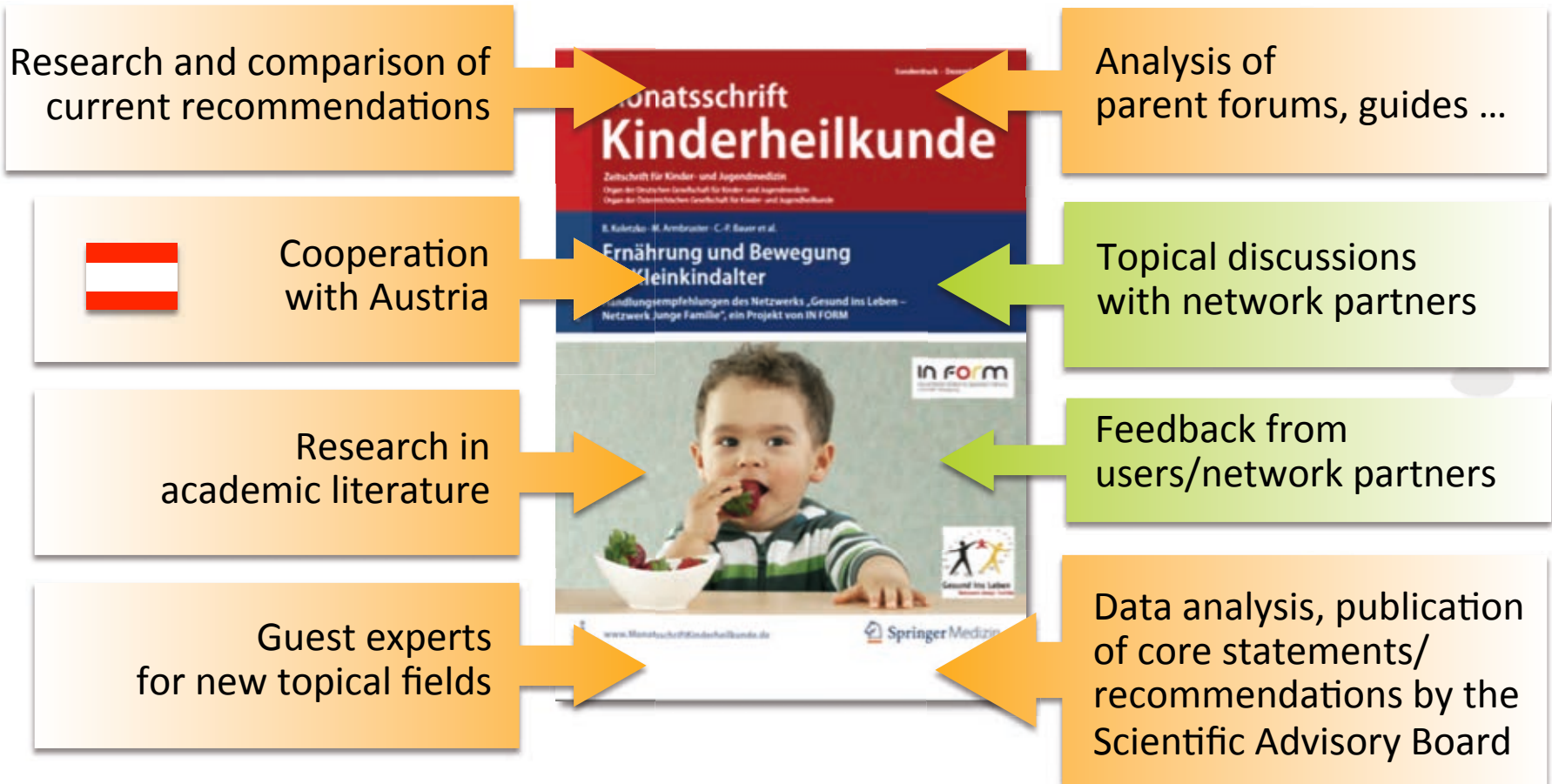




Diet and exercise during infancy
Recommendations by Healthy Start –
Young Family Network,
an initiative by IN FORM

Slide presentation

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Diet during infancy

The transition from baby food to infant food: characteristics

- A pronounced increase in the variety of food
- A reduction in the proportion of milk
- A rise in mixed/family food
- Active food selection by the child
- Conditioning of weight development
- Increased risk of deficiencies
(above all iodine, iron, vitamin D, omega-3 fatty acids)*

*EFSA. *EFSA Journal* 2013, 11: 3048

Topics addressed by the recommendations

- Dietary patterns
- Drinks
- Vegetarian diet
- Risk of aspiration
- Protection against foodborne infection and intoxication



Recommendation – status quo

**Desirable
toward the end of the first year**



Actual



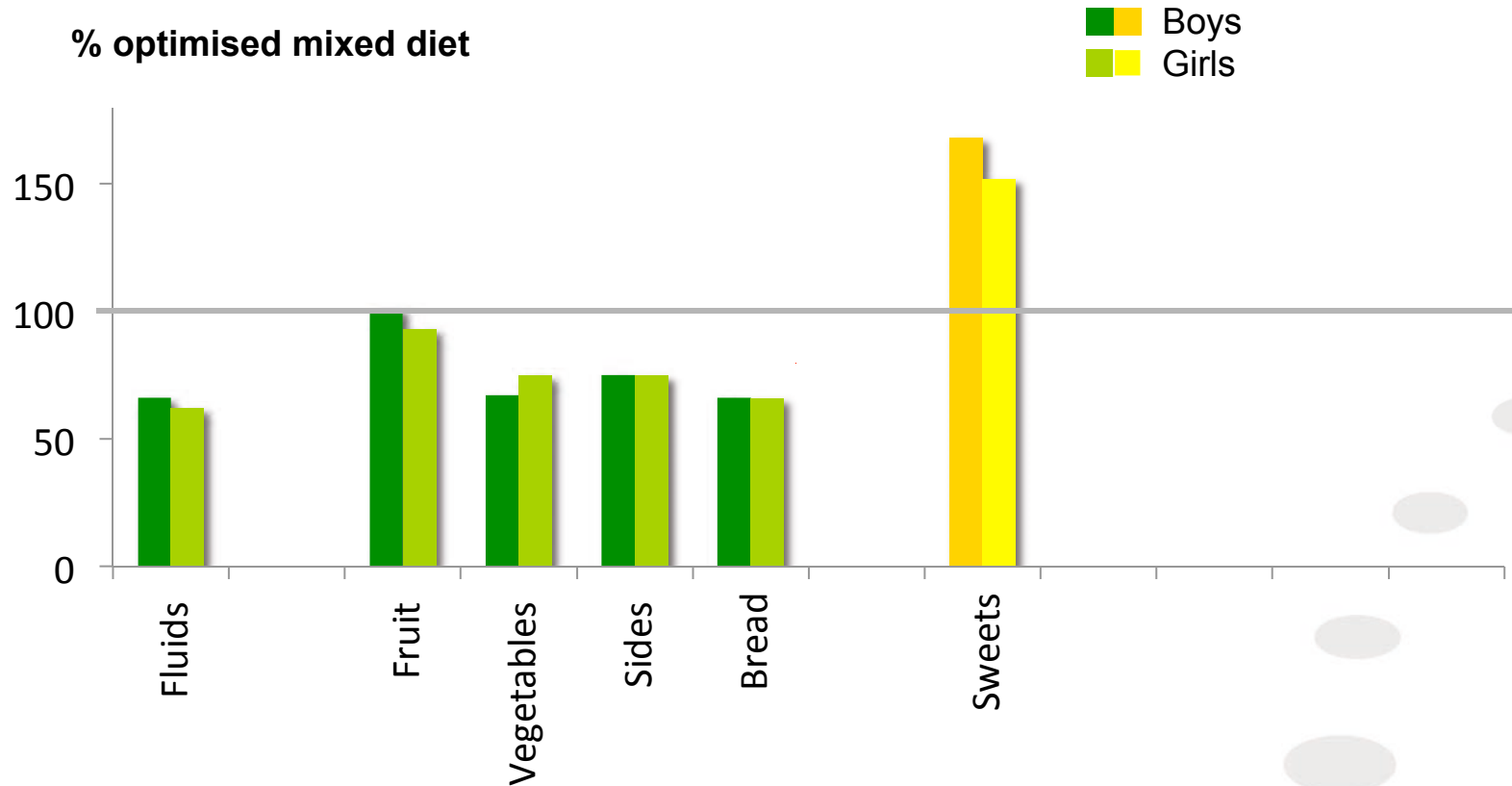
42% of children
aged 18 months



66% of children
aged 18 months

Foterek et al. *Ernährungs Umschau* 2012, 59: 442–447

Food consumption by small children compared with an optimised mixed diet



Hilbig et al. *Akt Ern Med* 2011

Too many saturated, too few polyunsaturated fatty acids

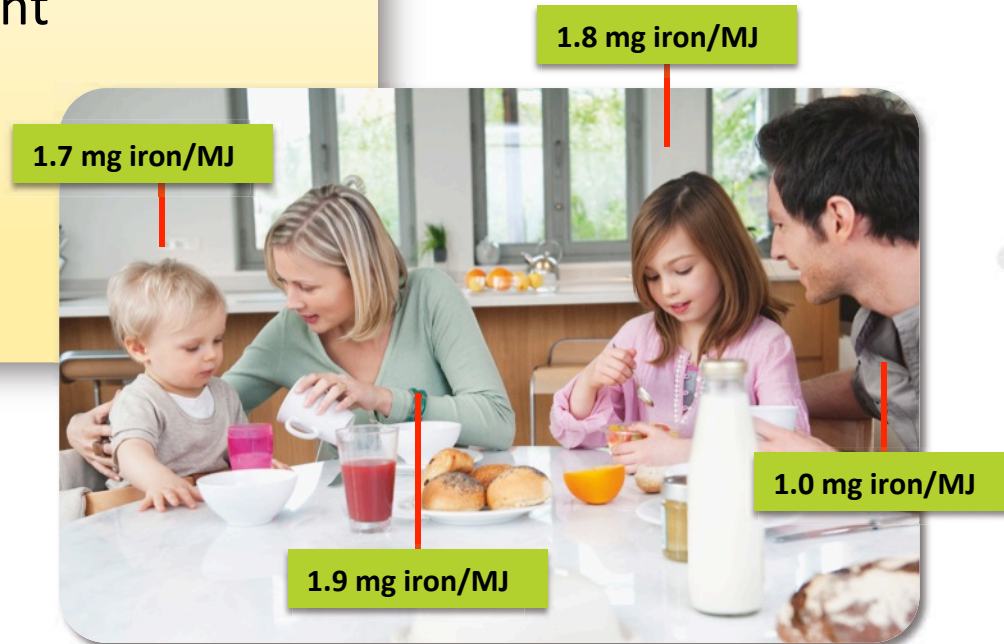
Children aged 1 to 4

	Boys	Girls	
Fat	34.2 % of energy	35.2 % of energy	
Saturated fatty acids	15.9 % of energy	16.4 % of energy	<i>Target: ≤10 % of energy</i>
Poly-unsaturated fatty acids	3.7 % of energy	3.7 % of energy	<i>Target: 6–8 % of energy</i>

Dietary study to determine food consumption among infants and small children (VELS; The Nutrition Report 2008)

Recommendations

- A balanced and varied family diet can satisfy the needs of the infant
- Infants can and should take part in family meals



Infants and parents have similar nutrient requirements per megajoule

D-A-CH Reference Value 2013: recommended energy intake per MJ for children (aged 1 to 4) and adults (aged 25 to 51); 1 MJ = 239 kcal

Recommendations

Balanced family diet =

- Plenty of liquids and vegetable products
- Moderate amounts of animal products
- Sparing quantities of sugar and sweets, salt, fats with a high proportion of saturated fatty acids and snack products



© aid infodienst e.V. Idea: S. Mannhardt

Consume plenty

- Drinks:

Water or other unsweetened/sugar-free beverages are best

Water



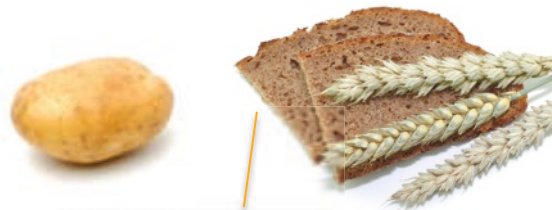
- Vegetable products:

Fruit, vegetables, cereals, cereal products, potatoes

Vit. C, folate, provit. A, K, Mg, fibre



Vit. B₁, Mg, fibre

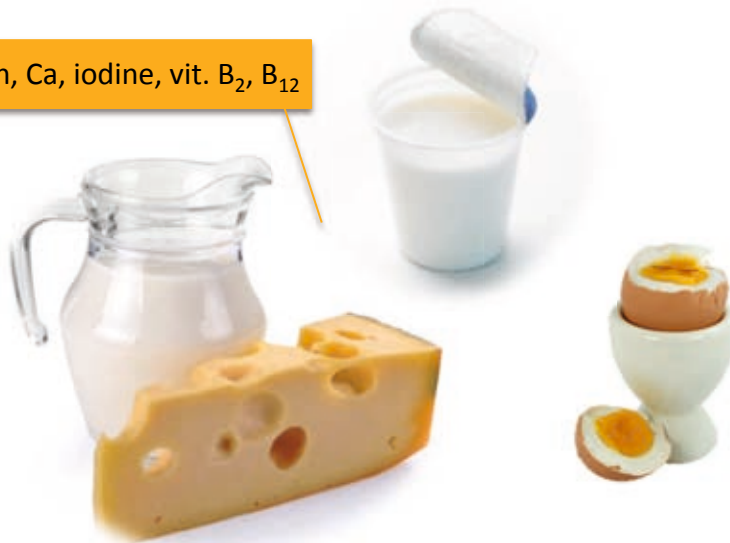


Balanced diet

Consume in moderation

- Animal products

Protein, Ca, iodine, vit. B₂, B₁₂



Protein, vit. D, DHA/EPA, iodine



Protein, vit. B₁, B₆, B₁₂, niacin,
biotin, iron, zinc



Recommended fish intake

1–2 portions of fish per week,
including at least 1x fatty fish

DHA, vitamin D and iodine



Fat intake

Consume sparingly

- Fats containing a high proportion of saturated fatty acids

Give preference to

- Vegetable oils,
e.g. canola oil



Recommendation

Healthy infants can enjoy a balanced diet without requiring any special products

Tip for selecting foods

Pay attention to the 'plenty, moderate, sparing' categories



Liquid intake for infants

	1 year		2 years		3 years		4 years	
	Boys	Girls	Boys	Girls	Boys	Girls	Boys	Girls
Median	508	462	592	526	562	524	638	561
Target*	820		820		820		820	

Information in ml/day, Nutrition Survey (VELS) Kiel, Hamburg, Paderborn, Berlin, Dortmund, Bonn, Fulda, Jena, Sigmaringen, Regensburg

Research Institute of Child Nutrition 2003

*D-A-CH reference values for water intake in beverages 2012

Sugary drinks

(e.g. lemonade, juice, sweetened teas)

- Promote excessive energy intake ¹
- Increase the risk of obesity²
- Can lead to a preference for sweet foods
- Cause a deterioration in nutrient supply³
- Increase the risk of tooth decay⁴
- Acids erode dental enamel⁵

1. e.g. Wang et al. *Arch Pediatr Adolesc Med* 2009; 163:336-343

2. e.g. Hu/Malik. *Physiol Behav* 2010; 100:47-54. Muckelbauer et al. *Obes Facts* 2009; 2:282-285

Similar results in NL: de Ruyter et al. *N Engl J Med* 2012; 367:1397-406, Deboer et al. *Pediatrics* 2013; 132:413-420

3. Marshall et al. *J Am Coll Nutr* 2005; 24:65-75

4. WHO, Geneva 2003

5. Vadiakas. *Eur Arch Paediatr Dent* 2008; 9:114-125

Recommendations

Children should drink water (or other unsweetened/sugar-free beverages)

- With each meal and also between times
- From a glass, cup or open mug



A vegetarian diet for infants?

- The more biased the nutrition and the younger the child, the greater the risk of nutrient deficiency
- **Ovo-lacto-vegetarian diet** (*with milk & egg*)
Reduced supply of iron, zinc, and long-chained omega-3 fatty acids
- **Vegan diet** (*only vegetable products*)
Without supplements, this diet will lead to nutrient deficiency (protein, iron, zinc, calcium, vitamin B₁₂, vitamin D, long-chained omega-3 fatty acids, etc.) a failure to thrive, developmental disorders

Recommendations

Ovo-lacto-vegetarian diets

- A balanced vegetable diet, including milk/dairy products and eggs, is also possible for small children
- Parents must ensure a sufficient supply of iron and zinc

Vit. C improves iron utilisation



Recommendations

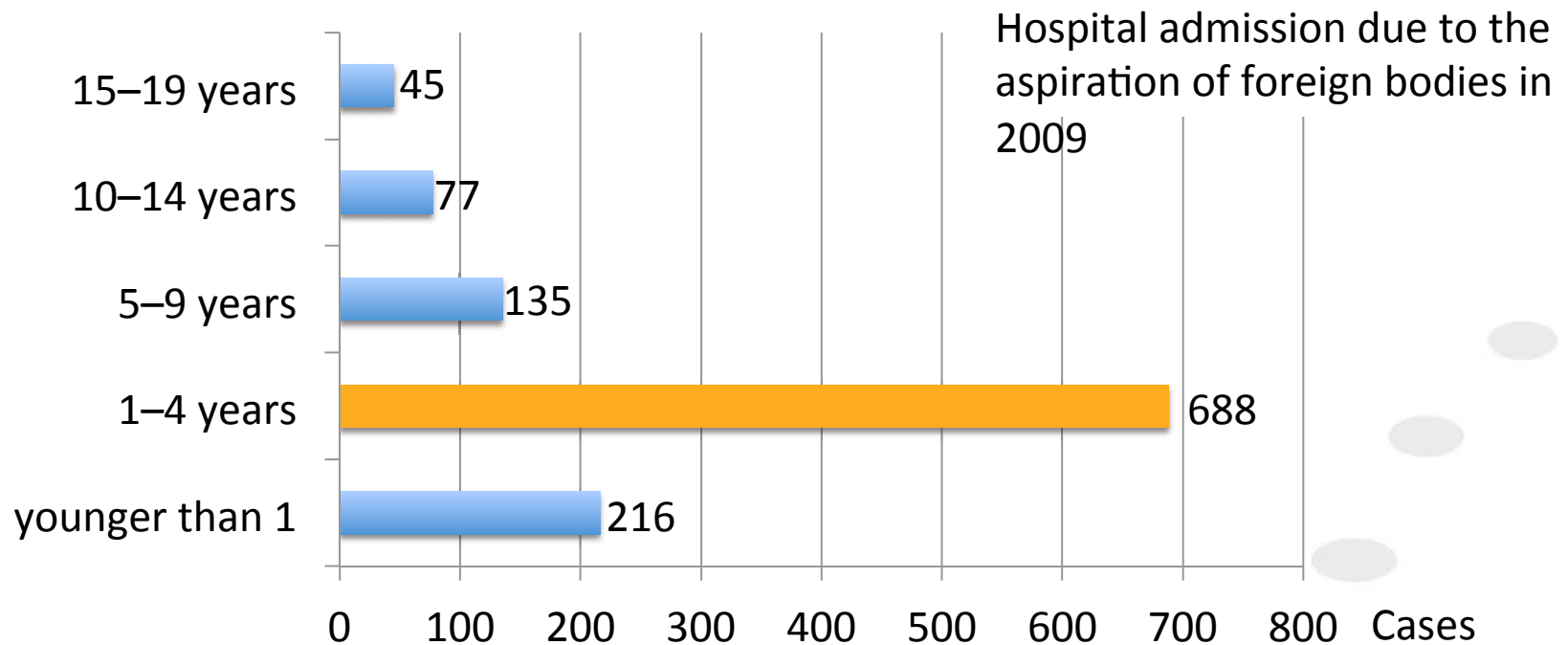
Vegan diet

- Parents must be advised against a purely vegan diet
- If parents decide to give their child a vegan diet nonetheless, it will always be necessary to provide special medical advice and nutrient supplements as the risk of nutrient deficiency is too severe



Choking – Aspiration

Particularly high risk for small children



Link. Foreign body aspiration among children. Distribution of cases with inpatient admission diagnosis 'Foreign body in the respiratory tract' (ICD-10: T17) in the age group 0 to 19 years (n=1161) in the Federal Republic of Germany in 2009. Data source: Federal Statistical Office, 2012: <http://www.qucosa.de/fileadmin/data/qucosa/documents/8660/Fremdk%C3%B6rperaspiration%20bei%20Kindern%20Bibliotheksversion.pdf>

Recommendations

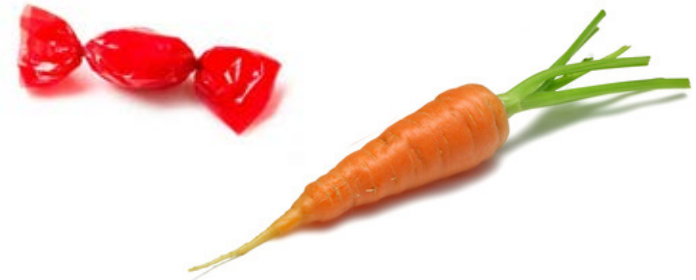
- Nuts, almonds and other hard foods in a 'peanut size' present the risk of aspiration
(swallowing into the windpipe)
- They should be kept out of the reach of small children



Risk of aspiration

Critical foods

- Nuts and seeds
- Berries, grapes with seeds
- Legumes
- Raw root vegetables, whole or in pieces
- Fish with bones
- Large pieces of meat
- Boiled sweets, chewing gum
- Bubble tea



Foodborne infections and intoxication



Significant risk during infancy

- Children 0 to 5: the immune system is not yet fully mature
- Above all salmonella, campylobacter, yersinia, EHEC
- Raw animal products may contain these pathogens
- EHEC also found in vegetable products, e.g. sprouts
- Noroviruses and hepatitis viruses are found in frozen foods
(strawberries in nurseries and schools in Eastern Germany, 2012)

Recommendations

Small children should not eat any raw animal products. They include

- Raw or rare meat
- Raw cold cuts
- Raw fish
- Unpasteurised milk, soft cheese made of unpasteurised milk
- Raw eggs
- Insufficiently heated foods, prepared using these ingredients



Recommendation

Eat warm meals shortly after their preparation

If leftovers remain ...

- Leave to cool quickly
- Reheat:
+70°C for at least 2 minutes



Recommendations

Adhere to the general rules of hygiene when preparing and storing food:

- Thoroughly wash your hands before preparing food
- Store raw and cooked foods separately and at the recommended temperatures
- Do not use the same kitchen utensils for raw and cooked foods
- Pay attention to cleanliness and hygiene





Learning to eat

Background

- End of the 1st year: transition to family food
→ **The variety of foods** increases
- Eating habits and preferences acquired during infancy persist into adulthood*

Parents are role models and

- Provide a 'learning environment' and the range of food
- Recognise the child's signals and needs and respond to them
- Therefore nurture and strengthen the child's development



*Nicklaus. *Appetite* 2009; 52:253–255

Topics addressed by the recommendations

- Shared meals
- Recognising hunger and satiation
- Enlarging the variety of foods



The importance of regular meals

- Fewer meals – greater risk of obesity*
- Relatively high energy requirements – low stomach capacity
- Reliable structure in everyday routines
- Individual organisation dependent on cultural habits



*Koletzko/Toschke. *Crit Rev Food Sci Nutr* 2010; 50:100–105,
Kaisari et al. *Paediatrics* 2013; 131:958–967

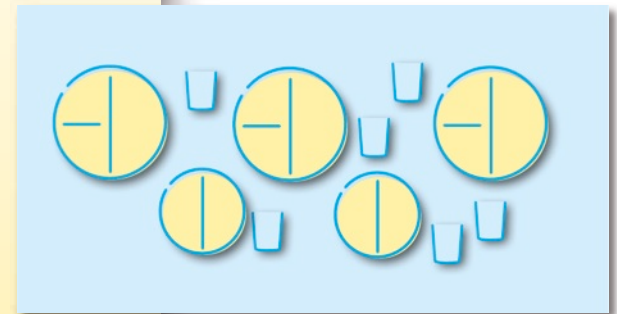
Recommendations

Small children should receive their meals in a regular rhythm

- e.g. 3 main meals and 2 smaller meals in between
- Mealtimes and times without food must alternate

During the breaks between meals (e.g. for 2–3 h):

- Do not offer snacks, sugary drinks, milk
- Water at any time



We need a communal experience to learn how to eat

- More family meals – more frequent recommended eating patterns, weight tends to be normal¹
- A pleasant social environment conditions food preferences and eating habits²
- Family meals are an important part of communal life (satisfaction of needs, shared experience, cohesion, communication)



'A good meal is a balanced mix of nutritious food, care, close bonds, a sensual experience and unpredictable human emotions and moods' (J. Juul)

1. Hammons/Fiese, *Paediatrics* 2011; e1565–e1574
2. Birch/Anzman-Frasca, *Physiol Behav* 2011; 641–645

Recommendations

Shared meals are desirable

- Sufficient time and peace
(without distraction, e.g. if a TV set is on)
- A shared family meal at least once per day
- In a friendly atmosphere
(positive eating experience)



Eating independently

- Acquire personal experience, promote self-awareness
- Learning eating skills (handling cutlery etc.)
- The speed of development differs from child to child*



*Carruth. *Am Diet Assoc* 2004; 104: 51–56

Recommendations

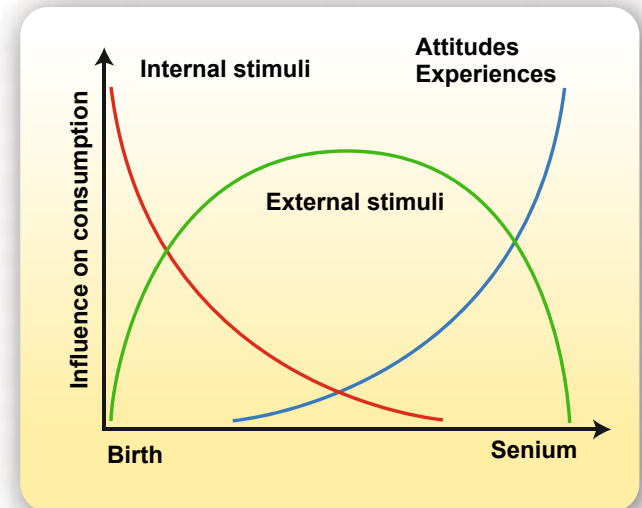
Parents should allow their child and should support its efforts

- to eat by itself
- to participate actively in mealtimes



Recognising hunger and satiation

- Hunger and satiation = internal mechanisms to control food intake
- The ability to exercise self-control = aligning the consumed quantity to suit physiological needs



Ellrott. *Oralprophylaxe Kinderzahnheilkunde* 2009; 31: 78–85

Promoting self-control

- Early prevention of obesity¹
- Frequent eating without hunger – higher BMI²
- Low perception of satiation – higher BMI²



1. IOM 2011

2. Faith et al. *Hum Heredity* 2013; 75: 80–89

This strengthens self-control

- Have faith in the child's abilities
- Be aware of signals (hunger, satiation, emotions ...)
- Interpret the signals correctly
- Respond appropriately

Consumed quantities

- Differ from time to time
- Are sufficient if the child is healthy, happy and content



This impedes self-control

- False interpretation of signals
- Bans
- Compulsion
- Rewards for eating
- Rules like 'finish your plate'
- Inappropriately large portions on the plate



Recommendations

Parents should respect the hunger and satiation signals that their child shows

- Parents are responsible for a balanced range of food
- The child alone decides how much it wants to eat

Start with a small portion, add more if necessary

- Parents initially offer small portions, i.e. the child takes its own portion as soon as its is able to help itself
- The child can ask for or take more until it is full



Recommendations

Parents should allow their child to concentrate on eating

- They must avoid distractions
- No tricks, no persuasion scenarios, promises or games to animate the child to eat
- Food should not be used as a reward or a punishment
- Eating is not an achievement. No excessive praise for what the child eats, and how much



Recommendations

If the child ends the meal prematurely or refuses any food

- The parents should encourage the child to continue eating no more than 1–2 times
- The parents must not offer alternative food instead



Variety as early as possible

- Benefits for nutrient intake
- Pleasure of eating
- Table culture
- Habits remain for a long time
- Rejection (food neophobia)
is most frequent between the age of
2 and 6*

* Dovey et al. *Appetite* 2008; 50: 181–193



Preferences – a question of habits

- Offering several times¹
- Combination with familiar foods²
- Child-appropriate preparation
- With time, pleasure, spontaneity and together with others (role model)
- With all the senses
- No compulsion³



1. Birch/Anzman-Frasca. *Physiol Behav* 2011; 104: 641–645

2. Pliner/Stallberg-White. *Appetite* 2000; 34: 95–103

3. Dovey et al. *Appetite* 2008; 50: 181–191

Recommendations

Children should be encouraged to experiment with and discover new foods/dishes

- What they look like
- How they smell and feel
- What they taste like
- Which consistency they have

Parents should provide a varied range of foods



Recommendations

Children acquire taste preferences after repeated attempts

- Parents offer new foods/dishes on several occasions and without compulsion
- Parents accept the child's (temporary) rejection

Offer foods individually as well

→ **Discover their specific taste**



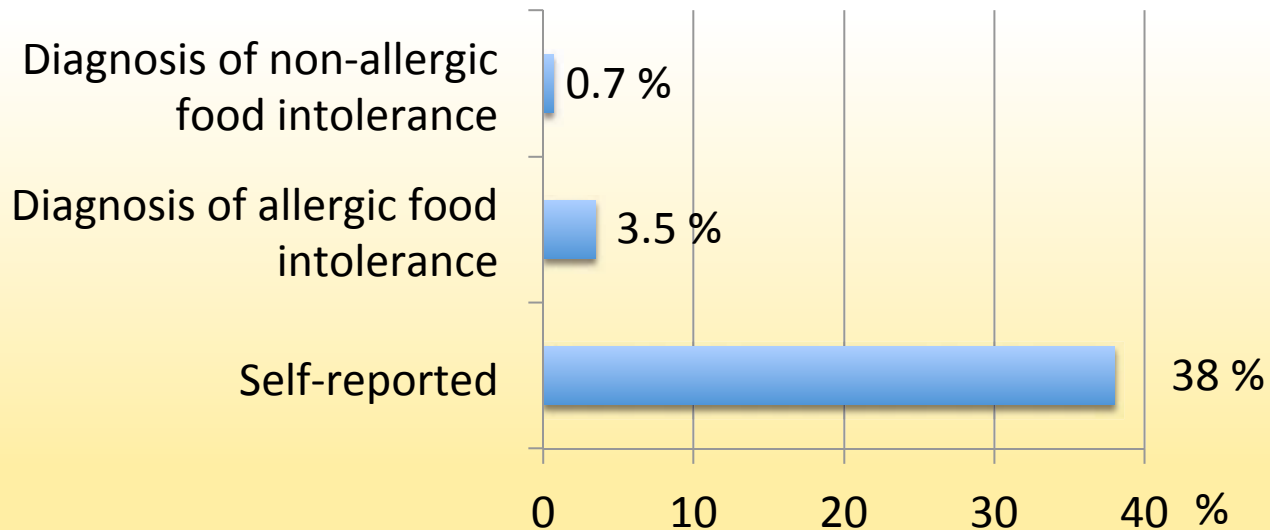


Food intolerances

Symptoms of food allergies



Assumed more often than real



- Survey of children and adolescents (aged 0–17)
(Roehr et al. *Clin Exp Allergy* 2004; 34: 1534–41)
- Danger: Exclusion of foods based merely on suspicion

Excluding foods

- Risk of malnutrition
- A burden for the child ('eating different things in a group')
- No benefits in terms of allergy prevention

(S3 Guideline to Allergy Prevention)



Frequency among small children

- Food allergy: approx. 4%¹
- Food allergy in the case of atopic dermatitis: 33 to 50%
- Non-allergic food intolerances: rare
- Lactose intolerance: small children are generally unaffected²



¹ Augustin et al. 2010

² Heyman. *Paediatrics* 2006; 118: 1279–1286

Developing tolerance

- Many food allergies subside by school age
- Cow's milk allergy: 90%¹
- Chicken egg allergy: up to 70%²
- Peanut allergy: up to 20%²



¹ Koletzko et al. *Monatschr Kinderheilkd* 2009; 7: 687-91

² Lange. *Paediatr Allergol* 2009; 12: 7-9

Recommendations

- Merely the suspicion of a food intolerance is insufficient to justify a longer-term exclusion of foods from a diet
- Doing so may be a significant burden to the child and damage their health; it must only take place based on a reliable diagnosis



Reliable diagnosis

- Medical history
- Elimination
- Provocation with suspected foods
- If necessary, skin test or in-vitro test for IgE antibodies



Not suitable

- Determination of IgG and IgG4
- Bio-resonance
- Kinesiology
- Electro-acupuncture
- Cyto-toxic food test
- Lymphocyte transformation test
- Vega test
- Iris diagnosis
- Hair analyses
- Diagnosis by dowsing etc.



Coeliac disease

- Frequency: 0.7% of small children¹
- Diagnosis: Determination of antibodies and examination of the mucous membranes of the small intestine²
- Dietary treatment: permanent gluten-free diet



¹ Koletzko. *Monatschr Kinderheilkd* 2013; 161: 63–78

² Husby et al. *J Pediatr Gastroenterol Nutr* 2012; 54: 136–160

Neurodermatitis – influencing factors

- Allergens
- Environmental factors
- Stress
- Climate
- Bacteria/fungi
- etc.
- Sugar is not an exacerbating factor*

* Ehlers et al. *Acta Derm Venereol* 2001; 81: 282–284

Recommendation

A dietary treatment of neurodermatitis is only justified if there is a proven food intolerance



Recommendations

- The food or ingredient in question must be avoided altogether if a food allergy is proven
- The remaining diet should be balanced and varied
- It must satisfy the age-appropriate need for energy and nutrients
- Dietary treatment must always include expert advice





Physical activity

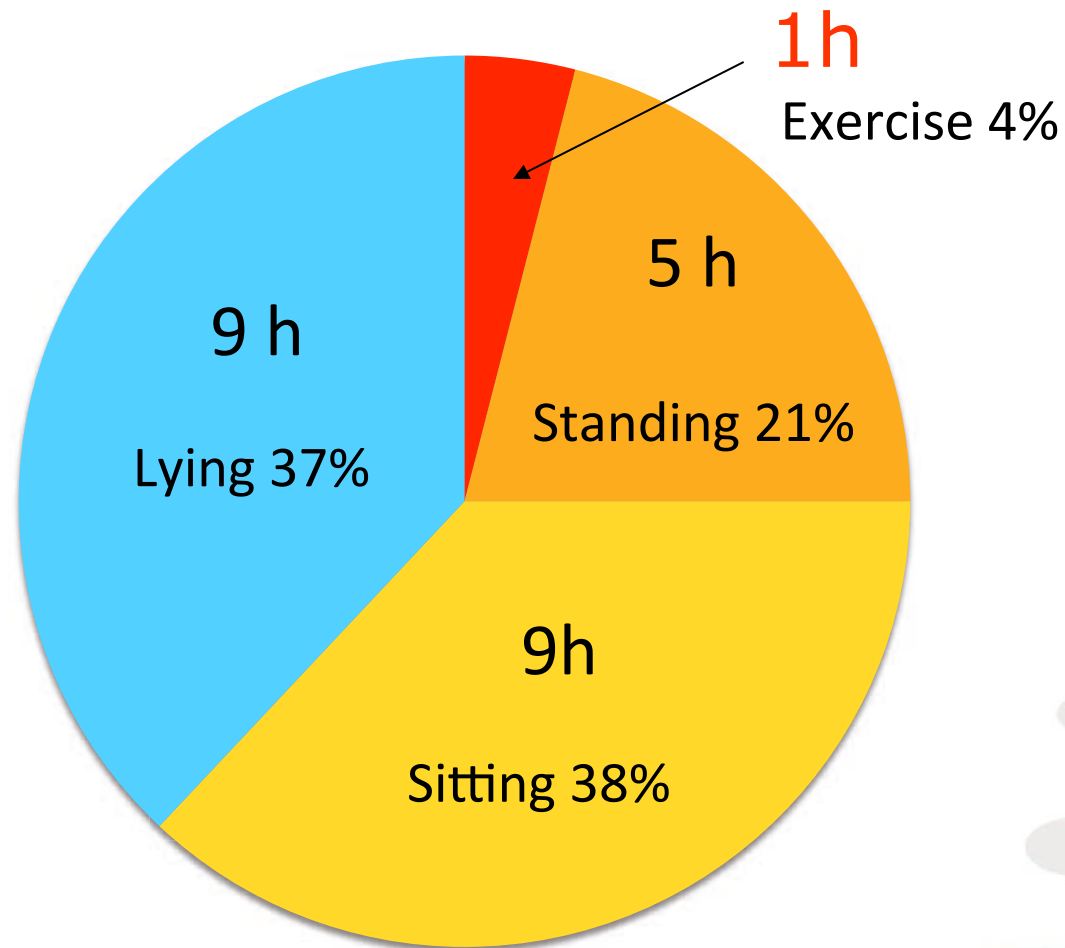
The importance of exercise

- Prevention of cardiovascular risk factors, i.e. other diseases
- Improvement in motor skills
- Improvement in cognitive abilities
- Prevention of dependencies
- Accident prevention
- Increase in self-worth* / social skills, etc.



* Tremblay et al. *Appl Physiol Nutr Metab* 2011; 36: 36–46; 47–58
Graf et al. *Monatsschrift Kinderheilkunde* 2013; 116: 439 et seqq.
Ekeland et al. *Cochrane Database Syst Rev* 2004; (1): CD003683

Activity periods for children (aged 6 to 10)



Bös/Krug. *E&M* 2011; 26: 156-160

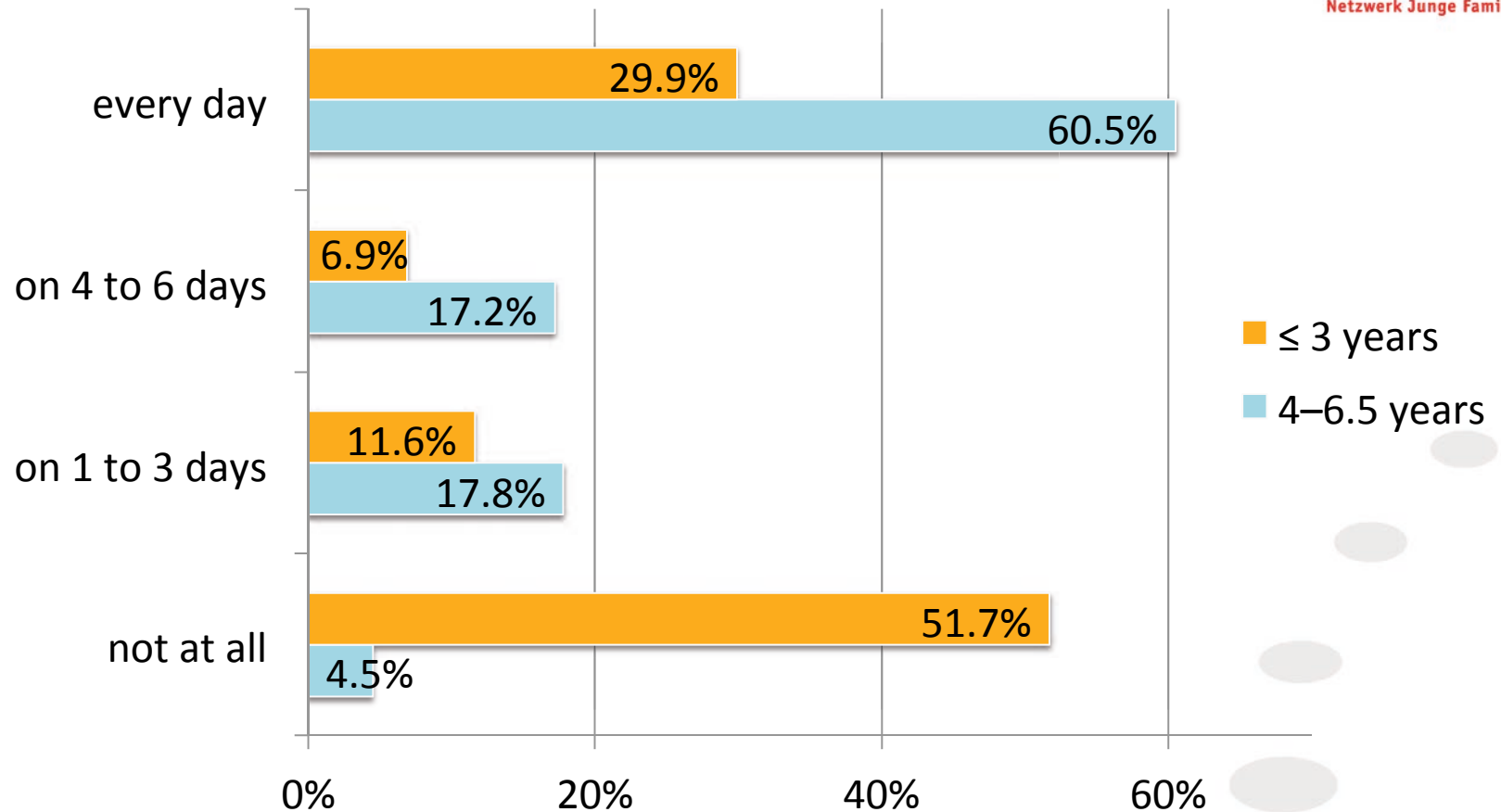
Total physical activity

(with supervision and free activity)

n = 576 children (53.6% male)
 Age: 3.0±1.7 years
 Migrant background: 43.7%

		Mean	Minimum	Maximum
Total activity per day (in minutes)	0–6.5 years	69.0	0	400
	4–6.5 years	76.1	0	385
	0–3 years	62.0	0	400

Weekly media consumption among children



Screen media – Health consequences

- Overtaxing for small children
 - Overstimulation
 - Neglect of other activities that would promote development¹
- Variety of sensual perceptions limited to the audio-visual senses
- Greater risk of obesity, also due to more frequent exposure to advertising²
- Irregular sleeping patterns³
- Possibly: Impairment of speech acquisition⁴

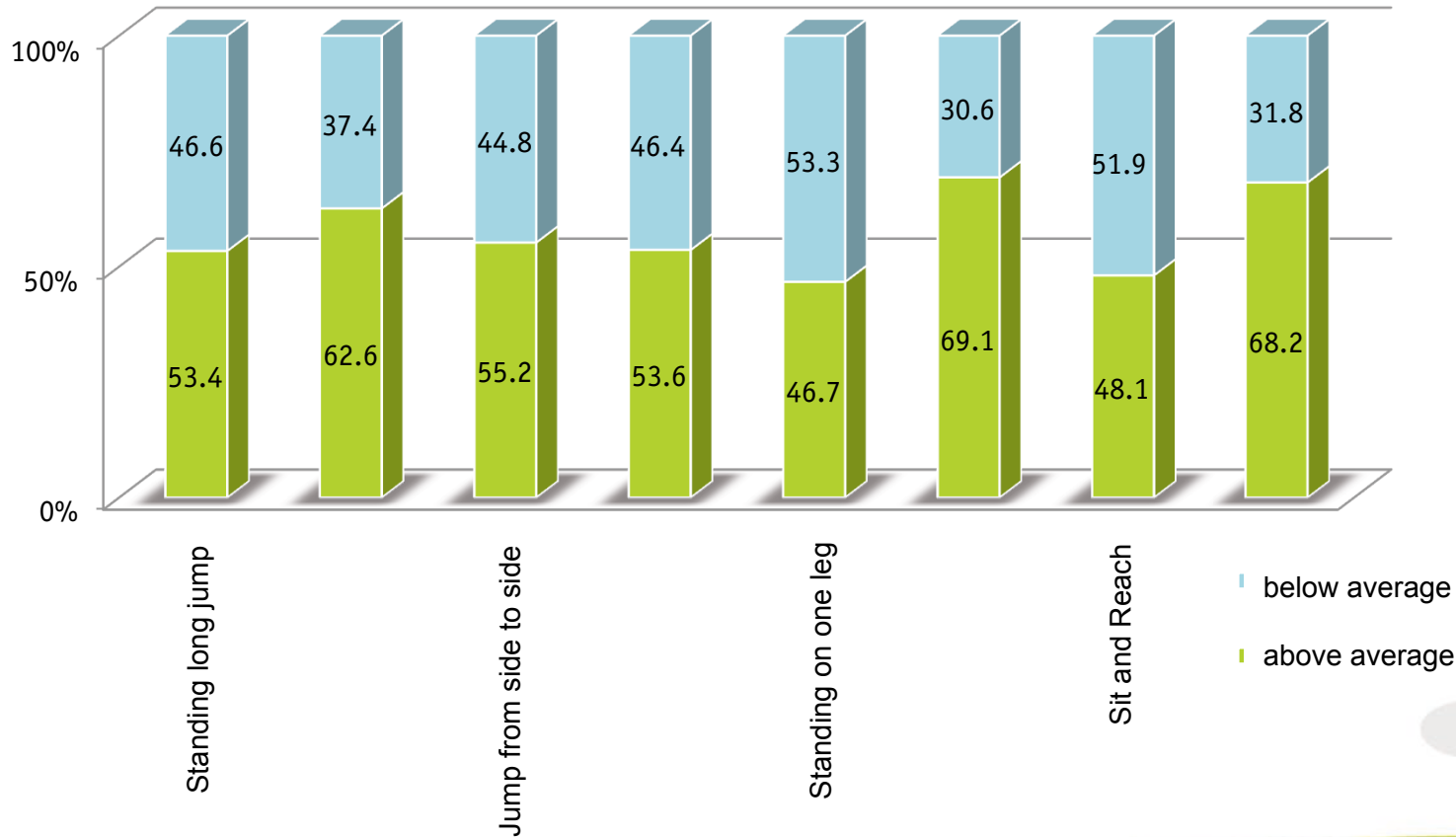
1. Christakis. *Acta Paediatr* 2009; 98:8–16

2. LeBlanc et al *Appl. Physiol Nutr Metab* 2012; 37:753–772 / Hastings et al. for WHO 2007

3. Thompson/Christakis. *Pediatrics* 2005; 116:851–856

4. Brown. *Pediatrics* 2011; 128:1040–1045

Motor skills kindergarten



n = 1228 children
(45.8% female)

Age 4.7 ± 1.0 year

Karlsruher
Motor
Screening

Topics addressed by the recommendations

- Amount and type of movement
- Support for physical activity
- Restriction of inactivity
- Sleep and relaxation



Amount of movement

How much movement is desirable?

- There is never too much if it is voluntary

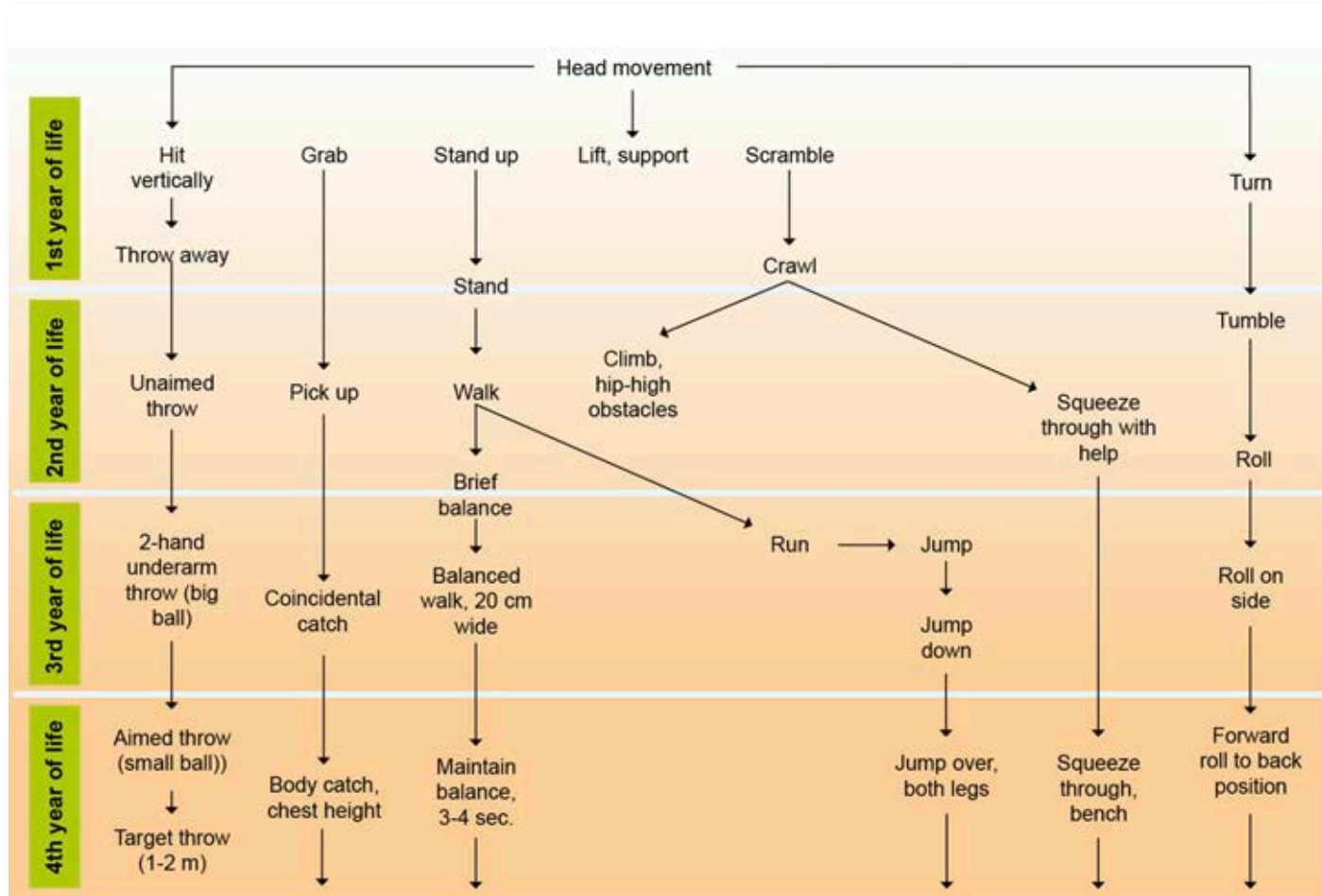
National/international recommendations

- German expert consensus: 90 minutes and more
- US recommendation: 90 minutes and more
- WHO for children over 5: 60 minutes and more

- In everyday routines: activity times hard to measure



Motor development



Recommendations

- Do not restrict a small child's natural urge to move
- They should be active as much as possible, especially outside



Recommendations

Complex motion sequences are particularly beneficial to the development of motor skills

Examples:

- Climbing
- Ball games
- Moving to rhythms and music



Small children need ...

- Time for movement in everyday routines
- Space to move around
- Plenty of varied physical activity
- Intense physical activity
- Running around with others



Small children need ...

Independent (unstructured) movement

- To try things out alone, to be courageous, to cross boundaries
- To strengthen self-efficacy, establish a positive self-concept
- To develop skills in handling risks

Structured activities

- Incentives and stimulation



Recommendations

Parents should actively support their small children in their experience of physical activity

- Join with their child to introduce physical activity to everyday routines
- Deliberately stimulate the child to engage in different kinds of physical activity
- Create as much time as possible and a secure environment for the child to move around
- Allow the child to experience physical activities with other children
- Use family courses such as parent/child gymnastics and other activities on offer for small children

Risk of injury

- Children become more confident as they acquire versatile motor skills
- Many accidents are due to uncertain motor skills*
- No walkers:
they can cause injuries



Kambas et al. *Deutsch Z Sportmed* 2004; 55: 44–47

Recommendations

- Children should learn to deal competently with dangers and risks
- Therefore, parents should not interrupt a child's chosen physical activity as long as there is no serious danger



Recommendation

- Longer periods of sitting down should be interrupted, and unnecessary time spent in a seated position (e.g. in a buggy or high chair) avoided
- Screen media (TV set, computer, mobile phone, games console, etc.) are not recommended for small children



The importance of rest and sleep

- Important for healthy development
- To process information and to learn
- Insufficient sleep – greater risk of obesity*



*Dattilo et al. *J Obes* 2012

Recommendations

- Parents must give the child the opportunity for regular rest and sleeping times
- How much rest and sleep is needed will differ from child to child

Small children sleep
around 10 to 14 hours per day

Galland et al. *Sleep Med Rev* 2012; 16: 213–222



List of media for small children



Recommendations:
expert information for
health professionals
(Order no. 3418)



Flyer for parent
advice
(Order no. 361)



Sticker for the child's
check-up booklet
(Order no. 3688)



Slides for health professionals



[www.gesundinsleben.de/
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Geördert durch:



aufgrund eines Beschlusses
des Deutschen Bundestages

Imprint 2014

Published by
aid infodienst Ernährung, Landwirtschaft, Verbraucherschutz e.V.
Heilsbachstr. 16, 53123 Bonn, www.aid.de
with funding from the Federal Ministry of Food and Agriculture
by resolution of the German Parliament



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Images: www.gesundinsleben.de/bildnachweise

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