



**Karolinska  
Institutet**

**Institutionen för kvinnors och barns hälsa**

**FEEDING THE VERY LOW BIRTH WEIGHT INFANT  
SHORT AND LONG TERM EFFECTS OF TUBE FEEDING METHODS IN  
EARLY POSTNATAL LIFE**

**AKADEMISK AVHANDLING**

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av

**Ann Dsilna Lindh**

Leg. Sjuksköterska

*Huvudhandledare:*

Professor Kyllike Christensson  
Karolinska Institutet  
Institutionen för kvinnors och barns hälsa,  
enheten för reproduktiv hälsa

*Bihandledare:*

Professor Mats Blennow  
Karolinska Institutet  
Klinisk vetenskap intervention och teknik,  
enheten för pediatrik

Professor Hugo Lagercrantz  
Karolinska Institutet  
Institutionen för kvinnors och barns hälsa  
enheten för neonatologi

Professor Lars Alfredsson  
Karolinska Institutet  
Institutionen för miljömedicin, enheten för  
kardiovaskulär epidemiologi

*Fakultetsopponent:*

Docent Lars Wallin  
Karolinska Institutet  
Institutionen för neurobiologi och  
vårdvetenskap

*Betygsnämnd:*

Docent Christine Rubertsson  
Uppsala Universitet  
Institutionen kvinnors och barns hälsa,  
enheten för reproduktiv hälsa

Docent Claus Klingenberg  
University of Tromsø, Norway  
Department of paediatrics

Docent Nina Nelson  
Linköpings Universitet  
Institutionen för klinisk och experimentell  
medicin, enheten för pediatrik

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# ABSTRACT

**The overall aim** of this thesis was to investigate short term effects of tube feeding methods, continuous versus intermittent bolus feeding in very low birth weight infants on gastro intestinal tolerance and growth and, behavioural responses of stress during feeding in early postnatal life. A further aim was to compare and follow up of longer term effects of these enteral feeding methods on later breastfeeding capability.

**Methods:** Seventy very low birth weight infants, gestational age (GA) 24-29 weeks and birth weight <1200grams, were randomly assigned within 30 hours of birth to one of three feeding methods: continuous nasogastric feeding, bolus nasogastric feeding and bolus orogastric feeding. The intervention continued up until 32 weeks postmenstrual age. At this time point continuous fed infants were transitioned to intermittent bolus feeding and, bolus orogastric infants transitioned to bolus nasogastric. The follow-up phase continued up until six month corrected age or as long as the infants were breastfed.

The assessments comprised gastrointestinal tolerance, assessed by time to achieved full enteral feeding and, bone growth velocity from birth to 32 and 36 weeks which was assessed by knemometer. Behavioural stress responses to feeding were assessed by video-recording at seven and 15 days of postnatal age and at 32 weeks PMA. Follow-ups of the infants' feeding and breastfeeding behaviour were assessed during hospital stay and by structured interviews with mothers at four and six months corrected age. Total length of breast feeding was followed up by telephone contact.

## Results:

The continuous fed infants achieved full enteral feeding significantly faster than the intermittently fed infants (hazard ratio (HR) 1.86; 95 % CI 1.07 - 3.22). In stratified analysis according to birth weight, the improvement was more pronounced in the smallest infants < 850 grams, (adjusted HR 4.13; 95 % CI 1.48 - 11.53). Growth rate was significantly faster among the continuously fed infants ( $p = 0.002$ ) (I). The bolus fed infants showed a significantly higher risk of a behavioural stress response to feeding compared with the continuous fed infants at 15 days of age, adjusted odds ratio 4.1 (95% CI: 1.1 - 15.4) with a similar result at 32 weeks, adjusted OR 4.2 (95% CI: 1.0 - 17.8). The bolus fed infants showed greater need of behavioural and physiological stabilisation during feeding (II). In the follow-up of infants' breastfeeding capability, the continuous fed infants had a significantly higher probability of feeding themselves directly from their mothers' breast compared with bolus fed infants, at discharge from hospital prevalence ratio (PR) 1.7 (95% CI=1.1 - 2.5), at two months corrected age PR 2.1 (95% CI=1.2 - 3.6) and at four months corrected age 2.3 (95% CI=1.02 - 4.3). The continuous fed infants also breastfed for a significantly longer time period, adjusted HR 6.5 (95% CI 2.8-15.4) ( $p = < 0.0001$ ), and achieved exclusive breastfeeding to a higher extent ( $p=0.02$ ) compared to the bolus fed infants. In infants compromised with severe bronchopulmonary dysplasia (BPD) requiring oxygen treatment after discharge from hospital, capability to transition to exclusive breastfeeding between study groups remained significant ( $p=0.03$ ) (III).

## Conclusion

The results presented in this thesis suggest that feeding methods used in early postnatal life influence both short term and indicate an influence of longer term effects in infants with birth weight below 1200grams and GA at birth 24 to 29 weeks. Continuous nasogastric feeding was found to enhance gastrointestinal tolerance and growth and to decrease behavioural stress in early postnatal life. The results of the follow-up study showed effects on later feeding capability. These results indicate that continuous nasogastric feeding may serve as beneficial for this specific group of very preterm infants. An increased nutritional status is supported by the findings concerning improved enteral tolerance and better growth. The findings concerning reduced stress with less need for direct nursing to ameliorate discomfort may also have influenced improved growth and development. These results during early postnatal life may indicate that continuous nasogastric feeding has a protective and supportive function regarding infants' later feeding behaviour, and thus may explain the findings revealed in the follow up of the infants' breastfeeding capability.

**Key words:** tube feeding, very low birth weight infants, gastrointestinal tolerance, stress, video recording, breastfeeding.