

PedsCases Podcast Scripts

This is a text version of a podcast from PedsCases.com on “**INFANT NUTRITION (6 TO 24 MONTHS)**.” These podcasts are designed to give medical students an overview of key topics in pediatrics. The audio versions are accessible on iTunes or at www.pedcases.com/podcasts.

INFANT NUTRITION (6 TO 24 MONTHS)

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INTRODUCTION:

Hi everyone, my name is Keon Ma. A huge thank you to Dr. Mel Lewis for helping to develop this podcast. This podcast is part 2 of a series on infant nutrition. We strongly recommend you review the materials from the previous podcast prior to listening to this podcast. We will discuss infant nutrition from 6 to 24 months of age, with a case to highlight the guidelines developed by Health Canada, the Canadian Pediatric Society, Dietitians of Canada, and the Breastfeeding Committee for Canada.

By the end of this podcast, the listener should be able to:

1. Discuss when and what complementary foods should be introduced
2. Describe how to prevent iron deficiency and why that is important
3. Discuss the relationship between introduction of complementary foods and food allergies
4. Discuss the role of breastfeeding and vitamin D3 supplementation
5. Describe supportive strategies to promote breast feeding
6. Discuss the role of responsive feeding based on hunger and satiety cues to encourage healthy eating behaviors in the future
7. List foods that are contraindicated in children less than one year of age

Let's use a case to explore nutrition around this age.

In your clinic, a mother brings her 8-month old infant, John, for a regular check-up. He is healthy and his growth is on a normal trajectory. She is looking for suggestions for foods that he could try, but she is also concerned about food allergies. She also wonders if the vitamin D supplementation is still necessary with the introduction of more solid foods.

Infants and toddlers between the ages of 6 months and 24 months should continue to be supplemented with 400 IU (10 µg) of Vitamin D as long as they are being breastfed. Vitamin D is essential for calcium and phosphorus absorption to build

strong bones and teeth. After 2 years of age, a vitamin D supplement is no longer required.

The frequency of complementary feeding should be gradually increased while continuing to breastfeed. When infants are 6-11 months old, caregivers should give complementary foods in 2 to 3 sessions, with 1 to 2 snacks per day, depending on cues given by the infant. As the child grows older, there can be more feedings with a higher quantity of food. This may vary depending on how the infant feels, how distracted they are, the time of day, how much breastmilk they are consuming, their appetite and the energy density of complementary foods.

Complementary textures should be offered to infants no later than 9 months of age, as exclusive breastfeeding will not meet all energy and nutrition requirements and is also associated with feeding difficulties in older children.

The types of complementary foods given should coincide with the infant's developing ability to chew. Foods like crackers, toast and cereals are appropriate even if teeth have not appeared. In addition, tender cooked meats that are mashed or ground up can now be added to their diet. Pureed and soft-cooked vegetables, ripe fruits, grated cheese, and bread crusts are also good options. Once older infants can move their tongue from side to side and make use of their teeth, they will be able to consume a wider selection of chopped foods.

Infants can enjoy many foods that the family is already consuming, with no added sugar or salt. Commercial infant food, however, can often be high in sugar. At this stage, iron-rich complementary foods are important to prevent iron deficiency. **Iron-rich foods should be introduced first at 6 months of age and then in no specified order, vegetables, fruit, and milk products such as cheese or yogurt.** It is important to expose the child to as many new foods as possible, as eating nutritious foods from an early age helps to promote healthier eating habits.

Iron deficiency can be insidious and not obvious until severe. It results in symptoms like pallor, poor appetite, irritability, slowed growth and development, and in severe cases, developmental delays. The most common cause of anemia in this age group is iron deficiency.

There are a couple factors that may put infants at risk for iron deficiency. These are:

1. Lower iron reserves at birth due to a birth weight less than 3000 grams, babies born to iron-deficient mothers, diabetic mothers, or mothers who consumed excessive alcohol during pregnancy.
2. Abnormal growth rate or patterns.
3. Exclusive breastfeeding for greater than 6 months, because an infant's reserves of iron are depleted.
4. Introduction of cow milk before 9 months of age, because cow milk is low in iron, displaces iron-rich food and inhibits iron absorption. The volume of cow milk

consumed is also important, and infant's should not be receiving more than 750 mL per day.

5. Any delay in offering iron-rich foods 2 or more times a day between 6-12 months and at every meal when over 1 year of age. Meats are preferred because of a higher bioavailability of the heme form of iron, as compared to cereals, legumes, eggs and tofu. Meat also increases the absorption of non-heme iron by 150% when eaten together. Processed meats should be avoided if possible due to higher salt and fat content.

Infants with these risk factors should be screened for iron deficiency between 6-24 months, and given medicinal iron drops starting at 6 months if needed.

With respect to food allergies, there is no evidence that the order of solid food introduction affects the risk of food allergy development, including infants at risk for atopy. Common food allergens like peanut, fish, wheat, milk, soy and whole eggs can be given to infants starting at 6 months. It is recommended that no more than 1 potential food allergen be introduced per day, and to wait 2 days to assess for any signs or symptoms of an allergic reaction. Common signs include: a rapid heartbeat, red and itchy skin (urticaria), swelling in the eyes, face, lips, tongue and throat, and difficulty breathing. Vomiting, cramps, diarrhea or even severe reactions include shock and death are possible and parents should be vigilant.

It should also be mentioned that he should not be fed raw or undercooked meats, eggs, or fish. He should also not consume unpasteurized milk. **Since John is under 12 months of age, he should avoid honey, as honey is the only food directly linked to infant botulism.** Even pasteurization does not kill the spores of *Clostridium botulinum* because the temperature is not high enough in the process. Infant botulism presents as constipation, general weakness, weak cry, poor sucking reflex, irritability, lack of facial expression and loss of head control. They may even have difficulty breathing due to diaphragmatic paralysis.

John's mother is grateful for all the suggestions and advice you've provided. She wonders when John should be weaned off breastmilk, as she anticipates returning to work after maternity leave, and is concerned about not having enough time to breastfeed. She inquires about alternatives and other beverages she can give to John.

Returning to work is a common reason for many mothers to stop breastfeeding other reasons being an inability to maintain a milk supply, or an unsupportive workplace.

It is recommended that breastfeeding be supported for up to 2 years and beyond, as long as mother and child want to continue. Complementary foods should be slowly introduced at 6 months of age, as breastfeeding can only provide about one half of energy needs when infants are 6-12 months old, and about one third when they are 12-24 months old.

Breastfeeding may protect against childhood obesity and some evidence suggests protection against gastrointestinal and respiratory infections. Breastfeeding for a longer duration is also beneficial for the mother. It may protect against ovarian cancer and increase bonding with their child.

As a healthcare professional, it is important that you support breastfeeding for as long as the mother and child desires. Early weaning is common practice in North America, but many other societies wean closer to 2-4 years of age.

The following factors tend to help mothers continue to breastfeed:

- Availability of nearby child care
- Use of breast pumps to express milk
- Flexible work and class schedules
- Supportive family and social networks, as well as supervisors and colleagues
- Workplaces with safe spaces to express milk and refrigerate for storage

After discussing with John's mother, you work towards a collaborative plan with her that includes a discussion with her employer before she returns to work, as well an investment in a breast pump to express milk.

Although breastfeeding is still generally the number one recommendation, commercial infant formula can be used until infants are 9 to 12 months old, but there is no added benefit to consuming it past 1 year of age.

- Pasteurized homogenized (3.25% M.F.) cow milk may be subsequently introduced at 9-12 months of age. Full-fat pasteurized goat milk, evaporated or powdered milk are acceptable alternatives.
- 2% or 1% M.F. or skim milk is not generally recommended at this stage, but can be offered after 2 years of age.
- Toddler milk or "growing-up" milk is not necessary and not specifically endorsed by the Canadian Pediatric Society; infants can transition directly to 3.25% M.F. milk. However, if caregivers choose to provide next step formulas, they are encouraged to compare nutrition with cow milk in key areas like calcium, vitamin D, vitamin A, protein and fat.
- Soy milk may be continued if cow milk cannot be given due to cultural or dietary preferences such as vegan diet.
- Plant-based drinks like almond, rice or coconut milks do not provide the same level of dietary fat and nutrition as homogenized (3.25% M.F.) cow milk, so they should be avoided.

There is no need to restrict dietary fat for children under 2 years, as this can hinder development. Cheese, avocados, nut butters, vegetable oils, salad dressings, margarine and mayonnaise are great sources. Fish is also a great source but fresh or frozen tuna, shark, swordfish, marlin, orange roughy and escolar should be avoided or limited to 75 grams per month because of a risk of mercury over-consumption.

During this age, fruit juices and sweetened beverages should be avoided, instead offering water to quench thirst. Juices can easily fill up the infant's stomach so that they don't have an appetite to consume other more nutritious foods. They also contain a high amount of sugar and lack vitamins and minerals. Lastly, they can also increase the risk of childhood caries.

John returns for another visit when he is 12 months old. John's mother is also concerned about his picky eating and whether it will affect his growth. She exclaims that she's been forcing John to eat what's on the table, but that he's also had a couple gagging episodes. You measure his height and weight and his growth remains on a normal trajectory.

Generally, appetites vary due to many factors like fatigue, illness or social environments. It is possible that a new food be introduced over 10 times before a child will eat it. A variety of combinations of food and textures may help encourage infants to try new foods. Picky eating temporarily is okay as long as their growth pattern is on track, which is the case with John.

Rather than forcing a child to eat, responsive feeding based on hunger and satiety cues from the child promotes healthy eating. Some good ways to encourage this include:

- Balancing help with self-feeding by offering finger foods
- An open cup is also a great way to encourage self-feeding and prevents prolonged bottle feeding. Infants may need parents to hold the cup against their mouth at first. Sippy cups are not encouraged as infants continue to suck liquid out and they do not gain new drinking skills.
- Eye contact and positive verbal encouragement may also help, as well as supplying eating utensils
- Minimizing distraction during feeds, and feed in a safe environment
- Offering a variety of combinations of food are also good strategies

Cues to watch out for include:

- Restlessness or irritability indicating hunger
- Turning away, refusing to eat, falling asleep or playing which may indicate satiety

Non-responsive feeding may disrupt an infant's hunger and satiety cues. Pressuring infants to eat may lead to negative attitudes about eating, including excessive eating and weight gain. Restricting high-fat and energy dense foods in earlier stages may increase the child's intake of those foods later when offered.

Parents may be concerned that self-feeding is messy, but this is an important part of a child's motor and oral development. A good tip is to offer small amounts of food and add more as the child gives hunger cues.

Since John is 12 months old, he can begin to develop a regular routine of meals and snacks. Canada's food guide recommendations include foods from all 4 food groups, with minimal or no added salt or sugar.

It is important to educate parents on foods that may be potential choking hazards.

The following foods are not safe for children under 4:

- Hard candies or cough drops
- Gum or marshmallows
- Popcorn
- Nuts and seeds
- Fish with bones
- Snacks using toothpicks or skewers
- Whole hotdogs

Special preparation of some of these foods may enable the infant to consume it safely. For example, grating raw carrots or apples, removing fruit pits, chopping grapes, cutting hotdogs lengthwise or dicing it, finely chopping fibrous textures like celery or pineapple or thinly spreading peanut butter on toast or crackers.

If parents are concerned about gagging, they can be reassured that gagging is a natural reflex that helps infants to avoid choking, and occurs when infants cannot move food backwards effectively because it sticks to the back of the tongue. If an infant is attentive, upright and free from distractions, their risk of choking is like that of an adult.

I want to leave you with a few key pearls from this podcast:

1. Breast feeding should be supported until 24 months of age.
2. Babies and toddlers up to the age of 2 years should be supplemented with 400 IU of Vitamin D daily.
3. Complementary foods should be introduced at 6 months of age beginning with iron rich foods such as meat or iron fortified cereal to prevent anemia.
4. There is no evidence to support delaying the introduction of any food to prevent allergy.
5. The only food that is contraindicated in all children less than 12 months of age is honey due to the risk of botulism.
6. Parents should be counseled to feed their infants and toddlers well cooked meat and fish, and avoid substances that are a choking hazard.

Thanks for listening to PedsCases!

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