

Supporting families to introduce solids

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The period of introducing solid foods is a vulnerable time for infants. Good nutrition in the transition to solid foods provides the foundation for lifelong nutritional health. Parents often ask their GPs about when and how to introduce solids (complementary foods). This article is a practical guide for GPs to support parents to introduce solids, covering when, what and how much, with practice tips and advice about premature infants.

Infants experience rapid growth, development and changes in feeding skills during the first year of life. Parents frequently present to GPs with questions and confusion about the 'when, what and how' of infant nutrition. Providing up-to-date recommendations and screening for signs of nutritional deficits may improve health both in infancy and later life.¹

Advances in research, the use of different guidelines between countries, social and cultural pressures, and exposure to differing opinions online and in social media can confuse and mislead parents (and practitioners) about optimal and appropriate feeding and nutrition in the first year of life. With Australian infants visiting their GP an average of 11 times during the first year of

life,² GPs have a valuable opportunity to guide and support parents to introduce solids and to answer their questions.

This article explores the timing and adequacy of complementary feeding; two key principles in ensuring the nutritional needs of infants are met during the first year of life. Specific reference to the management of infants born prematurely and practice tips for GPs are also provided.

When to introduce solids

The NHMRC and the Australasian Society of Clinical Immunology and Allergy recommend introducing solids at around 6 months of age,³ but not before 4 months of age,⁴ to help meet infants' increasing nutritional and developmental needs. Introducing solids before 4 months of age stresses the immature gut, kidneys and immune system and can decrease exposure to the protective factors of breastmilk. Also, most infants do not yet have enough oromotor control to safely start solids at this age.

Clinically, infants who are introduced to solids before 4 months of age have been found to have increased rates of respiratory and gastrointestinal illnesses and otitis media.⁵ Nutritionally, these infants are more likely to be provided with foods from outside of the five food groups before their first birthday,⁶ and are more likely to be overweight in later life.⁷

Previous recommendations to delay the introduction of solids until after 6 months of age – or in some cases as late as 12 months – were aimed at reducing the incidence of allergies. We now know there is no evidence that delaying the introduction of allergenic foods prevents the development of allergies, and parents should be encouraged to introduce these foods within the first 12 months of life.⁴ There is well-documented evidence to support the introduction of eggs by 9 months of age and peanuts by 12 months of age to reduce allergy risk.⁴ Parents should be provided with safe strategies for timely incorporation of these items.

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1. RISK FACTORS FOR THE EARLY AND LATE INTRODUCTION OF SOLIDS**Risk factors for early introduction**

- Perceived hunger, particularly among boys⁵
- Lack of sleep and/or unsettled behaviours⁵
- Exclusive formula feeding
- High birth weight and/or rapid weight gain during the first months of life⁵
- Coming from a household of three or more children¹⁰
- Younger maternal age

Risk factors for late introduction

- Prematurity
- Developmental delays
- Presence of gastro-oesophageal reflux disease
- Limited access to food/financial stressors¹¹
- Craniofacial anomalies

TABLE. GUIDE TO STARTING SOLIDS IN PREMATURE BABIES

Event	Chronological age	Corrected age
• Birth at 28 weeks' gestation	• 0	• 12 weeks' premature
• Continue breastfeeding or formula	• 4 months	• 4 weeks
• Start solid feeds	• 7 months	• 4 months

Late introduction of solids also places an infant at an increased risk of feeding difficulties, poorer overall nutrition in the first two years of life,⁸ poorer acceptance of new tastes and textures,⁹ and delayed development of muscles important for speech. (Box 1 sets out risk factors for early and late introduction of solids.)^{5,10,11}

Timing for premature infants

There is confusion around the use of corrected or chronological age when introducing solids to infants who were born prematurely. Preterm infants should be considered for weaning between 5 and 8 months' chronological age to ensure that sensitive periods for the acceptance of solids are not missed and to allow development of appropriate feeding skills (Table).

The exact time within this three-month window will depend on the individual infant's needs and cues.¹² The introduction of solids should be considered on an individual basis with consideration of medical stability, aspiration risk, gestational age at birth, developmental cues and/or anatomical abnormalities. GPs should be involved in multidisciplinary team planning of nutrition and feeding in complex cases.

PRACTICE TIP: Encourage parents to provide their infant with complementary solids between 4 and 6 months of age (7 months' chronological age for premature infants), and when their child displays developmental readiness.

Measuring adequate growth

It is important to recognise that a weight measurement below the third percentile does not necessarily mean an infant has poor weight gain. A 'bare weight' (clothes and nappy removed) should be taken at all regular contacts with health professionals. In the community setting, an infant's length is generally measured fortnightly and their weight is measured weekly in the first month after birth, with the gap between measurements increasing as the infant gets older.

It is best practice to plot an infant's weight gain over time rather than comparing individual weight gain with population-based 'weekly goals'. Plotting shows whether an infant is meeting their growth velocity and trajectory. An infant with normal growth has plotted values that follow along, or parallel to, one of the percentile

lines without crossing one or more percentile ranges, and when weight and length are relatively proportional. Identification of altered growth can be an indicator of an underlying health or developmental issue and should be monitored and/or referred on for specialist assessment (Box 2).

If using electronic methods for plotting, it is important to be aware that some clinical practice software and apps used by parents feature charts other than those produced by WHO. Use of different charts will likely suggest changes in growth and weight patterns and can lead to the incorrect interpretation of actual growth.

Growth for premature infants

Until a premature infant reaches their expected date of birth, growth will be monitored on a preterm growth chart because these charts represent intrauterine growth parameters. After that, gender-specific WHO charts for babies aged 0 to 24 months are most appropriate. Infants born at a gestational age of less than 37 weeks should have their weight and growth plotted based on adjusted gestational age until they reach 24 months of actual age.

PRACTICE TIP: Growth and bare weight gain should be measured and plotted on WHO charts at regular intervals.

Adequate intake**Breastmilk or formula and solids**

At the time of introducing solids and up until 9 to 10 months of age, the main source of nutrition remains breastmilk or formula. Solids should be offered after a milk feed until this time. A natural 'flip around' to meals followed by milk is generally seen by 12 months of age. If solids are introduced before 6 months of age, parents should be advised not to reduce the frequency of breastfeeding or volume of formula.

How much?

Two to three servings of solid food a day is appropriate between six and eight months

2. RED FLAG ACTIONS

Weight loss or gain, or a crossing of more than one percentile range, suggests a red flag for suboptimal growth, weight gains and/or nutrition. Identifying these changes should be combined with:

- a thorough clinical history, including feeding history
- questions about accuracy of previous weight measures (e.g. was the infant weighed bare, was a corrected or actual weight used?)
- discussion of intake (i.e. types, frequency and duration of feeds)
- consideration of referral to a paediatrician and/or paediatric dietitian for further assessment.

of age, increasing to three to four servings by 9 to 11 months of age. In the initial stages of introducing solids, when eating skills are beginning to develop, a serving size of one to five teaspoons is generally appropriate. With increasing age, and as skills and endurance develop, infants generally naturally increase their efficiency and volume.

What foods?

Solid foods for infants must be nutrient-dense because of their high nutrient requirements and the small amounts they can eat. Many parents provide fruits and vegetables as the first foods, delaying the introduction of iron-rich items until fruits and vegetables are well accepted. GPs play an important role in encouraging iron-rich foods in the first weeks of complementary feeding, particularly by the time an infant is 6 months of age (Box 3). Iron deficiency should be considered in infants and toddlers who have a history of delayed introduction of iron-rich solids, particularly those who may present with poor appetite, slow growth and/or other clinical signs of deficiency.

It can be harmful to assume that all parents have a good understanding of appropriate first foods. Some Australian infants are given foods including ice

3. EXAMPLES OF IRON-RICH FIRST FOODS



- Pureed or soft cooked meat, poultry and boneless fish
- Cooked eggs
- Lentils and legumes
- Tofu
- Fortified cereals such as infant cereal or Weet-Bix
- Hummus
- Smooth nut butter
- Green leafy vegetables*

* Due to low levels of energy and calories, green leafy vegetables should not be provided as the main source of dietary iron.

cream and chips as young as 4 weeks of age and most are offered a range of non-core foods before their first birthday.⁶ Guiding parents to choose nutritious foods – particularly those rich in iron, and vegetables and fruit – cooking without added salt, and supporting those with limited access to healthy food helps to set positive foundations for life-long nutritional health.

PRACTICE TIP: Advise parents to provide first foods from the core food groups, emphasising the importance of iron-rich foods by 6 months of age.

What about water?

There is no need to give additional water to an exclusively breast- or formula-fed infant. Water can start to be introduced in a cup at around 7 to 8 months of age.¹³

A cup is best as it helps to regulate intake and prevents the infant filling up on water. Juice, diluted juice and other sweetened beverages are not required or recommended. There is no need to boil tap water, unless it comes from a tank or a stream.

Conclusion

The period of introducing solid foods is a vulnerable time for infants. Screening for signs of suboptimal nutrition and educating parents allows for early intervention to prevent nutritional deficits, optimising the infant's nutritional health and setting foundations for improved health in later years. MT

References

A list of references is included in the online version of this article (www.medicinetoday.com.au).

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