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OSCE in Pediatrics

for Postgraduates and Practitioners



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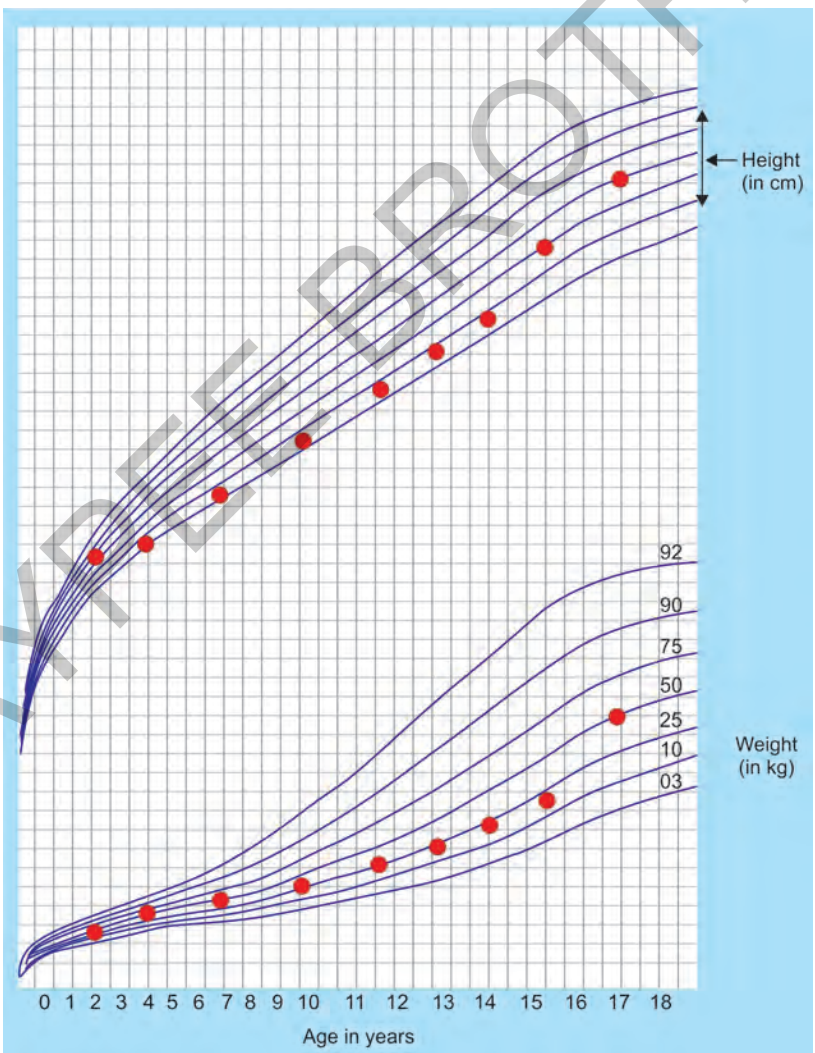
CHAPTER

2 Growth

Hemchand K Prasad

QUESTIONS

Q2.1 **Growth chart of a child on follow-up in the growth clinic is presented here.**



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a. What is your diagnosis based on growth chart?
   i. Growth hormone deficiency
   ii. Constitutional delay of growth and puberty
   iii. Familial short stature
b. What is the birth weight and birth length of the child in this condition?
   i. Normal
   ii. Below 3rd percentile
   iii. Above the normal for population
c. How would you describe the growth of this child in childhood years?
   i. Persistent deceleration
   ii. Sustained close to the 3rd percentile
   iii. Normal
d. How is the growth spurt anticipated in this child?
   i. Normal
   ii. Early
   iii. Delayed
e. How is the skeletal maturity of this child expected?
   i. Normal
   ii. Delayed by 1 year
   iii. Delayed by 2 years
f. What is the age of preferred testosterone replacement?
   i. 13 years
   ii. 14 years
   iii. 15 years

Q2.2 List eight Food and Drug Administration (FDA) approved indications for growth hormone.

Q2.3 Answer the following questions on Growth Hormone?

a. What is the weekly dose of this medication in mg/kg/week?
b. What is the daily dose of this medication in µg/kg/day?
c. What is the route of administration of this drug?
d. What is the frequency of administration of this drug?
e. What is the biomarker of adherence to this drug?
f. Mention the skeletal age up to which this drug causes growth augmentation in males.
g. Mention the skeletal age up to which this drug causes growth augmentation in females.
h. Which year of therapy has maximum auxological response?
i. Mention any two side effects of this drug.

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Q2.4 A 10.5-year-old child with height <1st percentile, bone age (BA) 1 year and the below finding:

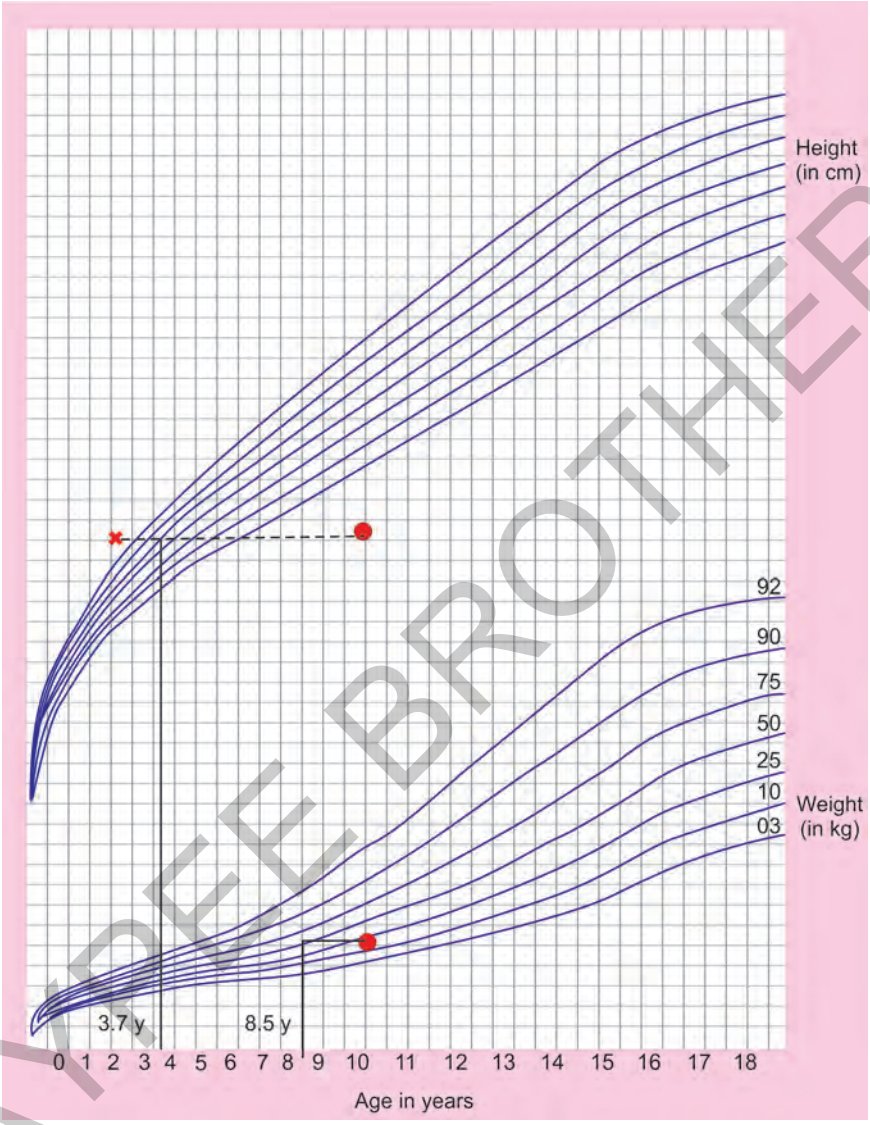


a. Mention the likely diagnosis.
b. How is the weight for height in this child expected to be?
c. How does one expect the voice of this child to be?
d. Mention any two associated endocrine deficiencies that may be associated?
e. How is the IQ of this child expected to be: normal or subnormal?
f. Mention any two neonatal features of this condition.
g. Mention two biochemical screening tests to diagnose this condition.

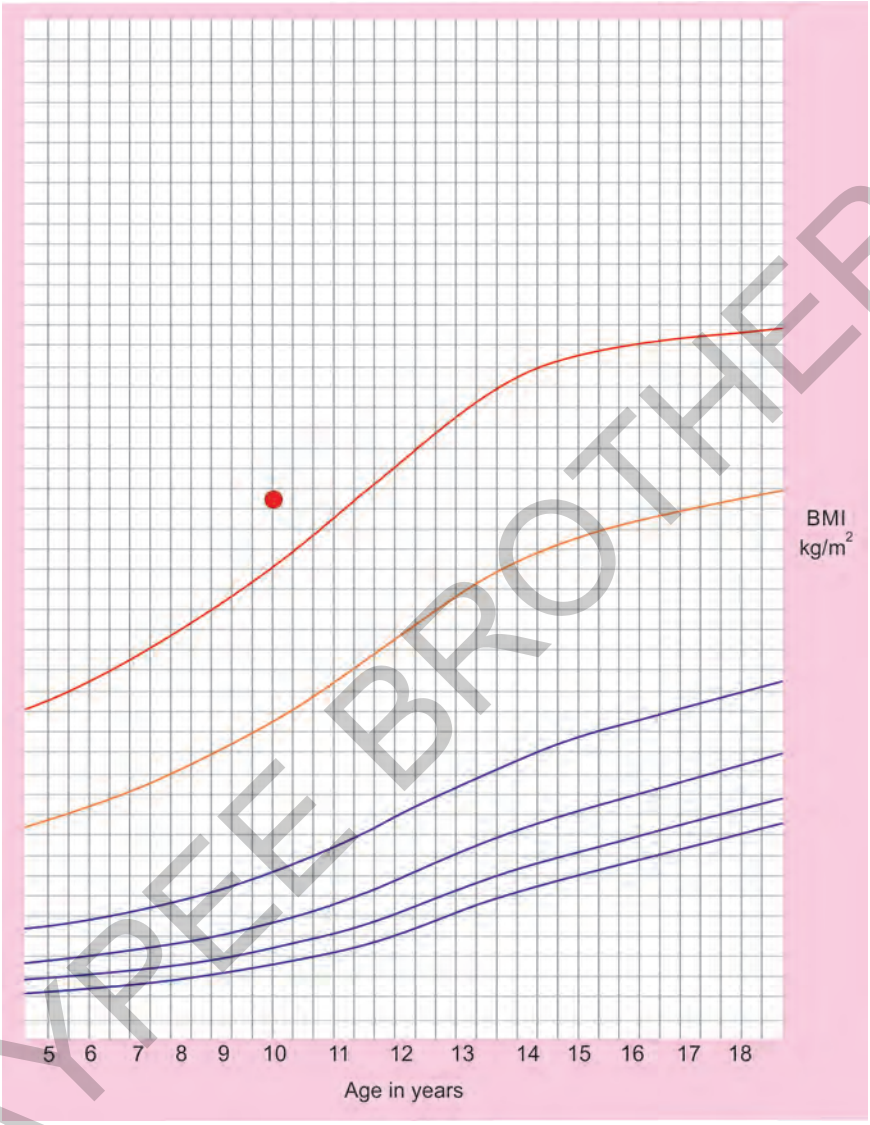
Q2.5 A 10-year-old girl presents in the growth clinic with height of 100 cm and weight of 25 kg. BA assessment done shows 2 years.

a. Plot the height and weight on the growth chart.
b. Calculate body mass index (BMI) and plot the BMI on the growth chart.
c. Calculate the weight age (WA).
d. Calculate the height age (HA).
e. Plot the BA.
f. Arrange chronological age (CA), HA, WA, and BA in chronological order.
g. Provide any two differential diagnoses for this girl.

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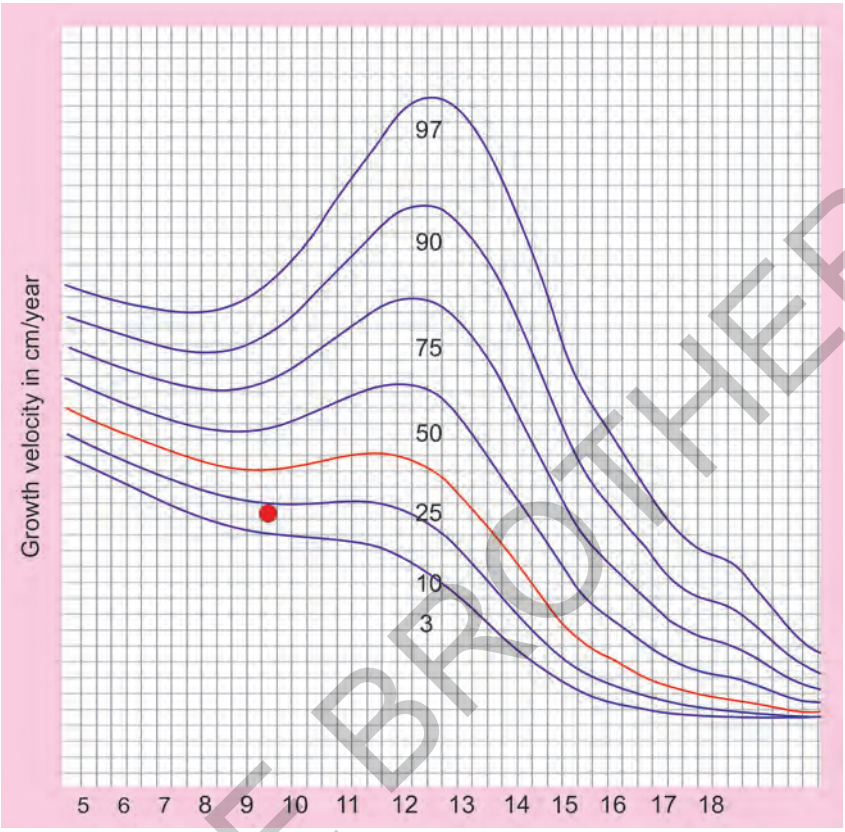
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Q2.6 **A 10-year-old female child presents with a known case of type 1 diabetes mellitus on insulin therapy. The summary of growth parameters is as below:**

	Height in cm	*Weight in kg*
9 years	106 cm	24 kg
10 years	110 cm	25 kg

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a. Calculate the growth velocity.
b. Plot the growth velocity on the growth velocity chart provided.
c. Interpret the plot on the growth velocity chart.
d. Mention two causes for the same.

Q2.7 State whether the following are true or false (pertaining to Tanner stage).

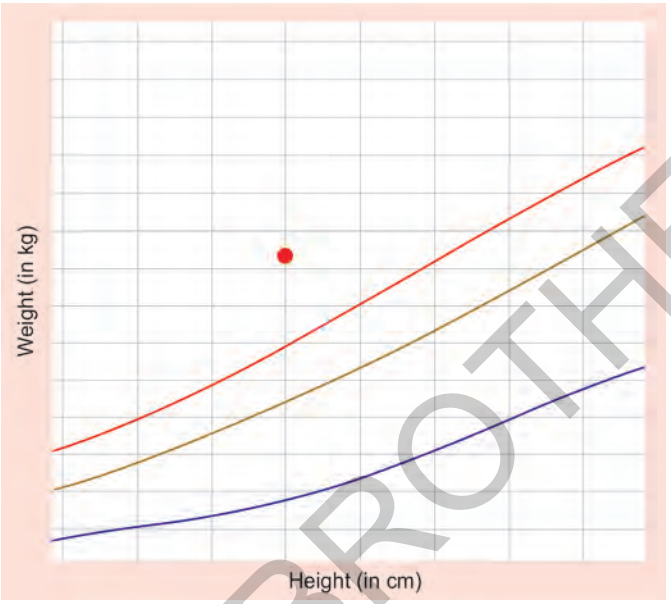
a. Pubarche appears 6–12 months after onset of thelarche in girls.
b. Menarche in girls usually occurs 2–2.5 years after onset of thelarche.
c. Pubarche precedes the growth of penis in boys.
d. Axillary hair appears during late puberty in boys.
e. Thickening of scrotum is a sign of puberty in boys.
f. Growth acceleration is observed during Tanner stage 2 in boys.

Q2.8 A tool is provided below. Please answer the following questions:

a. Identify the tool that is provided.
b. What is the starting age the tool can be used?
c. Is the tool gender specific or gender neutral?

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d. A 10-year-old girl has a height of 145 cm and 65 kg. Please plot it on the tool.
e. What is your interpretation of the plot on the chart?



Q2.9 Fill up the blanks:

a. _____ depicts the position of the child in the reference population.
b. An equivalent percentile for a Z-score of 0 is _____ percentile.
c. The percentile of 97.2 is equivalent to a Z-score of _____.
d. BMI below the 3rd percentile in a 7-year-old child is termed: _____.
e. A weight for height Z-score of +2.3 in a 3-year-old child is classified as _____.
f. Weight for age Z-score of -3.8 in a 2-year-old child is classified as _____.
g. BMI above _____ is termed as obesity in a 10-year-old child.
h. Rapid crossing of _____ major percentiles rapidly warrants evaluation.

Q2.10 Match the following:

Formula	*Diagnosis*
a. CA > HA > WA = BA	1. Precocious puberty
b. CA > WA > HA > BA	2. Nutritional deprivation
c. WA > HA > BA > CA	3. Endocrine short stature
d. WA > CA > HA > BA	4. Nutritional obesity
e. BA > HA > WA > CA	5. Nonnutritional obesity

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Q2.11 A 10-year-old girl child with short stature and this clinical finding:



a. Identify the clinical finding.
b. Name the likely diagnosis.
c. Name the most common cardiac condition in this girl.
d. Name the most common autoimmune disorder in this girl.
e. Name one renal disorder that can be associated with the child.
f. Name the starting dose of transdermal estrogen for this girl.
g. Name two drugs that can be given to improve the stature.

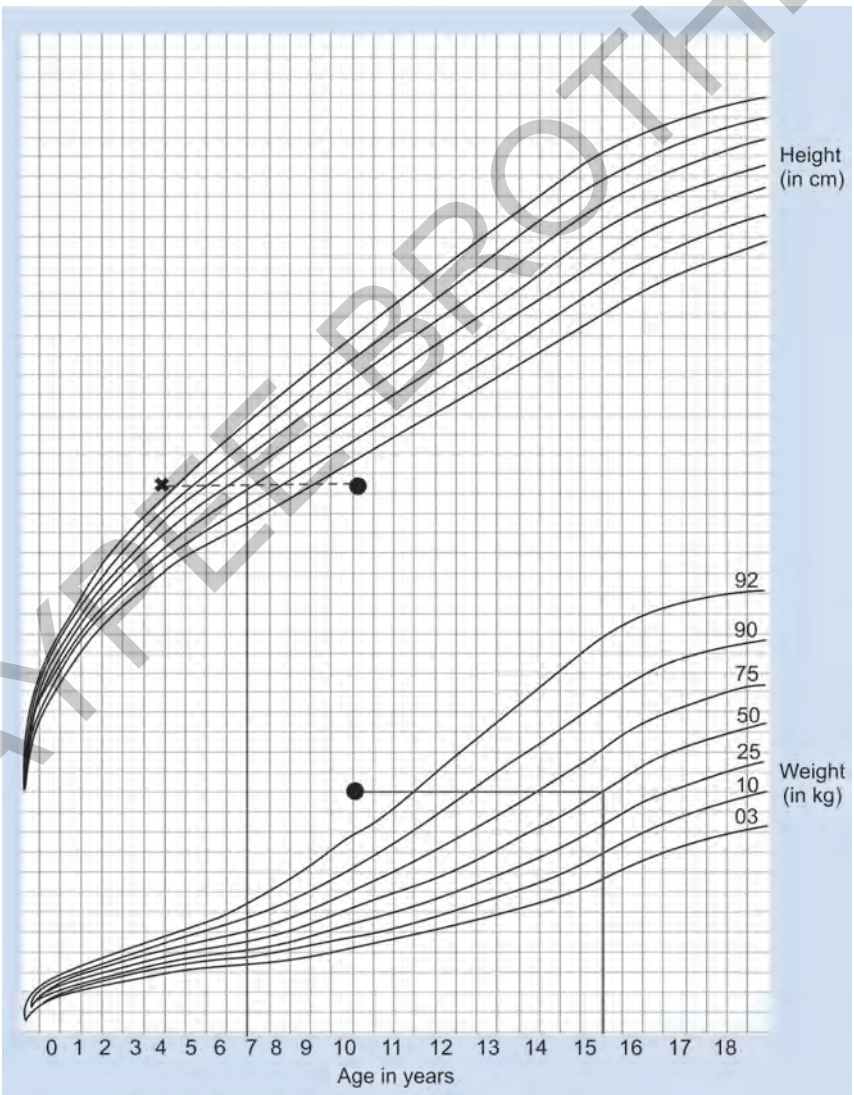
Q2.12 An 8-year-old girl with: Height: 117 cm, Weight: 18 kg, Mother's height: 150 cm, Father's height: 163 cm.

Father's height		Mother's height
150 cm	3rd percentile	140 cm
155 cm		143 cm
160 cm		147 cm
163 cm	10th percentile	150 cm
168 cm		151 cm
169 cm		153 cm
170 cm	25th percentile	155 cm
172 cm		160 cm
174 cm		162 cm
175 cm	50th percentile	165 cm
178 cm		166 cm
180 cm		169 cm
181 cm	75th percentile	170 cm
182 cm		173 cm
183 cm		175 cm
184 cm	97th percentile	176 cm
185 cm		180 cm

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a. Identify the tool above.
b. Calculate the target height.
c. Mention the target range.
d. Calculate the midparental height (MPH) percentile using the above tool.
e. The girl is at the 10th percentile of height on Indian Academy of Pediatrics (IAP) charts. Does this child warrant any intervention?
f. How many percentile line discrepancies between target height and child's height are considered as significant?

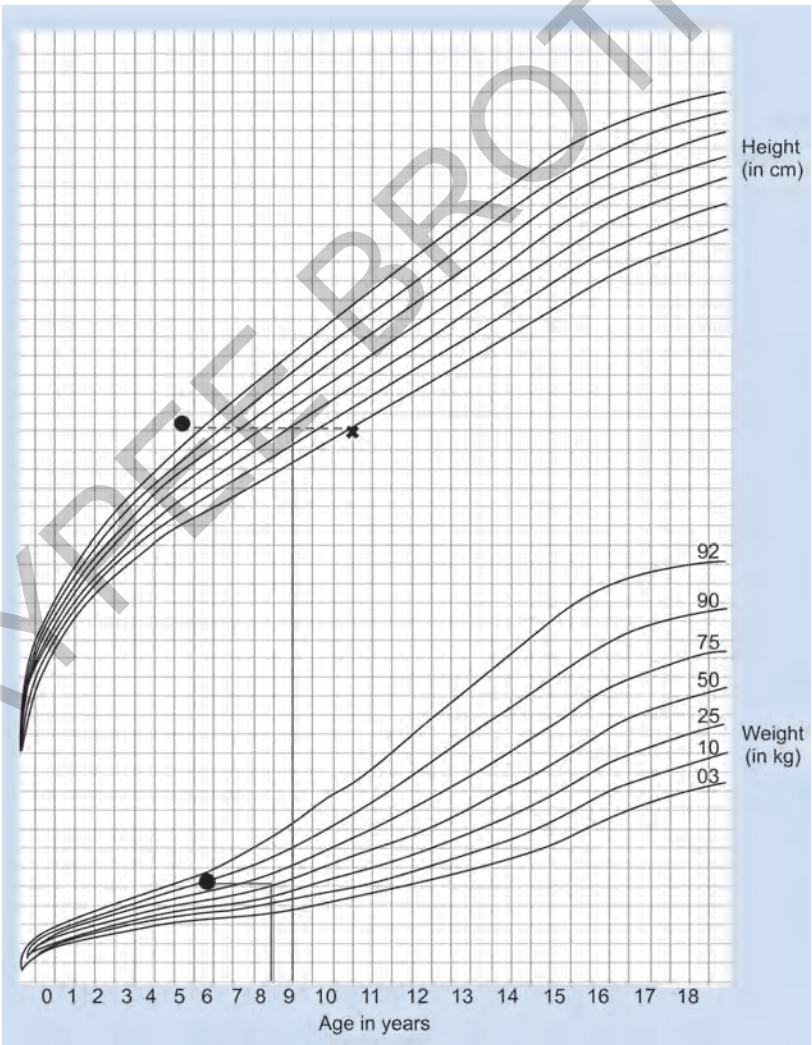
Q2.13 A 10-year-old boy is assessed for growth: Height is 122 cm and weight is 55 kg. BA is 4 years. Answer the following questions:



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a. Plot the height and weight.
b. Calculate the BMI.
c. What is the HA?
d. What is the WA?
e. Plot the BA on the growth chart.
f. Arrange the CA, HA, WA, and BA in ascending order.
g. What is your diagnosis?
h. Mention one differential diagnosis for this boy.

Q2.14 A 5-year-old child presents with tall stature. His Tanner stage is testes 3 mL (right), 3 mL (left), Tanner stage 4 genital stage, pubic hair Tanner stage 4. Bone age assessed by Greulich and Pyle atlas is advanced—11 years.



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a. What is your diagnosis?
b. Mention two clues to your diagnosis from the growth chart.
c. Mention two clues to your diagnosis from the Tanner's stage.
d. What is the method to estimate final height in this method of BA assessment?
e. The estimated final height will be higher than the target height in this boy—true or false.

Q2.15 Fill up the table with appropriate terminologies and diagnosis:

Proportionate short stature, short-limbed dwarfism, short-trunk dwarfism, achondroplasia, growth hormone deficiency, and mucopolysaccharidosis

US:LS ratio	*Terminology*	*Example*
3 years male with ratio of 1.9:1		
At birth with 1.1:1		
6 years with 1.2:1		

(US:LS: upper segment: lower segment)

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ANSWERS

Ans. 2.1

a. Constitutional delay of growth and puberty
b. Normal
c. Sustained close to the 3rd percentile
d. Delayed
e. Delayed by 2 years
f. 14 years

For your knowledge:

What is the cause/physiological basis of this condition?

- *Persistent hypogonadism state of childhood*
- *Measurement of insulin-like growth factor-1 (IGF-1) is low for chronological age (CA) and normal for bone age (BA)*

Ans. 2.2

1. Growth hormone deficiency
2. Turner syndrome
3. Idiopathic short stature
4. Chronic renal failure (before transplantation)
5. Small for gestational age with short stature
6. Prader–Willi syndrome
7. *SHOX gene defect*
8. *Noonan syndrome*

Ans. 2.3

a. 0.16–0.24 mg/kg/week
b. 22–35 µg/kg/day
c. Subcutaneous
d. Once a day
e. IGF-1
f. 16 years
g. 14 years
h. First year
i. Type 2 diabetes mellitus, slipped capital femoral epiphyses, gynecomastia, scoliosis, and pseudotumor cerebri

Ans. 2.4

a. Hypopituitarism, growth hormone deficiency
b. Normal
c. High pitched

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- Commonly encountered OSCEs are presented as annexure.

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