



Sensorimotor therapy and time to full oral feeding in <33 weeks infants☆☆☆



Louma Basma Rustam^a, Saadieh Masri^b, Nathalie Atallah^a, Hani Tamim^c, Lama Charafeddine^{b,*}

^a School of Medicine, American University of Beirut, Beirut, Lebanon

^b Department of Pediatrics and Adolescent Medicine, American University of Beirut, Beirut, Lebanon

^c Clinical Research Institute, Biostatistics Unit, American University of Beirut, Beirut, Lebanon

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ABSTRACT

Background: Previous research has shown that oral stimulation improves feeding skills in preterm infants. However, it remains unclear whether other sensorimotor therapies have similar effect.

Objective: To investigate the effect of sensorimotor therapy on the time to reach full oral feeding (FOF) in infants <33 weeks.

Methods: Retrospective review compared two time periods between 2009 and 2014, before (PRE TX) and after (POST TX) initiation of sensorimotor therapy to infants <33 weeks. Type and number of sensorimotor therapy, time to FOF and length of stay (LOS) were collected. Statistical analysis used SPSS 22 for descriptive, non-parametric testing, chi-square and multivariate linear regression computation.

Results: Of 245 records, 137 were excluded due to death, record unavailability/incompleteness or transfer. The remaining 55 in PRE TX and 53 in POST TX infants differed by small for gestational age (SGA) (36.4% vs. 28.3%, $p = 0.02$); sepsis (81.8% vs. 54.7%, $p = 0.002$); patent ductus arteriosus (PDA) (5.5% vs. 22.6%, $p = 0.01$) and bradycardia (47.3% vs. 83%, $p < 0.0001$). Infants in (POST TX) achieved FOF in 6.3 ± 4.3 days vs. 8.8 ± 6.6 days in (PRE TX) ($p = 0.02$); their LOS was 56.8 ± 26.4 vs. 52.2 ± 25.1 ($p = 0.36$). Predictors of days to FOF were any number of therapy sessions ($\beta = -4.31$; 95% CI: -6.47 – -2.15), LOS ($\beta = 0.05$; 95% CI: 0.004 : 0.09), PDA ($\beta = 3.23$; 95% CI: 0.27 : 6.19) and bradycardia ($\beta = 2.94$; 95% CI: 0.62 : 5.26).

Conclusion: Providing any type of sensorimotor therapy decreased time to reach FOF in infants <33 weeks. Structured guidelines may help optimize this effect.

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1. Background

Over the past decade, the rate of preterm births has been increasing, ranging between 9 and 12% and reaching 18% in certain countries [1]. This amounts to a substantial number of infants who are cared for in neonatal intensive care units (NICU) [2]. This adds burden to the families and society in general, mostly in low and middle income countries where resources are limited and their even distribution is challenging. Preterm infants, especially those who are born before 32 weeks gestation, are at risk of oral feeding difficulties due to immature oral motor skills and lack of sucking, swallowing and breathing coordination [3–5]. Their ability to reach full oral feeding (FOF) contributes to their prolonged hospital stay [6–8]. Measures that have been shown to

improve oral feeding include non-nutritive sucking (NNS), early introduction of oral feeding and effective cue-based oral feeding [9–11].

The emergence of NNS, swallowing and breathing are seen by 10–15 weeks of gestation [12,13]. Premature infants can elicit NNS as soon as they are born while rhythmic coordination of patterned sucking, swallowing and breathing starts developing at around 32 weeks of gestation [14–17]. Therefore, infants born prior to 32 weeks depend on gavage feeding until they achieve a well-coordinated suck-swallow and breathing pattern, in addition to stable behavioral organization and regulated cardiorespiratory status [17].

Many studies have addressed factors associated with transition to oral feeding [18–20]; for example, oral stimulation was shown to improve transition from gavage to independent oral feeding and subsequently resulted in decreased length of stay of preterm infants [18]. Bingham et al. studied the effect of NNS before the introduction of oral feeding and found that infants who practiced NNS were able to reach FOF in less time [21]. Arvedson et al. concluded in a systematic review of 12 studies, NNS with oral or perioral stimulation decreased transition time to FOF, in addition to improved feeding and swallowing physiology in preterm infants <37 weeks [19]. Fucile et al. showed that preterm

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* Corresponding author at: Department of Pediatrics and Adolescent Medicine, American University of Beirut, P.O. Box 11-0236, Riad El-Solh, 1107 2020, Beirut, Lebanon.
E-mail address: lc12@aub.edu.lb (L. Charafeddine).

infants subjected to sensorimotor oral stimulation and tactile/kinesthetic input reached FOF earlier than the control group, however there was no effect on LOS. The opposite has been demonstrated by other research groups who did not find that oral stimulation increased the ability to transition from gavage to oral feeding in a shorter time nor did it shorten the LOS [22]. Bache et al. did not show any difference in time to reach FOF or LOS in preterm infants born between 26 and 33 weeks who received pre-feeding oral stimulation compared to a control group [22]. Similar results were obtained in another study where preterm infants <35 weeks who received NNS for 10 min before feedings were compared to historical control [23].

In this study, we aimed to determine whether the introduction of oral stimulation, psychomotor, occupational and/or physical therapy has decreased the time to reach FOF and LOS in preterm infants <33 weeks of gestation compared to a historical control.

2. Methods

2.1. Study design and setting

This is a retrospective study that took place from January 2009 to December 2014 at the American University of Beirut Medical Center, a tertiary care center in a middle income country. This center is JCI accredited and magnet designated; it provides a variety of inpatient and outpatient services to national and regional patients. The NICU is a level III unit with 22 beds and around 200 admissions per year, of those, around 8% are <28 weeks and 10% are between 28 weeks and 32 weeks with an average LOS of 53 and 30 days respectively. Most of medical doctors working in the unit use predetermined feeding guidelines.

This study was approved by the Institutional Review Board of the American University of Beirut.

2.2. Intervention

Starting in 2011 a team of specialized neonatal therapists, trained in physical, feeding, psychomotor or occupational therapy, started their consultation. Their training consisted of holding a bachelor's degree in their respective fields, in addition to having experience in working

with newborns. Upon the request of the attending neonatologist, the pediatric neurologist along with the therapist would determine the type of therapy needed and its frequency based on infant assessment. Therapy consisted of physical, feeding, occupational and or psychomotor sessions. Physical therapy consisted of ensuring proper body flexion and alignment; feeding therapy worked on improving oral motor skills sucking and swallowing coordination; occupational and psychomotor therapies provide developmentally supportive environment and engage parents in bonding with their infants. All sessions were administered in the unit and were documented in the infant's medical record along with a follow up plan. The team of therapists provided their services at least twice per week and more frequently if needed.

2.3. Procedure

Two separate time periods were reviewed: the first time period, extended from January 2009 to December 2010, represents the period when infants did not receive any type of therapy (PRE TX). The second time period, extended between January 2011 and December 2014, represents the period at which infants received at least one type of therapy (POST TX) during their hospital stay. All available medical records during the two study periods were screened by the authors (SM, LR) and 245 infants were found to be <33 weeks.

Conditions known to interfere with feeding, infants diagnosed with congenital anomalies, neuromuscular disorders, hypoxic ischemic encephalopathy (HIE), seizures, or dependent on gastric tube feeding were excluded. 231 records were reviewed and 108 met the inclusion criteria. Fig. 1 shows the flow diagram of the review process. The information extracted from the medical record were demographic data, respiratory conditions, feeding status, medications, score for Neonatal Acute Physiology II (SNAP II), number of therapy sessions and type of therapy (physical, feeding, occupational and psychomotor), diagnosis and complications.

2.4. Statistical analysis

The sample size was determined based on the literature review of similar studies that reported an average time of 11 days to reach exclusive full oral feeding [20,24,25]. A total of 110 infants' records were

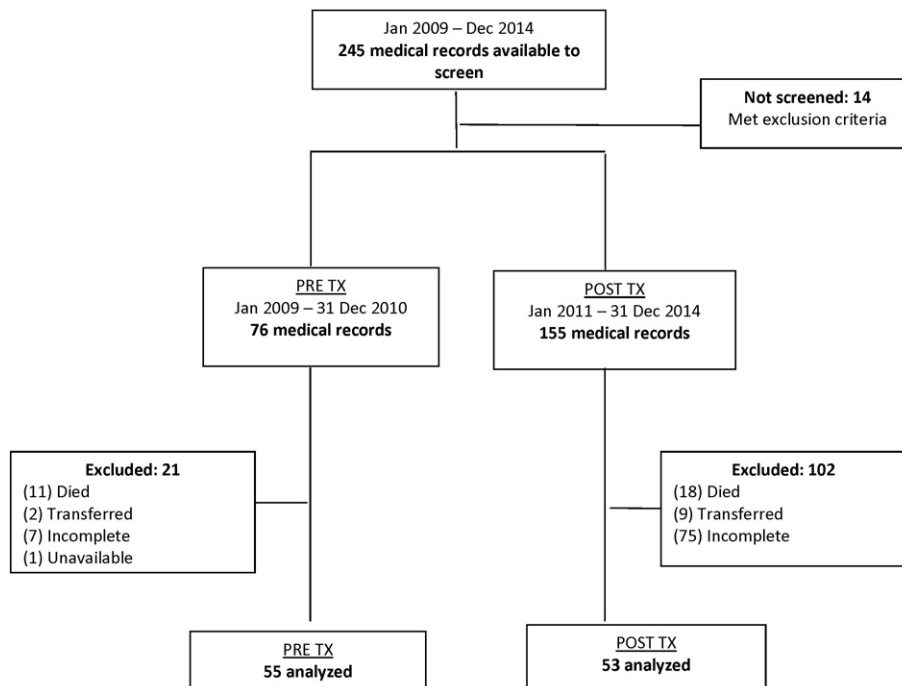


Fig. 1. Flow Diagram of the chart review process.

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