

# How to burp an infant – a prospective comparative pilot study on four different methods

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## Abstract

**Objective:** To compare the effects of four methods of infant burping.

**Patients and Methods:** A prospective systematically allocated comparative pilot study performed by a physician on paternity leave on two healthy twin girls. Burping was attempted with one of four different methods, each applied every fourth day; 1. Supported sitting, 2. Sitting with gentle rocking, 3. Supported with the chest against the investigator's shoulder, 4. The shoulder position with gentle patting on the infant's back. Outcome measures were burping, time to burping and vomiting.

**Results:** Of 660 attempts over 52 days, 493 (74.7%) resulted in burping. No significant difference in the rate of burping was found between the four methods ( $p=0.198$ ). Time to burping was significantly different between the groups ( $p<0.01$ ), with the sitting method resulting in the shortest average time to burping of 89.5 seconds. The shoulder positions resulted in significantly higher frequency of moderate to large amount vomiting compared to the sitting positions (19.8% vs 11.5%,  $p<0.01$ , OR 1.90, 95% CI 1.16 to 3.14).

**Conclusions:** No significant effect of position on the likelihood of burping was found. Using the sitting position appears to be the fastest way to induce burping and may prevent moderate to large vomiting in one out of twelve episodes compared to a shoulder position. Although statistically significant, this difference is unlikely to be of clinical relevance for healthy infants. Further studies on the effects of different methods of burping are needed on infants suffering from gastroesophageal reflux, failure to thrive or dehydration.

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**Abbreviations used:** OR - Odds Ratio, AIDS - Acquired Immune Deficiency Syndrome.

## Introduction

To burp an infant after feeds is widely regarded as an essential part of infant care. Instructions on this are commonly included in educational material for new parents and believed to decrease the chance of vomiting and improve the infant's sleep.<sup>[1]</sup> Most experienced parents of young children likely agree with this, having experienced the hassle of dealing with a fussy child and cleaning up excessive vomit if this important step of infant feeding is omitted.

Infant colic, characterized by paroxysmal and excessive crying, is a common and significant source of infant and parent stress.<sup>[2]</sup> Colic is often believed to be caused or worsened by excess intestinal gas, and multiple types of infant bottles have been patented and marketed with the aim of reducing intestinal gas and colic symptoms.

On an even more serious note, nearly one in every five child deaths in the world today is believed to be caused by dehydration from gastroenteritis, a total of at least one million children every year. This is more than the mortality from AIDS, malaria and measles combined. Besides that, about 20 million children are suffering from malnutrition which is linked to over one third of all child deaths.<sup>[3]</sup>

Given the above issues, it is clearly important that every aspect of infant feeding is studied in detail. When the author of this paper assumed responsibility for infant burping after the birth of the family's first child, it was surprising to find no scientific studies at all on the optimal method of how to perform this task. It is apparently not known if burping really has any significant effect on infant colic, sleep, weight gain or other indicators of infant wellbeing. For infants fighting malnutrition, gastroenteritis and dehydration, no studies have been done on the optimal way to induce burping or to assess if correct burping can lead to a decrease in the frequency and volume of vomiting.

Presented here is the first known study on the effect of different methods to induce infant burping after feeds.

## Patients and Methods

This is a prospective systematically allocated comparative pilot study on the effects of four different methods to induce infant burping. The study subjects were fraternal female twins born by cesarian section at 37 weeks and 4 days gestation. They had been developing normally intrauterine and postnatally, gaining weight at or above normal growth charts and reaching age appropriate milestones. All immunizations were up to date, and they had no known medical problems.

At the start of the study the infants were breastfed twice daily in the mornings and evenings. During the day they were fed

formula (Gerber® Good Start® or Enfamil®) in a semirecumbent position using NUK® bottles with size 2 silicone nipples. As the study progressed, breastfeeding was decreased and stopped, and they received gradually increasing proportion of cereal.

Induction of burping was attempted after a minimum feed of 80 ml. Study measurements were not done after breastfeeding to ensure the minimal amount of feeding volume before burping was attempted. Four different methods were used to induce burping;

1. Sitting position - infant supported upright in a sitting position
2. Sitting and rocking position - the same basic sitting position but with added gentle rocking back and forth and to the sides, attempting to move a gas bubble in the stomach to the gastroesophageal junction.
3. Shoulder position - infant held with its chest against the investigator's shoulder,
4. Shoulder position with patting - the same shoulder position as above but with added gentle patting on the back.

The choice of methods was aimed at obtaining data to compare the sitting to the shoulder positions, and to see if gentle rocking in the sitting position and gentle patting on the back in the shoulder position would have any additional effect. Each method was applied to all feedings for a full day, so each method was used every fourth day. The induction of burping was considered unsuccessful if no burping had occurred in 5 minutes.

All these techniques have been randomly applied by the investigator to induce burping by the twins in their first five months of life, on the investigator's previous two children and in his family for generations. The study did involve adopting or stopping any methods to induce burping or pose any risk for the infants.

The primary endpoint of the study was successful induction of burping within 5 minutes, with time to burping and amount of vomiting as secondary endpoints. Vomiting was classified as none, minimal, moderate, or large amount.

The results were analyzed by chi-square, t-test and analysis of variance using OpenEpi 2.3.1<sup>[4]</sup>

## Results

The study period was 52 days, from the infants' age of 5 months to almost 7 months. During this period the weight of infant A increased from 4990g to 6010g and that of infant B from 6351g to 7172g with neither having any episodes of gastroenteritis or fever.

A total number of 660 attempts at burping were made, averaging 6.3 per infant per day. Burping was successfully induced 493 times (74.7%), in 237 of the 316 attempts for infant A (75.0%), and in 256 of the 344 attempts for infant B (74.4%).

Attempts at burping were most successful in the sitting with rocking position, occurring in 79.9% of attempts but least successful in the shoulder position without back patting where 66.3% of attempts resulted in burping. (Figure 1)

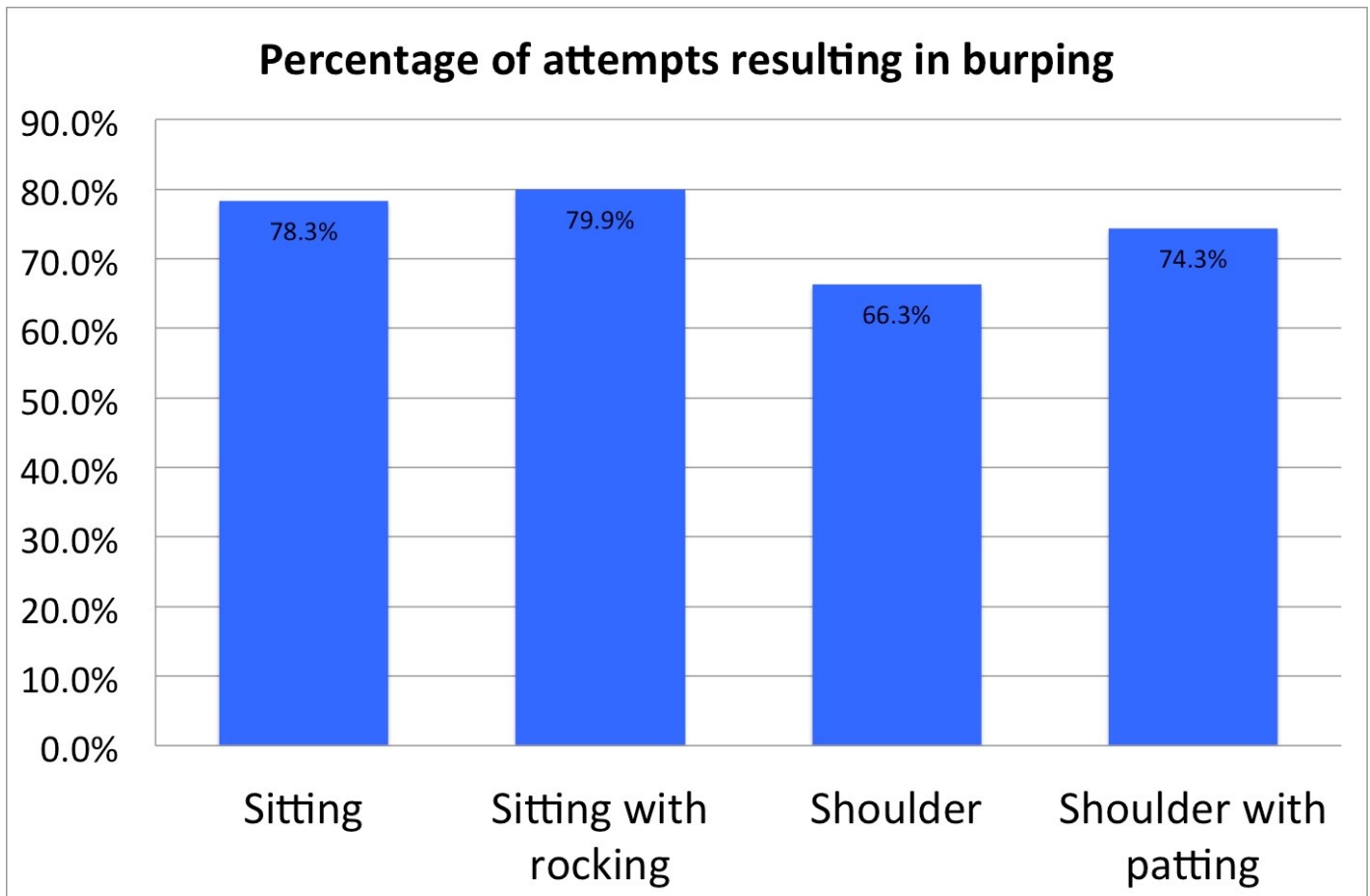


Figure 1. Percentage of attempts resulting in burping

When comparing the different methods to induce burping, there was no significant difference in the success rate between the four groups ( $p=0.198$ ) or when comparing only the two sitting positions (78.3 vs 79.9%,  $p=0.73$ , Odds ratio 0.91, 95% Confidence Interval 0.53 to 1.55) or the two shoulder positions (66.3 vs 74.3%,  $p=0.11$ , OR 0.68, 95% CI 0.42 to 1.10).

When looking at time to burping, analysis of variance revealed a significant difference between the four methods ( $p < 0.01$ ). The sitting method was the fastest averaging 89.5 seconds (95% CI: 76.1 to 103.0) and the sitting with rocking method being the slowest averaging 125.8 seconds (95% CI: 111.9 to 139.7). When looking only at the sitting positions, adding the rocking motion significantly delayed burping on average 36 seconds ( $p<0.01$ , 95% CI 16 to 54 sec). In the shoulder position, adding gentle patting on the back only decreased the average time to burping of 5.5 seconds, from 113.0 to 107.5 ( $p=0.60$ , 95% CI -15.5 to 26.5 sec). Figure 2 illustrates the median, interquartile range, and 5th and 95th percentiles of time to burping.

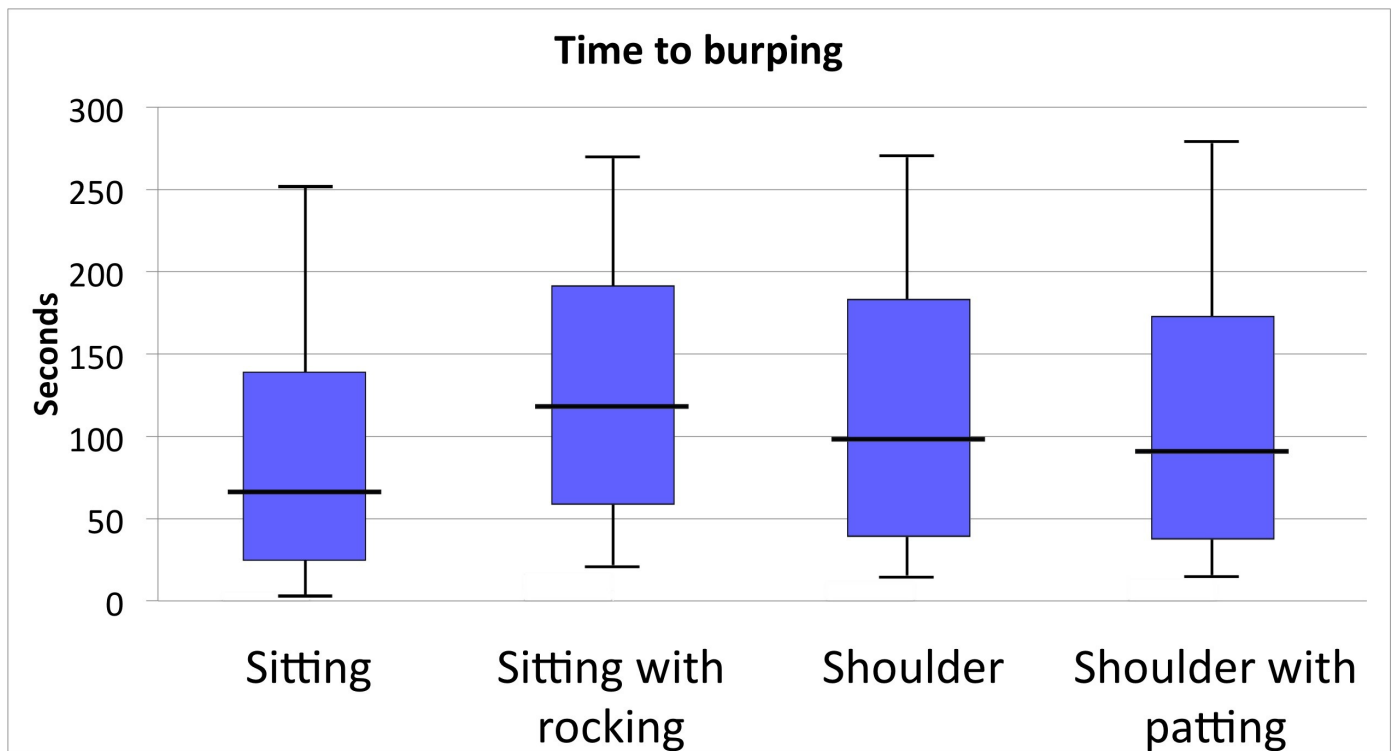


Figure 2. Time to burping

No vomiting occurred with 343 of the 493 burps (69.5%), 74 (15.0%) resulted in minimal vomiting, 58 burps (11.8%) in moderate and 18 (3.7%) of the burps resulted in large volume vomit. (Figure 3) Burping resulted in significantly higher frequency of moderate to large amount vomiting in the two shoulder versus the two sitting positions (19.8 vs 11.5%,  $p < 0.01$ , OR 1.90, 95% CI 1.16 to 3.14). A similar effect was also found when looking only at large volume vomiting which occurred in 6.5% of the episodes of burping in the shoulder positions versus 1.1% in the sitting positions. ( $p < 0.01$ , OR 5.95, 95% CI 1.70 to 20.8) Vomiting of any amount occurred more frequently in the first half of the study compared to the later half (37.1 vs 23.1%,  $p < 0.01$ , OR 1.96, 95% CI 1.32 to 2.91)

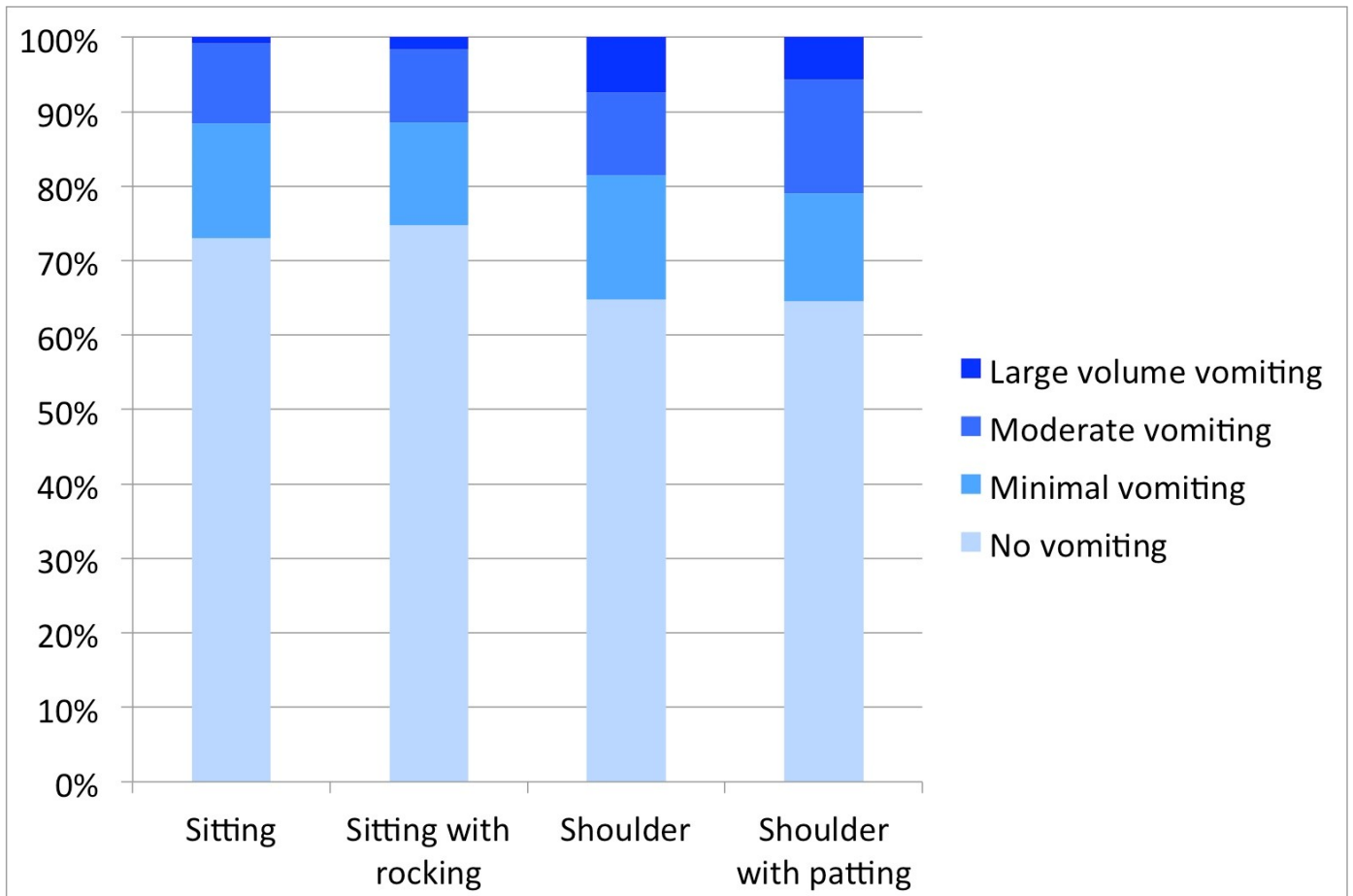


Figure 3. Amount of vomiting associated with burping

## Discussion

No significant effect on the success of inducing burping could be found in this study among the four methods compared. In the shoulder position, there was a trend towards the addition of gentle patting on the infant's back increasing the chance of burping.

The moderate effect of the different methods on time to successful burping is unlikely to be of major significance. It appears that the idea that a gentle rocking motion in the sitting position would increase the chance of an air bubble escaping through the gastro-esophageal junction does not hold true, this only delayed burping.

The effect of different burping methods on vomiting warrants further research. This study indicates that using a sitting position compared to a shoulder position has the potential to eliminate a moderate to large volume vomiting with loss of feeds in one out of every 12 episodes of feeding. This effect was found to be statistically significant and may be of some clinical significance for dehydrated infants, but it is unlikely to be of clinical significance for a healthy infant's wellbeing or the work of laundry for parents. When looking only at the first half of the study, vomiting was significantly more common than in the later half. In the investigator's experience vomiting was even more common and voluminous in the first months of the twins' life. It is therefore possible that a more pronounced effect of burping techniques on vomiting could be found if this study is had been done earlier in the twins' lives.

The shoulder position had the infants leaning slightly more forward and with a mild pressure of their own weight on the front of their chest and upper abdomen. It is likely that this explains the increased frequency of vomiting in the shoulder positions.

It remains to be addressed if different methods of feeding and burping have any effect on vomiting and well being of infants suffering from colic or gastroesophageal reflux. More importantly, it needs to be studied if using an optimum method for burping is of any clinical importance to infants with a failure to thrive or who are suffering from malnutrition, and if this actually has any effect on morbidity and mortality from gastroenteritis and dehydration.

There are significant limitations to this study, done on only two fraternal twin Caucasian girls. Further research on larger groups, infants of other races or male gender, using other types of formulas or feeding methods and other techniques to induce burping may lead to different results. The method of quantifying the volume of vomit was crude and more accurate estimates are needed. No attempt was made to assess infant sleep or other means of well-being after the feeds and vomiting after the observation period from the end of feeds to burping was not recorded.

## Conclusion

The investigator's favorite method of burping his twin daughters, based on the experience recorded in this study, is the sitting position without a rocking motion. This appears to be the fastest method to induce burping and least likely to induce vomiting of the four methods tried. Using the sitting position may prevent moderate to large volume vomiting in one out of every twelve episodes compared to using a shoulder position. Although statistically significant, this difference is unlikely to be of clinical relevance for healthy infants. Further studies on the effects of different methods to induce burping are needed on infants suffering from gastroesophageal reflux, failure to thrive or dehydration.

## References

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