2018 Oregon Dental Conference®
Course Handout

Ben Miraglia, DDS

Course 9123: “Childhood Sleep Disordered Breathing: The Role of the Dental Team***”
Thursday, April 5
1:30 - 4:30 pm
Childhood Sleep Disordered Breathing: The Dental Team’s Role

Dr. Ben Miraglia
Oregon Dental Conference 2018
DR. BEN MIRAGLIA

- SUNY Buffalo School of Dental Medicine
- Danbury Hospital Residency
- Private Family Practice in Mount Kisco, NY
- United States Dental Institute Faculty Member
- Align Technology Faculty Member
- 24 Years General Practitioner Experience
- 14 Years Interceptive Orthodontic Experience
- Board of Directors – American Academy of Physiological Medicine and Dentistry
- Board of Directors – American Academy of Cosmetic Orthodontics
- Dentistry Today – Leaders in CE
WHY ARE WE HERE?

THE ANSWER:

FOR THE OVERALL GROWTH, DEVELOPMENT, HEALTH AND LONGEVITY OF OUR YOUNG PATIENTS
Do you know any children with...

- ADD/ADHD
- Allergies
- Asthma
- Upper respiratory infections
- Ear infections
- Ear Tubes
- Bed wetting
- Nightmares/Night terrors
- Poor academic performance
- Hyperactivity
- Aggressive behavior
- Clenching/grinding teeth
- Restless sleep/wakes often
- Small/Delayed growth
- Pacifiers
- Anxiety
- Depression
- Daytime sleepiness
- Overweight
- Obesity
- Night sweats
- GI distress/reflux
- Emotional instability
- Sensory issues
- Snoring
- Mouth breathing
THE MOST COMMON ORTHODONTIC PROBLEM IS THE CROWDED MALOCCLUSION
CAUSES OF CROWDED MALOCCLUSION

1. Improper Arch Form
2. Improper Arch Width
   1. Transverse Measurement
   2. The Eyes
IMPROPER ARCH WIDTH

- Uncrowded adults have a 35-39mm transverse measurement.
- The transverse measurement is the shortest distance between teeth 3 and 14.
Transverse Measurement
THE EYES

- VENOUS POOLING – purple/blue discoloration under the eyes
- The inferior orbital vein passes through the pterygomaxillary fissure
- A narrow maxilla will have a narrow pterygomaxillary fissure
- The physical constriction slows the blood flow
- Result – a build up of venous or deoxygenated blood
- We see this...
NOT Causes of Crowding

- Too many premolars
- Too many lower incisors
- Too many teeth
- Head is too small
- Teeth are too big
LET’S PUT SOME PIECES TOGETHER

- Improper arch form and improper arch width are the result of inadequate development of the maxilla and the mandible.
- I.e: An underdeveloped maxilla and mandible will lead to (cause) crowding.
- An underdeveloped maxilla will also have an adverse effect on the position of the mandible.
GROWTH

- NORMAL GROWTH IS WIDE, FORWARD AND DOWNWARD

- ABNORMAL GROWTH IS ANY COMBINATION OF NARROW, BACKWARD AND DOWNWARD

- MOST ABNORMAL GROWTH IS UNDERDEVELOPMENT
THE NEXT QUESTION...

- WHY ARE THE MAXILLA AND THE MANDIBLE UNDERDEVELOPED?
- SOMETHING PREVENTED THE MAXILLA AND THE MANDIBLE FROM DEVELOPING TO THEIR FULL POTENTIAL
- WHAT CAUSED THAT?
FOR THAT ANSWER WE NEED...

- TO LOOK AT ANTHROPOLOGY RESEARCH
- THREE CONTRIBUTORS:
  - DR. JAMES SIM WALLACE
  - DR. ROBERT CORRUCCINI
  - DR. JEROME ROSE

(THERE ARE HUNDREDS)
EARLY 1900’S

“AN EARLY SOFT DIET PREVENTS THE DEVELOPMENT OF THE MUSCLE FIBERS OF THE TONGUE RESULTING IN A WEAKER TONGUE WHICH CAN NOT DRIVE THE PRIMARY DENTITION OUT INTO A SPACED RELATIONSHIP WITH FULLY DEVELOPED ARCHES WHICH WILL LEAD TO MORE CROWDING OF THE PERMANENT TEETH.”
Dr. Robert S. Corruccini
He wrote the book...
Dr. Robert S. Corruccini

- Distinguished Professor Emeritus
- Southern Illinois University - Carbondale
Dr. Robert S. Corruccini

- ANTHROPOLOGIST
- 30+ YEARS OF RESEARCH
- 7 BOOKS
- HUNDRES OF JOURNAL ARTICLES
- FOSSIL STUDIES
- POPULATION STUDIES
- ANIMAL TESTING
- TWIN STUDIES
PRIOR TO 400 YEARS AGO...
LITTLE TO NO EVIDENCE OF MALOCCLUSION
POPULATION STUDIES

- Dr. Corruccini traveled the world
- Studied isolated rural peoples
- Breastfeeding
- All had a hard diet
- Little to no incidence of malocclusion or other degenerative diseases
- Little to no variation
- Also studied several populations as they became exposed to Western cultures
ANIMAL STUDIES

- DECADES WORTH OF HARD-SOFT DIET STUDIES
- RESULTS ALWAYS THE SAME:
  - SOFT-DIET ANIMALS
    - SMALLER BODY MASS
    - NARROWER MAXILLA
    - SMALLER MANDIBLE
    - THINNER ALVEOLUS
    - SMALLER CONDYLES
    - LESS DENSE BONE
    - SMALLER, WEAKER ORAL MUSCULATURE
BROKEN ISOLATION

- Malocclusion shows up in the first generation after exposure to prepared, processed and preserved foods. 50%
- Malocclusion rates rise dramatically into the second generation. 70% and third generation. 85% and fourth generation. >90%
- Variation also increases.
CONCLUSIONS

- BREASTFEEDING RESULTS IN PROPER TRAINING AND DEVELOPMENT OF THE TONGUE
- THEN THE EARLY HARD DIET CONTINUES THE PROCESS
- WHEN THE TONGUE POSTURES, SWALLOWS AND SPEAKS PROPERLY, WE GET IDEAL GROWTH
- MOST MALOCCLUSIONS ARE ACQUIRED, NOT INHERITED
- MALOCCLUSION IS A DISEASE OF WESTERN SOCIETY
“DIETARY CONSISTENCY AND TOUGHNESS PROMOTE PROPER BONE GROWTH AND PROPER PERMANENT TOOTH ERUPTION, BRINGING ABOUT IDEAL OCCLUSION; WHEN NONRESISTANT PROCESSED FOODS BECOME UBIQUITOUS AFTER INDUSTRIALIZATION, AND THE ERUPTION AND CUSPAL COORDINATION OF TEETH LOSE THE CRITICAL PATHFINDER INFLUENCE OF VIGOROUS MASTICATORY PRESSURES, MALOCCLUSION SHOWS A RAPID RISE.” from: How Anthropology Informs the Orthodontic Diagnosis of Malocclusion’s Causes
Breastfeeding Trends in the USA

- The current rate is 70%
- Drops to 50% at 6 months – partial/pumping
- Bottle feeding/jar or blended food is different (soft)

Results:
- Tongue is not trained properly – poor function
- Tongue musculature is weaker – poor growth
- Child misses the optimal growth and development of the maxilla and mandible during the first 2 years of life
Graduates ‘Puffs’. The nutritious snack that melts in baby’s mouth.
THIS BEGS THE NEXT QUESTION

- WHAT ARE THE RESULTS OF HAVING AN UNDERDEVELOPED MAXILLA AND MANDIBLE?
- WE NEED TO LOOK AT OUR ANATOMY FOR THE ANSWERS.
MAXILLA
ANATOMY

WHEN THE MAXILLA AND MANDIBLE (TONGUE) DO NOT GROW TO THEIR FULL POTENTIAL THE RESULT IS A CHILD WITH A COMPROMISED...

AIRWAY
NASAL BREATHING VS.
MOUTH BREATHING
• Director – Center for Craniofacial Anomalies – UCSF
• Research – Primate Center – UC – Davis
  • Rhesus monkeys
  • Blocked monkey’s noses with cotton rolls
  • Conducted airway studies
  • Nasal obstruction > mouth breathing > lower tongue posture > malocclusion
Dr. Sten Linder-Aronson

- Dr. Sten Linder-Aronson – children
  - Research focus was the difference between nasal breathing kids and mouth breathing kids
  - Same results – mouth breathers develop differently
  - MOUTH BREATHING + POOR TONGUE POSITION/FUNCTION = HIGH RATES OF MALOCCLUSION
FUNCTIONS OF THE NASAL CAVITY

- FILTER
- HUMIDIFY
- WARM
- ACCELERATE

One Purpose:
Prepare the air for the lungs
NASAL BREATHING

- DELIVERS IDEAL AIR TO THE LUNGS
- LEADS TO OPTIMAL O₂ – CO₂ EXCHANGE
- RESULTS IN EXCELLENT O₂ DELIVERY TO:
  - THE BRAIN
  - THE HEART
  - ALL ORGANS
  - ALL MUSCLES
- END RESULT: A PROPERLY OXYGENATED CHILD
PROPER NASAL BREATHING

- LIPS TOGETHER AND AT REST
- TONGUE AT THE ROOF OF THE MOUTH
- INVISABLE
- SILENT
- NO MOVEMENT OF LIPS AND CHEEKS DURING SUBCONSCIOUS SWALLOW
MOUTH BREATHERS

- INCREASE IN UPPER RESPIRATORY INFECTIONS
- INCREASE IN ENT INFECTIONS
- INCREASE IN ASTHMA
- INCREASE IN ALLERGIES

WHY?
MOUTH BREATHING

- VENOUS POOLING
- CO₂ HAS A VASODILATORY EFFECT
- MOUTH BREATHING REDUCES BLOOD CO₂
- INFERIOR ORBITAL VEIN CONSTRUCTS
- THE RESULT IS VENOUS POOLING
- ALSO
- NASAL BREATHING RELEASES NITRIC OXIDE FROM THE PARANASAL SINUSES
- MOUTH BREATHERS REDUCE BLOOD NO
- INFERIOR ORBITAL VEIN CONSTRUCTS
- THE RESULT IS VENOUS POOLING
COMPROMISED NASAL AIRWAY

- AN UNDERDEVELOPED MAXILLA LEADS TO A SMALLER NASAL CAVITY/NASOPHARYNX
- THE RETROGNATHIC POSITION OF THE MANDIBLE REDUCES THE OROPHARYNX
- MOUTH BREATHING AND SOFT DIET HAVE LOW TONGUE POSTURE
- MOUTH BREATHING CAUSES TONSILS AND ADENOIDS TO SWELL
- FURTHER REDUCES THE AIRWAY
Connecting the dots...

“We found that mouth breathing is closely related to increased overjet, reduced overjet, anterior and posterior crossbite, openbite and displacement of contact points.”

Connecting the dots...

“Mouth breathing has been linked to oral conditions such as craniofacial deformity, malocclusion and obstructive sleep apnea.”

Airway Assessment
# Tonsil Assessment

<table>
<thead>
<tr>
<th>Grade</th>
<th>Definition</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>Not visible</td>
<td>Tonsils do not reach tonsillar pillars</td>
</tr>
<tr>
<td>1+</td>
<td>Less than 25%</td>
<td>Tonsils fill less than 25% of the transverse oropharyngeal space measured between the anterior tonsillar pillars</td>
</tr>
<tr>
<td>2+</td>
<td>25% to 49%</td>
<td>Tonsils fill less than 50% of the transverse oropharyngeal space</td>
</tr>
<tr>
<td>3+</td>
<td>50%-74%</td>
<td>Tonsils fill less than 75% of the transverse oropharyngeal space</td>
</tr>
<tr>
<td>4+</td>
<td>75% or more</td>
<td>Tonsils fill 75% or more than the transverse oropharyngeal space</td>
</tr>
</tbody>
</table>
Dr. Christian Guillemenault

- Stanford University
- Childhood Sleep Disordered Breathing Research
- Tonsil & Adenoid removal research
  - Mostly unsuccessful 9-12 months post removal
  - Mouth vs. Nose
  - Conclusion: Nose breathing is the ultimate outcome
Connecting the dots...

- In 98% of patients with OSAS, the condition is due to abnormal anatomical features of the soft tissues and/or the structures of the maxillomandibular skeleton that cause a “disproportionate anatomy” of the airway, and in only 2% of adult patients is the condition due to a space-occupying lesion, such as a tonsillar or uvula hypertrophy, in which case resection would be curative.

CONSULTATIONS

- ENT
  - EVALUATE SIZE AND QUALITY OF TONSILS AND ADENOIDs
  - HELP TO SHRINK THEM TO PROMOTE NASAL BREATHING
    - FLONASE – 2 WEEKS MAX – BETTER BREATHING/SLEEP
  - REMOVE THEM TO OPEN AIRWAY
    - TONSILECTOMY
    - ADENOIDECECTOMY
SLEEP-DISORDERED BREATHING

- MOUTH BREATHING TO OBSTRUCTIVE SLEEP APNEA
- AIRFLOW INTERRUPTED
- O₂ DELIVERY TO LUNGS IS REDUCED
- O₂ DELIVERY TO BRAIN, HEART, MUSCLES AND ORGANS IS REDUCED
- CHILD WAKES OFTEN TO REGAIN O₂ LEVELS
- END RESULT: SLEEP FRAGMENTATION OR DISRUPTION OF THE REPAIRATIVE SLEEP CYCLES
- REDUCED TIME IN STAGE 4 SLEEP RESULTS IN A DISRUPTION IN GROWTH HORMONE RELEASE
Karen Bonuck, PhD.

- Published research in 2012 that followed 11,000 kids for 6 years

Objective

- Examine statistical effects of SDB symptom trajectories from 6 months to 7 years on subsequent behavior.
RESULTS OF THIS STUDY

- “A STRONG AND PERSISTENT ASSOCIATION BETWEEN SLEEP DISORDERED BREATHING AND DIMINISHED IQ”

- SLEEP DISORDERED BREATHING INCREASED THE RISK OF ADD/ADHD BY 50%

- SLEEP DISORDERED BREATHING KIDS WERE 40-100% MORE LIKELY TO HAVE NEURO-BEHAVIORAL ISSUES
Connecting the dots...

- “A narrow maxilla with high arched palate characterizes a phenotype of patients with obstructive sleep apnea. This is associated with increased nasal airflow resistance and posterior displacement of the tongue.”

Connecting the dots...

“The Class II malocclusion was significantly more common in the OSA group. The V palatal shape was a frequent finding in the OSA group.”

Connecting the dots...

“Snoring is associated with straight profiles, V-shaped palatal morphology, increased neck circumference, decreased upper arch length, and decreased inter-first upper premolar distance.”

SDB/OSA ASSOCIATED WITH

- INCREASED FACE HEIGHT
- DECREASED NOSE PROMINENCE
- DECREASED NOSE WIDTH
- RETROGNATHIC MANDIBLE
SDB/OSA ASSOCIATED WITH

- NARROW ARCH
- HIGH VAULT
- RETROGNATHIC MAXILLA
- RETRUDED MANDIBLE
- LARGE TONGUE
SDB
GOALS OF EARLY COLLABORATIVE INTERVENTION

- ESTABLISH NASAL BREATHING
- ESTABLISH PROPER TONGUE POSTURE, STRENGTH, SWALLOWING, AND SPEECH
- ELIMINATE ALL BAD HABITS
- GUIDE IDEAL GROWTH AND DEVELOPMENT OF THE MIDDLE AND LOWER THIRD OF THE HEAD INCLUDING THE AIRWAY
- FACILITATE THE GROWTH AND DEVELOPMENT OF THE WHOLE BODY
- CORRECT ANY ORTHODONTIC DIAGNOSIS TO A MILD CLASS I WITH IDEAL OVERBITE AND OVERJET BEFORE THE AGE OF 12
NON-NUTRITIVE SUCKING

- PACIFIER
- FINGERS
- SIPPY CUPS
NON-NUTRITIVE SUCKING

- FORM FOLLOWS FUNCTION
  - TONGUE
  - FACIAL MUSCLES
- RESULTS OF NON-NUTRITIVE SUCKING
  - IMPROPER ARCH FORM
  - IMPROPER ARCH WIDTH
  - NARROW AND HIGH VAULTED PALATE
  - I.E. UNDERDEVELOPMENT
  - I.E. AIRWAY COMPROMISE
Dr. Brian Palmer

www.brianpalmerdds.com
Ankyloglossis

- AKA – tongue-tie

Abnormal shortness of the lingual frenum causing limited movement of the tongue
Lingual Frenum Assessment

Irene Marchesan, PhD SLP
Research Associate at CEFAC, Department of Orofacial Myofunctional Therapy. She is world-renowned in this field having authored over 300 articles and books and presided over 400 thesis defenses. She has over 30 years of experience in research and clinical practice in Brazil. As a professor, she has lectured around the world. She is currently President of the Brazilian Speech Pathology Society.
DR. LAWRENCE KOTLOW

www.kiddsteeth.com

BOOK: SOS FOR TOTS
4 MAIN TECHNIQUES

- Nasal Hygiene
- Myofunctional Appliances
- Myofunctional Exercises
- Expanders
4 MAIN REFERRALS

- Orofacial Myologist
- ENT
- Oral Surgeon
- Pediatrician - bloodwork

- Severe cases – Sleep Study
NASAL HYGIENE

- Nasal Spray – www.xlear.com
- Breathe Right Strips - www.breatheright.com
- Breathable tape – www.3M.com
NASAL SPRAY

- FLONASE – 2-3 weeks
  - OTC
  - STEROID
- XLEAR
  - XYLITOL
  - LONG TERM USE
  - www.xlear.com
NASAL SPRAY & SINUS IRRIGATION

www.xlear.com
BREATHABLE TAPE

- **3M MICROPORE TAPE**
  - Daytime only
Orofacial Myology

Is used to treat tongue and facial muscle dysfunction

“The study and treatment of oral and facial muscles as they relate to speech, dentition, chewing/bolus collection, swallowing, and overall mental and physical health.”
Exercises

FOCUS ON BALANCING THE INTRORAL AND EXTRAORAL MUSCLES
NASAL BREATHING
POSTURE
Current Health Status of USA Children

- BEDWETTING
  - 10% of all children under 12 are bedwetting
Current Health Status of USA Children

ADHD
5% of kids have ADHD- American Psychiatric Association
11% ages 4-17 have ADHD- CDC (2013)
600,000 children medicated for ADHD in 1990
3.5 million children medicated for ADHD in 2013
Prescription sales have quintupled over the last 10 years exceeding 9 billion in annual sales
$9 BILLION

$1,000,000
X100
$100,000,000
X10
$1,000,000,000
X9
$9,000,000,000
It gets worse...

- ADHD
- New York Times article

- 2-3 year olds
  - > 10,000 children age 2-3 are medicated for ADHD
THE STORY OF HEADGEAR – YOUTUBE VIDEO
OPPORTUNITIES FOR CONTINUING EDUCATION
SANDRA COULSON
www.coulsoninstitute.com
To know even one life has breathed easier because you have lived – that is to have succeeded.

Ralph Waldo Emerson
THANK YOU!