The care of newborn babies
Formulas

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The normal newborn infant 37-42. gestational weeks

mean weight: 3200 g

height: 60 cm

Prematurity

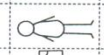
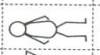
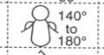
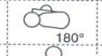
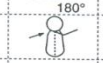
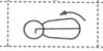
24 < Prematurity > 37 gestational weeks

42 < Postmatured > 37 gestational weeks

How can we assess the gestational age of newborns?

Table 1–2. New Ballard Score for assessment of fetal maturation of newly born infants.*[1]

Neuromuscular Maturity

Neuromuscular Maturity Sign	Score							Record Score Here
	–1	0	1	2	3	4	5	
Posture								
Square window (wrist)	 >90°	 90°	 60°	 45°	 30°	 0°		
Arm recoil		 180°	 140° to 180°	 110° to 140°	 90° to 110°	 <90°		
Popliteal angle	 180°	 160°	 140°	 120°	 100°	 90°	 <90°	
Scarf sign								
Heel to ear								
							Total Neuromuscular Maturity Score	

Physical Maturity

Physical Maturity Sign	Score							Record Score Here
	–1	0	1	2	3	4	5	
Skin	Sticky, friable, transparent	Gelatinous, red, translucent	Smooth, pink, visible veins	Superficial peeling &/or rash; few veins	Cracking, pale areas; rare veins	Parchment, deep cracking; no vessels	Leathery, cracked, wrinkled	
Lanugo	None	Sparse	Abundant	Thinning	Bald areas	Mostly bald		
Plantar surface	Heel toe 40–50 mm: –1 < 40 mm: –2	> 50 mm: no crease	Faint red marks	Anterior transverse crease only	Creases anterior ⅔	Creases over entire sole		
Breast	Imperceptible	Barely perceptible	Flat areola; no bud	Stippled areola; 1- to 2-mm bud	Raised areola; 3- to 4-mm bud	Full areola; 5- to 10-mm bud		
Eye/Ear	Lids fused loosely: –1 tightly: –2	Lids open; pinna flat; stays folded	Slightly curved pinna; soft; slow recoil	Well-curved pinna; soft but ready recoil	Formed & firm instant recoil	Thick cartilage; ear stiff		
Genitals (male)	Scrotum flat, smooth	Scrotum empty; faint rugae	Testes in upper canal; rare rugae	Testes descending; few rugae	Testes down; good rugae	Testes pendulous; deep rugae		
Genitals (female)	Clitoris prominent & labia flat	Prominent clitoris & small labia minora	Prominent clitoris & enlarging minora	Majora & minora equally prominent	Majora large; minora small	Majora cover clitoris & minora		
							Total Physical Maturity Score	

Maturity Rating	Score	–10	–5	0	5	10	15	20	25	30	35	40	45	50
	Weeks	20	22	24	26	28	30	32	34	36	38	40	42	44

*Reproduced, with permission, from Ballard JL et al: New Ballard Score, expanded to include extremely premature infants. J Pediatr 1991;119:417.

[1]See text for a description of the clinical gestational age examination.

Comparing of the birthweight to the gestational age

Appropriale for gestational age AGA

Small for gestational age SGA

- symmetric
- asymmetric

Large for gestational age LGA

Is it important distinquish between prematurity or SGA patient?

The first physically examination of newborn infant

Infant evaluation at birth:

Apgar score one minute and 5 minute after complete birth

What does it show the Apgar score?

Is there any meaning of the Apgar score?

Table 1–5. Infant evaluation at birth—Apgar score.[1,2]

	Score		
	0	**1**	**2**
Heart rate	Absent	Slow (< 100)	> 100
Respiratory effort	Absent	Slow, irregular	Good, crying
Muscle tone	Limp	Some flexion	Active motion
Response to catheter in nostril[3]	No response	Grimace	Cough or sneeze
Color	Blue or pale	Body pink; extremities blue	Completely pink

[1]Reproduced, with permission, from Apgar V et al: Evaluation of the newborn infant—Second report. JAMA 1958;168:1985.

[2]One minute and 5 minutes after complete birth of the infant (disregarding the cord and the placenta), the following objective signs should be observed and recorded.
[3]Tested after oropharynx is clear.

Birth trauma

caput succadeum

fractures – humeral, femoral, clavicula

brachial plexus injury – palsy

hemorrhage

Hyberbilirubinaemia in infancy

unconjugated -orange **conjugated – green**

pathophysiological causes of „physiological” jaundice:

haematological

the liver and the intestine not enough matured

Prevention and neonatal screening

Hepatitis B

PKU, galactosaemia, hypothiroidism

missing of biotinidase

more 24 enzime defect

Feeding of the normal newborn

till the 6 month exclusively breast feeding

requering of total energy intake
120 kcal/kg/day

60-70 kcal/100 ml energy in breast milk

Table 3. The Baby-Friendly Hospital Initiative: ten steps to successful breastfeeding

- Have a written breastfeeding policy that is routinely communicated to all healthcare staff
- Train all healthcare staff in skills necessary to implement this policy
- Inform all pregnant women about the benefits and management of breastfeeding
- Help mothers initiate breastfeeding within 1.5 h of birth
- Show mothers how to breastfeed and maintain lactation, even if they should be separated from their infants
- Give newborn infants no food or drink other than breast milk, unless medically indicated
- Practice rooming in – that is, allow mothers and infants to remain together 24 h/day
- Encourage breastfeeding on demand
- Give no artificial teats or pacifiers (also called dummies or soothers) to breastfeeding infants
- Foster the establishment of breastfeeding support groups and refer mothers to them on discharge from the hospital or clinic

The possible preventional effect of duration of breast feeding in case of

infections

allergic diseases

diabetes mellitus I.

IBD

No Breast Feeding

Till 6 month: formulas

a) if not enough breast milk

b) if anycase of contraindication of breast feeding

c) if any special need in case of the patients‘s disease

After 6 month: vegetable, fruits, or cereal

Table 1. Mean macronutrient and energy contents in mature human milk and in cow's milk

Component	Mature human milk (≥14 days)	% of energy	Cow's milk	% of energy
Protein	1.0 g/100 g	6	3.4 g/100 g	21
of which caseins	0.4 g/100 g (40% of protein)	2.4	2.8 g/100 g (80% of protein)	17
Fat	3.8 g/100 g	52	3.7 g/100 g	51
Lactose	7.0 g/100 g	42	4.6 g/100 g	28
Minerals	0.2 g/100 g	–	0.8 g/100 g	–
Energy	66 kcal/100 g	100	65 kcal/100 g	100

Adapted from Koletzko [10].

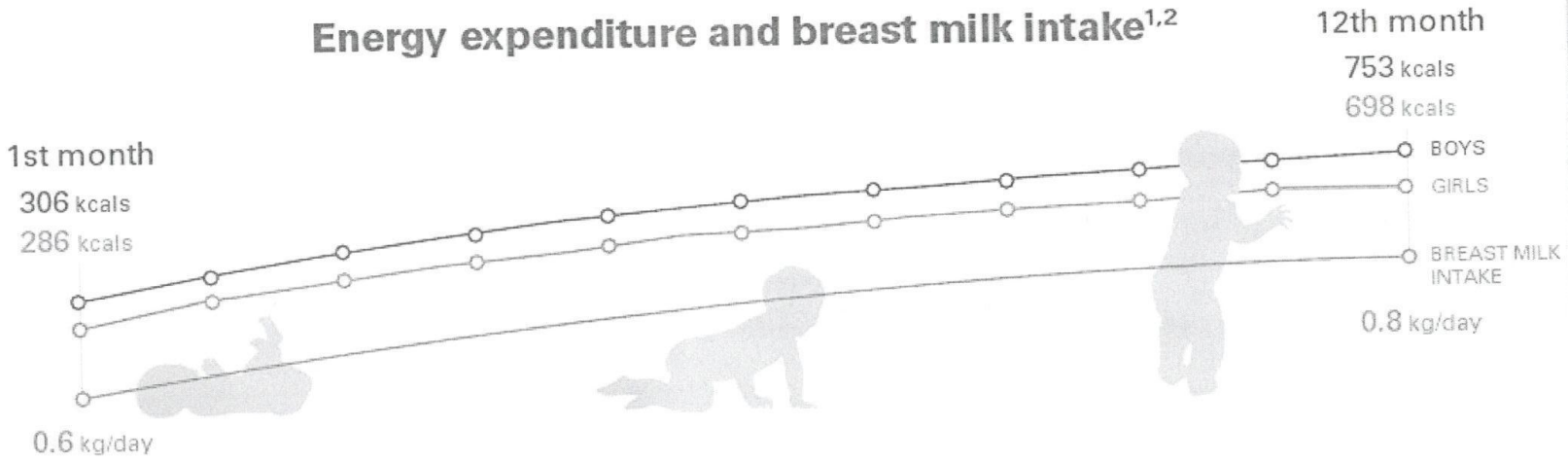
FAT incl AA,DHA	1-2 % of TEI		Ø	
Pre/or probiotics	++		Ø	
Vitamin K	±		→	

Table 1. Examples for special formulae for infants and children with certain diseases and situations

Disease or condition	Energy density	Modification of macronutrients	Modification of electrolytes, trace elements and vitamins per 100 kcal energy
Cow's milk protein allergy	⇔	Protein: extensively hydrolyzed or amino acids only	⇔
Phenyketonuria	⇔	Phe free	⇔
Glutaraciduria	⇔	Lysin free	⇔
Galactosemia	⇔	Lactose free	⇔
Infant with frequent regurgitation	⇔	Addition of starch or carob bean gum	⇔
Infants with failure to thrive, poor intake, heart disease	⇑	Normal relation of P: L:CH, but higher concentration, polyglucose to reduce osmolality	⇔
Cholestasis	⇑	Lipids, but MCT ⇑	Fat-soluble vitamins ⇑
Cystic fibrosis	⇑	Protein: hydrolyzed lipids ⇔, but MCT ⇑	Na ⇑, Se ⇑ Fat-soluble vitamins ⇑
Renal insufficiency	⇔	Protein: ⇓	K ⇓, P ⇓
Short bowel syndrome	⇔	Protein: extensively hydrolyzed Lipids ⇔ but MCT ⇑	⇔
Oxidation of long-chain fatty acids, lymphatic loss	⇔	Lipids: ⇓, but MCT ⇑	⇔
Intractable epilepsy, GLUT1 transporter defect, PDH deficiency	⇔	Lipids ⇑⇑⇑	⇔

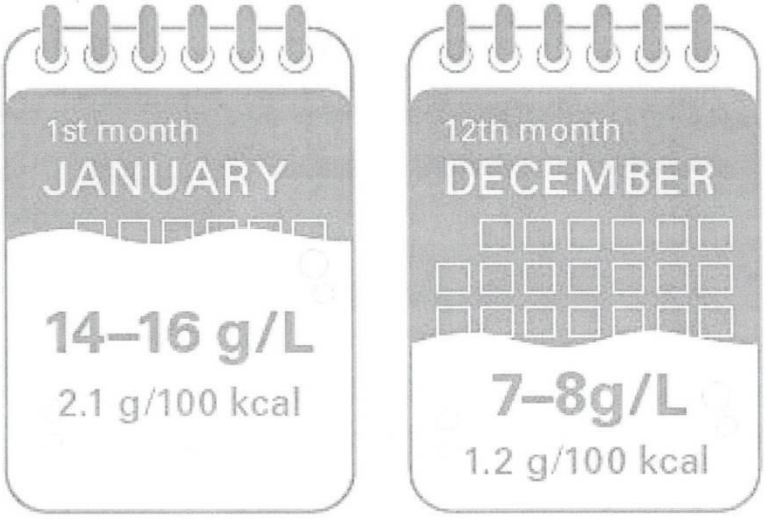
PDH = Pyruvate-dehydrogenase; ⇔ = Unchanged, ⇑ = increased, ⇓ = decreased compared to standard formula for age.

Energy expenditure and breast milk intake[1,2]



Infants' total energy expenditure increases rapidly, doubling during the first year of life.[1] This is reflected in a corresponding increase in breast milk consumption.[2]

Protein content of breast milk[3]



Protein content varies at each stage of lactation and decreases significantly after several months of breastfeeding.

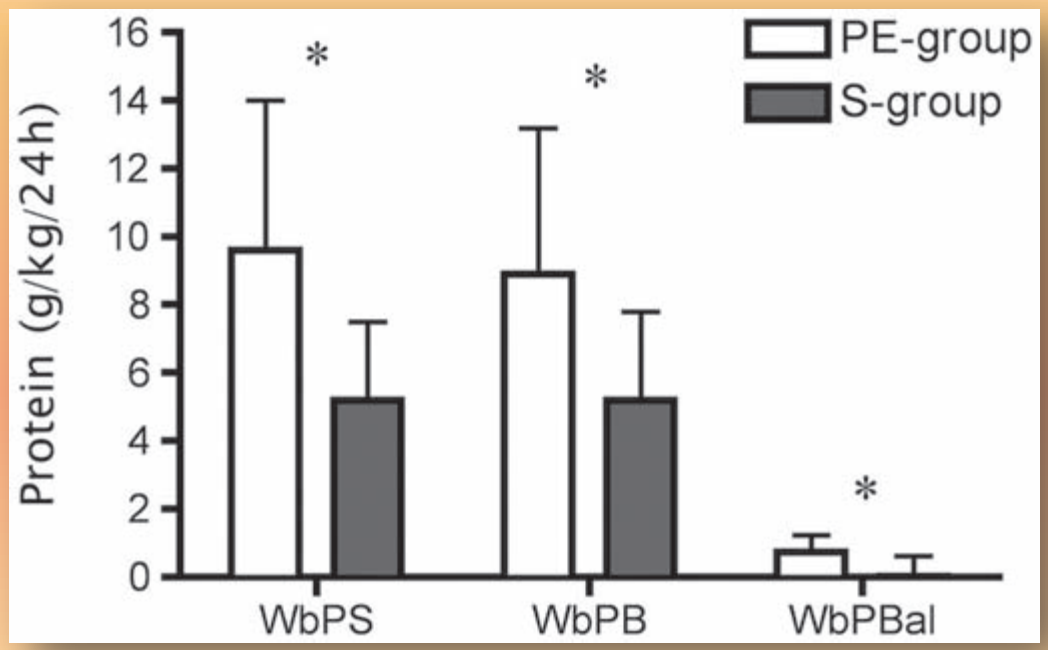
Protein kinetics with the standard and protein-energy rich formulas in time of cath up growth

Figure 1 Rates of protein kinetics (g/kg/24 h) in the protein and energy enriched formula fed group (PE) whas significantly higher than standard formula group S $p<0.05$.

WbPB: whole body protein breakdown;

WbPBal:whole body protein balance;

WbPS: whole body protein synthesis.



Consequently, a positive WbPBal was achieved in the PE-group, which was signifi cantly higher than in the S-group. (*Arch Dis Child* 2011;**96**:817–822.)

Cow milk (CM) protein allergy- prevention and treatment 1

Formulas of treatment

- eHF – W
- eHF – C
- Semielementery and AA

Formulas of the prevention

- pHF - W

Cow milk (CM) protein allergy- prevention and treatment 2