

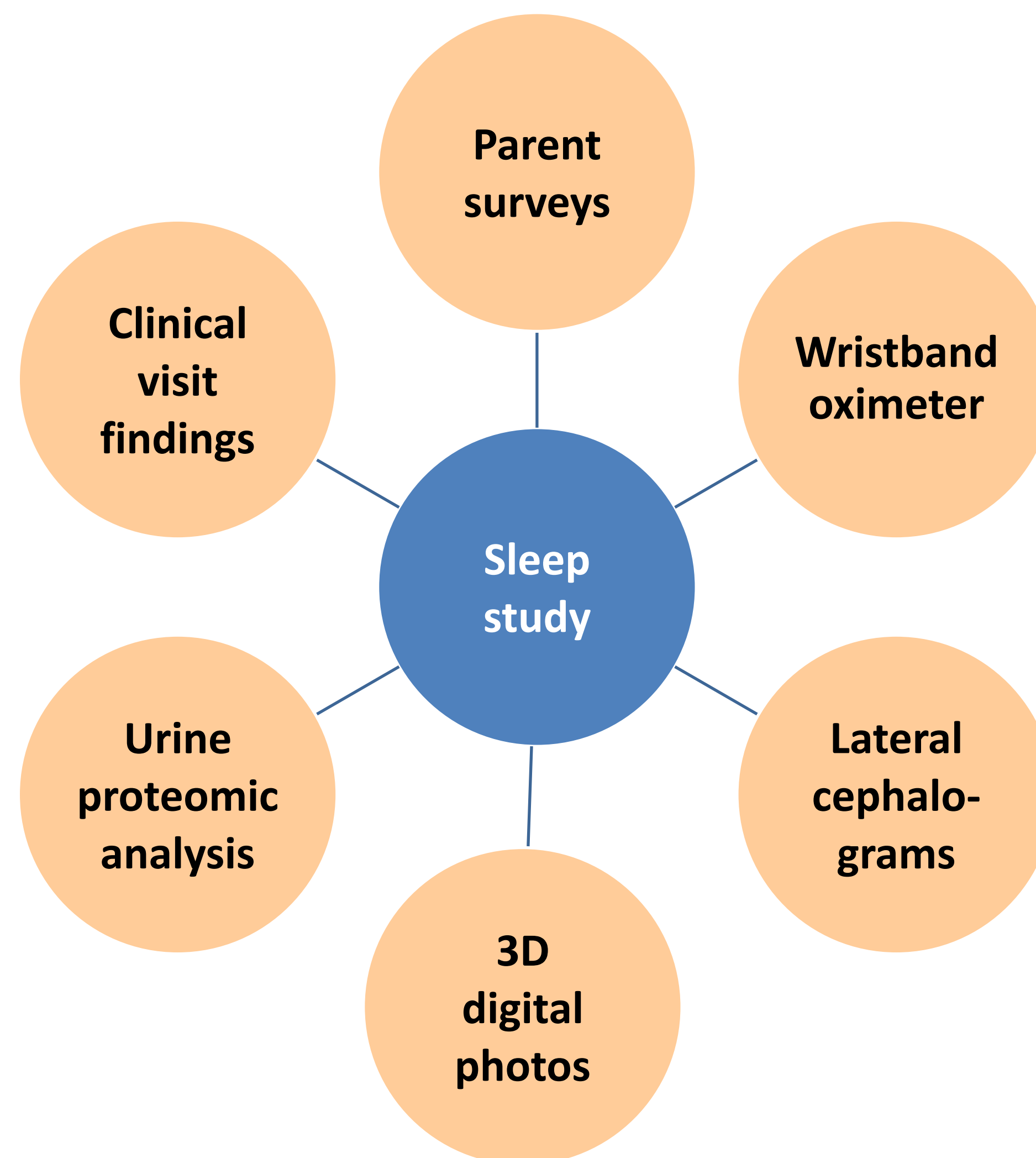
# Predicting Obstructive Sleep Apnea in People with Down Syndrome

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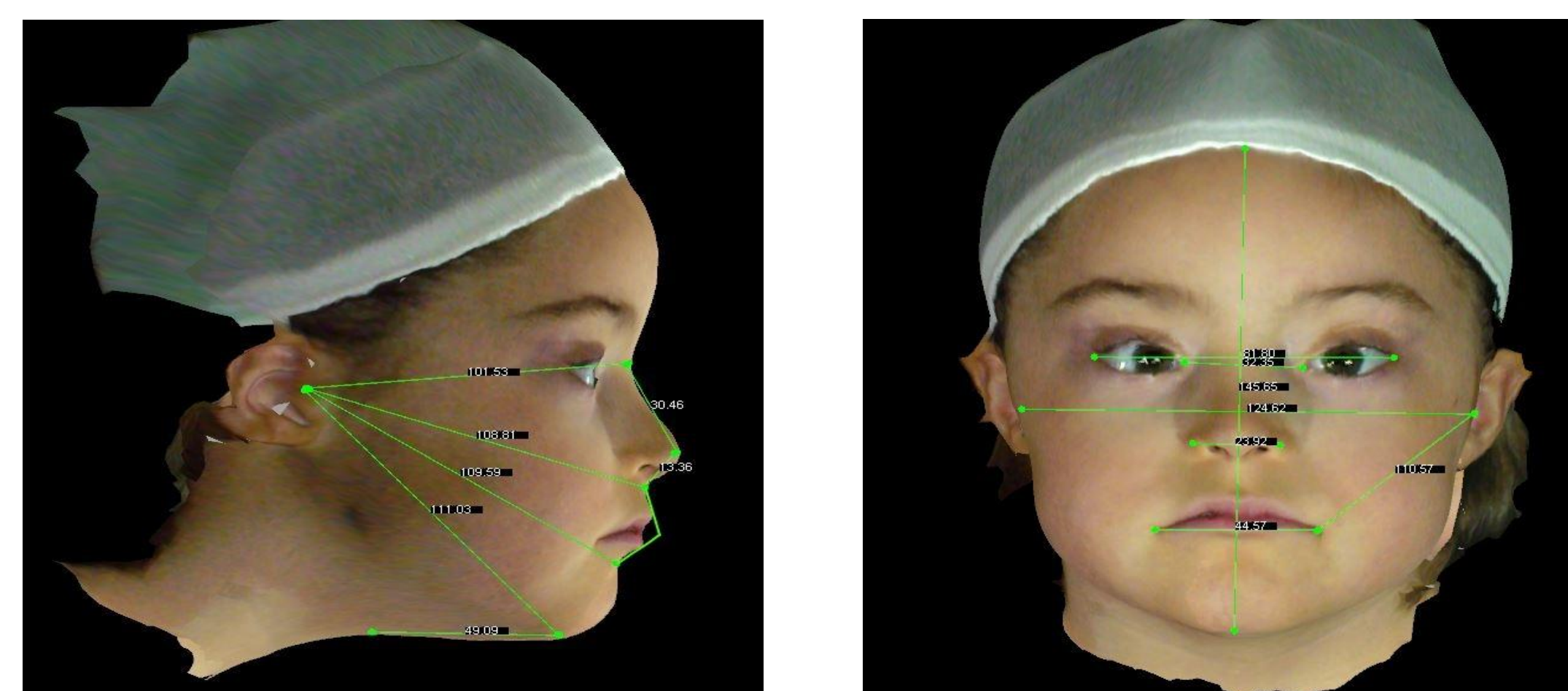
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## BACKGROUND

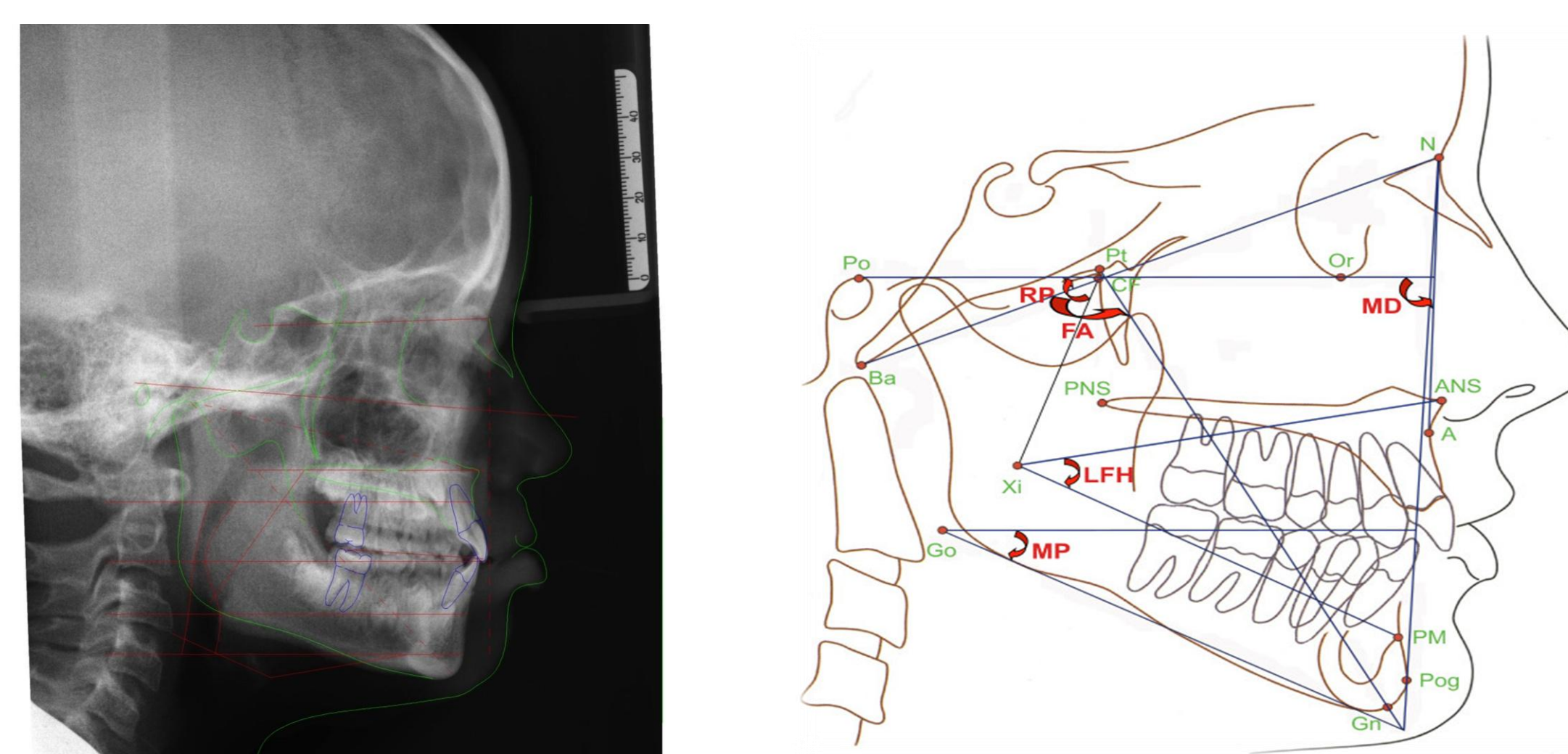
- Obstructive sleep apnea (OSA) in individuals with Down syndrome is associated with multiple morbidities.
- An overnight sleep study or polysomnogram is the gold-standard for diagnosing OSA.
- The AAP recommends that all persons with Down syndrome have a sleep study by the age of 4.
- While noninvasive, sleep studies are not insignificant procedures for individuals with Down syndrome (DS). They are often expensive, not readily available, poorly tolerated, and inconvenient.



## 3D Photogrammetry



## Lateral Cephalograms



## Sleep Questionnaires

1. **Sleep-Related Breathing Disorders (SRBD) Scale of the Pediatric Sleep Questionnaire (PSQ)**, a validated tool to assess OSA in the pediatric population.
2. **Children's Sleep Habits Questionnaire (CSHQ)**, another validated and reliable instrument for the pediatric population.

**Nonin WristOx<sub>2</sub> Model 3150**



## RESULTS

		Predicted Results		
		AHI ≤ 1	1 < AHI ≤ 5	AHI > 5
Actual Results	AHI ≤ 1 <i>none</i>	29	3	25
	1 < AHI ≤ 5 <i>mild</i>	8	6	13
	AHI > 5 <i>mod-severe</i>	3	2	13

<b>Positive Pred (PPV):</b>	<b>AHI &gt; 1</b> 55%	<b>AHI &gt; 5</b> 25%
<b>Negative Pred (NPV):</b>	73%	90%

## Variables in Final Model

- **Questionnaires:** CSHQ, SRBD
- **Medication usage** (e.g., thyroid, reflux meds)
- **Anthropometric measurements** (e.g., BMI)
- **Vital signs** (e.g, BP, Awake SpO<sub>2</sub>)
- **Age**
- **Physical exam** (e.g., Mallampati, neck circum)

## CONCLUSIONS

With simple procedures that can be collected at minimal cost, the proposed model accurately predicted when patients with DS were less likely to have moderate to severe obstructive sleep apnea and thus may not need a diagnostic sleep study.

Before we recommend implementing this predictive model, we are validating our prediction accuracy with a new set of patients.

## ACKNOWLEDGEMENTS

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## OBJECTIVES

- To develop a novel model that could predict OSA in individuals with Down syndrome.
- The model should use comfortable, practical, and cost-effective measures, for diagnosing OSA in individuals with Down syndrome

## DESIGN/METHODS

All people with Down syndrome, ages 3-35, who were already enrolled in the Down Syndrome Program at Boston Children's Hospital.

**exclusion:** already had adenoids, tonsils, or both removed; previous sleep study within past 6 months