



Children, who are the future of any country, need to be afforded the best opportunity for growth and development as well as the best possible nutrition options. Feeding is a shared social activity and is important for health and wellbeing.¹ Individuals with developmental disabilities are known to be at increased nutritional risk.^{2,3} As such, feeding difficulties early in life should be regarded as clear warning signs from the point of view of disease prevention,² and should also prompt the mother to seek expert advice from a health professional.¹

Feeding problems in the first 6 months of life include extended feeding times and weak suckling, whereas the older child may be unable to maintain good head control, resist spoon feeding, lumpy food or food with texture, or simply resist anything to the mouth except the breast, pacifier or bottle.² Ramsay *et al.*⁴ have proposed that two or more of the following four clinical signs need to be present for the appropriate diagnosis. Such signs appear at birth or shortly after.

1. Abnormal duration of feeding, i.e. 45 minutes to 2 hours, or frequent small feeds throughout the day (more frequent than every 2 hours); taking less than 30 ml of breastmilk or formula feed (depending on age) or few spoonfuls at a time.
2. Poor or no appetite, with the infant not crying for or demanding food, and having to be woken up for feeds, with an appetite that is easily satisfied by a few sips of breastmilk or formula feed.
3. Food texture intolerance for age-appropriate food textures.
4. Unusual feeding behaviours such as refusing breast, bottle or solids, falling asleep or being easily distracted while feeding, holding food in the mouth, spitting out nipple or food, fussy eating, gagging easily and vomiting.

In this edition of *SAJCN*, Dannhauser, Walsh and Nel⁵ report their findings on the nutritional status of disabled black schoolchildren (8 - 15 years). Nutritional status was assessed by anthropometric measures and a dietary intake. The authors found a high prevalence of stunting and underweight, although median protein and energy intake appeared to be only slightly lower than recommendations. The high prevalence of stunting (47.4% in Tswelang and 37.3% in Pholoho) and underweight (29.8% in Tswelang and 18.7% in Pholoho) is a matter of concern and underscores the importance of early identification of stunting and underweight among these children and the importance of early intervention. The latter is essential not only

from the point of view of improved nutritional status but also because normalisation of feeding patterns is known to have the potential to make the child more independent.^{2,6}

In this regard, it is important to understand the development of feeding and the importance of the suck/swallow/breathe (SSB) synchrony, especially in the disabled child (child with special needs). The primary function of the SSB synchrony is to transfer air and nutrients from the environment into the body.⁷ Disorganisation of the SSB synchrony leads to difficult feeding. The infant who cannot co-ordinate the synergy for feeding can become fearful and refuse to eat, or may be prepared to handle only small amounts of liquid or food at a time, because breathing, which is more important for immediate survival, supersedes eating.⁷

The mouth is the centre of an infant's ability to explore and exhibits the most organised sensory integrative and neuromotor behaviours. The primary oral motor mechanism is the SSB synchrony or the rhythmical, co-ordinated pattern of sucking, swallowing and breathing. An intact synchrony of SSB is critical to sensory, motor and cognitive development.⁷ Even subtle disruption of any element has an effect on development and function.⁷

The SSB synchrony is present at birth and develops and modifies as development progresses.⁷

- The **suck component** and sucking *in utero* is observed by 15 - 16 weeks' gestation and co-ordinated swallowing at 18 - 19 weeks. This progresses to finger sucking, swallowing amniotic fluid, breathing movements and even hiccups at 22 weeks of gestational age. The infant uses both positive and negative pressure methods to suck liquids. The tongue helps to form a bolus and the cheek and jaw offers a stable base.
- The **swallow component** transfers nutrients from the mouth to the oesophagus. Swallowing consists of three phases, the oral phase, the pharyngeal phase and the oesophageal phase.⁷ The swallowing process is complex and to be successful requires co-ordination of 31 muscles and 6 cranial nerves at different levels of the central nervous system.⁸
- The **breathing component** is important as a means to prevent breathing while swallowing in order to avoid aspiration. When the breathing functions are co-ordinated with sucking and swallowing there is stability and correct postural and movement patterns.⁷

Touch stimulus to the mouth or face area of the newborn initiates a response towards accepting the breast or bottle, while touch stimulus to most parts of the rest of the newborn's body results in a withdrawal or protective response.⁷ If the child has negative experiences of touch to the body the reaction could therefore be resistance to feed. There are also pathological oral reflexes that negatively affect eating. These include the tonic bite, where the child bites down on the spoon, the tongue thrust, where food is pushed out of the mouth, and poor mouth closure while eating.⁹

Early recognition of feeding problems in children with special health needs (CSHN) is essential to avoid growth failure. The estimated risk for nutritional disorders in CSHN ranges from 40% to 92%.⁸ Data from the UK indicate that 81% of 11 794 children with cerebral palsy experienced feeding problems.¹ The position statement of the American Dietetic Association also indicates that nutritional problems are common in children with disabilities, with the highest estimate of affected children being 90%.³ By comparison Dannhauser *et al.*⁵ report that few (10 - 25%) of the children they studied had feeding difficulties. This may well be an underestimate, since children with severe disabilities and unique nutritional requirements were excluded from their study. It would therefore be essential to study the prevalence of nutritional disorders in the future within a wider context of disability in order to define and identify 'feeding difficulties' as well as to study coping and survival mechanisms. This can be achieved in collaboration with speech therapists, who use a number of instruments such as structured feeding questionnaires, behaviour-focused feeding assessment, oral-motor and feeding evaluation forms, and development pre-feeding checklists for assessing the infant/child.⁸⁻¹¹

It is important to realise that growth patterns in infants/children can also be affected by medications. Drugs prescribed to reduce spasticity and prevent convulsions, sleeping difficulties and/or restlessness can all affect feeding.^{1,3,11} Other factors that adversely influence growth include altered absorption, blood loss (reflux oesophagitis or colitis), increased energy needs to maintain tone and posture, poor dentition, early satiety because of slow eating or constipation, behaviour disturbances, neurological impairment, other underlying medical conditions, genetically programmed growth failure and limited communication abilities.^{1,2,8}

Sensory processing disorder (SPD) and its influence on feeding can also be a factor precipitating nutritional disorders in these infants and children. Obesity in children with Down syndrome, for instance, can be due to SPD resulting in intake of only soft foods and sugary and starchy foods¹² that could be high in energy.

In view of the rather specialised nutritional disorders seen in these infants and children, the question then arises whether infants at risk, or possible risk, should be screened at birth and 3 and 6 months of age to prevent nutritional disorders early in life. The special growth charts available for some children with special needs would greatly facilitate such screening and follow-up.^{11,13} Nutrition experts should form part of a team of speech therapists, occupational therapists, physiotherapists and doctors who manage these infants and children and support their growth with early intervention programmes.²

Finally, there is a paucity of data and experience on disabled infants and children in the developing world. Knowledge about their nutritional needs is urgently required and should be recognised as such by dietitians and health professionals.

Annatjie Smith

*Manager, Dietetic Department
 Port Elizabeth Hospital Complex
 Eastern Cape Department of Health*

1. Sive A. Feeding the neurologically disabled child. *Specialist Medicine* 1999; 21(8): 542-548.
2. Brown JE, Isaacs JS, Krinke UB, Murtaugh MA, Stang J, Woodriddle NH. *Nutrition Through the Life Cycle*. Belmont, CA: Wadsworth/Thomson Learning, 2002: 191-282.
3. American Dietetic Association. Position Statement (2003): Providing nutritional services for infants, children, and adults with developmental disabilities and special health care needs. *J Am Diet Assoc* 2004; 104(1): 97-101.
4. Ramsay M, Gisel EG, Boutry M. Non-organic failure to thrive: growth failure secondary to feeding skills disorders. *Dev Med Child Neurol* 1993; 35: 285-297.
5. Dannhauser A, Walsh C, Nel M. Nutritional status of disabled black schoolchildren in Mangaung (2002 - 2003). *South African Journal of Clinical Nutrition* 2007; 20: 6-10 (this issue).
6. Fung EB, Samson-Fang L, Stallings VA, *et al.* Feeding dysfunction is associated with poor growth and health status in children with cerebral palsy. *J Am Diet Assoc* 2002; 102(3): 361-369.
7. Oetter P, Richter EW, Frick SM. *M.O.R.E. Integrating the Mouth with Sensory and Postural Function*. Hugo, Minn.: PDP Press, 1995.
8. Arvedson JC, Brodsky L. *Pediatric Swallowing and Feeding: Assessment and Management*. 2nd ed. Canada: Delmar Learning, 2002: 187-468.
9. Stevenson RD, Meyers R. Nutrition in the child with disabilities. In: Preedy V, Grimble G, Watson R, eds. *Nutrition in the Infant: Problems and Practical Procedures*. London: Greenwich Medical Media, 2001: 267-276.
10. Morris SE, Klein MD. *Pre-feeding Skills*. Arizona: Therapy Skills Builders, 1991.
11. Cloud HH. Developmental disabilities. In: Samour PQ, Helm KK, Lang CE, eds. *Handbook of Pediatric Nutrition*. 2nd ed. Gaithersburg, Md: Aspen Publishers, 1999: 293-314.
12. Stevenson RD. The development of normal feeding and swallowing. *Pediatr Clin North Am* 1991; 38(6): 1439-1453.
13. Williams CP, ed. *Pediatric Manual of Clinical Dietetics*. The Pediatric Nutrition Dietetic Practise Group. American Dietetic Association, 1998: 169-179. www.eatright.org