

Non dairy diet in infants

The introduction of non-dairy food (side dishes) is important for both nutritional and developmental reasons. This is the period of transition from a dairy diet to a family diet. During this period the infant is growing and developing rapidly, which is why it is very sensitive to nutrient deficits/surpluses. There are large differences between individual countries in the practices regarding the introduction of non-dairy complementary foods. A complementary food is any solid or liquid food other than breast milk or infant formula.^[1]

For a healthy, thriving infant, exclusive breastfeeding until the end of the 6th month (i.e. 26th week of life). Allergists recommend introducing non-dairy foods from the end of the 4th month, i.e. during the so-called "window of immunological tolerance" between the 4th and 6th months of age, while simultaneously breastfeeding. If the child thrives, it is recommended to continue breastfeeding with gradually introduced solid foods for 2 years or more. .^[2]

Recommendations of the Child Gastroenterology and Nutrition Working Group of the CPS for the nutrition of infants and toddlers (2014)

Optimal duration of breastfeeding

According to ESPGHAN, WHO and AAP recommendations, exclusive breastfeeding is preferred until 6 months of age. If for some reason this is not possible, it is accepted that between 17 and 26 weeks of age, solid foods can be started. Based on the results of studies from developing countries, exclusive breastfeeding up to 6 months reduces the incidence of gastrointestinal and respiratory infections in children compared to exclusive breastfeeding up to 4 months. There is no difference in growth parameters, development and cognitive functions, nor in the incidence of tooth decay or allergies between exclusively breastfed children up to 4 and 6 months.

If a breastfed baby does not thrive after the 4th month, it is recommended to first support the mother in breastfeeding and introduce non-dairy complementary foods. Only if lactation does not improve and the child does not start to thrive, introduce infant formula (substitute milk formula) as a supplement. According to Lactation League data from 2012, 65% of children were breastfed at 6 months of age; 33% of children were exclusively breastfed at 3 months and 17% at 6 months.^[2]

Introduction of non-dairy foods

Solid food should not be introduced before the end of the 4th month of age, it should be introduced at the latest at 6 months, both for fully breastfed, partially breastfed and non-breastfed children. Starting solid foods before the end of the 4th month or after the 6th month of age carries some health risks, such as malnutrition, eating disorders, allergies and anemia.

The child must be psychomotorically able to handle the food, i.e. keep the head in a stable position, coordinate the eyes, hands and mouth when searching for, grasping and putting food in the mouth. Must be able to swallow and tolerate solid food.

When introducing complementary foods, there is no reason to postpone any foods that are believed to cause allergies, since late contact with allergens will not reduce the risk of developing allergic diseases even in predisposed individuals. It is better to introduce allergens while the child is at least partially breastfed, in gradually increasing doses. It is not recommended to introduce allergens before the end of the 4th month.

Individual foods are recommended to be introduced into the menu with an interval of several days so that possible allergic reactions can be detected.^[2]

Opinion of allergists

Allergists recommend introducing non-dairy foods from the end of the 4th month, i.e. during the period of the so-called "window of immunological tolerance" between the 4th and 6th months of age, optimally still while breastfeeding. During this period, all essential foods should be introduced, including animal milk proteins, egg whites, gluten-free cereals and fish, regardless of atopic disposition or confirmed sensitization (i.e. regardless of primary and secondary prevention). It is necessary to respect clinically manifest food allergy (tertiary prevention). The order of introduced foods can be determined by national tradition, or the usual composition of the expected menu.

The introduction of complementary food before the end of the 4th month (17th week) of life increases the risk of immunological hypersensitivity to exposed foods due to insufficient maturity of the immunological equipment of the digestive tract mucosa and the fading effect of maternal immunity. The introduction of a complementary diet after the end of the 6th month (26th week) of life can also lead to higher immunological hypersensitivity and an increase in allergic diseases without a food connection (allergic rhinitis, asthma, sensitization to aero-allergens) as

a result of circumventing the phenomenon of oral tolerance. If the period of the so-called "window of immunological tolerance" does not offer antigen to programmed regulatory lymphocytes (gut and system), future understanding of this antigen may shift to atopic or even autoimmune elements.^[2]

Introducing gluten

Currently, there are no clear documents on how to prevent celiac disease. From the point of view of infant nutrition, The European Society for Pediatric Gastroenterology, Hepatology and Nutrition (ESPGHAN) recommends not introducing gluten before the 4th month and no later than the 7th month of life. The introduction of gluten should be gradual — at first, approx. 6 g of flour per day is recommended, which corresponds to, for example, 2 sponge cakes. A full portion of cereal is gradually introduced into the diet. This recommendation also takes into account the prevention of allergy to wheat proteins (prolamins).^[2]

Introduction of non-dairy complementary foods in premature babies

For babies born after the 35th week of pregnancy, solid foods are introduced in the same way as for full-term babies. For children born before the 35th week of pregnancy, solid foods can be introduced 5-8 months from the date of birth, no earlier than after the end of the 3rd month (13th week) of the corrected age of the child. The introduction of complementary foods is assessed individually according to the state of health, psychomotor maturity and development.^[3]

Alternative nutritiona

Vegetarianism

- a well-planned vegetarian diet covers nutritional needs and allows for normal growth in infants and older children;
- there is a risk of deficiency of some vitamins, minerals and macronutrients — a small but significant risk of deficiency of iron, zinc, calcium and vitamins B12, D and riboflavin;
- lower energy content — the risk increases with the degree of restriction;
- breastfed children of vegetarian mothers usually do well in the first six months of life; problems arise when introducing non-dairy foods and when weaning;
- if the mother does not want to breastfeed, it is best to offer a soy-based formula;
- recommendations for serving non-dairy foods and planning a vegetarian diet:
 - it is advisable to divide the diet into 5 groups, which should be included in the menu every day: milk and milk products, vegetable protein (legumes, peanut butter, nuts, meat analogues, textured vegetable proteins, soy cheese or cottage cheese), fruits and vegetables, cereals, other (eggs, oil, margarine);
 - feed iron-rich foods at the same time as sources of vitamin C
 - serve dairy and vegetable meals separately, as calcium inhibits iron absorption;
 - excess fiber in infants and toddlers accelerates intestinal transit too much and reduces absorption;
 - even a small amount of mammalian milk improves and supplements the biological quality of vegetable protein and increases its utilization;
 - even a small amount of fat increases the energy value of food, vegetable oils supply essential fatty acids;
- positives of a vegetarian diet: reduced intake of fats and especially cholesterol, vegetable oils with unsaturated fatty acids, higher intake of fruits and vegetables — beneficial effect on blood pressure, obesity, cardiovascular disease, incidence of diabetes, some malignancies and constipation — however, a similar effect can be achieved and mixed food.

Veganism

- infants and smaller children should not be given a vegan diet because of possible protein-calorie malnutrition and growth and psychomotor retardation (WHO recommendation);
- for strictly vegan mothers, it is advisable to supply vitamins and minerals to the mother and/or the child during breastfeeding — especially vitamin B12.^[4]

ESPGHAN Recommendations (2017)

- Foods (non-dairy food and drinks other than breast milk or infant formula) should not be introduced before the 4th month of age (i.e. before 17 weeks of age) and at the same time no later than 6 months (i.e. at 26 weeks of age).
 - At 4 months of age renal function and the functions of the digestive tract are already sufficiently mature. The digestive tract then matures further due to the introduction of complementary foods.
- Infants should be offered different foods, varied tastes, different textures of foods. In the recommendations of individual countries, local customs are applied according to the traditional composition of the menu.
- It is recommended to continue breastfeeding while introducing solid foods.
- All children should receive iron-rich foods - meat and/or iron-fortified foods.
 - By 6 months of age, the child will use up all endogenous iron reserves and will begin to need iron from exogenous sources - from the diet. Iron stores are increased by delayed umbilical cord cutting.
 - After 6 months of age, the physiological need for iron is higher than later in life.
 - Red meat is a good source of bioavailable iron.
 - Iron is found in the diet in the form of heme (as hemoglobin and myoglobin of animal products - especially in red meat, liver and offal) and non-heme (in legumes, nuts, green leafy vegetables, dried fruit and iron-fortified cereals). Absorption of non-heme iron is improved by breast milk, meat protein,

ascorbic and citric acid, fermented vegetables. On the other hand, absorption is inhibited by cocoa, polyphenols, phytates, tannins, fiber, calcium and cow's milk.

- Allergen foods should be introduced along with other foods anytime after 4 months of age.^[5]
- Gluten should be introduced between 4 and 12 months of age. In the first weeks of introducing gluten, it should not be consumed in large quantities, as well as later in childhood.^[6]
- Children at high risk of peanut allergy (infants with severe eczema and/or egg allergy) should be exposed to peanuts between 4 and 11 months of age, always after consulting a specialist.^{[7][8][9][10]}
- Whole cow's milk should not be the main drink before 12 months of age, but small amounts can be added to snacks. Cow's milk contains an excess of protein, fat and energy and is a poor source of iron.
- Meals should not contain added sugar and salt.
 - Children have an evolutionary preference for sweet and salty tastes and, conversely, an aversion to bitter tastes.
 - Eating habits and taste preferences are influenced already before birth (in utero) and then through breast milk.
- It is not suitable to serve juices and sugary drinks.
 - A diet high in sugar is the main risk factor for tooth decay. The most cariogenic sugar is sucrose, as it can form glucans that allow bacteria to adhere to teeth.
- Honey should not be introduced before 12 months of age due to the risk of botulism. [*Clostridium botulinum*] spores can be inactivated (industrially) by high pressure and high temperature.
- Fennel (in the form of tea or oil) is not recommended for children under 4 years of age because it contains estragole, which is a naturally occurring genotoxic carcinogen.
- Rice drink is not recommended for young children due to its content of inorganic arsenic a carcinogen.^[11]
- Food should not be used to calm the child or as a reward.
- Between the 8th and 10th months, snacks should no longer only be pureed, but should also contain pieces of food.
- By the end of the first year of age, the child should be drinking from a cup instead of a bottle.
- Veganism: vegan mothers should pay attention to the supplementation of vitamins B 12 , B 2 , A and D during pregnancy and breastfeeding. In children, it is necessary to supply sufficient amounts Vitamin B12 (otherwise there is a risk of serious irreversible cognitive deficit), D, iron, zinc, folate, n-3 fatty acids (especially DHA), proteins, calcium and the necessary amount of energy. Tofu, beans and soy products can be used as a source of protein. Regular medical and nutritional consultations are important.^[1]

Non-dairy side dishes

- příkrm **podáváme zásadně lžičkou**
- jako **první příkrm** doporučujeme **monokomponentní zeleninové pyré**
- v průběhu jednoho měsíce je možno nasadit **vícesložkové** příkrmy – **zeleninové a masozeleninové**
- po masozeleninovém příkrmu (např. zelenina s kuřetem) lze do jídelníčku zavést **ovocné pyré**
- každý druh ovoce by měl být přidáván do příkrmu v rozmezí 3–4 dnů, abychom příp. odhalili nesnášenlivost
- množství vypitého mléka do konce 2. roku života nemá být menší než 500 ml/den^{[12][13]}

Extras

- **vitamin D** (D2 – *ergokalciferol*, D3 – *cholecalciferol*) – breast milk contains a very small amount of vitamin D
 - the main source for the infant is sunlight (if the mother herself is well supplied and the baby is sufficiently exposed, that's enough)
 - but there is little sunlight in our climate zone (from October to March it is negligible)
 - administration of vit. D as a prevention of rickets is therefore necessary in our country
 - we give vit to all breastfed babies. D (400 IU daily from the 2nd week throughout the first year of life and in the winter months of the second year) – e.g. *Vigantol*® or *Infadin*®
 - this dose is also recommended for children on artificial nutrition
 - vitamin D should be administered alone (combination with vit. A is considered unsuitable with regard to bone metabolism)
 - watch out vit. D is currently contained in various preparations, therefore there is a risk of hypervitaminosis
- **iodine** – mothers often lack iodine, this can be solved by eating fish twice a week
 - if the mother does not eat fish, she should take iodine tablets at a dose of 200 µg/day
- **vitamin K** (*phytoquinone*) – given to prevent bleeding diseases in new borns
 - 1 mg im (*Kanavit*® 1 mg = 0,1 ml) or
 - 2 mg po (1 drop = 1 mg), in fully breastfed infants, 1 mg po must be repeated once a week until the age of 10–12 weeks of age^[14]
- **fluorodine** – for effective prevention of tooth decay
 - from the 6th month of age in a dose of 0.25 mg of ions (this is needed in 0.55 mg of NaF)
 - has no harmful effect on the child's health and reduces tooth decay by up to 50%
 - the administered amount is adjusted when the child starts using toothpaste (a child aged 2–4 swallows a dose corresponding to one tablet when brushing his teeth) (dítě ve věku 2–4let při čištění zubů spolkně dávku odpovídající jedné tabletě)^{[12][13]}

Links

Related Articles

- Child nutrition: Newborn nutrition • Breastfeeding • Infant formula • Infant non-dairy diet • Toddler nutrition • Pre-school, school-age and youth nutrition • Recommendations for infant nutrition 2011 • Recommended nutrient intake (pediatrics)
- Nutritional recommendations: Nutritional recommendations (1. LF UK, NT) • Nutritional recommendations for the adult population • Nutrition of pregnant and lactating women • Nutrition in old age • Factors influencing nutritional needs
- Special nutrition
- Food consumption: Carbohydrates in food • Proteins in food • Fats in food • Mineral substances in food • Trace elements in food • Vitamins • Microorganisms in food • Foreign substances in food
- Failure to thrive • Eating disorders • Nutrient excess or deficiency disease • Food allergies • Food intolerance • Cow's milk protein allergy

External Links

- Zdravystart.cz — Zdravystart.cz — Information on the introduction of non-dairy foods, menus, recommended doses of nutrients (<https://www.google.com/a/zdravystart.cz/ServiceLogin?service=jotspot&passive=1209600&continue=https://sites.google.com/a/zdravystart.cz/zdravy-start/home&followup=https://sites.google.com/a/zdravystart.cz/zdravy-start/home&ul=1>)
- WHO: Infant and young child feeding (<https://www.who.int/en/news-room/fact-sheets/detail/infant-and-young-child-feeding>)
- Cochrane Database Syst Rev. 2014: Early additional food and fluids for healthy breastfed full-term infants (<https://www.ncbi.nlm.nih.gov/pubmed/25420475>)
- PLoS One. 2017: Allergenic food introduction and risk of childhood atopic diseases (<https://www.ncbi.nlm.nih.gov/pubmed/29176842>)

Reference

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- 2.
- 3.
- 4.
- 5.
- 6.
- 7.
- 8.
- 9.
- 10.
- 11.
- 12.
- 13.
- 14.

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