerperium, and type of delivery), and also the characteristics of the researched infants (gender, weight at delivery, and gestational age). The variables related to the breastfeeding position were: mother's position; infant's position in relation to the mother; infants' position; infants' chin in relation to the mother's breast; infants' mouth; infants' lower lip; infants' tongue; infants' mouth position in relation to the nipple; infants' suction and swallowing<sup>(16)</sup>. For this assessment, an expert observed one-time breastfeeding episodes, observing them from the beginning through the end or via spontaneous interruption. A specific form, especially built for this study, recorded all pertinent data.

Chi-Square and Student's t-tests were applied in the statistical analysis. In order to certify whether or not statisti-

cally meaningful analyses ( $p \leq 0,05$ ) between possible factors and the nipple trauma were present, the univariated analysis calculated the ratio of chances (intervals with 90% reliability) and correspondence analysis toward the conjoint association among variables related to the breastfeeding position presenting traumas.

## RESULTS

The study included 146 mothers and their respective newborns, divided into 73 cases and 73 controls. On average, women were 26 years old ( $p=0.591$ ; SD 6.0), having eight years of formal education ( $p=0.263$ ; SD 2.7), and were on the second day after the delivery. As per obstetrical data, 32% were primigests ( $p=0.215$ ), 35% were primipara ( $p=0.385$ ), and 64% had a vaginal delivery ( $p=0.002$ ). In addition, 52% were males ( $p=0.508$ ) and 92% were born at term ( $p=0.347$ ).

Regarding the binomial 'positioning during breastfeeding', the following was observed: mother with tense should-

ers and/or bending over the infant ( $p=0.501$ ); and distance between infant and mother ( $p=0.071$ ). These variables were not statistically meaningful for the emergence of the lesion. However, the misaligned infant position was statistically very significant to the development of nipple trauma ( $p=0.047$ ).

As for the aspects related to nipple attachment, the following variables were observed: infant's narrow mouth, placed forwards ( $p=0.863$ ), fast suction ( $p=0.319$ ), and non-audible swallowing ( $p=0.596$ ) were not statistically significant to the occurrence of nipple trauma. Whenever an infant presented the chin placed far away from the breast, and the lips facing inwards, these situations provided some explanation for the trauma, as they were quite significant ( $p$  respectively=0.444 and 0.001).

After the univariated analysis of data, the odds ratio and the respective intervals were estimated, showing a 95% reliability status (Table 1).

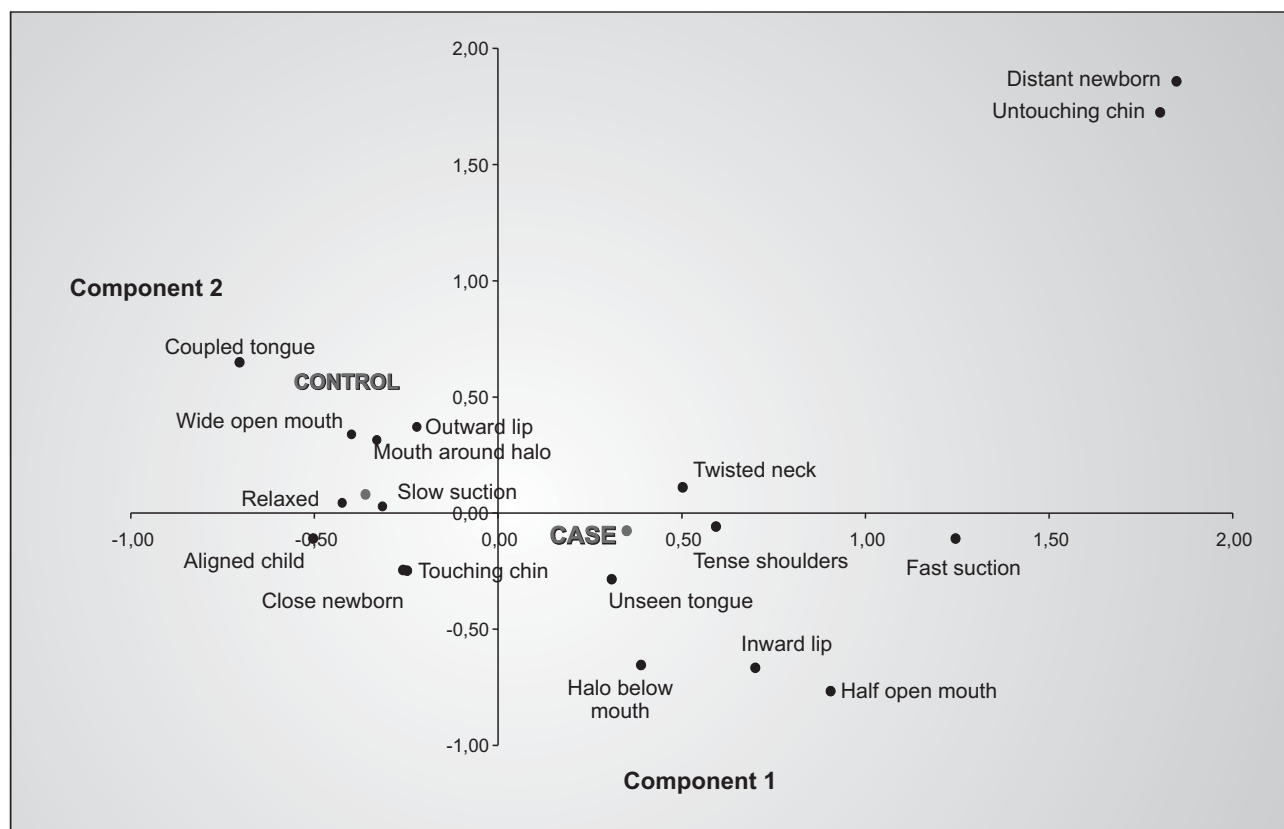
**Table 1** - Results of the associations between nipple trauma, binomial positioning, and nipple attachment showing the odds ratio, respective reliability intervals, and descriptive p: case study-group control - Sao Paulo, 2006

Variable	Case	Control	p	OR	CI (95%)
<b>Mother's positions when breastfeeding</b>					
Correct	41	45			
Incorrect	32	28	0.501	1.254	(0.648 2.428)
<b>Infant's position in relation to mother</b>					
Correct	61	68			
Incorrect	12	05	0.071	2.675	(0.891 8.030)
<b>Infant's position</b>					
Correct	31	43			
Incorrect	42	30	0.047*	1.942	(1.006 3.749)
<b>Infant's chin</b>					
Correct	60	68			
Incorrect	13	05	0.044*	2.947	(0.992 8.749)
<b>Infant's mouth</b>					
Correct	48	54			
Incorrect	25	19	0.279	1.480	(0.726 3.017)
<b>Infant's lower lip</b>					
Correct	38	60			
Incorrect	35	13	0.001*	4.251	(1.998 9.047)
<b>Infant's tongue</b>					
Correct	17	27			
Incorrect	56	46	0.071	1.934	(0.940 3.978)
<b>Areola observation</b>					
Correct	46	47			
Incorrect	27	26	0.863	1.061	(0.540 2.883)
<b>Infant's suction</b>					
Correct	56	60			
Incorrect	17	12	0.319	1.518	(0.666 3.460)
<b>Infant's swallowing</b>					
Correct	64	66			
Incorrect	09	07	0.596	1.326	(0.466 3.773)

\* Statistic significance

Women whose infants presented a twisted neck while breastfeeding, with their chin distant from the breast, and their lower lip facing inwards had 1.942 times (CI 95%= 1.006 to 3,749), 2.947 times (CI 95%= 0.992 a 8.749), and 4.251 times (CI 95%= 1.998 to 9.047), respectively, the risk of developing nipple trauma when compared with mothers whose infants lacked these characteristics.

In the association analysis, the research observed that the mothers' characteristics regarding nipple trauma were: mother with tense shoulders and/or bent over the newborn; infant's twisted neck; unseen newborn's tongue; infant displaying rapid suction; infant's lower lip facing inwards, and infant's narrow mouth; another feature was a larger proportion of the areola below the newborn's mouth (Figure 3).



**Figure 1** - Analysis of factor correspondence associated with nipple trauma concerning infant's positioning and nipple attachment during breastfeeding: case study-control - Sao Paulo, 2006

## DISCUSSION

The study allowed for the identification of factors associated with breastfeeding positioning and attachment that can contribute to the occurrence of nipple trauma.

Nipple lesions were present up to the 6<sup>th</sup> day after delivery, emerging on average on the second day. The main objective of this variable was to make possible the opportunity for every control to eventually become a case. Thus, all mothers in the group had the risk of developing nipple lesions. Results confirmed what literature has shown: the period of occurrence of nipple trauma is located in the first post-delivery week<sup>(6)</sup>.

As per the educational level of the studied women, the research observed that both groups had, on average, eight years of formal education. Therefore, in the present investigation, the educational level was not significant for the development of nipple lesion. Some authors believe that a

higher educational level enhances the chance of successful breastfeeding, inferring that the act is not instinctive, but is instead a practice that can be learned<sup>(17)</sup>.

Regarding the number of gestations, we did not find any study that corroborates their direct relation to nipple trauma. This study identified a greater proportion of primigests displaying nipple lesion (57.4%). As per parity, the largest incidence of nipple trauma has been found in primiparae women, which may be explained by inexperience in breastfeeding technique<sup>(18)</sup>. The present study observed that 54.9% of primiparas presented nipple lesion, while 45.1% of them (multiparas) did not.

As per the type of delivery, some studies identify a larger incidence of nipple trauma in women who had a caesarean delivery<sup>(15)</sup>. It is believed that this occurs because the pain and the 24-hour rest after delivery hamper the adequate positioning of the infant during breastfeeding. Added to that is the fact that women receive anesthetic medicine

that can influence the infant's suction behavior<sup>(19)</sup>. Nowadays, some recommendations such as early walking, encouragement of different breastfeeding positions, and precaution regarding the type and dosage of anesthetics are more favorable to breastfeeding.

Regarding neonatal characteristics, it has been observed that male infants display a more vigorous suction, according to reports from mothers and references given by some studies. However, in this assessment, there was no difference noted between the studied groups. Such results were corroborated by another study<sup>(20)</sup>. The studied infant's weight was, on average, 3.100 grams (109,3493 ounces), both for the control and the case groups. As per the gestational age, a study identified that the major incidence of traumas takes place in mothers of 37-40 week newborns<sup>(18)</sup>; nonetheless, opposite results were observed in mothers of premature newborns. Premature newborns can display less strength in sucking, resulting in less nipple tissue being taken in, as well as the postponement of the first breastfeeding episode, due to the need for clinical stabilization<sup>(20)</sup>. However, this study did not identify any difference between the groups.

As per the breastfeeding assessment, the position of mother and infant, nipple-areola attachment, suction, and swallowing were analyzed. It is obvious that the breastfeeding experience must be comfortable to both the mother and the baby. The mother has to be relaxed, having her back straight, so that she can sit or lie down. Regarding the baby's position, his head must be horizontally aligned with his body, next to the mother's body and facing her breast<sup>(16)</sup>.

As per the binomial reference during breastfeeding, it was observed that inadequate positions of both mother and child were not statistically meaningful for the emergence of the lesion. In terms of infants with twisted necks, results were significant when a comparison between the groups was performed. Women whose infants were incorrectly positioned had 1.942 times the risk (CI 95%= 1,006 to 3,749) of developing trauma when compared with women whose infants were correctly positioned.

For a correct attachment to happen, the mother has to place the infant's lips on the nipple, aiming at stimulating reflexes of rooting, searching, and attaching. Next, she must draw the infant's head close to the breast. The infant has to attach to the entire nipple-areola region, in such a way that his mouth is kept wide open, with the chin touching the breast, the lower lip facing outwards, the tongue covering the gum, and placing the upper part of the mouth, more than the lower, on the nipple, so that part of the areola can be seen. Tight lips facing forwards indicate incorrect attachment<sup>(16)</sup>. In this study, the half open mouth, unseen tongue, and areola below the mouth were not significant to the occurrence of the trauma.

Regarding the infant's chin position, results were statistically significant ( $p=0.044$ ), indicating that it should be con-

sidered as a relevant factor toward the occurrence of nipple lesion. Results also showed that mothers whose infants were positioned in such a way that their chin did not touch the breast had 2.947 times (CI 95%=0.0992 to 8.749) the risk of developing trauma, when compared with those infants who were correctly positioned.

As per the infant's lip position, authors point out that during the attachment process to the breast, the infant's lower lip must face outwards, thus characterizing a correct attachment<sup>(16)</sup>. Lower lip position during breastfeeding was statistically meaningful ( $p=0.001$ ), showing that 72.9% of infants whose mothers belonged to the case group had their lower lip facing inwards. It can also be observed that the mother whose infant's lip was incorrectly positioned displayed 4.251 times (CI 95%=1.998 to 9.047) the risk of developing trauma, when compared with those whose infants presented lips facing outwards.

During breastfeeding, suction is slow and deep and swallowing can be seen and/or heard. When the infant displays rapid suction and produces loud *sucking* noises, it signals that the technique is incorrect<sup>(16)</sup>. A non-sufficient suction is recognized as a factor that predisposes mothers to nipple trauma<sup>(18)</sup>. The *suction* variable was not significant in this study when compared with literature's results.

Regarding the *swallowing* variable, it was not identified to be analyzed along with the *suction* variable, since it does not have any relation to the nipple trauma occurrence. The achieved results did not show any statistically meaningful difference. Although these variables were not significant, they were close to the limit for the trauma emergence identification level. When analyzed as a whole, these results point to the need for implementing other investigative actions.

The correspondence analysis allowed for the evaluation of the behavior of the *positioning* and *attachment* variables towards the lesion development. Mothers and their respective babies presented inadequate characteristics regarding breastfeeding observation; on the other hand, the control binomial displayed some adequate characteristics during breastfeeding (Figure 3).

These findings allow for the identification of relevant aspects that corroborate literature data concerning intervention factors towards precocious weaning, thus contributing to clinical practices.

## CONCLUSIONS

Taking the results into consideration, it is possible to conclude that the *infant's position – twisted neck, infant's chin distant from breast, and infant's lip facing inwards* variables were statistically significant to the development of nipple trauma. Observing the infant's positioning at the onset of breastfeeding may be a preventive factor and should be the normal practice.

Moreover, obtained results allow for the identification of scientific subsidies that ground the breastfeeding technique, thus preventing nipple trauma, appointed as being responsible for countless precocious weaning cases.

Bearing the above-mentioned research in mind, the importance of observing and counseling mothers during the breastfeeding process should be highlighted as an integral part of women's health care.

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