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Perspective

The Connection Between Ankyloglossia (Tongue-Tie) and Airway-Related Conditions Such as Obstructive Sleep Apnea (OSA) and Sleep-Disordered Breathing (SDB) in Infants and Children

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Many children are referred to a pediatric dentist for issues such as: breastfeeding difficulty, speech delays, or eating disorders, yet their restricted tongue mobility (ankyloglossia) is often not considered in the context of breathing or sleep issues and how these comorbidities are all often related to ankyloglossia. Preventing OSA/SDB in newborn infants and toddlers requires immediate consideration and intervention, not a wait and see attitude, when the tongue is unable to move forward and blocks the infant's airway.

Pediatric OSA /SDB is a disorder of infant respiration, when a child or infant's breathing is interrupted during sleep, it characterized by partial upper airway obstruction and or intermittent/complete obstruction (obstructive apnea) that disrupts adequate oxygenation during sleep and normal sleep patterns. Obstructive sleep apnea (OSA) is associated with a physical blockage of the infants, toddlers, youth and adult's airway or nasal passages. When the tongue is tethered, it tends to fall backward, especially when the child is lying down, potentially obstructing the airway. This obstruction during sleep may lead to interrupted breathing, reduced oxygen delivery to the brain, and disrupted sleep patterns. When the tongue is tethered, the tongue is pushed distally into the airway and cannot move adequately forward reducing oxygen flow to the brain. When the breast, bottle or pacifier is placed in the infant's mouth, and the infant cannot bring the tongue forward resulting in reduced oxygen flow to the brain. This obstruction during sleep may lead to interrupted breathing and disrupted sleep patterns. Adequate oxygen is critical for neuron development in newborns.

Consequences of this oxygen deprivation in infants can be behavioral issues, developmental delays, or misdiagnosed ADHD. Infants who suffer from lack of adequate sleep can develop additional comorbidities as they grow and may be diagnosed as hyperactive, develop trouble focusing and get tired quickly causing behavior problems at home and when they begin school. An infant's brain oxygen demands are enormous; our brain is only 2 percent of the infant's body, yet the brains consume 20 percent of the body's oxygen supply. When a child suffers from Sleep deprivation it is often misdiagnosed as an attention deficit disorder (ADHD.ADD) due to obstructed airways. Even one episode of OSA (stopping breathing for more than 10 seconds) in an infant, can produce irreversible damage to certain areas of the brain" (Ron Harper UCLA Neurologist). Untreated OSA/SDB consequences for children may be even more severe including not only medical issues, but growth and emotional development as well. An overlooked comorbidity can often be Enuresis (Bed wetting) associated with increased urine production from hormonal dysregulation. This may be accompanied by increased levels of catecholamines and frequent arousal that further contribute to enuresis.

Sleep disturbance breathing in infants and children can result in developmental changes which may be accompanied by rather profound behavioral and neurocognitive deficits. During early infant development, if persistent obstructive sleep apnea (OSA) occurs during this critical time of rapid active brain and nervous system development, research indicates that hyperactivity and behavior problems may develop (ADHD, ADD).

Early warning signs of OSA in an infant:

1. Frequent and loud snoring during nap time or nighttime.
2. Raspy breathing noises.
3. Nasal congestion.
4. Observable pauses (Apnea) in breathing and/or gasping for air when the child is sleeping.
5. Restless sleep: observing as frequent tossing and turning and staying asleep.
6. Mouth breathing: Rather than nasal breathing when sleeping and/ or awake.
7. Feeding difficulty: when feeding by the breast and/or bottle.

Long term comorbidities which may develop from untreated sleep apnea in school-aged children:

1. Bed wetting (enuresis)
2. Clenching teeth, bruxism, mouth breathing
3. Poor school performance due to misdiagnosed ADHD
4. Aggressive behavior, emotional instability
5. Developmental delay
6. Rare sequelae of untreated OSA include brain damage, seizures, coma, and cardiac complications
7. Delayed or impaired growth
8. Facial and dental structure changes (high arched palate, narrow jaw formation)
9. Night fears
10. Night sweats.

Symptoms in older children:

1. Under or overweight
2. Dark circles under eyes
3. Tonsillar hypertrophy
4. Long thin narrow face
5. Sleeping or tired during the day
6. Maxillary hypoplasia(underdevelopment)
7. High arched hard palates
8. Elongated soft palate and uvula soft tissue
9. Maxillary sinus obstruction
10. Hyperactivity and antisocial behavior
11. Inability to properly focus on activities
12. Morning headaches.

The "wait and see" approach to allowing a child to have any type of hypoxia is no longer acceptable. these infants and toddlers require early clinical evaluation and treatment, particularly when signs of tongue restriction are present alongside airway or sleep issues. Primary care providers, ENT, feeding and speech specialists, dentists, and lactation consultants need to be proactive in screening for ankyloglossia in infants with feeding, breathing, or sleeping issues. Consider referral for tongue-tie assessment and possible frenectomy (surgical release) when comorbidities exist [1-19].

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