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Practice Perspectives

Growth Faltering in the Very Young: Implications for Forensic Nurses

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Abstract

Growth faltering (GF), also known as failure-to-thrive (FTT), is a serious health threat in both adults and children that forensic nurses (FNs) may encounter. Children who fail to grow optimally often miss critical developmental milestones due to insufficient nutrition, which is essential for normal child development. GF and FTT are symptoms, not final diagnoses. Therefore, FNs should use critical thinking and assessment skills to identify the underlying causes. This article provides insights into the FNs approach to evaluating a child with GF. It emphasizes the importance of gathering a detailed psychosocial history, assessing growth trends, and considering multidisciplinary referrals when necessary. The aim is to equip FNs with the best practices to address GF, particularly when they are involved as experts in court cases or in situations reported to Child Protective Services (CPS).

Keywords: growth faltering, infant feeding, early childhood nutrition, forensic nursing, child neglect, nutritional assessment.

Growth Faltering in the Very Young: Implications for Forensic Nurses

Growth faltering (GF), also known as failure-to-thrive (FTT), refers to individuals who do not reach expected growth norms, projected growth trajectories based on age, or those who fall behind due to weight loss. The root cause of GF is always insufficient nutrition, and it is the healthcare provider's responsibility to investigate the reasons behind this (Duryea, 2022; Frank & Rogers, 2023; Larson-Nath & Biank, 2016; Vachani, 2023). Common causes include diminished caloric intake, high metabolic demands, or underlying medical conditions that impair nutrient absorption (Tang et al., 2021). The extensive list of potential causes makes the forensic nurse's (FNs) evaluation of GF particularly challenging, especially in cases of suspected child neglect as the possible underlying cause.

FNs often play a pivotal role in assessing allegations of child neglect (Faugno et al., 2022). FNs need skills to differentiate between caregiver neglect and a variety of other medical and social contributors to GF. Understanding the root cause(s) is critical to directing the range of appropriate services that may be needed to support children and families, including in-home support, education, hospitalization, and foster care placement in some cases. This article aims to guide FNs in assessing, evaluating, and managing the care of very young children under the age of three with GF to improve outcomes for children and families.

GF Terminology and Definitions

GF has also been referred to as FTT, weight faltering, undernutrition and growth deficit, among other terms (Duryea, 2022; Goodwin et al., 2023). We use GF to avoid the distressing and stigmatizing connotation of the term "failure." Additionally, GF accurately describes the problem and is the more current terminology (Goodwin et al., 2023). Although GF can occur at any age, it is most concerning for infants and toddlers under the age of three due to its potential negative effects on milestone attainment and brain development, which can be irreversible (De Sanctis et al., 2021).

GF is an appropriate label for any one of the following situations:

- An infant or child with a weight that is less than the 2nd percentile for gestation-corrected age and sex, and a weight velocity that is disproportionate to growth. Weight velocity refers to the rate at which a child's weight changes over a specific period. Weight velocity is typically measured in grams per day (g/day) as outlined in Table 1 (adapted from Kistin & Frank, 2018), or grams per month (g/month) and can be calculated by taking the difference in weight between two time points and dividing by the number of days or months between those points.
- An infant or child with a weight less than the 2nd percentile for gestation-corrected age and sex on more than one occasion that is disproportionate to growth *or* an infant or child with a weight less than 80% of ideal weight-for-age using a standard growth chart.
- An infant or child with a depressed weight-for-length (i.e., weight-for-age less than length-age, weight-for-length less than the 10th percentile).
- A rate of weight change that causes a decrease of two or more major percentile lines within a six month period
- A rate of weight gain less than that expected for age in the absence of illness.

- A Z-score between -2.0 to -3.0, which indicates a young person is moderately malnourished, *or* a Z-score less than -3.0, which indicates a young person is severely malnourished (Casey, 2009, p. 583 as cited in King & Duryea, 2024; Smith et al., 2022).

Table 1.
Rate of Daily Weight Gain Expected for Age

Age	Weight Gain
0-3 months	26-31 g/day
3-6 months	17-18 g/day
6-9 months	12-13 g/day
9-12 months	9-13 g/day
1-3 years	7-9 g/day

Multifactorial Causes of GF

The causes of GF in young children are often multifactorial resulting from medical, developmental, and behavioral problems, as well as food insecurity, poverty, and social challenges at home (Duryea, 2022; Goodwin et al., 2023; Roberts et al., 2022; Vachani, 2023). Insufficient intake is a common underlying cause, but it is important to consider differential medical diagnoses, such as cystic fibrosis, gastrointestinal dysfunction, or hormonal abnormalities, amongst others, which may impair nutrient absorption or caloric expenditure in the body (Duryea, 2022; Goodwin et al., 2023; Vachani, 2023; Yadav & Dabas, 2015).

Among children hospitalized with weight loss or inability to gain weight, 59-86% will have inorganic problems, where the issue is not a medical disease but a social, psychosocial, or psychological cause (Peterson Lu et al., 2023; Smith et al., 2022; Tang et al., 2021). Examples include single-parent families with strained budgets or lack of resources, parents with undiagnosed postpartum depression, substance use disorders, and food insecurity. Additionally, many causes of poor weight gain are related to unidentified feeding behavior, breastfeeding problems, or incorrect feeding (Peterson Lu et al., 2023; Smith et al., 2022; Stack & Meredith, 2018; Tang et al., 2021). Since GF may stem from an underlying, correctable medical condition, close collaboration with a primary care provider who knows the family well is essential for the best prognosis (Vachani, 2018).

Effects of GF

Untreated GF can cause effects ranging from subtle to severe in developing children. Many young children with prolonged malnutrition experience delayed milestone attainment, muscle wasting, and stunted growth, the latter of which occurs in approximately 4-7% of children with GF (De Sanctis et al., 2021; Victora et al., 2021). The youngest children with GF are the most vulnerable due to the rapid growth experienced during this stage of life. Infants and young children with significant GF often have weaker immune systems, delayed wound healing, short stature, deficient language development, reduced motor activity, decreased responsiveness, poor attention spans, major learning difficulties, and diminished social skills (Vachani, 2023; De Sanctis et al., 2021; Soliman et al., 2021; Calder et al., 2020). Some of these outcomes can be irreversible if not caught during the early stages (De Sanctis et al., 2021).

Populations at Risk for GF

Certain populations are more susceptible to complications from GF, especially those with special medical needs who may already have baseline developmental delays. Infants and young children in impoverished countries and communities face the most severe consequences, with higher mortality rates. Childhood malnutrition remains a leading cause of morbidity and mortality worldwide, affecting up to 45% of children under the age of five globally (Tang et al., 2021). Children affected by GF may be undocumented, refugees, or live in impoverished areas, and often have a history of low birth weight or other prenatal health complications (Duryea, 2022; Victora et al., 2021). Parental risk factors for having a child with GF include mental health disorders, intellectual disabilities, and addiction (Vachani, 2018). To accurately identify all potential causes of growth failure, the forensic nurse must take a comprehensive, holistic approach to the assessment, considering both the child's medical and developmental needs as well as the family's psychosocial and environmental factors.

Forensic Nurses and the GF Evaluation

Child Neglect and GF

Child maltreatment - due to acts of commission or omission - is one cause of GF (Faugno et al., 2022). The FN has a central role in assessing allegations of child maltreatment, including nutritional neglect, deprivation, and starvation, which may occur in abused children. Careful, multidisciplinary evaluations of children who may be the victims of neglect, deprivation, and abuse are essential to recognizing overt neglect and differentiating it from unintentional or social causes outside the family's locus of control (Faugno et al., 2022).

FNs play vital roles in multidisciplinary teams (MDTs) and community partners, assisting social workers, law enforcement agents, judges, and victim advocates with case assessments and decisions (Palusci, 2022). In cases of GF, the FN helps the MDT or partner determine the reasons for a young patient's GF and recommend appropriate services. If the MDT or partner identifies neglect in a family, the FN may be crucial in rescuing children who are victims of abuse and neglect or in assisting families who are not intentionally negligent but face significant financial, social, or educational challenges.

Components of the Forensic Nursing Evaluation of GF

FNs should recognize that children's growth rates and measurements can naturally fluctuate over time. However, consistent deviations from the average can signal potential health issues requiring further assessment by the nurse or FN in collaboration with Child Protective Services (CPS). A thorough forensic nursing assessment includes five key elements: (1) selecting the appropriate growth chart and plotting growth parameters; (2) obtaining a detailed medical history; (3) conducting a careful psychosocial history; (4) gathering a detailed dietary history; and (5) performing a physical examination (Goodwin et al., 2023; Kesari & Noel, 2023).

Growth Charts and Serial Measurements

Selecting an appropriate growth chart is essential in the forensic nursing evaluation of GF. According to the Centers for Disease Control and Prevention (CDC), a growth chart should complement the comprehensive evaluation and overall formation of a clinical impression, rather than being used as the sole diagnostic instrument (n.d.-b). The CDC (n.d.-b) recommends using the World Health Organization (WHO) growth charts for infants and toddlers aged 0-2 years in the U.S., including both breastfed and formula-fed infants.

The World Health Organization (WHO) offers the only internationally approved growth charts that accurately reflect cross-cultural anthropometric measurements, making them suitable for children of all races and nationalities (Duryea, 2022). Specialized charts are also available for preterm babies, infants from birth to 12 months, children aged 12 months to 5 years, and those aged 5 to 18 years. Additionally, there are specific charts for children with medically complex conditions, such as Spina Bifida and Down Syndrome (U.S. Department of Health and Human Services, Health Resources and Services Administration, n.d.).

FNs, general pediatric nurses, and nurse practitioners, such as those in public health settings, family practice, nurse family partnerships, or community clinics, are well-positioned to identify young children deviating from normal growth curves. Deviation refers to how a child's growth measurements (e.g., weight, recumbent length/height, or head circumference) differ from the average values for their age and sex, often expressed in percentiles or z-scores (CDC, n.d.-a). Growth concerns typically begin with a decrease in weight velocity, followed by a decrease in length/height velocity, and finally a decrease in head circumference, indicating more severe growth problems (Kiernan & Mascarenhas, 2023).

Medical History

When evaluating young patients with suspected GF, FNs should gather a detailed medical history to identify potential underlying medical causes of poor weight gain and prevent long-term sequelae (Vachani, 2018). The assessment should include a holistic workup of both parents and the child, covering past medical history, pregnancy and birth history, prior hospitalizations, surgeries, acute and chronic conditions, and medications including over the counter (OTC) medicines. If the mother is breastfeeding, inquire about her medications including OTC as well. Her medications may affect breast milk production. Lastly, it is crucial to gather facts about prenatal factors such as drug, alcohol, and tobacco exposure, as well as prematurity (Vachani, 2023; Zubler et al., 2022).

Family history questions should include the heights of parents and siblings to identify potential genetic or endocrine conditions, such as familial short stature, constitutional growth delay, or early onset of puberty (Grigoletto et al., 2021; Vachani, 2018). Asking about elimination patterns (e.g., diarrhea, constipation, vomiting, reflux, abnormal voiding) helps rule out underlying medical causes of GF (King & Duryea, 2024). Laboratory tests should also be considered, as suggested in Table 2.

Table 2.
Diagnostic Workup

Comprehensive metabolic panel	Stool for fat, ova/parasite and culture
Complete blood count with differential	Lead level
Thyroid function tests	Transglutaminase antibodies
Vitamin B12	Sweat chloride test
Growth hormone	Urinalysis
ESR	Urine culture
HIV screen	Developmental testing

Lastly, a developmental history of key milestones should be obtained. Developmental delays can both result from and increase vulnerability to GF, so a careful developmental

assessment using standardized surveillance tools (e.g., Ages and Stages Questionnaire) is essential (Vachani, 2023; Zubler et al., 2022).

Psychosocial History

Clinicians and researchers increasingly recognize poverty and social determinants of health as leading root causes of GF (Vachani, 2023). Therefore, the optimal forensic nursing assessment should include evaluating social factors affecting the holistic health of the entire family. Important details to consider include economic stability, access to healthcare, living in a food or medical desert, availability of nutritious food, and access to state or federally funded nutritional programs. Table 3 provides additional questions in the psychosocial history should cover parenting styles and expectations, parental competency in feeding and infant care, parental education levels, and overall family composition (Ajami et al., 2018; Homan, 2016; Vachani, 2023; Wijesunera et al., 2023). Determining whether the family receives benefits like Women Infant and Children (WIC) or Supplemental Nutrition Assistance Program (SNAP) services, and whether they have health insurance, will help the FN identify social needs and recommend appropriate services.

Table 3.
Psychosocial History Questions

With whom does the child live? Is the child visible in the community such as daycare?
Who are the caregivers who feed the child?
What signs do caregivers recognize when the child is hungry?
When and where are feeds offered?
Does the family eat together?
Is the child distracted while eating such watching TV?
Does the caregiver encourage eating?
Can the family afford nutrition?
Does the child have health insurance?
Does the child have access to WIC or SNAP?

Mental Health and Substance Misuse. Screening for mental health conditions, substance abuse disorders, and intimate partner violence are also relevant questions that should be asked in a supportive, non-judgmental manner. The United States Preventative Services Task Force, American Academy of Pediatrics, and the American College of Obstetricians and Gynecologists recommend screening all postpartum mothers for post-partum depression (PPD) (Maurer et al., 2018). Risk factors for "postpartum blues" and PPD include a history of depression prior to or during pregnancy, gestational diabetes, epidural anesthesia during delivery, and giving birth to a boy (Liu et al., 2022). Postpartum psychosis, although rare, is an extreme form of PPD that can be very risky for the mother and the baby (Zivoder et al., 2019). A screening tool for PPD is the Edinburgh Postnatal Depression Scale (EPDS). New fathers should also be screened for depression, because paternal depression is associated with maternal depression (Da Costa et al., 2019; Paulson & Bazemore, 2010). Fathers can be screened with the Patient Health Questionnaires (PHQ-2 and PHQ-9).

Substance Abuse and Domestic Violence. Screening for substance abuse and intimate partner violence can require skillful diplomacy. Some tools that can help identify these determinants include the CAGE questionnaire for alcohol abuse; the Drug Abuse Screening Test-10 (DAST-10) to assess for drug abuse and dependence; and the Hurt, Insult, Threaten, Scream

(HITS) for domestic violence. Community based interventions include referrals to home visiting agencies, such as Nurse-Family Partnerships, Women Infants and Children, support groups and other mental health therapy and programs.

Dietary History

A detailed dietary history is crucial to identify potential causes of GF. Caregivers should describe their feeding routines and provide a 24-hour dietary recall to estimate caloric intake. For follow-up visits, a diet log detailing date, time, food, amount eaten, type and amount of beverage, and pertinent events can be requested.

Additionally, caregivers should describe feeding behavior, such as feeding cues, cues to satiety, and the ability to suck, swallow, and chew. For bottle-fed infants, ensure the nipple size is appropriate. For breast-fed infants, assess pumping habits and feeding practices. As noted in the medical history, it is also important to ask breastfeeding mothers about medications, as some can decrease milk production, like antihistamines and other anticholinergics.

For formula-fed infants, inquire about feeding frequency, amount, and preparation details. In some cases, caregivers may dilute formulas (both powder and liquid) intentionally or unintentionally, which should be assessed (Harris et al., 2024; Smith et al., 2022; Vachani, 2018). Table 4 provides a checklist of questions for breastfeeding and formula-fed infants.

Table 4.
Feeding and Elimination Questions

Breastfeeding and Formula Feeding Questions	
Ask the caregiver how she/he/they feel(s) the feedings are going and if any issues are identified.	
Does the caregiver stop to burp the baby at least once during the feeding? Is there spit up, regurgitation, or vomiting?	
Does the baby sleep or fall asleep during feeds? If so, does the caregiver awaken the baby to finish?	
How often is the baby fed during the day? (How many hours between feedings?	
How often does the baby wake in the night to feed?	
Is the caregiver providing any other liquids to drink? Specifically ask about water, milk, juice, soda, tea and other low-calorie liquids.	
How many diapers per day is the child using? Ask about voiding including bowel movements.	
Breastfeeding	**Formula Feeding**
Is the mother taking any medication including OTC or drugs? If so, assess for L4 and L5 classes of medication that may either decrease her production or cause harm to the infant.	Have the parent demonstrate how to prepare a bottle of formula noting the form (powder, concentrate, ready to feed).
How many minutes is the baby spending on each breast? Usually 10-20 minutes per side is enough.	Is the caregiver able to calculate the math for powder form? Does the caregiver pour water in first, then the powder?
How many feedings is the baby getting in 24 hours?	Check the bottles and nipples. Does the formula come out of the nipples easily, or are the holes too small for the age of the infant?
Can the mother hear the baby swallowing?	Does the caregiver put other elements into the bottle such as rice cereal?
Is the mother pumping breast milk? If so, for how long and much does she get? Does she freeze extra milk?	Does the parent use state or federal resources such as WIC or SNAP?
Is the mother supplementing with formula or baby food/solids? See Formula Feeding Checklist.	Has the caregiver ever had to dilute formula “to make it last?”

When evaluating a young child who is eating solid foods, caregivers should be asked which foods the child eats and how the child has progressed to solids. It is important to inquire about any foods that have caused allergic reactions or discomfort, such as gastrointestinal upset, diarrhea, constipation, or skin reactions. Additionally, obtaining a history of daily juice intake or other beverages is vital, as excessive juice and low-calorie drinks are leading causes of failure to thrive, especially in toddlers (Heyman et al., 2017).

Physical Exam

The physical exam (Table 5) starts by observing the infant's or child's behaviors and interactions with caregivers (adapted from Hockenberry et al., 2024). This initial observation helps guide the rest of the exam.

Table 5.
Assessment of GF in Children ages 0-3 Years Old (adapted from Hockenberry et al, 2024)

Body System	What to Assess	Other Possible Contributing Factors to Abnormal Findings
General	Overall state of the child (hygiene, alertness, behavior); anthropometrics: weight, length or height, weight-for-length or BMI, head circumference	Poverty, sleep deprivation, hunger cues, parenting skills, thyroid disorders, growth hormone deficiency, diabetes
Neurological	Developmental milestones, muscle tone, reflexes, developmental delays	Cerebral palsy, neurodegenerative disorders, prenatal alcohol or drug exposure
HEENT	Infant fontanel, general dental/oral hygiene for the presence of caries or abscesses, mucous membranes, abnormalities of the mouth, lymph nodes and thyroid palpation.	Presence of cleft lip or palate, ankyloglossia (tongue-tie)
Respiratory	Breathing effort, oxygenation, signs of respiratory disease	Chronic lung disease, recurrent infections, environmental exposure (e.g., smoke)
Cardiovascular	Heart rate, murmurs, perfusion, cyanosis	Congenital heart disease, anemia, hypotension
Gastrointestinal	Distention or organomegaly, hepatosplenomegaly (such as in kwashiorkor)	Metabolic or genetic disorder, liver disease, cardiac issues, malignancies, infections, hemolytic anemias
Genitalia	Presence of precocious or ambiguous sexual development	Endocrine disorder
Musculoskeletal	Signs of dysmorphia Neck range of motion Mid upper arm circumference	Metabolic or genetic disorders, Possible torticollis (wryneck)
Skin	Rashes, skin turgor, color, wounds or injuries including patterns and scars, presence of scaly/hard/dry/cracked skin	Dehydration, overbathing, eczema, infections
Hair and Nails	Dullness, dryness, brittle hair Koilonychia “spoon nails”	Dehydration Iron deficiency
Psychosocial	Caregiver interaction, response to environment	Maternal depression, family stress, inadequate social support
Other	**What to Assess**	**Rationale**
Growth Charts with Serial Measurements	Growth charts from the primary care provider/pediatrician/community nurse or other specialists	Ensure the proper growth charts have been used
Serial Photographs of the Child	Obtain baseline and at follow up visits.	For comparison

Since growth problems can affect every system in the body, a thorough examination is crucial, including height/recumbent length, weight, BMI, and head circumference in children under 2 years old. Examine the posterior and anterior fontanelles in infants for size and position (sunken or bulging) and neurologic signs of developmental delay.

The FN should pay special attention to hair, mucous membranes, lymph nodes, and thyroid palpation. Assess impediments to feeding and swallowing, such as cleft lip or palate, by observing a feeding session and parent-child interaction. A thorough mouth examination can identify dental caries, oral abscesses, or enlargement of the tonsils, adenoids, or tongue. Check the abdomen for distention or organomegaly and the genitalia for signs of precocious or ambiguous sexual development or hepatosplenomegaly. The FN should note skin findings such as scaling, dryness, edema, alopecia, spoon-shaped nails, and bruises or other trauma evidence. The musculoskeletal assessment should evaluate dysmorphic features, neuromuscular tone, and loss of subcutaneous fat. Photographic documentation is helpful if permitted. Consult with an advanced practice provider (nurse practitioner, physician assistant, or physician) if the physical examination findings indicate the need for diagnostic studies (Table 2) or specialist referrals (Faugno et al., 2022; Smith et al., 2022; Vachani, 2023).

Appropriate Community Referrals by the Forensic Nurse

Community interventions should be the first-line treatment in cases of mild to moderate growth problems to support the caregivers in mitigating the short and long-term health consequences. Table 6 provides high caloric dense foods to recommend. Encourage the parent or guardian to offer young children options, which will empower the child to make a choice, but limited to the options. Should suggested behavior changes prove unsuccessful, specialist referrals may be necessary. Starting with a referral to a registered dietitian for individualized medical nutrition therapy is often helpful. Mothers who are breastfeeding may need the support of a lactation consultant. Other specialist services may include speech and language therapy for swallowing and/or occupational therapists for feeding support.

Table 6.
Foods that Increase Caloric Density for Young Children on Solids

Avocados
Eggs
Cheese
Nut and seed butters
Butter, margarine, oil,
Cream cheese, mayonnaise, sour cream
Salad dressings
Heavy whipping cream or half & half (added to whole milk)
Chicken potpies
Milk fortifiers such as Carnation Instant Breakfast ® or Ovaltine ®

Hospital admissions should be considered under some circumstances in consultation with the primary care provider, such as when community interventions are unavailable or ineffective (Peterson Lu et al., 2023). If the child continues to exhibit signs of GF, or the provider is still not able to identify the cause of the GF, a further workup can be explored. Enteral feeding is required when it is essential to avoid malnutrition or dehydration (Duryea, 2023). Hospitalization can also identify whether the poor weight gain is due to more intentional psychosocial determinants, such

as Munchausen Syndrome by Proxy. Once hospitalized, providers can not only monitor a child's behaviors and symptoms but can also offer the child a prescribed diet and track growth. *When a young child with GF gains weight successfully in a controlled environment, it strongly suggests an underlying modifiable cause, including child neglect.* During a hospital evaluation for GF, FNs should work closely with social workers and CPS staff to ensure there will be a safe discharge plan.

Conclusion

Forensic nurses (FNs) are in a unique position to identify modifiable causes of growth faltering and promote successful feeding behaviors. The FN should be competent in identifying potential root causes of GF starting with a comprehensive history and thorough exam. Early identification and strategies should be implemented to minimize malnutrition and associated detrimental health and social consequences. By asking the caregivers specific questions, the FN may be able to identify practical solutions for nutritional support and providing community referrals to address the challenges and ensure the child is growing at an acceptable rate. Should the forensic evaluation lead to concerns for neglect, CPS must be involved to ensure the young child is in a safe, nurturing environment with caregivers who are willing and able to provide adequate nutrition.

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