

Massage Therapy in Preterm Infants

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Abstract

Premature infants are at greater risk for long-term growth, health, social-emotional, behavioral, motor and neuro-developmental problems. Progress has been made in the care of preterm infants in the Neonatal Intensive Care Units (NICU) over the last 40 years. More recent research has shown that massage of preterm infants while in the NICU has beneficial effects on growth and neuro-developmental outcomes. The massaged infants have greater weight gain, fewer hospital days, fewer stress behaviors, and accelerated brain maturation; all with no adverse outcomes. Despite all these probable benefits, only one third of NICU's offer massage therapy to their preterm infants or provide information and/or instructions to parents/caregivers about massage therapy for their preterm infants.

The case reported is of 30 weeks 5 days preterm infant who, post discharge at day 54 of life, had parentally administered whole body massage once/day for a minimum of 3/week. The child appears to have accelerated growth on all three modalities with full catch up growth by 6 months of life. This is the first study of its kind to examine the potential benefit of in-home parentally administered message therapy of a preterm infant. This case supports the hypothesis that in-home message therapy may improve the long-term growth outcomes of premature infants. The personal touch provided by this simple low-tech, low-cost, and low risk therapy should be seriously considered for premature infants.

Keywords: Preterm; Premature; Massage; Massage therapy

Abbreviations: NICU: Neonatal Intensive Care Unit; HC: Head Circumference; MT: Massage Therapy

Introduction

The significance of premature birth lies in the high incidence of morbidity and mortality related to prematurity and the impacts of these complications on the infant's survival and subsequent growth and development [1,2].

There has been sharp decline in infant and neonatal mortality, especially gestational-age specific mortality, over the last few decades. This has been attributed to improvements in both obstetric and neonatal intensive care; especially for infants born premature and small for gestational age. In premature infant survivors, there is increased incidence of long-term growth, health, social-emotional, behavioral, motor and neuro-developmental problems. These outcomes are related to the underlying cause of the preterm birth; family and parental risk factors; and the extra uterine environment - including the NICU, home, extended family and community [1-3].

The NICU presents premature infants with a challenging environment—filled with noisy and mysterious equipment, bright lights, unpleasant and painful stimuli - because of the high tech care and the resultant infant's requirement for multiple medical procedures. It is fairly common for the parents of critically ill child to feel weighed down and beset by the technology that they come across in the NICU and to have trouble relating with their newborn infant beneath all the NICU equipment

Current NICU efforts to modifying the premature infant's environment focuses on:

- Restricting noxious stimuli by changing routines and equipment to reduce noise and bright lights e.g. dimming bright overhead lights, coordinating and clustering nursing and physician care [4,5].
- Encouraging positive sensory (rocking, stroking, holding) and acoustic stimuli (mother's recorded voice and lullabies and music).

- Providing nonnutritive sucking (i.e., use of a pacifier for the infant to suck on during tube feeding). This is associated with better feeding and a shorter length of hospitalization.

- Kangaroo care (providing skin-to-skin care by placing the naked infant between the mother's naked breasts). This assist preterm infants with temperature regulation, nutrition, and stimulation [5]. Several studies from developing countries, including a few randomized controlled trials, imply that kangaroo care improves weight gain (an additional 3.6 grams per day), decreases the incidence of nosocomial (i.e., hospital-acquired) infections, and reduce the incidence of severe illness and respiratory ailment up to 6 months of age. Also care givers who provided kangaroo care were more prone to continue to breast-feeding and were more pleased with the care that their child received in the NICU.

- Moderate pressure massage of physiologically stable premature infants (flexion and extension of the upper and lower limbs (kinesthetic stimulation) and firm/moderate pressure stroking (tactile stimulation)). A number of studies in the last 2 decades have suggested that massage and/or kinesthetic stimulation assists preterm infants with improved weight gain and shortens the length of the hospital stay [1,2,4-17]. The effect of short term (5-10 days) in hospital massage was evident at 6 month follow up. Equivalent results have been shown by using mothers as therapists. Guzzetta et al. have suggested that these infants show accelerated brain maturation as measured by global parameters of electroencephalography. No adverse outcomes have been documented.

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Despite all these probable benefits, only one third of NICU's offer massage therapy to their preterm infants or provide information and/or instructions to parents about massage therapy for their preterm infants [16].

Hypothesis

Massage therapy can be of additional benefit if performed by a parent or caregiver at home following discharge.

Patient Presentation

Baby T was born at 30 weeks +5 days gestation at an emergency Cesarean Section secondary to maternal pre-eclampsia & a non reassuring fetal heart tones. Apgar was 8 & 9 at 1 minute & 5 minutes respectively. He was intubated soon after because of increase work of breathing. He was ventilated for 7 day & then successfully weaned to CPAP for 2 days & then nasal canula with flow of 1 liter/minute. He was initially treated with 7 days of intravenous antibiotics for suspected sepsis. He started oral feeds (fortified breast milk) at day 5 of life & reached his calculated nutritional goal at day 14 of life. He was diagnosed with Necrotizing Enterocolitis at day 22 of life & treated medically. Oral feeds were stopped. Subsequently he was started on oral feeds (Breast milk-not fortified) at day 30 of life. He was diagnosed with culture positive sepsis at day 34 of life & treated with intravenous antibiotics. Oral feeds were again stopped temporarily. He was restarted on oral feeds (breast milk-not fortified) at day 36 of life. He was discharged at day 54 of life.

After discharge, he continued to have breast milk to about 4 months

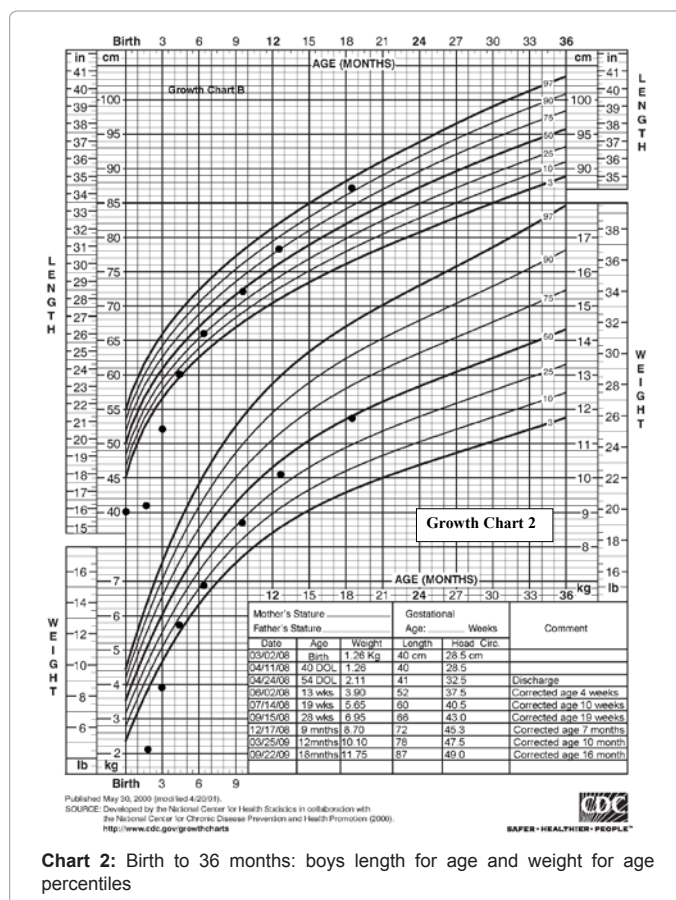


Chart 2: Birth to 36 months: boys length for age and weight percentiles

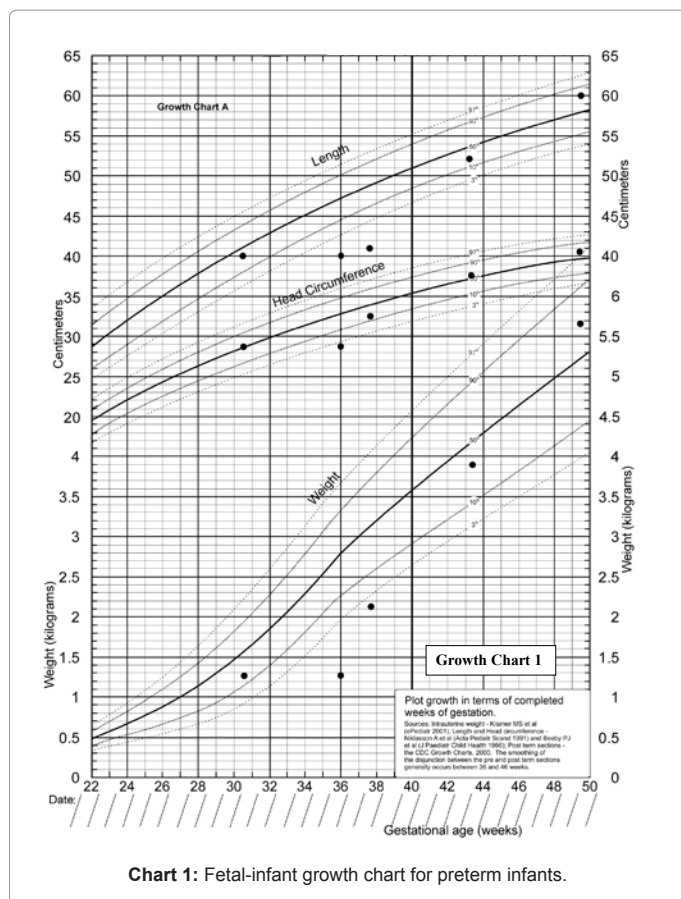


Chart 1: Fetal-infant growth chart for preterm infants.

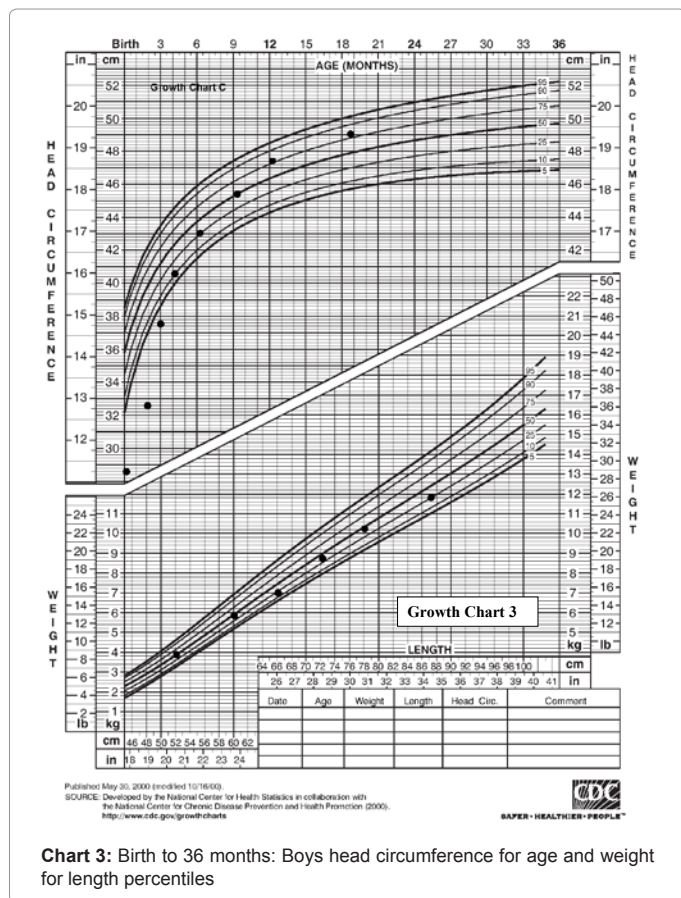
Date	Age (Actual/Corrected)	Weight (Kg)	Length (cm)	Head Circumference (cm)
03/02/2008	Birth	Birth 1.260	40	28.5
		D40 1.260	40	28.5
04/24/2008	Discharge	Discharge 2.110	41	32.5
06/02/2008	13 wks/4 wks			
3 mths/1 mnth	3.9	52	37.5	
07/14/2008	19 wks/10wk			
4 mths/2 mths	5.65	60	40.5	
09/15/2008	28 wks/19 wks			
6 mths/4 mths	6.95	66	43.0	
12/17/2008	9 mths/7 mths	8.7	72	45.3
03/25/2009	12 mths/10 mths	10.10	78	47.5
09/22/2009	18 mths/16 mths	11.75	87	49.0

Table 1: Growth and developmental outcomes.

of life, thereafter formula. He received regular infant care plus whole body massage using Aqueous Cream once/day, a minimum of 3 times per week.

Results

Initially baby T showed no growth (Chart 1)–which reflected how sick the baby had been. Once he was established on oral feeds, reached his goal for oral intake & remained clinically stable, he slowly started to gain weight (Chart 1). At discharge, his weight was below 3rd percentile (10th percentile at birth), his length well below 3rd percentile (10th-50th percentile at birth) & his head circumference at 10th percentile (50th percentile at birth).



After discharge, the growth appears to have accelerated. At 3 months actual age-weight was at 10th-50th percentile, length was at 10th-50th percentile & head circumference was at 50th-90th percentile (Chart 2 and 3). At 5 months actual age-weight was at 50th-90th percentile, length was at 50th-90th percentile & head circumference was at 50th-90th percentile (Chart 2 and 3). Baby T appeared to have reached full catch up growth by 6 months of life (Chart 2 and 3). No other factors appeared to be co-related. Accelerated growth appeared to continue over the next few months (Charts 1-3).

Discussion and Conclusion

There are high rates of long term neuro-developmental and chronic health problems in premature infants. This together with significant emotional, economic, social and psychological costs to the families underscores the need for improved postnatal interventions and neuro-protective strategies that may enhance extra-uterine neuro-maturation and the neuro-development.

The final growth and developmental outcomes for the preterm infant are mainly influenced by the home and community environment [3].

The annual collective economic burden associated with premature birth in the United States was at least \$26.2 billion in 2005 [3]. Many feel that the ideal approach to modify and improve the premature infant's NICU sensory and auditory environment are with positive interventions involving the parents/caregivers, who can simply be trained how to identify and observe their infants for signs of distress or sensory input excess.

Parents/caregivers can employ this approach during their visits, which should provide an ideal chance for them to be involved in their infant's care. This should have a carryover effect to the post-discharge care and should promote the parents/caregivers' concern in providing neuro-developmental support for their premature infant (Table 1).

This novel, one of a kind, case study offers a starting point for hypothesis-testing clinical research and a low tech, low risk, low cost method to improve the long term growth outcomes of premature infants.

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