Although catchup growth is beneficial for neurodevelopmental outcome, it has been hypothesized to lead to adverse metabolic consequences in adulthood.\textsuperscript{1,2} The analyses of large epidemiological databases have suggested that infants and children who show rapid early weight gain are predisposed to the development of obesity,\textsuperscript{3} type 2 diabetes, and cardiovascular disease later in life.\textsuperscript{4}

**Normal patterns of catchup growth**

Compared with term-born peers, individuals born preterm usually show slow growth in the early postnatal period, especially if they are sick, followed by catchup growth over 2–3 years, and achieve a slightly lower mean adult height.\textsuperscript{1} Following correction of growth-impairing factors, children demonstrate growth canalization: a regulative force that returns growth to its constitutionally preferred channel.\textsuperscript{5} Once accomplished, the child’s weight tracks reasonably consistently at his or her own constitutionally determined percentile,\textsuperscript{6,7} whether being plotted against the CDC or WHO standards,\textsuperscript{8} or monitored using z scores. When it is consistent, such growth is normal growth, even if it is above or below the percentile or z-score extremes generally defined as non-organic failure to thrive\textsuperscript{9} or obesity.\textsuperscript{10} Children who show low weight for height but not low height for age can experience catchup growth in weight at a rate up to 20 times normal, while children with both low W/H and H/A grow rapidly only until they restore appropriate W/H, then they tend to grow at about 2-3 times the usual rate. Thus, restoring body tissue appears to take precedence over restoring linear growth. Complete catchup growth can occur even with severe growth retardation provided epiphyseal fusion has not occurred. Pubertal development can be delayed for as long as two years in malnourished children and can allow for complete catchup in linear growth.\textsuperscript{11}

**Catchup growth or weight acceleration?**

Preterm infants are generally offered enriched human milk and/or high protein/calorie infant formula. Beyond that, by definition in this paper, catchup growth is child driven and is achieved by adhering to the Satter Feeding Dynamics Model (fdSatter). In contrast, weight acceleration appears to be driven by prescriptive feeding: by getting the infant to eat certain amounts to achieve a defined energy intake. While the child crosses growth percentiles with either, percentile crossing with catchup growth tends to show a smooth continuation of a previous pattern; weight acceleration tends to show abrupt shifts from previous patterns. Children achieve catchup growth when they are fed optimally, that is, consistently with the Satter Division of Responsibility in Feeding (sDOR), and allowed to grow in accordance with their own genetic endowment. In short, catchup growth is a normal and natural process in an organism bent on survival. At the same time, enough epidemiological data\textsuperscript{1-4} has accumulated to arrive at a testable hypothesis that much if not most early childhood weight gain is counterproductive. This is likely due to the fact that this rapid weight gain is the product of weight acceleration: abrupt upward crossing of growth percentiles secondary to disruptions in the child’s biopsychosocial milieu.\textsuperscript{7,12,13}

**Quantity or quality?**

What are the studies about early infant weight gain really examining? Is it catchup growth or weight acceleration? The work of nurse and speech-language therapist clinicians Philbin and Ross\textsuperscript{14,15} indicates that
rapid early infant weight gain is likely to represent hospital-induced weight acceleration. Their data show that in usual perinatal practice, the quantity of intake rather than quality of feeding (that is how much, rather than how) dominates decisions and actions. Philbin and Ross’s Supporting Oral Feeding in Fragile Infants (SOFFI) method is evidence-based, comprehensive, and fully consistent with fSatter. Usual NICU practice, based on long tradition rather than evidence, assumes that the preterm or fragile infant is not able to take an active role in feeding and, therefore, must be stimulated to take in a prescriptive amount. In contrast, SOFFI minimizes prescriptive feeding by employing the decisions of an observant caregiver who titrates, at each feeding, the manner of feeding and volume of intake to the infant’s physiologic stability, behavior state, and oromotor skill, and provides any balance of volume by tube feeding. The infant actively participates in the feeding, regardless of physiology, state, and skill; nothing is asked that s/he cannot comfortably do. Because feeding gives the infant minimal aversive experience, it supports his or her natural affinity for and enjoyment of food in the context of the feeding relationship. In contrast, feeding decisions based on quantity of intake rather than quality of experience are likely to produce infants “who are averse to food and feeding and show typical, eating avoidant behavioral repertoires.”

Rapid early infant weight gain and sDOR
Because feeding dynamics is not reported, we don’t know whether the infants considered in the early infant weight gain studies were fed in a child focused fashion – a fashion consistent with sDOR. However, based on common opinion and practice with feeding in the usual NICU, it is likely that most infants addressed in these studies are predominantly fed based on dietary prescription.

Thus, we are left with a new working hypothesis, and it is this:

Infants who are fed according to sDOR and allowed to achieve normal catchup growth are healthier, throughout life, and more inclined to achieve stable body weight than infants who achieve abnormal weight acceleration.

Studies examining this hypothesis will be difficult and expensive. Until they are done, however, we are far more likely to do no harm by trusting that each preterm, tiny, ill, and fragile infant is best served when s/he is supported in eating according to internal regulation and growing in the way that is right for him or her.

REFERENCES

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