

Beautiful Balanced Faces

The First 9 years: The Most Critical time!

By William P. Tipton, DDS

Abstract: This article is a review of the literature presented over the past 150 years regarding the implications of airway obstructions. A practical approach is presented and directed to understanding growth and development of children from infancy through adulthood. Emphasis is placed on the first nine years of a child's life. The author believes that early intervention and control of airway obstruction will enhance the lives of children who have obstructed airways. Studies have been cited as well as cases presented verifying the authenticity of the material.

Today's society is favorable to beautiful people. Look at every television and magazine advertisement as you seek confirmation; everyone is stunning.¹ Studies have shown that more attractive faces lead to more successful personal and professional lives.² Pleasing faces are rewarded with better salaries, more credibility, more rapid employment advances and are more readily accepted into the cultures of the world.³ We have become conscious to the tune of 75 billion dollars spent annually on products and services that can affect looks.⁴ During the first nine years of a child's life, critical events occur rapidly and with such complexity that the miracle is that balance occurs at all. Research has shown that the hub for the development of beauty and function is a clear and open airway.^{5,6,7} This paper reviews growth and development research conducted over the past one hundred and fifty years.

Multiple factors affect the growth and development of human faces. The major factor contributing to the development of a balanced face is the airway. Environmental conditions, nutrition, exercise, habits, and family history all play a role in the development of a beautiful face and body. Evidence indicates that an open airway has a primary and perhaps the ultimate responsibility for proper development of the face.⁸ Enlow says, "Everything that develops, develops around the airway, the airway is the central hub of development, any event that alters the free flow of air passing over the airway causes dysplasia."⁹

Since Robert¹⁰ first described the relationship between airway function and maxillary anomalies, multiple researchers have discussed the causes and effects of malocclusions, and irregular facial developments occurring during childhood. Technological advances over the past twenty years have

opened a vast array of informational exchanges that allow us to share the research that we need to assist our children in developing normally.

Airway obstruction can be defined as a lack of patency of the airway. Tonsils, adenoids, a small narrow palate, and obstructive tumors may be located within the airway, altering the free flow of air through the nose, over the turbinates, and in and out of the lungs. A proper sequence of ventilation is essential for growth.

In 1843 Robert¹¹ suggested that there was a relationship between enlarged tonsils and mouth breathing. He found that children who had large tonsils were usually mouth breathers. The children had small concave palatal vaults and crowded upper anterior teeth. Since this first reference to the development of facial anomalies was done 164 years ago, it is hard to believe that

so little has been done about an issue that affects so many. For years most practitioners and researchers believed that genetic attributes were responsible for small airways, small palates, long faces, and crowded teeth.

One of the greatest physicians of the 20th Century, Sir William Osler stated in 1919: "Chronic enlargement of the tissues of the tonsillar ring is an affection of great importance, and may influence in an extraordinary way the mental and bodily development of our children."¹² Osler keenly observed, described,

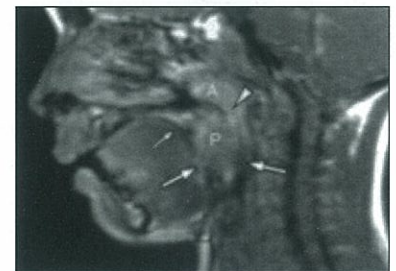


Fig. 1 - Tonsils and Adenoid Position Age 5
 A. Adenoids
 P. Palatine Tonsils
 Q. Arrows point to the size of the tonsils

Photo Credit-American Journal of Roentgenology-2002: 179:503-508. Lane F., Donnelly, Keith Casper and Ben Chen.

and wrote about sleep-breathing problems in children and his belief was that the tonsils and adenoids were the culprits. His observations are valid today and his descriptions of chronic tonsillitis taken from the 8th edition of *The Principals and Practice of Medicine* still ring true today, Figures 2 and 3.

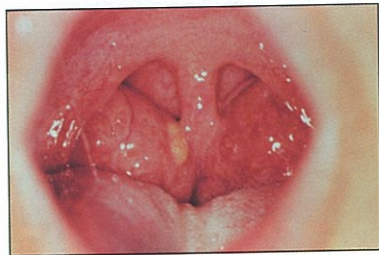


Fig. 2 - Stage 4 Tonsils
Photo Credit Newton Duncan, MD

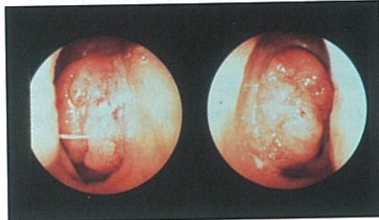


Fig. 3 - Enlarged Adenoids
Photo Credit Newton Duncan, MD

In 1962 Donald Enlow¹³ published his first research on the manner in which bone is formed. For the next 40 years he devoted his life to understanding facial growth. He showed the development of the face is a complex event that takes place over the entire life of a person, and he indicates that genetics have a lesser role in its growth and development. Enlow¹⁴ says muscle moves bone. He states that an attachment to a bone will move the bone to a balanced relationship with its surrounding structures. Bone may be moved by changing position or by the gradual addition of mass. For example: it is clear that the tongue is a very strong muscle. When the upper airway is closed by enlarged tonsils the tongue is pushed forward to allow air to pass into the airway over the tongue. This in turn pushes the teeth forward. The muscles of the genioglossus, hyoids, and external pterygoids pull the mandible downward and forward. This results in an open mouth which allows the child to breathe. Without correction, a change in the resting position of the mandible occurs and a long-faced individual will ultimately be seen.

Beginning in 1970 and continuing through the 1980s a series of studies carried out by Linder-Aronsen¹⁵ consistently supported the relationship between nasal obstruction and dental and facial development. He found that obstructed airways lead to multiple craniofacial changes such as elongated faces, crowded teeth, cross bites and open bites. His studies included a group of post adenoidectomy patients who returned to normal nasal breathing and showed a significant shift back toward horizontal mandibular growth.

A study done in 1998 by Agren, Nordlander, Linder Aronsson and Zettergren measured change in mandibular growth one year following adeno-

tonsillectomy.¹⁶ The angle formed by the intersection of the Mandibular Line and the Nasion Line was compared before and after surgery. The ML/NL is one of the most diagnostic measurements to define dentofacial growth. One year post-operatively the ML/NL angle had decreased an average 3.1 degrees, Figure 4. The angle formed by the union of the Sella Nasion Line and the Mandibular Line is also diagnostic of direction of mandibular growth and it decreased an average of 2.1 degrees one year following surgery, Figure 5.

They concluded the direction of mandibular growth becomes more horizontal following adeno-tonsillectomy. Multiple experimental episodes have been carried out with mice and monkeys and each demonstrates that

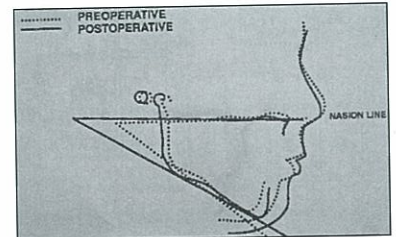


Fig. 4

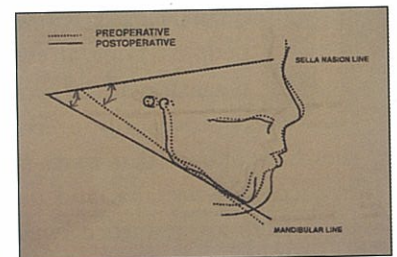


Fig. 5

when the airway is obstructed, craniofacial growth is altered.¹⁷ Medical researchers have documented episodes of closure of one side of the nasal-maxillary complex with subsequent lack of development of the closed area and development of the patent area. When both nasal passages are blocked the lower jaw grows downward and forward and the maxillary complex ceases to grow. Their research further notes that when the obstructions are removed and patency is reestablished, normal growth occurs. Thus, normal growth depends on the patency of the nasopharyngeal airway.

There is an increased awareness that early examination of the child and identification of airway problems has a significant impact on the proper growth and development of the child.

Birth to 3 years

From birth to age three more than three-fourths of the head is made up of the cranium that protects the

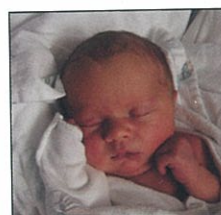


Fig. 6 - Infant



Fig. 7 - 24 Months



Fig. 8 - 36 Months

brain. The face is less than one fourth of the head and carries out its function to supply food and oxygen to the baby. The principal source of nourishment for the first year is the milk from the breast of the mother. The sucking response is natural and the newborn is equipped to perform the necessary actions to get nourishment. The mandible and oral cavities are small and for the first two years of life undergo only limited growth. Between ages 2 and 3 one begins to see what is a growth process that carries on throughout life. As a child's activity level increases muscle mass increases and the growth of the child accelerates. Note Figures 6, 7, and 8 rapid changes in growth pattern.

The most rapid changes in a child's face occur during the first three years of life. As the activity level of the child increases muscle mass increases, bone and soft tissues are altered and more airflow and food are required. The nose and mouth begin to grow accommodating the requirements of the growing child. The chest wall and airway change in order to respond to the physiological needs of the developing child. A three year old's torso is fifty percent of the body mass with the head representing twenty five percent.

From age three to nine there is maximum acceleration of growth of the face. We know from the Meredith¹⁸ and Rubin¹⁹ studies that at age 4, sixty percent of the craniofacial development is complete and by age 9 over ninety percent of craniofacial development has occurred. This period of growth and development is the ideal time to intervene with interceptive therapies designed to alleviate problems adversely affecting normal facial development.

What is happening between Ages 3-9?

Airway obstruction in its most perfect form.

Figures, 9, 10, 11, 12 and 13.



Fig. 9 - Nine Year old



Fig. 10 - Nine Year old

The classic symptoms of an obstructed airway

A mouth-breathing nine-year-old boy with enlarged tonsils, enlarged adenoids, gorged turbinates, night terrors, adenoid face, shiners under his eyes, under developed maxilla, crowded teeth, and the beginnings of an elongated mandible and short maxilla.

There is window of opportunity for ideal growth. *If 60% of the head is formed by age 4 and 90% of the head is developed by age 9 we have five years to evaluate and alter patterns of growth and development.* This is a time when the tonsils are frequently 200% of adult size and are frequently infected and swollen. This is the period of childhood where the treating doctors may intervene and obtain near optimal results.

This is an age where signs and symptoms of developmental problems become obvious. Parents begin to notice that their child is a restless sleeper, grinds his or her teeth, has multiple ear infections, upper respiratory infections, begins to show signs of hearing loss, and has a continual runny nose. Timing of treatment is essential and intervention at this phase is ideal.



Fig. 11 - Stage 4 Tonsils
Photo Credit- Newton Duncan, MD



Fig. 12 - Crowded Teeth, Underdeveloped Maxilla
Photo Credit- William P. Tipton, DDS



Fig. 13 - Cephalometric Radiograph Under developed Maxilla

Scammon's Growth Curve

Scammon's growth curves²⁰ (Figure 14) point out four major tissue systems of the body and a percentage of adult attainment at 20 years of age. The curve for lymphoid tissue which reaches 200% of adult attainment at or around age twelve. The lymphoid tissues then undergo a decrease in size until they reach 100% in adulthood. The neural tissues reach about 90% of their adult attainment at roughly 9 years of age and finally at age 20 are at adult attainment. General body growth follows a direct line to age twenty and finally the genital tissues begin their growth at puberty which is around age fourteen. The dramatic increase in lymphoid tissue from age four until puberty in a constricted space easily accounts for the obstruction

commonly seen in children. The significance of Scammon's Growth Curve relates to the lymphatic tissue present during the height of growth ages 4 through 9.

To appreciate the significance of airway blockage by the palatine tonsils one must realize that each tonsil

may be variable in size, but may be quite large when considering the average airway is 11 to 15mm in width. The length of the adult tonsil measures from 20 to 25mm, its width ranges from 15 to 20mm and its thickness is about 12mm. The average weight of the adult tonsil has been found to be 1.5 gm.²¹

Another measure that has been used to establish the relationship between obstructed airways and facial development is to measure the two dimensional widths of the airway in children taken from a Cephalometric Radiograph. Linder-Aaronson and Woodside²² in 1973 in Orebro sample measured 54 mouth breathers and 55 nose breathers ages 7 through 11 and found the following: the width of the airway in nose breathers was between 11mm and 15mm while the airway width of mouth breathers was between 8mm and 13mm.²³ Clearly, we should measure the width of the airway from a Cephalometric Radiograph; and, if the airway is less than 11mm, we could begin to look for airway problems in this child. Though the Cephalometric and Panoramic Radiographs provide only a two dimensional view of the patient they are useful tools in diagnosis.

The conclusion has been drawn that between ages 4 and 14 *seventy-five percent* of children with obstructed airways have malocclusions and abnormal facial development. The alterations in facial development can range from the underdeveloped maxilla to the long face and their multiple ramifications. This correlates with the general population statistics where malocclusions are seen in 75% of the population.

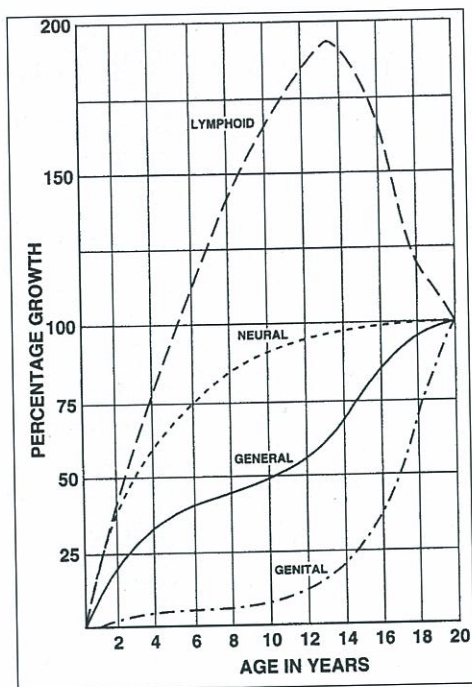


Fig. 14 - Scammon's Growth Curve

Ages 12 and older

After the age of twelve the tonsils usually begin to diminish in size. This has resulted in a *lack of concern* about the dangers created by tonsils and adenoids, historically. Now, because of the increased awareness of the dangers of sleep apnea in both adults and children, the issue of airway patency is being radically revised. We are beginning to recognize the danger of doing nothing with enlarged tonsils, enlarged adenoids, and gorged turbinates during the time of growth when these structures have the most impact on facial growth. We know that when we diagnose early and treat early we increase the opportunity for the patient to develop normally.²⁴

The damage is done in the early development stages of a child's life from ages 4-9 if the tonsils and adenoids are obstructing the airway. The interference in the flow of air over the turbinates and through the airway continue to modify growth and development allowing changes that lead to other than beautiful faces. A study done by Denise-Romette²⁵ showed that 72% of children ages 11-13 suffer from dental malocclusion and cranio-facial malformations. Romette suggested that most of these malformations are related to changes in ventilation or modified airways. Vig²⁶ et al showed that when airway obstruction was artificially established head posture changed over time, but when the airway obstruction was removed and the mode of breathing returned to the nose, head posture normalized within fifteen minutes.

By taking no action to remove the tonsils and adenoids if airway obstruction is evident is paramount to ignoring a rapidly growing tumor. The residual damage caused by the airway obstruction will be felt for the rest of the child's life. The changes in the facial structure brought about by the changes in muscle habits ends up being responsible for multiple problems that could have been corrected between the early ages of 4 and 9.

Signs and symptoms of airway obstruction

- a. Mouth breathing
- b. Tongue thrust
- c. Grinding of teeth during sleep
- d. Restless sleep habits
- e. Allergies
- f. Hyperactivity of the child
- g. Limited attention span of the child
- h. Crowded teeth
- i. Cross bites in the dentition
- j. Dull appearance, particularly of the eyes
- k. Body weight growth is depressed. Child is under weight. Following removal of tonsils and adenoids

the child will catch up with growth as compared to his peers.

- l. Shiners (bags under the eyes) particularly when the child awakens
- m. Stoop shoulder posture
- n. Neck extended, nose upward, mouth open
- o. Nostril size
- p. Speech Hyponasality
- q. Nasal secretions, edema and erythema of the nasal mucosa
- r. Hearing difficulties

Witzig and Spahl's²⁷ study suggests that between ages 9-12 malocclusions become 25% worse or more severe. Why do we wait to correct the problems? We have the option of improving the quality of life for the child now and the adult of tomorrow.

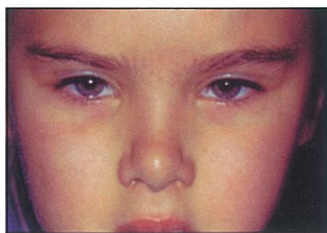


Fig. 15

Fig. 16

Child with Airway Obstruction demonstrating multiple signs of obstruction. It is imperative that the diagnostician enlighten the parents of airway obstruction and the damages that can occur when no action is taken.

Age 14 with malocclusion

If the patient is not diagnosed between ages 3 and 9 and growth continues the patient exhibits facial features that are almost always present with a closed airway: crowded teeth, open bite, underdeveloped maxilla, downward and forward growing mandible, and stooped shoulders. We know that by early intervention we can eliminate or at least reduce the effects of these problems; we must be proactive and get rid of the source of the disease. See Figures 15, 16, 17, 18 and 19.

Muscle Moves Bone

The muscles of mastication, swallowing, and head and neck extension are affected by the manner in which a child breathes. The body's growth is affected by the level of activity and the amount of air allowed to be exchanged in the lungs. Obstructions change the position of the head and neck and the effects of repetitive actions remodels the face. The brain is wired to direct the body to perform certain tasks. Sensory systems and motor pathways are initially directed by genes. Innate signals direct axons from the motor cortex

to grow into the spinal cord and stop at the necessary level to innervate the cervical motor neurons that control the actions of the jaw. The motor response is a general range of motion or actions that accomplishes the selected results that the muscle is laid out to accomplish when the nerve is stimulated: such as opening the jaw. With repetitive actions the motor tasks become refined and the pathway becomes a consistent, purposeful action which becomes stable and repeatable. The fact that the action is not in the best interest of the person plays no part in the result. The fact is that the action is

repeated, practiced over and over again, until the cerebellum is no longer activated during the task and the event occurs without thought. It is much like the task of throwing a baseball. Initial thought must be a part of the process; but, after much practice the act becomes a part of what happens when a ball is picked up and thrown. The same is true when a patient with airway obstruction breathes. The mouth is opened, tongue is moved downward and forward, and air is moved in and out of the lungs. Thus, we develop a chronic mouth breather.

The application of the muscle moving bone extends throughout the head and neck and relates not only to the bones of the face, but to the bones of the neck and upper torso. We see mouth breathers with forward extended head positions, stooped shoulders and forward extended arms. Solow and Kreiborg²⁸ suggested that the translation of the skull through posterior flexing on the cervical vertebral column allowed the mouth to open thus allowing a flow of air to bypass the blocked nasal passage and pass directly from the mouth to the oropharynx and to the lungs. Solow and Tallgren²⁹



Fig. 17



Fig. 18

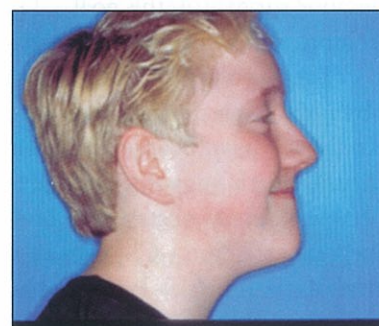


Fig. 19

found that the extension of the head relative to the cervical column was associated with large anterior and small posterior vertical facial heights, small anterior and posterior facial dimensions, large inclinations of the mandible relative to the anterior cranial base angle and a small nasopharyngeal space. It has further been determined that backward rotation of the skull to achieve an oral airway suggests changes in the muscular development of the head and neck which also affect the shoulders which affect the back which affect the entire body posture. Modifications therefore of the neuromuscular pattern are a direct affect of the blockage of the nasal airway. Solow and Greve³⁰ noted that increased craniocervical angulation in subjects with adenoid induced nasal obstruction was reduced following adenoidectomy. Airway obstruction changes the dynamics of the airway, by casting the entire naso-oro-pharynx into a situation where balance is obtained because survival is the goal. The result of this "balance" is survival though it is not always pretty.

The drooped shoulder posture is a common observation particularly after age 15. Solow and Kreiborg³¹ have proposed the soft tissue stretching theory which suggests that there is a relationship between airway obstruction and head posture relative to the cervical spine. Changes in the level of certain craniofacial muscles lead to an extension of the head and airway maintenance.³² This alteration causes a stretching of the masticatory and facial muscles, as well as, related soft tissue. A prolonged obstruction of the airway can lead to skeletal remodeling and ultimately a change in the craniofacial morphology.³³

Now, for a moment, let us put these factors together and see how each affects the outcome in growth and development. We know that the bone is the substructure of the human shape and that until puberty bone is malleable and ever changing. We know that sutures allow bone to expand. We know that muscles are attached to the bones and that each muscle's origin and insertion determines the forces placed on the bone. We know that muscle moves bone; and, malleable bone moves quickly. Let us imagine that we now obstruct the nasopharyngeal airway on a three-year-old child. What happens?

Breathing through the nose is limited.

Immediately the child begins to breathe through the mouth which must remain open at all times in order for air to pass through the oropharynx and into and out of the lungs. When the mouth is opened the Digastrics, Internal Pterygoid, External Pterygoid, Temporalis, Genioglossus, Hypoglossus, and Transverses Linguae exert their forces. Origins and insertions affect both

ends of the bone; thus, we are affecting both the maxilla and the mandible at the points of attachment. What then are the effects? The mandible is pulled downward and forward which will change the angle of the jaw as well as the direction of growth. The pterygoids will lengthen because they are extended most of the time as the mouth is held open. The tongue is pushed downward and forward which will move the mandible and teeth forward and downward as well. The blockage of the airway simply causes a change in the utilization of the muscles. At the same time the child is not breathing through his nose and we have no warm air stimulating the turbinates; thus, we observe a child with a minimally developing maxilla and a rapidly developing mandible.

We see a child that rapidly develops the long face and under-developed maxilla and the symptoms that we can easily recognize.

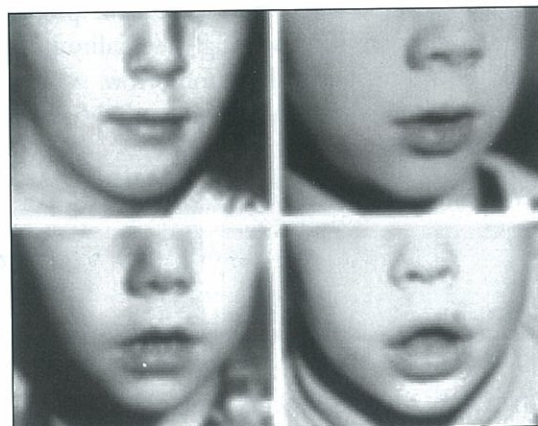


Fig. 20 - These four photographs demonstrate four levels of mouth breathing. Note the constriction of the nasal openings³⁴

Photo credit Otolaryngology Volume III Head and Neck.

Related problematic conditions associated with lack of a proper airway:

A. *Sleep disordered breathing in the child*

Sleep apnea is a threatening event in the life of any person; but, in children respiratory disorders are more severe during sleep. During sleep the respiratory rate decreases, the respiratory tidal volume decreases, upper airway resistance doubles, and the ventilatory drive decreases, particularly during REM sleep. Children spend about one half of their lives asleep and a newborn will sleep for as much as 18 hours each day. It is therefore incumbent that we continue to explore and understand the role airway obstruction plays in the sleeping child.

The etiology of childhood OSAS-Oropharyngeal Sleep Apnea Syndrome previously had been thought to be quite different from the adult condition. In adults, OSAS is principally associated with obesity. Increases in childhood obesity in the US are recognized as a major concern and there appears to be a correlation between obese young adults ages 10-18 and sleep apnea

incidence. In the US today, more than one-third of children between the ages of 10 and 18 are overweight.³⁵ One can differentiate between sleep apnea induced by obesity and sleep apnea induced by airway obstruction in children particularly before the child reaches ages 6-9. There is virtually no differentiation of sleep apnea between adult and child after the child reaches age 10. The young children between ages 4 and 9 who have airway obstruction usually are not obese; in fact, they demonstrate a failure to thrive. They are smaller in stature, thin, under weight and slow in their development. The vast majority of cases of OSAS in younger children are associated with adenotonsillar hypertrophy. The peak prevalence of childhood OSAS occurs between ages 2 and 8 years,³⁶ which is the exact age that the tonsils and adenoids are the largest in relation to the airway size, the exact time that rapid changes are occurring in the growth and development of the child. We have found that once obstructions have been removed from the airway these children become restful sleepers, begin to grow, and in about one year are growing at a rate that is par with their peers. The muscle functions are altered and ideal growth and development occurs. Multiple cases reflect that the mid-face begins to grow, posture improves, academic performance improves, and in general the quality of life is improved for the child.

It has been confirmed that childhood OSAS is a dynamic process resulting from structural and neuromotor abnormalities occurring over time rather than the obstruction alone. From this we would gather that the earlier intervention, the more likely detrimental effects on the beautiful face will be reduced.

B. IQ Effect

In 1998 Gozal³⁷ did a study on two-hundred-ninety-seven first grade children whose school performance was the lowest 10th percentile of their class rankings. The children were screened for OSAS at home using a detailed parental questionnaire and a single night recording of pulse oximetry and transcutaneous partial pressure of carbon dioxide. The method was to assess the impact of sleep-associated gas exchange abnormalities (SAGEA) on academic performance. If SAGEA were found the parents were encouraged to seek medical intervention for sleep apnea.

Fifty-four children (18.1%) were found to have SAGEA, of these twenty-four underwent surgical tonsillectomy and adenoidectomy. The remaining thirty children did not receive any treatment. Overall, grade point average in the treated children increased from 2.43 to 2.87, where the untreated children the

grade point averages were 2.43 to 2.46 staying the same with no change. The study suggests that SAGEA adversely affects learning performance. The data further suggests that children with behavioral and learning disabilities could have SAGEA and could benefit from medical evaluation, tonsillectomy, and adenoidectomy.

In 2004 Golan et al³⁸ reported in an article published in *Sleep* titled "Sleep Disorders and Daytime Sleepiness in Children with ADHD" that there was a direct link between the school performance and sleep apnea. They found that children who were low performers in school showed signs of sleep disordered breathing in 50% of the cases as compared to 7% of a controlled group who did not have sleep disorders. They further stated that children who were diagnosed with ADHD and were diagnosed with sleep apnea substantially improved following adenotonsillectomy. They conclude that there is a correlation between the behaviors of children diagnosed with ADHD and irregular sleep habits. Golan et al believe that the treatment of children with Ritalin is a drug induced state to keep an otherwise sleepy child awake during waking hours. They point out that the hyperactivity demonstrated by many ADHD children can be corrected by altering their sleep habits and thereby allowing them to get the proper amount of rest and increasing their ability to be alert, thrive, and learn.

Montgomery-Downs Crabtree and Gozal reported in 2005 that sleep disordered breathing in children has been associated with cognitive impairment.³⁹ In a group of low income pre-school children prior to T & A cognitive scores were significantly lower in OSA subjects as compared to controls. Following T & A these at risk pre-school children showed normalized sleep and respiratory patterns and normalized cognitive scores.⁴⁰

O'Brien, Holbrook, Gozal et al⁴¹ in a study of thirty five children with polysomnographically confirmed SBD were matched for ethnicity, age, gender, maternal educational attainment, and maternal smoking to healthy children with no evidence of SBD. Children with SBD had lower mean scores on Differential Ability Scales for General Conceptual Ability (similar to IQ) and for non-verbal skills. They tested lower on language skills and phonetic awareness skills which are important in children learning to read. Behavior skills were similar. They further found that the children with SBD were significantly sleepier than control children. The SBD children's total arousal index was negatively correlated with their cognitive abilities and they conclude that sleep fragmentation plays a major role in SBD induced cognitive dysfunction.

C. Allergies

Childhood allergies are on the upswing in our society today. Several studies have been done in populations devoid of allergies. One among Oklahoma Indians found them to have limited adenoidal tissues and more equipped for nasal breathing and virtually no dentofacial anomalies.⁴² Preston found a group of South African Indians who had no skeletal malocclusions, no allergies, and limited adenoidal tissues.⁴³ Again, we see that in our complex society multiple extrinsic factors affect what we consume and breathe. We may be victims of ourselves in that our lifestyles of demanding more of everything results in more of everything including those things not in our best interest. Research has shown that breast feeding of the infant child for the first year of life lessens by half the probability of the child developing allergies.⁴⁴

D. Ear tubes

Pediatricians are placing ear tubes in children from ages one to three, in an effort to control recurrent episodes of otitis media with effusion. Acute Otitis Media is the most common of childhood diseases; it accounted for 24.5 million physician visits during the year 1990. This represents a 150% increase over the number of visits in 1975.⁴⁵ Researchers are suggesting that Otitis Media with effusion will affect two-thirds of all American children by the time they are two years of age. In the growing child enlarged adenoids (especially infected adenoids) clearly cause Eustachian tube dysfunction, Otitis Media, Otitis Media with Effusion, Rhino sinusitis, Obstructive Sleep Apnea, hearing loss, voice changes, changes in facial growth and swallowing problems. The blockage of the Eustachian tube closes the pathway to the middle ear and ventilation of the Eustachian tube is central for middle ear health. The Eustachian tube must be able to open and close in order to allow for pressure equalization within the middle ear and the environment. Hearing loss is common in children with chronically infected adenoids. We must recognize the correlation between excessive adenoidal tissue, blocked airways, and their multiple effects on the future growth and development of the child. It is simply not about the earache.

E. Habits

Fratto, Proietti, Pogeasi and Cannon wrote that mouth breathing was due to acquired habits following nasopharyngeal obstructions.⁴⁶ Their research involved thirty children with classic symptoms of obstruction and twenty controls. They concluded that habits are formed because of an open airway as well as one that is

closed. The important factor is when the airway is closed the aberrations in development are seen. Linder-Anderson found that of 1,000 children 29% had no nasal obstruction; but, were simply mouth breathers.⁴⁷ The point being that habits can be a part of the problem and must always be investigated as part of the diagnostic process. The good news about habit without obstruction is that there is no physiological obstruction; and, functional orthodontic appliances often are successful in correcting the habit.^{48, 49}

F. Malocclusions

Smiles everywhere are brighter, whiter, straighter, and wider. The alignment of the dentition has become one of the most highly recognized signs of beauty. We are learning that earlier treatment leads to more lasting, balanced, and successful treatment. We know that with unobstructed airways few malocclusions occur. In the U.S. approximately 33% of the population does not have malocclusions.⁵⁰ They are viewed according to Angle's Classification system as having ideal occlusion, function, and beauty of their teeth. The remaining 67% have varying degrees of malocclusions, altered mandibular positions, altered tongue positions and discrepancies in the maxillary and mandibular housing of the teeth. With a clear and patent airway 33% of us develop quite nicely while an obstructed airway appears to cause 67% of us to have some sort of malocclusion. Airway patency must be brought to the forefront of our diagnostic procedures.

Conclusion

Most children improve with tonsillectomy and adenoidectomy. The earlier the intervention, the more complete the recovery in terms of growth and development. Intervention after age nine alters the pattern of growth but the results are not nearly as dramatic as when intervention occurs between the ages of 4 and 5. In terms of treatment results the data clearly suggests that removal of the tonsils and adenoids between ages four and five is the most effective long-term solution for treatment of Otitis Media and Otitis Media with Effusion. Surgical intervention proves to be the least costly in terms of time of treatment, drug costs, and effective use of time by the patient, parent, and physician. Once the tonsils and adenoids are removed the infections are eliminated, chronic symptoms disappear, and the general health of the child improves. The added benefits of surgical removal of the tonsils and adenoids begin to add up when one considers the quality of life issues that the child faces without removal such as sleep apnea, loss of hearing,

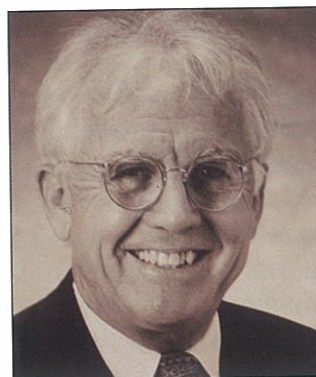
attention disorders, malocclusions and learning disabilities.

The data is presented to emphasize that by treating the obstructed airway early we can assist in providing healthier life styles for our patients as well as assisting the development of well-balanced faces. Since many of the deleterious effects of an obstructed airway are complete by age nine the window of opportunity for intervention exists for a relatively short time. Until airway patency becomes the standard of care with a basic evaluation done by the pediatrician, the dentist, the orthodontist, the chiropractor, and the parent, then, and only then, will we take the giant step of recognition of a major deterrent to proper body development. The time is now.

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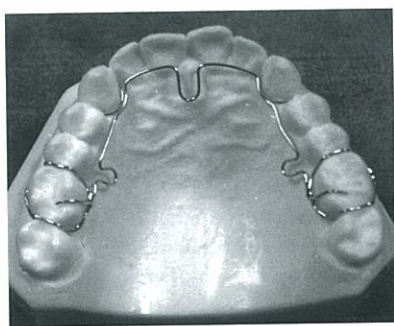
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