European Association for the Study of Obesity

Childhood obesity management: Clinical evaluation

Nathalie Farpour-Lambert, MD, MPH
Past-President of EASO
University Hospitals of Geneva

EASO Summer School – 11th July 2022

Is childhood obesity a chronic disease ?

The EASO COTF is convinced that classifying Obesity as a disease in children is crucial:

- for increasing **individual and societal awareness,**
- for improving **early diagnosis and intervention**,
- to enhance the **development of novel preventive and treatment** approaches, **health care policies and systems**, and the **education** of healthcare workers.

The management of obesity prior to the appearance of co-morbidities may prevent their escalation into significant medical and psychosocial problems, and **reduce their economic and societal impact**.

However, **the discourse** should be adapted to the target (policy-makers, patients, population) to avoid stigmatization.

Source: Farpourlambert NJ et al, COTF, Obesity Facts, 2015; 8:342-349

EASO
European Association for the Study of Obesity

Clinical evaluation of children and adolescents with obesity

1. Diagnosis of obesity / excess adiposity
2. History: personal / family / periconceptional / perinatal
3. Lifestyle & behaviors: diet / physical activity / sedentary behaviors / sleep / stress
4. Physical examination
5. Paraclinical investigations: laboratory, imaging, exercise testing, …

EASO
European Association for the Study of Obesity

Before you start……..

Who initiated this complaint to you?

- Child
- Parent
- Caregiver
- School
- Other healthcare professional

Awareness and motivation are keys to success!!

WHO Child growth standards and references

- Body mass index (BMI) is a surrogate marker of body fatness. It is a simple, inexpensive and noninvasive method.
- WHO Child Growth Standards and References = simple tool to assess whether children are growing and developing as they should.
- Demonstrated for the first time ever that children born in different regions of the world, when given the optimum start in life, have the potential to grow and develop to within the same range of height and weight for their age
- Used for detecting children not growing to full capacity or those who are under- or overweight on average.
- Establish breastfeeding as the biological norm and the breastfed infant as the standard for growth and development
- Previous reference charts were based largely on the growth of infants fed formula milk
- Global and for all children, in contrast to the previous international reference based on children from a single country (CDC, USA).

EASO
European Association for the Study of Obesity

Standard vs. Reference

- Standard - embraces the notion of a norm or desirable target, a level that ought to be met, and therefore is a more effective guide to, and evaluator of, interventions to improve healthy development and growth.
- Reference - provides a basis for making comparisons but deviations from the pattern it describes are not necessarily evidence of abnormal growth
- Standards – 0 to 5 years
- References – 5 to 19 years

EASO
European Association for the Study of Obesity

Age

- BMI in adults – age is not a factor

$$BMI = \frac{weight\,(kg)}{height^2\,(m^2)}$$

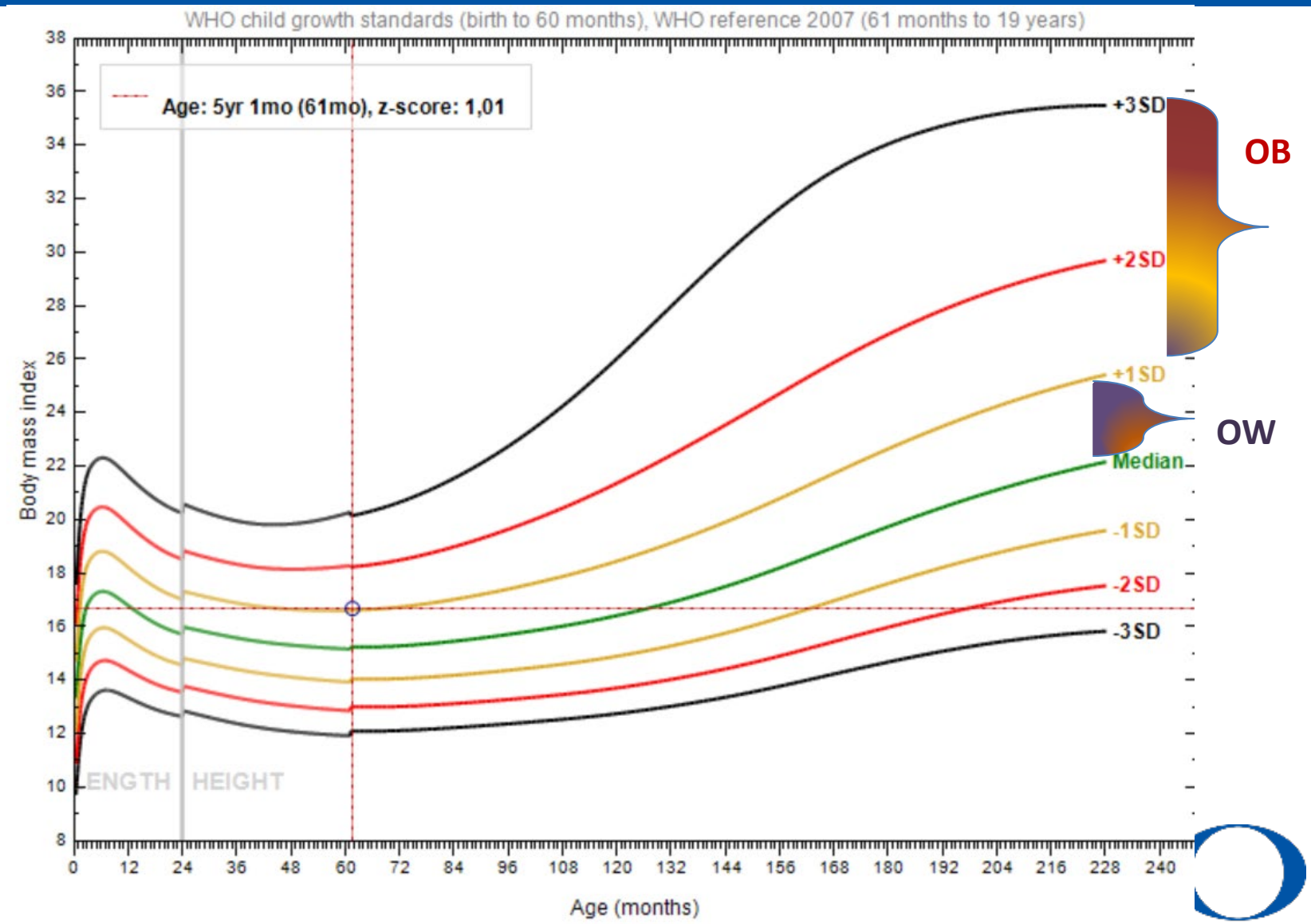
- Children: BMI is related to age and gender

Standards
Length/height-for-age
Weight-for-age
Weight-for-length/height
Body mass index-for-age (BMI-for-age)
Head circumference for age
Arm circumference-for-age
Subscapular skinfold-for-age
Triceps skinfold-for-age
Motor development milestones
Weight velocity
Length velocity
Head circumference velocity

EASO
European Association for the Study of Obesity

Objectivize overweight and obesity in children

- Overweight = +1 standard deviation (90th percentile) of the BMI-for-age index for sex and age (in <5 years, overweight =+2)
- Obesity = +2 standard deviations (97th percentile) of the BMI-for-age index for sex and age (in <5 years, obesity =+3)



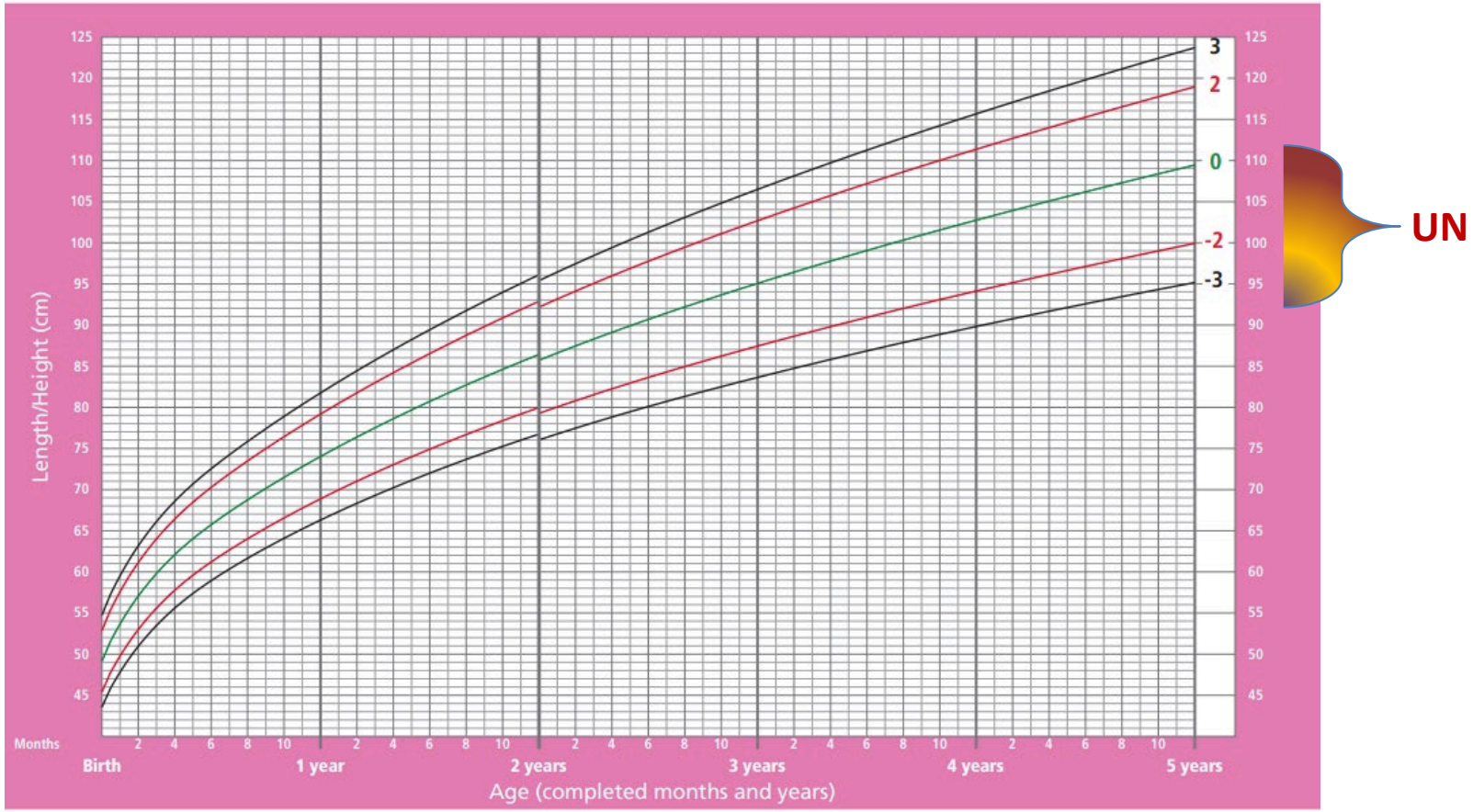
European Association for the Study of Obesity

Objectivize undernutrition

- Height-for-age
Stunting (chronic undernutrition)

- Weight-for-height
Wasting (acute undernutrition)

- Weight-for-age



European Association for the Study of Obesity

Using the WHO digital tools

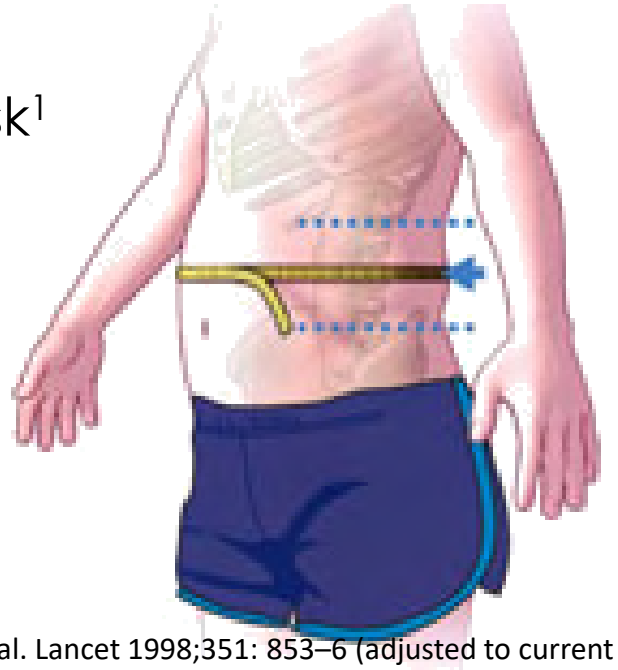
- Free-to-use software for 0-5 and 5-19 children and adolescents
- Download software(s)
- WHO Standards 0-5 years: https://www.who.int/tools/child-growth-standards/software
- WHO References 5-19 years: https://www.who.int/tools/growth-reference-data-for-5to19-years/application-tools
- It is much easier to initiate change when you have objective assessment of nutritional status.
- Measure and record, even if the present status looks in physiological norms.

EASO
European Association for the Study of Obesity

Beyond BMI

- **Waist Circumference**
  - Provides information about the **distribution of body fat**
  - People that carry excess body fat in their abdominal cavity are more likely to suffer the consequences of being overweight

Men: > 94 cm = increased risk[1]
Women: > 80 cm = increased risk[1]

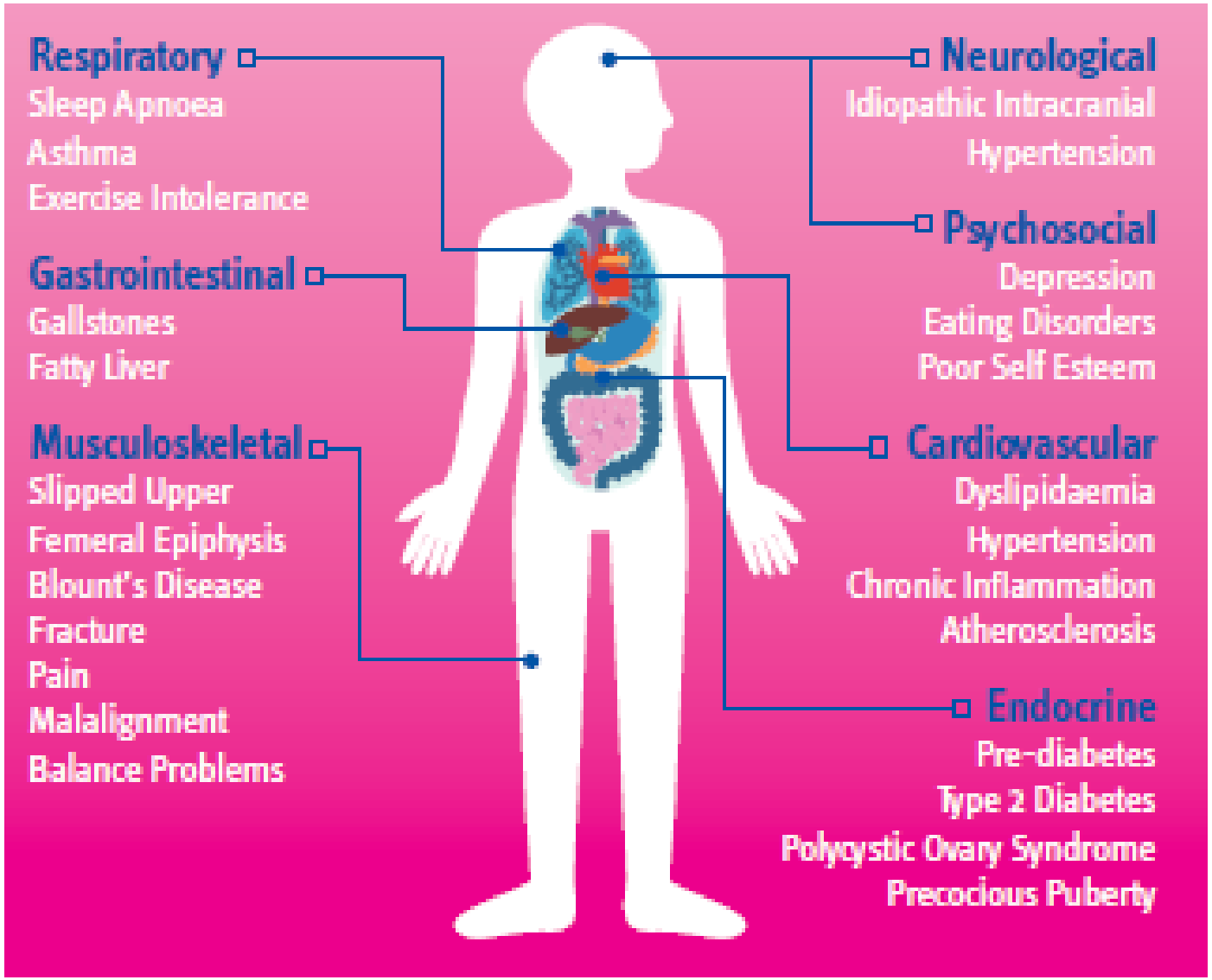


Children:
A waist/height ratio >0.5 is associated with an increased risk of co-morbidities (cardio-metabolic).

EASO
European Association for the Study of Obesity

Lean MEJ, et al. Lancet 1998;351: 853–6 (adjusted to current IDF data)

Childhood obesity is associated with multiple co-morbidities



Steinberger 2003, Lobstein 2004, Weiss 2005

EASO
European Association for the Study of Obesity

History Taking

- **Personal history:** medical conditions, medications (focus on steroids and neuroleptic medications), surgical interventions, immobilization, disabilities, substances abuse, health-related quality of life.
- **Review of systems:** sleep patterns (quality & duration, snoring, nocturia, fatigue), pain and physical limitations due to orthopedic problems, mood assessment, eating patterns (history of dieting and binging, nocturnal eating), polydipsia and polyuria.
- In female adolescents, ask the regularity of periods and the presence of hyperandrogenism. Delicately ask about sexual abuse.
- **Psycho-social:** friends and social connections in the school, participation extra-curricular activities, exposure to shaming and bullying.

EASO
European Association for the Study of Obesity

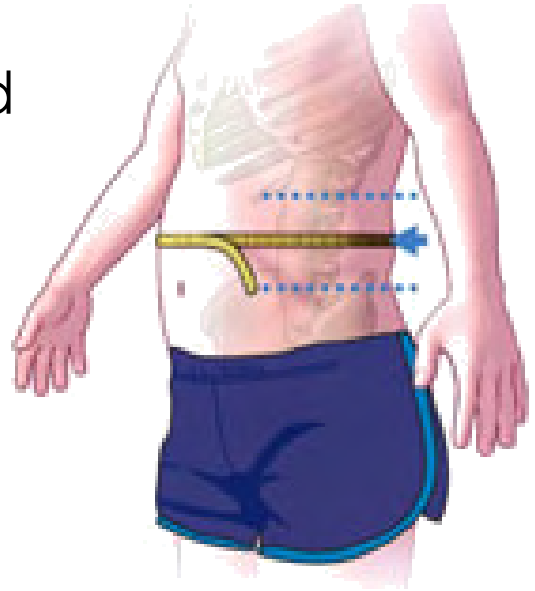
History Taking (2)

- **Pregnancy:** maternal BMI before conception, gestational weight gain, complications and health conditions during pregnancy (e.g. maternal gestational diabetes, hypertension, pre-eclampsia, impaired intra-uterine growth, …), smoking.
- **Birth & delivery:** term at birth, birth weight (small for gestational age or large for gestational age, macrosomia > 4000 g.), mode of devlivery, complications, neonatal adaptation.
- **Growth and development:** evolution of weight and BMI (see charts) , early onset obesity (before 5 yrs), neuro-developmental impairment.
- **Family history:** grand-parental, parental, and sibling anthropometrics, cardiovascular diseases, hypertension, type 2 diabetes, dyslipidemia, eating disorders, mental diseases, genetic diseases.

EASO
European Association for the Study of Obesity

Physical examination (1)

- **Measure height and body weight, calculate BMI & BMI percentile or z-score** (use WHO Child growth standards and references).
- **Measure waist circumference** and calculate waist/height ratio (normal < 0.5)
- **Assess blood pressure** after 10 min of rest (height/age/sex normalized – use appropriate tables). Make sure that the cuff is appropriate for the size of the child/adolescent.
- **Search for skin tags**, acanthosis nigricans, signs of hyperandrogenism in girls (hirsutism, extreme acne).



EASO
European Association for the Study of Obesity

Physical examination (2)

- **Search for signs of hypothyroidism** (goiter, dry skin, oedema, …).
- **Search for dysmorphism or stigmata** of underlying medical conditions (developmental delay, dysmorphism, hypogonadism, purple abdominal striae).
- **Do the abdomen/ liver exam** – search for hepatomegaly
- **Search for skeletal deformities and limitation of motion** (knee valgus, flat feet, hyperlordosis, …)

Cushing syndrome

Acanthosis nigricans

Knee valgus – flat feet

EASO
European Association for the Study of Obesity

Laboratory screening

Measures
Fasting glucose
Oral glucose tolerance test (OGTT) if family and medical history positive (type 2 diabetes, acanthosis nigricans, ethnicity)
Fasting lipid profile (TC, TG, HDL-C, LDL-C)
Alanine aminotransferase (ALT)
TSH
25-OH-vitamin D
Other measures according to medical assessment:
- polysomnography, portable monitoring device
- 24-hour blood pressure monitoring
- Cardiac echography

EASO
European Association for the Study of Obesity

Clinical signs associated with genetic obesity

Eating disorders

Hypotonia

Neurodevelopmental impairment

Obesity < 5 years

+

Developmental abnormalities

Growth delay
Hypogonadism

Neurosensorial abnormalities

EASO
European Association for the Study of Obesity

Source: https://www.sfdiabete.org/files/files/JNDES/2019/3_mced95_poitou.pdf

Investigations in case of suspicion of genetic obesity

- Endocrine: hypophysal axis, leptin level
- X-rays: hands, feet, forearm (search for skeletal abnormalities)
- Brain MRI: if cognitive impairment or abnormalities in the hypothalamo-hypophysal axis.
- Electro-retinogram: if retinal dysfunction.
- Cardiac and abdominal US: if suspicion of developmental abnormalities.
- Discuss with geneticians

Source: https://www.sfdiabete.org/files/files/JNDES/2019/3_mced95_poitou.pdf

EASO
European Association for the Study of Obesity

Assess child's and family behaviors

Eating behaviors

Structure
Size of portions
Fruits and vegetables
Snacks
Beverages
Dairy products: milk, yoghurts, cheese, …
Fat: oils, butter, mayonnaise, fried foods
Added sugar, salt, etc
Fast-food /eating out
Binge-eating
Restrictive eating

Physical activity

- Organised sport
- Physical education at school
- Free play, leisure-time activities
- Active transportation
- Special interests and dislikes
- Previous experiences

Sedentary behaviors

- Total screen time per day (week days versus weekend days)
- Other activities (e.g. reading, painting)
- Motorized transportation

Sleep

- Quality and quantity
- Sleep and wake times
- Sleep during the day
- Presence of screens in the bedroom

EASO
European Association for the Study of Obesity

EASO

European Association for the Study of Obesity

Thank you!