PRESCRIPTION FOR play

When Play is Missing:

How Modern Lifestyles Shape Airway & Oral Function

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GET YOUR PLAY ON!

When Play Is Missing:

How Modern Lifestyles Shape Airway & Oral Function

Presentation Slides
Part 2

The following slides are part of a collaborative presentation titled – *Prescription for Play: Playtime Pearls for Optimizing Airway and Oral Functions*.
Date: March 16, 2019
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Part 2 - Description

This presentation examines how reduced physical play intersects with modern risk factors—including sedentary lifestyles, processed diets, suboptimal craniofacial growth, posture changes, technology exposure, and sleep disruption—to influence airway development, oral function, and regulation in today's childhood landscape.

A Prescription for Play® Resource
For educational purposes only. Proper citation requested.

Sedentary Impacts

The Risks of Staying Indoors –
Impact on Airway & Oral Functions

Sedentary Lifestyle

- Obesity
- Diets: processed foods
- Craniofacial respiratory growth
- Forward head posture
- Static & dynamic posture
- Lymphatic & glymphatic drainage

Airway Function Disorders

- Abnormal breathing patterns 24/7
- Mouth breathing
- Primary snoring
- UARS
- OSA

Oral Dysfunctions

- Static and dynamic posture
- Practice large & small muscle use
- Weight bearing for bone growth
- Encourages respiration
- Expands experiences

Sedentary Lifestyle –
Obesity (especially if genetic predisposition exists)

- Significantly interferes with respiratory function by decreasing lung volume
- Mechanical changes result from production of cytokines
- Respiratory muscles: ineffective secondary to body fat distribution
- Reduction in strength and resistance give rise to inspiratory overload which increases respiratory effort, oxygen consumption, etc. (Mafort et al., 2016)
- Adipose tissue is deposited adjacent to the pharyngeal airway in patients with OSA and volume of this tissue is related to presence and degree of OSA (Shelton et al., 1993)
- In the early stages of OSA, the pharyngeal fat pad seems to play an important role in the development of disease in overweight patients (Pahkla et al., 2014)

Sedentary Lifestyle –
Diets high in processed foods

- Maternal work hours are positively associated with children's BMI and obesity, especially in children of higher SES (Datar, Nicosia, & Shier, 2014)
- Children whose mothers work more consume more unhealthy foods (ie. fast food) and less healthy foods (ie. fruits & vegetables) and watch more television
- Longer time spent in sedentary behavior was associated with higher prevalence of consumption of ultra-processed foods (Costa et al., 2018)
- Consider how today's food preparation and diets have evolved over time and their impact on airways and oral functions

Sedentary Lifestyle –
Craniofacial Respiratory Complex (CRFC) growth

- According to Boyd & Lieberman, “Soft diets eliminate the natural need for chewing, and this began to change the shape of our faces: narrowing our jaws and restricting our airways.” (Gelb & Hindin, 2016, p.30)
- Restrictions of CFRC growth have structural, functional, and behavioral sequalae

Structural Signs

- Malocclusion
- Retrognathic mandible
- Maxillary collapse
- Forward head posture

Functional Signs

- Abnormal breathing patterns 24/7
- Chewing inefficiency
- Reverse swallow pattern
- Articulation errors
- Sleep-disordered breathing

Behavioral Signs

- Neurocognitive
- Academic
- Social
- Emotional

It’s Not Just About Teeth

Hyunh, et al., (2011). Associations between sleep-disordered breathing symptoms and facial and dental morphometry assessed with screening. AJODO, 140, 762 -70.

Of the 600 orthodontic patients with SDB:

- 16% long facial form
- 86% convex profiles (mandible set back from maxilla)
- Over 50% had daytime mouth open posture

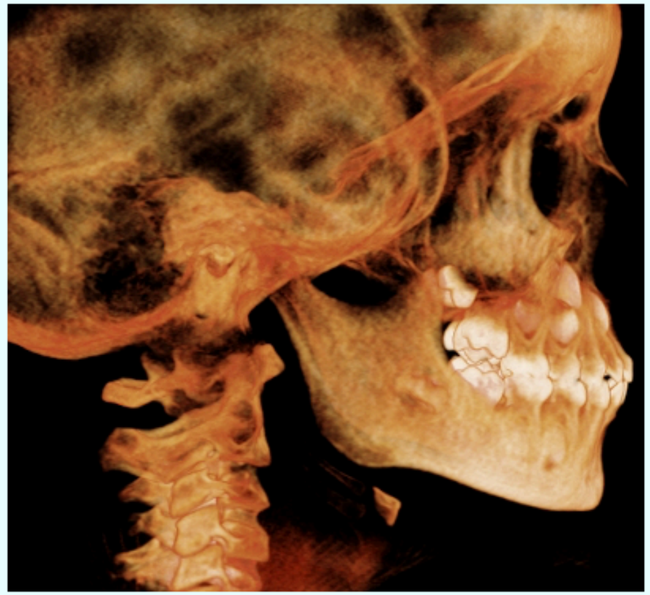
Courtesy of Dr. John Mew

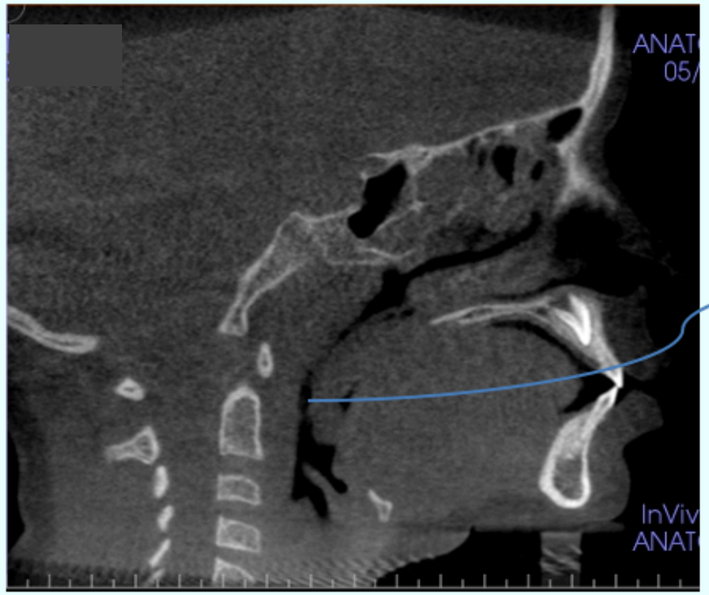
Anatomic Determinants of Sleep-Disordered Breathing

Dempsey, JA, Skatrud JB, et al. (2002). Anatomic Determinants of Sleep disordered Breathing Across the Spectrum of Clinical and Nonclinical Male Subjects. Chest, 122(3), 840 - 851.

- Short maxilla → smaller airway
- Narrow maxilla puts nasopharynx at risk for collapse with loss of muscle tone

Airway Volume-
Small Mandible = Small Airway





Hakan et al. (2011) Airway Volume for different dentofacial skeletal patterns. Am J Orthod Dentofacial Orthop, 139, e511 –e521

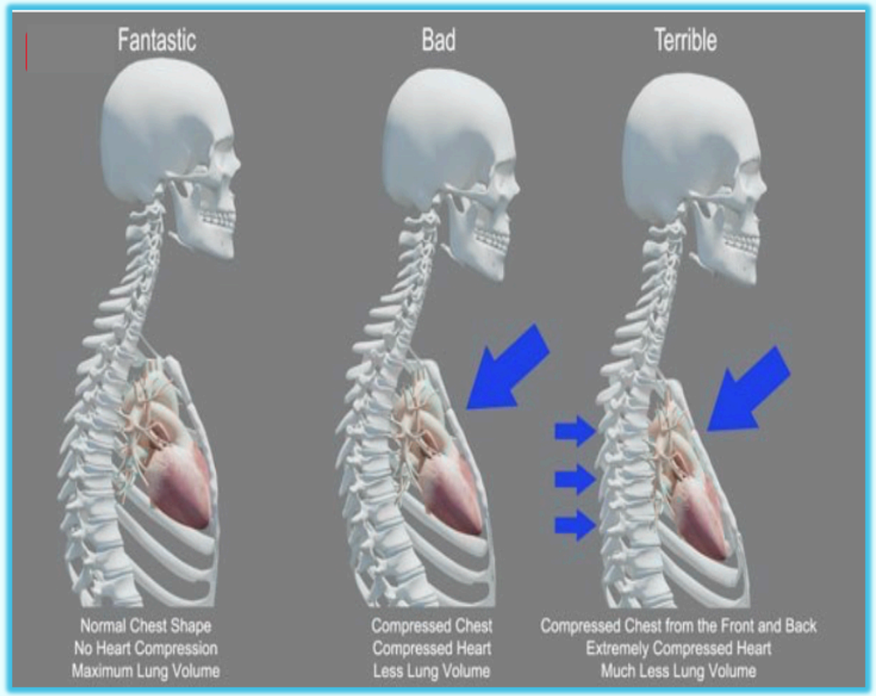
The smallest space behind the tongue (minAX) is the best predictor of NP airway volume.

Poor Posture Impacts Future Health

Abnormal Bone Growth

Wolff's law states that bone in a healthy person will adapt to the loads under which it is placed...

- Therefore, abnormal postural stress and current loads will alter bone development (Burger et al., 2019)
- Disc degeneration is not just in adults. In 10-year-olds 9% demonstrate disc degeneration within developing spine (Smith et al. 2003) (Smith et al., 2003)
- High levels of youth inactivity, starting to see osteoporosis and arthritis (NIH Osteoporosis and Related Bone Diseases National Resource Center, 2018)



Respiratory Dysfunction in Chronic Neck Pain Patients. A Pilot study E Kapreli et al Cephalalgia 2009 (Jul): 29 (7): 701 - 710

Poor Posture Impacts Future Health

Mental Health

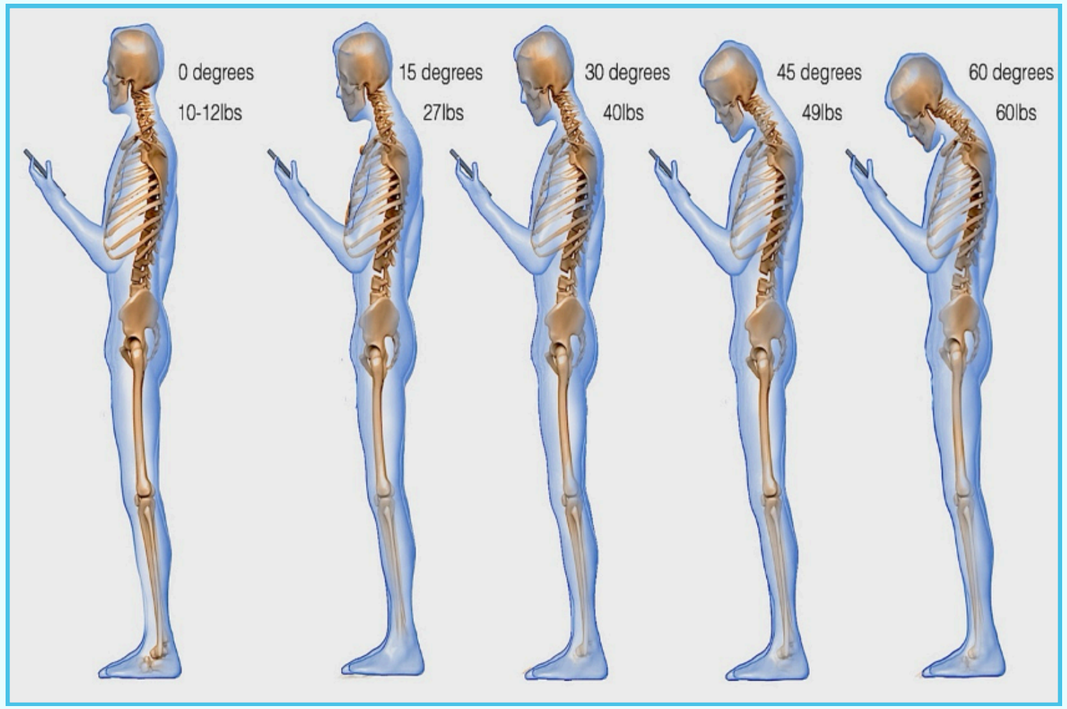
- Mood, anxiety, stress, fearful, hostile, nervous, quiet, still, passive, dull, sleepy, sluggish (Nair et al Health Psychology 2015)

Lung Function and Life Span

- Decrease maximal voluntary ventilation and respiratory muscle strength
- Strong association between an increased forward head posture and decreased respiratory muscle strength in neck patients (Kapreli et al, 2009)

Respiratory Dysfunction in Chronic Neck Pain Patients. A Pilot study E Kapreli et al Cephalalgia 2009 (Jul): 29 (7): 701 - 710

Texting and Spinal Damage



spinewellnesscenter.com

Forces on the neck increase the more we tilt our heads causing spine curvature

Digital Dementia
(Neuroscientist, Manfred Spitzer, 2012)

- The overuse of technology and excessive slouched sitting postures relate to the breakdown of neurocognitive functions leading to signs and symptoms of dementia.

Too much technology increases rates of:

- ADHD, ASD, developmental delay, anxiety, learning disorders, sleep disorders and other behavioral disorders in children due to overstimulation of the vestibular system (Spritzer, 2012) (Waldman et al., 2006)

- Mental health issues related to reduced grey matter in the hippocampus … part of brain related to spatial cognition: schizophrenia, PTSD, depression, dementia (West et al., 2015; Konishi & Bohbot, 2013; & Kuhn et al., 2011)

American Posture Institute

"Short term memory pathways will deteriorate from underuse…if we overuse technology" (Spitzer, 2012).

Where it All Begins

Too much technology increases rates of:

- Sensory deficits from the lack of movement associated with the sedentary nature of technology
- Significant decreased physical activity levels contributing to childhood and adult obesity
- Video games and violence on TV have been shown to significantly increase sympathetic activity (fight/flight response) in children and adults leading to anxiety and depression disorders

Internet Addiction Disorder

- Identified by brain researchers
- Kimberly Young, PhD, et al. demonstrated that there can be a significant negative brain changes associated with excessive time spent on the internet
- Changes associated with excessive dopamine stimulation via the reward and pleasure centers of the brain
- These are the same pathways activated by certain drugs such as cocaine, opiates, and methamphetamines

Researchers found that Internet addiction disorder (IAD) demonstrated widespread reduction of function in major white matter pathways; such abnormal white matter structure may be linked to some behavioral impairments.

Lin, F. et al. (2012). Abnormal White Matter Integrity in Adolescents with Internet Addiction Disorder: A Tract-Based Spatial Statistics Study. Plos One.

Blue Light & Cortisol

- Digital devices emit high levels of blue light (Tosini et al., 2016).
- Research demonstrates that blue light is proven to increase cortisol levels (Heo et al, 2017)
- Chronically elevated cortisol levels have been shown to shrink the hippocampus, an area associated with memory and recall
- Blue light disrupts normal circadian rhythms essential for sleep, and can lead to sleep disorders (Tosini et al., 2016)

Conclusions

Frequency of cordless phone calls, mobile phone dependency, and tablet use were related to an increase of subjective and objective sleep problems in adolescents. These results seem to indicate that sleep displacement, mental arousal, and exposure to blue light screen emission might play a more important role on sleep than a high RF-EMF exposure to the brain. However, more studies are needed assessing personal RF-EMF levels to draw conclusions.

Cabre-Riera et al (2019). Telecommunication devices use, screen time and sleep in adolescents. *Evniron Res, 171, 341-347.*

Children should be dreaming not streaming (Robbins, 2019)

Sedentary Lifestyle –
Forward Head Posture (FHP)

The consensus from numerous studies assessing body posture of individuals who mouth breathe is that FHP the major change Cuccia, Lotti, & Caradonna, 2008)

Airway Function Disorder

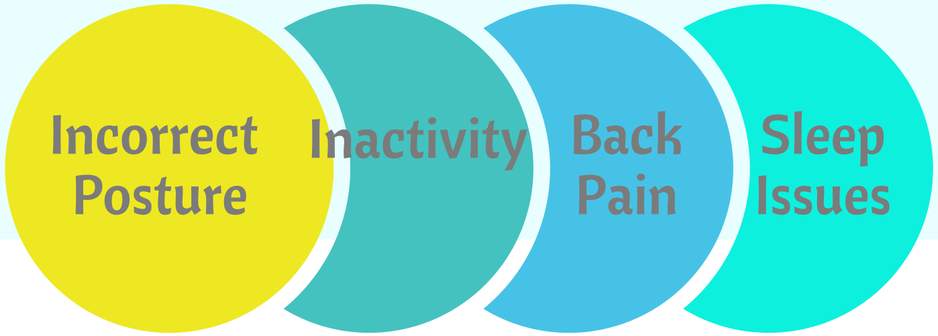
Internet Addiction

Forward Head Posture

= Functional Deficits

Sedentary Lifestyle –
Static & Dynamic Posture

- Posture provides a stable base for locomotion, manual actions, and facial actions
- Consider that poor posture can impact respiratory function during sleep
- “Musculoskeletal back pain is a known consequence of incorrect posture and prolonged muscular inactivity (i.e. being stationary at one point for a lengthy period). Back pain is the number one cause of global disease burden worldwide, and musculoskeletal disorders such as lower back pain…” (Jia Wang et al., 2018)
- Both stress and musculoskeletal pain are associated with poor sleep among hospital workers Vinstrup et al., 2018)



Too much chair time leads to postural stress, and poor circulation and breathing

Eric Jensen, 2003

Sedentary Lifestyle –
Lymphatic & Glymphatic Drainage

- Lymphatic system: a complex network that courses throughout the body to circulate important fluids and protect against infection. Lymph nodes, spleen, thymus, tonsils, adenoids, etc.
- Lymphatic drainage patterns in tongue and soft palate (Pan et al., 2010)
- Movement of lymph: rebounding, exercising, stretching, breathing, etc.
- Glymphatic system: a functional waste pathway for the CNS. Clears the brain of toxins while people sleep (Nedergaard et al., 2012)
- Deep non-REM stage sleep is essential for optimal function of the glymphatic system (University of Rochester Medical Center, 2019)
- Sleep and exercise exert substantial positive effects on one another Dolezal et al., 2017)

Screen Genes –
(Robbins, 2019)

Preventative Measures for Screentime

Ergonomics

- Height and angle of screen
- Height of desk and chair
- Posture: arm, eyes and head position
- Regular breaks from sitting at the computer (i.e. stretching & movement)

Sleep

- Tablet, computer, and phone turned off
- No screens 1 hour before bedtime

Blue Light Filter

- Blue light/ amber glasses
- Screen filter

Screen hygiene → Epigenetic effects

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Thank You!

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