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Pathophysiology of upper airway obstruction: a developmental perspective.

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The obstructive sleep apnea syndrome (OSAS) occurs in patients of all ages, from the premature infant to the elderly. Much remains unknown about the pathophysiology of the syndrome. However, research suggests that OSAS in all age groups is due to a combination of both anatomic airway narrowing and abnormal upper airway neuromotor tone. The anatomic predisposing factors for OSAS differ over the lifespan. However, a smaller upper airway is noted in all age groups and probably predisposes to airway collapse during sleep. Despite the known anatomic factors, such as craniofacial anomalies, obesity, and adenotonsillar hypertrophy, that contribute to OSAS throughout life, a clear anatomic factor cannot always be identified. This suggests that alterations in upper airway neuromotor tone also play an important role in the etiology of OSAS. Infants and children are less likely than adults to arouse in response to upper airway obstruction and do not compensate for prolonged increases in inspiratory resistive load. The overall ventilatory drive is probably normal in patients of all ages with OSAS. However, upper airway neuromotor tone and reflexes during sleep vary with age and are increased in normal infants and children compared to adults, perhaps as a compensatory response for their relatively narrow airway. This compensatory response appears to be blunted in children with OSAS. Further research is needed to fully understand the complexities of upper airway structure and function during both normal development and disease.

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