

Child With Suspected Short Stature

Suggestive history and physical findings	Initial laboratory and/or radiologic work-up can include:	When to refer	Items useful for consultation	Additional information
<p><u>Symptoms/signs:</u></p> <p>Child well below 3rd percentile for height</p> <p>Child with decreasing growth velocity – crossing percentiles down after the age of 3 years</p> <p>Child’s height is significantly below the genetic potential</p> <p>Child with a history of IUGR without catch-up growth by age 2</p> <p>Syndromic appearance, abnormal body proportions</p> <p><u>Differential Diagnosis</u></p>	<p><u>Blood tests:</u></p> <ul style="list-style-type: none"> • Total or free T4 and TSH • Comprehensive metabolic panel • Complete blood count • ESR or CRP • IGF-1 • IGFBP-3 • Tissue transglutaminase IgA • Total serum IgA • Can consider chromosome analysis if female child has features of Turner’s syndrome <p><u>Radiologic studies:</u></p> <ul style="list-style-type: none"> • Bone age x-ray of left hand and wrist 	<p><u>Urgent:</u></p> <p>If child is growing poorly and is having headaches or vision changes</p> <p>If you suspect a child may have multiple hormone deficiencies</p> <p><u>Routine:</u></p> <p>Height below 3rd percentile</p> <p>Abnormal growth velocity in a child older than 3 years</p> <p>Height potential is different than expected for the family.</p> <p><u>Find a Pediatric Endocrinologist</u></p>	<p>Previous growth data/growth charts</p> <p>Pertinent medical records</p> <p>Recent laboratory studies</p> <p>Bone age x-ray (actual film) if done</p>	<p><u>Additional Information</u></p> <p><u>Constitutional Growth Delay and Familial Short Stature: A Guide for Families</u></p> <p><u>Short Stature: A Guide for Families</u></p> <p><u>Growth Hormone Deficiency: A Guide for Families</u></p> <p><u>References</u></p>

Differential diagnosis of short stature:

Common causes:

- Familial or intrinsic short stature
- Constitutional delay of growth and puberty
 - Children typically cross percentiles downwards in the first 3 years, and then grow at a normal growth velocity on the lower percentiles or just below the 3rd percentile
 - Bone age is delayed
- Idiopathic short stature
 - Height < 2.25 SD below the mean for age and sex (shortest 1.2% of children) – FDA definition
 - Multiple etiologies are likely
 - Unlikely to attain adult height in the normal range (less than 63 inches for boys and 59 inches for girls)
 - Diagnostic evaluation excludes other causes of short stature
- Small for gestational age without catch up growth by 2 years

Other causes:

Endocrine abnormalities:

- Growth hormone deficiency
- Hypothyroidism
- Cushing's syndrome
- Growth hormone insensitivity

Metabolic disease:

- Rickets
- Diabetes mellitus

Syndromic:

- Turner's syndrome
- Noonan's syndrome
- Trisomy 21
- Russell-Silver Syndrome
- Prader-Willi Syndrome

- DiGeorge Syndrome

Chronic Illness:

- Gastrointestinal diseases
 - Celiac disease
 - Inflammatory bowel disease
- Pulmonary diseases
 - Asthma
 - Cystic fibrosis
- Cardiac disease
- Renal disease
- Diabetes mellitus

Glucocorticoid treatment

Musculoskeletal issues:

- Skeletal dysplasia
- Spinal disorders

Psychosocial issues:

- Psychosocial dwarfism
- Fetal alcohol syndrome

Additional Information:

Mid-parental target height can be calculated with the following formulas:

For boys: Mother's height + 5 inches averaged with father's height

For girls: Father's height – 5 inches averaged with mother's height

Suggested References and Additional Reading:

- Rogol AD, Hayden GF. Etiologies and early diagnosis of short stature and growth failure in children and adolescents. J Pediatr 2014;164:S1-S14.

- Cohen LE. Idiopathic short stature. A clinical review. JAMA. 2014;311(17):1787-1796.

Author: Dianne Deplewski

Copyright © 2020 Pediatric Endocrine Society. Education Committee

