The Evaluation: What to Expect

Knowledge to grow by

Models throughout are used for illustrative purposes only.

Introduction

In the early years, children's heights can vary. While some children are tall, some are much shorter than others their age. Shorter children are said to have short stature. Short stature does not always mean a medical condition. Growing more slowly than average could just mean a naturally slow growth rate.

In some cases, a child may be short simply because being short runs in the family. In other cases, a child is short due to a medical condition that affects growth. Medical conditions can either slow or stop growth in a child.

If your child is shorter than average, he or she may need to see an endocrinologist. This doctor is a specialist who is trained to diagnose and treat children with growth disorders. The endocrinologist will evaluate your child to find the cause of your child's slow or unusual growth. If there is a medical condition, the doctor can suggest medicines that may help your child grow. It is important that your pediatrician refer you to an endocrinologist if he or she suspects a problem, even if they do not begin treatment right away. It is easier for the endocrinologist to monitor your child and intervene if necessary.

This brochure reviews the steps in an evaluation by an endocrinologist. It should help you understand what to expect.

Each child is unique, so each evaluation is different. The endocrinologist will do an evaluation that best suits your child.

The evaluation: what to expect

Medical history

A detailed medical history of your child is important for the evaluation. The doctor may need the following information about pregnancy and birth:

- During pregnancy
  - > Mother's nutrition
  - > Mother's use of alcohol, nicotine, or other drugs
- Birth
  - > Birth length and weight
  - > Any trauma to the child during or after delivery
  - > Type of delivery, for example, cesarean section
  - > Whether the child was born on the date expected
- Early development
  - > Age your child started walking and talking
  - > Age that baby teeth first appeared

The doctor may request your child's medical records from the primary care doctor. Some or all of the following may be reviewed:

- Past growth measurements
- Past illnesses
- Medical treatment
  - > Chronic illness
  - > Past surgeries
  - > Past hospitalizations
- Eating habits
- Sleeping patterns
- Activity level
- Medication
  - > Current medicines
  - > Past medicines
  - > Any long-term treatments

This important information gives the doctor the full medical picture of your child. For example, feeling sluggish may be related to a thyroid problem or certain medicines could cause poor growth. Any health information about your child–no matter how minor–is important to give to the doctor.

Emotional development

Information about your child's social and emotional development is also needed. This includes:

- Eating and playing habits
- Performance in school
- Participation in social events
- Recent emotional or physical traumas
- Relationship with family and friends
- Whether your child has complained or been teased about being short

Children who are shorter than average may have low self-esteem. They may become withdrawn and quiet. This often happens if their peers respond to them based on their size instead of based on their age. The doctor will need to know about your child's self-esteem and whether your child has any emotional stress.

Family history

The doctor may gather the medical history of your child's family. This includes information on siblings and birth parents. Short stature tends to run in families. Family history helps the doctor understand your child's unique case.

The doctor may also ask when the child's parents went through puberty. This helps the doctor understand how the child will develop and grow. For instance, a parent who recalls being a late bloomer may have a child who develops more slowly than average.

In general, most mothers recall when they entered puberty. In women, puberty is marked by the growth of breasts and by their first menstrual period. On the other hand, fathers may not recall the start of puberty. In men, there is no clear landmark for puberty. It may be easier for fathers to recall whether they had delayed puberty. Puberty that is delayed continues past high school. Signs of delayed puberty in males include continued growth after high school or not shaving until age 20 or older.

As part of family history, the doctor will also need to know about growth patterns, genetic disorders, or medical conditions in close relatives. Some important medical conditions include:

- Hypothyroidism
- Inflammatory bowel disease
- Other diseases of the intestinal tract such as celiac disease

Predicting your child's adult height

A doctor can predict how tall a child will be from how tall the birth parents are. This is called the child's genetic target height. Shorter parents tend to have shorter children. Taller parents tend to have taller children.

For boys, the genetic target height in inches is calculated as follows:

1. **Height of father in inches plus height of mother in inches plus 5 inches.**
2. **Divide that number by 2.**

For girls, the genetic target height in inches is calculated as follows:

3. **Height of father in inches plus height of mother in inches minus 5 inches.**
4. **Divide that number by 2.**

The final number is about the height that the child will reach as an adult. Remember, this is only an estimate. It may not be the exact height your child will reach.

Physical examination

A complete physical exam is part of the evaluation. Your child's height and weight will be measured. The doctor will check for any physical signs of genetic disorders.

The doctor will also look at your child's current stage of puberty, also known as a Tanner stage. This is called a pubertal exam. It tells a lot about growth progress. The doctor will look at patterns of pubic and body hair. The doctor will also look at the growth of sexual organs. For boys, the doctor will look at testicle growth. For girls, the doctor will look at breast growth.

Other measurements which may be included in the physical exam are:

- Sitting height: your child's height sitting down
- Arm span: the total length from one hand to the other when your child has outstretched arms
- Head circumference: the length around your child's head
- Body composition: how much lean muscle and fat are in your child's body

Evaluation of growth

Doctors and nurses use growth charts to track a child's height and weight over time. They also use these charts to compare a child's height and weight with the statistical norm. This is the average height and weight of other children who are the same sex and age. Separate growth charts are used for girls and for boys.

In general, most children grow at least 2 to 2 1/2 inches every year between age 3 and puberty. Puberty starts between ages 9 and 13 in girls, and between ages 11 and 15 in boys. There is a special set of growth charts for children under 3 years of age (from birth to 36 months).

Growth velocity

The doctor will also measure your child's speed of growth over time. This is called your child's growth velocity. It shows how fast your child is growing. For example, 2 inches a year is a slower growth velocity than 3 inches a year. Remember this term. Your doctor may use it to discuss your child's growth progress. Your child may need at least 2 office visits over 6 to 12 months for your doctor to calculate growth velocity. The doctor keeps track of growth velocity to see if your child is growing at a constant rate. A rate of growth that is not constant may be a sign of a medical condition.

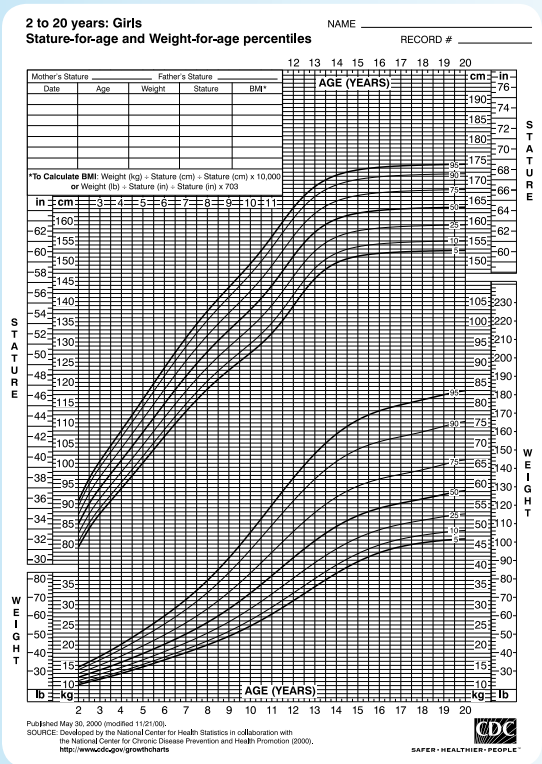
The growth chart

Each growth chart has lines, called percentile curves or percentiles. These lines represent the percentage of children at the same height or weight for that age group.

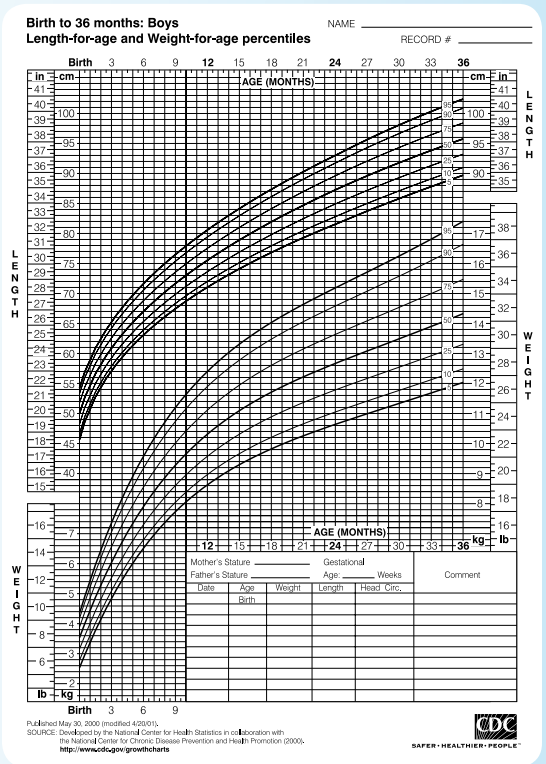
A percentile is a way to show ranking. For example, if a 10-year-old girl is in the 50th percentile for height, that means 50 percent of 10-year-old girls are taller and 50 percent are shorter than she is.

On the other hand, if a 2-year-old boy is in the 5th percentile for height, that means 95 percent of 2-year-old boys are taller and 5 percent are shorter than he is.

To record your child's growth, the doctor will draw a line connecting height measurements for your child at several points. This is called a growth curve. The growth curve for most children usually falls along one of the percentiles on the growth chart.



Growth chart for girls aged 2 to 20 years.



Growth chart for boys from birth to 36 months.

The doctor will also draw similar lines for weight.

To determine whether your child has a growth condition, your child's height and growth velocity are both important. If your child's growth curve is very different from or falls off of one of the percentile curves, this is considered unusual and calls for close evaluation. In general, your child may have insufficient growth if:

- Your child's height is below all the lines on the growth chart for his or her age; or
- Your child's height does not follow a percentile curve

Diagnostic tests

The doctor may order blood tests to evaluate your child's general health. These include tests of organs such as the liver and kidneys. Glands such as the thyroid, adrenal, and pituitary are also checked. These tests are done to rule out medical conditions such as kidney disease, cystic fibrosis, and hypothyroidism as the cause of your child's short stature. They also help determine if genetic disorders are part of the growth issue.

If these first lab tests show unusual results, the doctor may need more tests before making a diagnosis.

Radiology evaluation

Along with blood tests, the doctor may perform radiographic tests. These tests use X-rays or other radiation to see inside the body. Some examples are:

- X-rays
- Magnetic resonance imaging (MRI) tests
- Computed tomography (CT) scans

The most important test is an X-ray of the left hand and wrist. This is called a bone age X-ray. The doctor uses this X-ray to determine a child's bone age. Bone age tells the doctor whether the child's bones are developing at the right rate for the child's real age. They can also see how long your child has left to grow. Boys are usually finished growing at a bone age older than 16. For girls, a bone age of 14 or older indicates she has reached her adult height.

To determine the bone age, the doctor compares the child's X-ray with X-rays in a special atlas. This atlas has standard bone age X-rays for girls and for boys from birth to 18 years. The child's bone age is the bone age of the matching X-ray in the atlas.

Summary

Short stature is a common reason for a child to be sent to a specialized doctor. A height below the 5th percentile is uncommon, but does not always mean there is a medical issue. Only a small number of these children have growth disorders. To find the cause of your child's short stature, a doctor may need to know:

- Family and medical history
- Growth data
- Heights of the birth parents
- Level of emotional stress
- Stage of puberty

The doctor will review your child's growth and medical history. Reviewing growth means comparing accurate growth measurements with the proper growth charts. The doctor will also do a physical exam and may run lab tests. These include blood tests and tests such as MRIs, CT scans, and X-rays.

Knowledge to Grow By
brought to you by Novo Nordisk.

printed on recycled paper

Novo Nordisk Inc.
100 College Road West
Princeton, NJ 08540 U.S.A.

Printed in the U.S.A.
0410-00000580-1 May 2010