POLTAVA STATE MEDICAL UNIVERSITY

ARTIFICIAL FEEDING OF CHILDREN. CLASSIFICATION AND CHARACTERISTICS OF INFANT FORMULAS. COMPLEMENTARY FEEDING AND CORRECTION OF NUTRITION DURING ARTIFICIAL FEEDING.

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Plan of the lecture

- 1. Defenition of hypogalactia, lactation crisis.
- 2. Significant signs of deficiency of breast milk.
- 3. The reasons of deficiency of milk.
- 4. Recommendations for restoration of lactation.
- 5. Contraindications to breast feeding.
- 6. Rules of artificial feeding.
- 7. Partial breast feeding.
- 8. Weaning food introduction.

Hypogalactia

- Inadequate secretion of milk (hypogalactia) is one of the main reasons for transferring the child to bottle feeding.
- So the ability of medical staff to assess the lactation function of a woman and give her necessary support is very important.

Lactation crisis

- is temporary short-term decrease in the amount of milk due to different reasons.
- The bases of lactation crises are the changes in the hormonal system of women which are associated as well as with an increase in physical activity of women and intense growth of the infant.
- Lactation crises arise at 3-6 weeks, on 3, 4, 7 and 8 months of lactation. Their average duration is 3-4 days; they are completely reversible and does not represent a danger to the health of the child.

Treatment of lactation crisis

- - to inform the mother (at the first consultation) about the possibility of such crises;
- - to explain the mother that the crisis is temporary situation, which demands to come back to the regime of free feeding (up to 10-12 times a day), without night brake;
- - to establish appropriate rest and sleep regime of the mother, to provide necessary support from relatives and medical staff.

Significant signs of deficiency of breast milk

- - gain in weight less than 500 g per month;
- - child has less than 6 times a day urination, concentrated yellow urine with a pungent odor.

Possible signs of deficiency of breast milk

- - a baby is not satisfied after breastfeeding;
- - a child cries often;
- - a short interval between feedings;
- - prolonged breastfeeding;
- - a child refuses from the breast;
- - a child has rare defecation, dry green excrements of a small volume;
- - absents of milk at pumping

The reasons of deficiency of milk

- **I. Factors associated with technique of breastfeeding:**
- - wrong application to the breast:
- - long intervals between feedings and long night interval;
- - using pacifiers and bottles for supplementary feeding;
- - early introduction of complementary food .

II. Factors associated with mother:

- - physical fatigue;
- - lack of confidence;
- - excitement, stress;
- - negative attitudes to breastfeeding;
- - negative attitude to the child;
- - extragenital pathology;
- - use of contraceptives, diuretics;
- - pregnancy;
- - alcohol, drugs, smoking,
- - underdevelopment of the mammary glands (very rare).

III. Factors associated with the condition of the child:

- - diseases;
- - developmental anomalies

Recommendations for restoration of lactation

- 1. Relax at least 48 hours.
- 2. Temporarily increase quantity of feedings to 10-12 times a day.
- 3. During each feeding give both breasts.
- 4. Temporarily enter the night feedings to stimulate the production of prolactin.
- 5. Pump breast milk after each feeding.
- 6. Practice close contact between mother and baby (infant directly contacts to skin) for 6-8 hours.
- 7. Use relaxation techniques (massage, auto training, music therapy) to increase production of milk.
- 8. If necessary, supplementary feeding should be given using alternative means (cup , spoon, dropper), do not use any imitators of mother's nipple.

Recommendations for restoration of lactation

- 9. Application lactogenic factors (special food) and phyto therapy (Melissa, fennel, cumin, anise, Greek nuts, carrot juice with milk, etc.).
- Sometimes good result gives administrating the restorative medicinal vitamin preparations (apilak, multivitamin-polymineral complexes, nicotinic acid) and physiotherapy (ultraviolet waves, ultrasound, massage and acupuncture). It is necessary to explain the woman that excessive water intake does not increase the secretion of milk.
- Psychological support should be directed to the formation of a strong dominant on breastfeeding.
- The time required to restore the reduced lactation depends on many factors, but usually normalization of lactation needs 3-7 days.

Contraindications to breast feeding

- from mother's side:
  - operative measures during delivery. After Cesarean section the child may be put to a breast in 6 hours
  - decompensation of chronic somatic diseases
  - HIV infection, syphilis
  - tuberculosis in mother - the child should be vaccinated and separated from mother on 1,5-2 months
  - treatment by cytostatics, thyroid hormones
  - acute mental diseases in mother

Contraindications to breast feeding

- From the child's side:
  - serious birth trauma with violation of cerebral circulation
  - deep prematurity
  - asphyxia and respiratory distress syndrome
  - the serious form of newborn's hemolytic disease in the first 7 days
  - congenital anomalies with violation of vital functions

Reasons of artificial feeding

- Sometimes there are situations when mother cannot carry out breast feeding because of absence or insufficiency of milk or owing to the social reasons.
- It is possible to change breast milk by artificial formulas for the children's feed, prepared, as a rule, on the basis of the cow’s milk. Formulas on the basis of the goat’s or soya milk are sometimes used.

Cow's milk composition

- The cow's milk contains in 100 ml 3.3 g proteins, that almost 3 times more, than in human milk. A ratio of serum proteins and casein is 1:4. Therefore for preparation the formulas casein should be partially removed from the cow's milk.
- Cow's milk contains about 20 proteins, but the best sensitizing ability have 3: casein, alpha–lactalbumin and beta-lactoglobulin. Alpha-lactalbumin is thermolabile, and it is absent in dry formulas.

Cow's milk composition

- The content of lipids in the cow's and in the human milk is equal -3.5 g/100 ml, but in the cow's milk prevail saturated fat acids, in human milk – polyunsaturated fat acids. The technology of adaptation of artificial formulas includes removing the animal fat from it and adding the oil to their structure.

Cow's milk composition

- In the cow's milk contents of lactose is less than in human: 4.7 g/100 ml. Lactose is submitted by an alpha - isomer which is well acquired in intestine, does not achieve the colon and consequently does not render influence on growing of a microflora and synthesis of vitamins of B group.
- The mineral structure of the cow's milk is more saturated –higher contents of natrium, calcium, and phosphorus and its osmolarity is higher.

Goat’s milk

- Goat’s milk on structure and properties is close to cow’s milk. The quantity of protein, casein, calcium and phosphorus in goat’s milk is even higher, than in cow’s milk. Goat’s milk contents few of vitamins B-12 and folic acid, and the development of deficient anemia is possible. Goat’s milk contains 4.1 g proteins, 4.4 g both lipids and carbohydrates in 100 ml

Artificial formulas

- Undiluted cow's and goat's milk cannot be used for feeding of first 9 months old children since increased contains of protein and salts (high loads on kidneys and endocrine system).
- Formulas on the basis of the cow's milk can be sweet or acidic, adapted and not adapted. Not adapted milk formulas now practically are not applied; they can be prepared by dilution with water of the cow's milk and addition of sugar syrup.

Adapted formulas

- The adapted formulas can be divided on **basic or start**, for children from 0 till 6 months (NAN-1, HIPP-1, Nutrilon-1) and the **follow up formulas** for children of the 2 semester of life (NAN-2, HIPP-2, Nutrilon-2), after 1 year – NAN-3, HIPP-3, Nutrilon-3

Start formulas

- The start formulas are highly adapted to the human milk.
- The content of protein is 1.2-1.5 g, ratio of casein and serum proteins is 40:60.
- Formulas are enriched with vitamins, taurine, nucleotides, L-carnitine.

Caseinic formulas

- In the follow up formulas the general contents of protein is increased, a ratio of a casein and serum proteins is 60: 40, therefore such formulas are named also casein.

Caseinic formulas

- Energy value of caseinic formulas is higher, that corresponds to requirements of the child of the second half-year of life.
- Sometimes caseinic formulas are used for first half-year children, for example, in children with predilection to regurgitations, and also on financial reasons.
- To such formulas belongs Similac, Bona, antireflux variants of NAN, Nutrilon.

Acidic formulas

- Acidic formulas (fermented milk formulas) can be recommended at dysbacteriosis. NAN acidic, Nutrilon acidic and others.
- Acidic nonadapted – are fermented milk (kefir) and its dilutions. Kefir cannot be recommended to the child of the first year more than 1 time a day.

Special formulas

- Formulas of special purpose are used for feeding of premature children and children with low mass of body at a birth, for example, Nenatal, Pre–NAN, Pre-HIPP.
- In the case of often regurgitations can be used antireflux formulas: NAN - antireflux, Nutrilon – antireflux.

Food allergy

- For the children with food allergy on proteins of cow's milk is possible to recommend formulas on a basis of soya protein – Similac-isomyl.
- However allergy on soya protein develops in 50% of children with allergy on cow's milk protein.
- In mild allergy it is possible to use hypoallergic formulas on the basis of a hydrolyzate of proteins of the cow's milk – HIPP-HA, NAN-HA, Nutrilon-HA. Formulas on a basis of goat's milk are sometimes used.

Special needs

- For children with hard allergy it is possible to recommend formulas with a high degree of a hydrolysis – Alfare (from Nestle), Pepti (from Nutricia).
- The same formulas can be used in the case of malabsorbtion syndrom. Disadvantages of these formulas are the bitter test and also they are very expensive.

Serious allergy

- For children with serious allergy it is possible to recommend temporary assignment of formulas with **high degree of hydrolysis** – Alfare (from Nestle), Pepti (from Nutricia). The same formulas are used in the case of malabsorbtion syndrom. Disadvantages of these formulas are in the bitter test and they are very expensive.

Special needs

- In children with lactase insufficiency free of lactose formulas, which is reflected in their name, and also soya formulas are used.
- For the children with phenylketonurya can be used formulas with the low contents of phenylalanin – Phenyl-free, Lophenalac and others.

Rules of artificial feeding

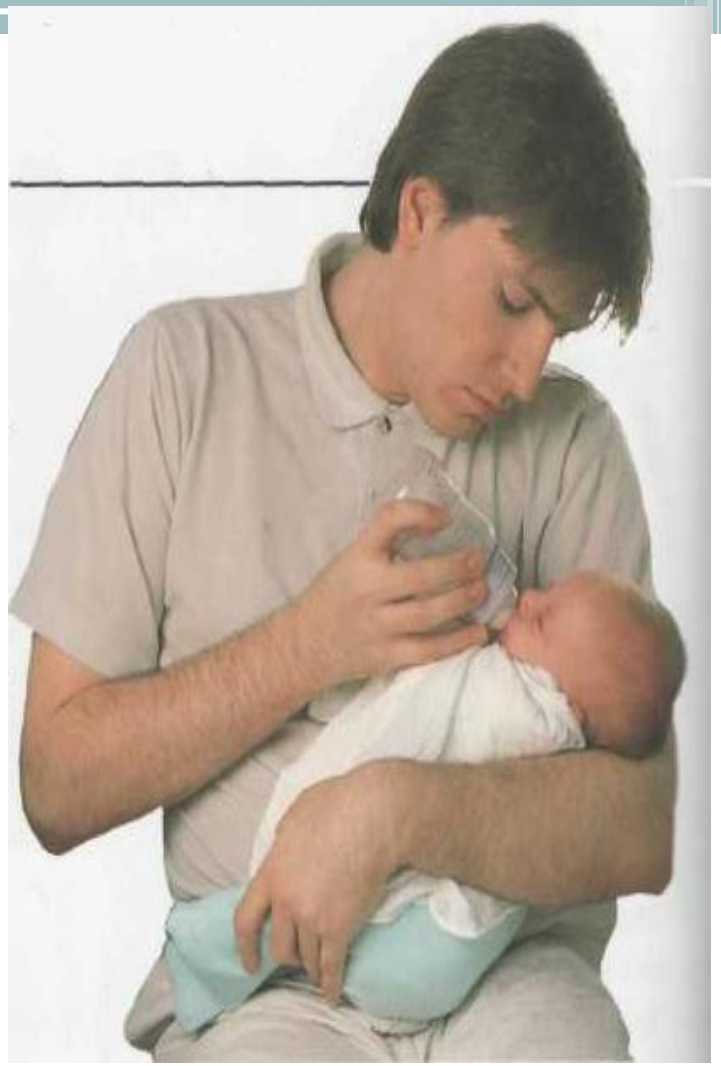
- It is necessarily to calculate volume of a meal. Use known formulas Zaytseva till 10 days of life, volumetric and caloric methods of calculation after 2 weeks
- In the case of artificial feeding intervals between feedings are enlarged. Till 1 month we can feed the child 7 times a day in 3 hours, from 1 till 5 months – 6 times in 3.5 hours, after 5 months – 5 times in 4 hours.

Rules of artificial feeding

- During a feeding mother holds the child on arm. A teat and a neck of a bottle should be filled with milk.
- The sterility of meal is provided with a sterility of teats and bottles, keeping of rules of storage of meal.
- Formulas should be prepared outright before using
- Temperature of meal should be 37-38 degrees C

TECHNIQUE OF FORMULA-FEEDING (FF)

The setting for FF should be similar to that for BF, with the mother or caregiver and infant in a comfortable position, unhurried, and free from distractions.



The infant should be hungry, fully awake, warm, and dry. He or she should be held as though being breast-fed.

The nipple holes should be of a size that allows the milk to drop slowly, and the bottle should be held so that milk, not air, channels through the nipple.

Milk should dribble from the rubber teat if the bottle is inverted.

The bottle and nipple need to be sterilized by boiling before each feed. The rubber teat is boiled for one or two minutes only, but the bottle should be kept in boiling water for at least ten minutes.

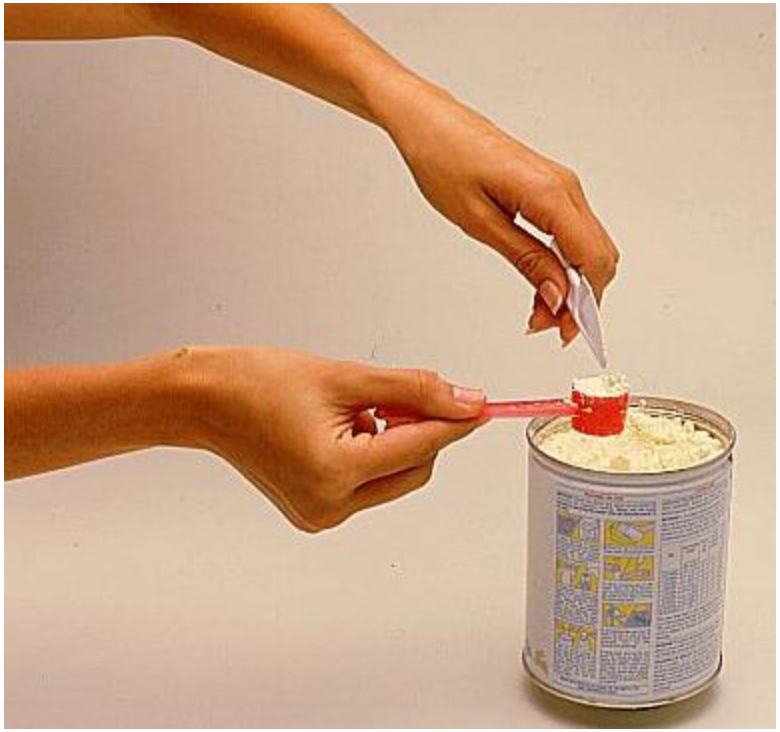
Adapted formulas

- The adapted formulas can be divided on **basic or start**, for children from 0 till 6 months (NAN-1) and the **follow up formulas** for children of the 2 semester of life (NAN-2), after 1 year – NAN-3.

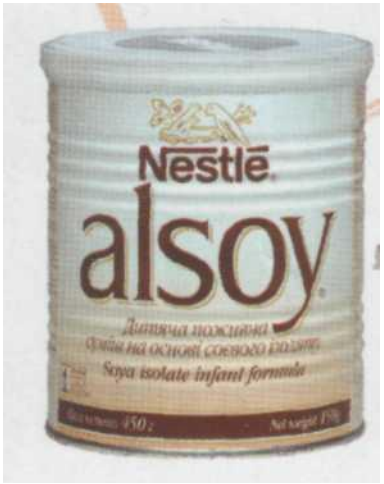
Nutritionally complete formulas

Standard infant formulas:

- **these have intact cow's milk protein (Nan 1, Nan 2)**



- **Soy milk protein (Isomil, Prosobee), triglycerides and lactose, sucrose or glucose.**




Nestlé
al 110
Суха рожевна суміш без лактози
Lactose-free infant formula


Nestlé
alsoy
Soya isolate infant formula


Nestlé
alprem
Special formula for low birthweight infants


Nestlé
NESTOGEN


Nestlé
alfaré


NEW
Nestlé
PreNAN
Сухая молочная смесь
Для недоношенных и маловесных детей
Легкое переваривание и усвоение белка
Способствует полноценному развитию мозга
Обеспечивает оптимальное формирование костной ткани
400г
С рождения
Содержит частично гидролизованный


Premium
Nestlé
NAN
Гипоаллергенный
Предупреждает развитие аллергии
Способствует укреплению иммунитета
1
ПЕРВАЯ ЗАЩИТА
Сухая молочная смесь с рождения


Nestlé
NAN
2


Nestlé
NAN
3
ЗАЩИТА И РОСТ
кая молочная смесь с 10 месяцев


Nestlé
NAN

Partial breast feeding

- It is applied at a hypogalactia, and also at social indications when mother continues study or work.
- Two variants of partial breast-feeding are possible.
- Mother gives artificial formula after each breast-feeding, and if it is possible, from the spun. Such method is more physiological.

Partial breast feeding

- The alternating method – breast and formula in turn.
- It is necessary to have breast-feeding not less than 3 times a day.
- A disadvantage of this method is the fast decreasing of lactation.

Partial breast feeding

- **high level – no more than 20 % of formulas in daily volume of nutrition**
- **medial level - 20-80 %**
- **low level – more than 80 % of formulas in daily volume**

Weaning food introduction

- Fruit juice - since 6 months – 10n, 100 ml maximum in one year
- Rubbed fruits - since 7 months - 5n, no more than 50 ml in one year
- **Vegetables - since 6 months from 100 up to 200 ml in one year**
- Meat products - since 6.5-7 months (in the beginning meat puree) from 30 up to 70 g

Weaning food introduction

- **Cereal milk porridge – since 6 months from 150 up to 200 in one year**
- **Sour-milk - since 8.5-9 months up to 200 ml**
- **Cottage cheese - since 7 months from 30 up to 50 g**
- **Yolk - since 7.5-8 months from 1/8 up to ½**
- **Crackers, bread, cookies since 8 months from 5 up to 10 g**

Thank you for attention!

Literature, was used in the lecture

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- **Інтернет – ресурси:**
- Сайти МОЗ України: https://moz.gov.ua/protokoli Онлайн-платформа з протоколами на засадах доказової медицини Джерела клінічних настанов Інформаційні ресурси http://www.booksmed.com/pediatriya http://pediatriya.info http://health-ua.com/parts/pediatrics
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