Neonatal and Preterm Infant Growth Assessment

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KEY POINTS

- Historically, the comparison of infant growth between sites has been difficult because consistent growth metrics have not been established for universal use.
- Infant growth assessments should include serial measurements for weight, head circumference, and length. These changes need to be evaluated with realistic goals that have been set with consideration of the infants' genetic potential, prenatal influences, nutritional history, and systemic illnesses.
- If an infant does not show weight gain or head or length growth parallel to established growth curves after the postnatal weight loss phase, first ensure that nutrition has been optimized, and evaluate for genetic and prenatal factors, social determinants, and biological disruptive factors, such as brain injury and other systemic illnesses.
- All anthropometric measures show normal biological variation, and therefore, an individual with size at an extreme (outside of the 3rd and 97th percentiles) and/or unusual growth rates for short periods of time could be normal for an individual.
- Many infants show brief periods of weight loss or slower weight gain during severe illness. If nutritional intake is appropriate per recommended intakes, then the infant should be assessed, as nutrition is appropriate and no changes would be needed in their care. Achievement of birth percentiles, or achievement of any other specific size, are not appropriate goals.
- Clinical and research needs to assess preterm infant growth differ. Growth assessments are used clinically to understand individuals' growth relative to their individual genetic potential and morbidity status. For research purposes, growth of groups needs to be quantified using meaningful metrics.

INTRODUCTION

Infants born at full term typically take about 3 to 4 months to double their weight. In contrast, preterm infants can double their birth weight in 8 weeks with growth rates per kilogram that are more than twice that of infants born at term gestation.[1,2]

Neonatal researchers and practitioners now recognize that to achieve appropriate growth, preterm infants need to receive adequate nutrients intake throughout their neonatal intensive care unit (NICU) stay. Preterm infants commonly accumulate nutrient deficits during routine NICU care, which prevents them from achieving their growth potentials.[3,4] Growth assessment remains the most important key to assess nutrition adequacy of preterm infants.

Increasingly, there is evidence indicating a strong association between growth and neurodevelopmental outcomes of preterm infants.[5] Slower growth rates during the NICU stay and after hospital discharge

have been associated with adverse outcomes.[5] Although growth at rates similar to intrauterine rates is necessary to achieve good neurodevelopmental outcomes in preterm infants, the attainment of superior growth cannot overcome adversities related to social determinants of health, maternal complications of pregnancy and neonatal morbidities (Table 1). Preterm infants in NICUs face several challenges, such as neonatal stress, brain injury, necrotizing enterocolitis, sepsis and bronchopulmonary dysplasia (BPD). All these challenges can affect growth velocity. Therefore, it is critical to ensure that inadequate nutrition and suboptimal growth do not further contribute to the difficulties that preterm infants may face.

Table 1: Contributors to altered infant growth

Prenatal	Social determinants Maternal health (medical conditions, such as lupus, anemia, clotting problems, hypertension, diabetes, medications, smoking, alcohol, drugs) Infant genetic potential/inherited size Genetic disorders Multiple pregnancy TORCH infection (toxoplasmosis, rubella, cytomegalovirus, human immunodeficiency virus, syphilis) Maternal weight/weight gain
Neonatal/ postnatal	Social determinants of health Infant genetic potential/inherited size Morbidities: brain injury (which includes intraventricular hemorrhage and periventricular leukomalacia), patent ductus arteriosus, bronchopulmonary dysplasia, necrotizing enterocolitis, sepsis Neonatal stress Nutrition (inadequate nutrient intake, limited oral feeding ability)

CLINICAL GROWTH MONITORING

1. Aim to meet nutritional needs for all infants to support their growth.
2. Aim for growth approximately parallel to growth curves. Use the growth patterns of all 3 growth parameters (weight, length, and head circumference) plotted on growth charts to assess growth.[45] "Increasing weight out of proportion to length does not confer developmental benefits" or improve outcomes.[46,47]
3. Do not be concerned about preterm infant body fat proportion at 40 weeks, as it increases only temporarily as a postnatal event in preterm as well as term infants.[26,27,34]
4. Accept variability; remember biological variation: it is normal to see a range of sizes and growth rates. Do not aim to exceed any specific percentile or z-score because any infant's genetic potential is unknown and sizes within and, rarely, even outside of the 3rd to 97th percentiles are normal and expected in a population.
5. Do not aim for a return to the birth weight percentile after the extracellular fluid contraction weight loss.
6. Infants should not be considered growth restricted or failing just because their weight is less than 10th or 3rd percentile between 36 and 40 weeks' PMA.1
7. If nutrition is optimized and growth does not equal intrauterine rates, look for other potential causes (see Table 1).[14,20,38]
8. Do not label children to parents/caregivers as growth restricted, malnourished, stunted, wasted, underweight, overweight, or obese, as labels are not helpful for individuals.[20] It is better when talking with parents/caregivers to instead use less judgmental terms, when necessary, such as "weight is ahead of length" or "length is not as tall as expected."
9. When a child is able to self-feed, respect the child's appetite and satiety[48] and feeding abilities.

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ESITI PROVA IDONEITA' INGLESE

/	COGNOME E NOME	DATA NASCITA	IDONEO /NON IDONEO
1.	ANEDDA LUISA	09/04/1993	IDONEO
2.	BEGHETTI ISADORA	24/12/1990	IDONEO
3.	CARBONI MICHELE	07/12/1990	IDONEO
4.	CASANO SIMONA	14/11/1987	IDONEO
5.	CASSITTA MARIA LUISA FRANCESCA	13/05/1980	IDONEO
6.	CASTI GIORGIA	13/10/1992	IDONEO
7.	CICALO' MARIA ISABELLA	27/09/1991	IDONEO
8.	CONCAS GIULIA	01/03/1990	IDONEO
9.	CONGIU DANIELA	26/10/1984	IDONEO
10.	CORRIAS FRANCESCA	27/02/1986	IDONEO
11.	DE MAGISTRIS ANNA	21/07/1981	IDONEO
12.	DEMURTAS ANNA	13/10/1989	IDONEO
13.	FIGLIOLINI PAOLO	28/07/1986	IDONEO
14.	FRASSETTO ROBERTA	01/08/1989	IDONEO
15.	FURNO MARIA	02/02/1987	IDONEO

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/	COGNOME E NOME	DATA NASCITA	IDONEO /NON IDONEO
16.	GALLO MANUELA	23/11/1990	IDONEO
17.	GIUA MARASSI MARIA LUCREZIA	24/04/1992	IDONEO
18.	IBBA VALENTINA	17/02/1991	IDONEO
19.	MAMELI SIMONE	19/05/1992	IDONEO
20.	MANIGA BARBARA	16/11/1990	IDONEO
21.	MARONGIU ANTONELLA	18/03/1991	IDONEO
22.	MELLINO MARIA LAURA	04/04/1992	IDONEO
23.	MONTECCHIANI VITTORIA	12/06/1986	IDONEO
24.	PALA ELISA	29/11/1992	IDONEO
25.	PARALUPPI VALENTINA	24/04/1989	IDONEO

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/	COGNOME E NOME	DATA NASCITA	IDONEO /NON IDONEO
26.	PINNA GIULIA	10/08/1992	IDONEO
27.	PUDDU FRANCESCA	13/03/1990	IDONEO
28.	SERRA CARLA	21/10/1986	IDONEO
29.	SERRAU GAIA	31/01/1993	IDONEO

Il componente aggiunto della Commissione Dott.ssa Rosangela Vacca

Rosangela Vacca
13.07.2022

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