A new standard is needed for earlier orthodontic (teeth) and orthopedic (jaw-bone) diagnosis and treatment from birth to age eight. It is warranted because published research increasingly shows that small jaws create small airways and increase the likelihood of life-threatening disorders, for life. Jaw and airway related disorders like sleep apnea have recently moved to the forefront of some medical research. Medical attention is drawn to these disorders because direct relationships to hypertension, heart disease and premature death have been discovered. Increasing the size of the jaws and airway during early growth and development may reduce human disease.

Since the upper and lower jawbones form the gateway to the human airway, earlier orthodontic and orthopedic jaw treatments are needed to help more small jaws and airways reach their full growth potential. Although chronological growth of the jaws needs to be better understood, it seems clear that earlier treatments cause complementary orthodontic and orthopedic results while treatment at later ages increasingly produces less orthopedic and more orthodontic results.

This article will review some background and present some specific steps clinicians can take to provide earlier orthodontic and Functional Jaw Orthopedic (FJO) diagnosis and treatment. This article will show how some early treatment techniques with patient outcomes that exhibit the unique advantages of earlier orthodontic and orthopedic treatment.

Newer multi-phase FJO diagnosis and treatment approaches and protocols can increase early treatment effectiveness, as well as long term overall efficiency. A new FJO protocol of routine multi-phase orthodontic examination, diagnosis and treatment involving the general dentist, pedodontist and orthodontist can result in superior unique health benefits for the patient. These new FJO concepts may very well help general dentists, pedodontists and orthodontists move dental care into a future world of medical dentistry that will include the airway, breathing, bed-wetting, ear disease, heart disease and longevity.

Early orthodontic treatment is very controversial, even among dentists. Just the definition of early orthodontics can cause major conflicts of opinion. General dentists, pedodontists and orthodontists all have different early orthodontic treatment approaches and protocols. Likewise, they all also have different perspectives on the advantages, disadvantages, scope and outcomes of current early treatment, which generally begins in the mixed dentition stage before all adult teeth have erupted.

Some practitioners consider early orthodontic treatment to be inefficient although they increasingly admit it is effective. This is because the FJO approach and protocol more than anything else. Additionally, a lack of understanding of the potential lifelong benefits of earlier orthodontic and orthopedic treatment also suppresses acceptance of earlier multi-phase therapy.

The main goal of all early orthodontic and treatment protocols should always be to provide the highest quality health service to each individual patient. First, convenience and efficiency are factors to consider in any health treatment. However, optimum patient outcomes (good balanced jaws, open airways and stable occlusion) must remain the predominant priority. Early treatment, when indicated, achieves some results that later treatment often cannot. For example, it has been shown that treatment of Class III malocclusion at age 5 results in orthodontic changes while treatment starting at age 9 yields mostly orthodontic tooth movement changes.

A review of current clubfoot pediatric orthopedic protocols which starts at birth, is important to understanding why earlier orthodontic and jaw treatment protocols should also start at birth. Clubfoot bones and malformed jawbones have parallel needs and growth patterns, but rather different treatment timing approaches. Today, clubfoot bones are routinely examined, diagnosed and treated beginning at birth. Conversely, substandard maxilla and mandible jawbones are not routinely examined, diagnosed and treated until after age 6, after about 80% of growth is already finished.

A clubfoot is an abnormal condition of the foot, which is usually present and very visible at birth.1 About one in every 1,000 babies are born with one clubfoot and about one in 2,000 will have both feet affected. The primary cause of a clubfoot is unknown. A clubfoot is commonly bent downward and inward and may also be rotated. Diagnosis can sometimes be made in-utero. Active treatment begins as soon as possible after birth, often within days. Early treatment may involve massage, manipulation, physical therapy, splints, taping, orthopedic casts, braces and even surgery. Some deformities are mild and others are severe, so treatments and future outcomes vary. Some clubfoot deformity will not usually improve on its own. Untreated, it will usually worsen and become unsightly and crippling.1 At birth, early clubfoot treatment is a medical priority.

Diagnosis of a clubfoot is much easier than diagnosing an abnormal jaw. The dramatic difference in diagnostic capability results in a major difference in the timing of orthopedic treatment. Early foot examination can therefore easily lead to early recognition, diagnosis and treatment of a very distinct clubfoot deformity. However, a clubfoot jawbone can be very subtle in its irregularity.

Diagnosis of an abnormal jawbone is quite complex. A cleft palate is very visible at birth. However, a small, high, narrow, bubble or channel palate is not as easily recognized or diagnosed. A severely underdeveloped and/or retruded mandible is more visible at birth. However a small, short or moderately underdeveloped mandible is not as easily recognized or diagnosed. Consequently, diagnosis of a substandard jawbone can be easily missed and the need for treatment can be
dismissed by the untrained eye. A result, early upper and lower jaw active treatment protocols often appear unimportant and the true medical need goes unrealized. 

Early jaw treatment is relatively nonexistent for most children under six years of age today because early diagnosis is relatively nonexistent. Hospital professionals in the health fields currently associated with birth and delivery lack orthopedic jaw diagnostic and therapy training.

A void in early jaw healthcare, "real" early orthodontic and orthopedic diagnosis and treatment, is present. Few health professionals in general lack the training and ability to recognize early maxilla and mandible deformation in children less than six years of age.

The current orthodontic specialty protocol that recommends an orthodontic screening by age 7 confirms the early jaw diagnosis gap and the indispensible need for earlier diagnostic training. Orthopedic jaw treatments from birth to age 8 will likely become a health priority once the diagnostic and treatment protocols are better defined and the benefits are better understood.

The void in early orthodontic and early jaw knowledge and treatment is wide, even at the research level. The late medical researcher, writer and lecturer Dr. James F. Bosma (M.D.) wrote in his 1989 book, *Anatomy of the Infant Head*, "the dearth of anatomical information about postnatal anatomical changes continues to handicap understanding of the processes of that development*. Moreover, Dr. J. Daniel Subtelny (D.I.S.) wrote in 2000 book, *Early Orthodontic Treatment*, "Much information needs to be added to our understanding of early orthodontics... long term observations of early orthodontic treatments... lack, in fact, with the fact that such treatment has not been routinely pursued."

The need for earlier orthodontics and orthopedics is clear. The upper and lower jawbones form the gateway to the human airway. Both jawbones are about 80% developed by age 6 and over 90% developed by ages 10–12. Jaw treatments from birth to age 8 can catch jaw problems before they become better than the protocols used today on older children after most jawbone growth has occurred. The formation of a new earlier diagnosis protocol, treatment protocol and standard is warranted.

Normal jaw growth and development depends upon factors, including a good airway, diet, habits and genetics. These factors play an unquestionable role in normal jaw growth and development. Interestingly, airway, diet and habits can contribute to the overall role in determining final abnormal jaw growth outcomes. While good jaws are important to having a good airway, a good airway is important to maintaining proper jaw growth and development, and in preventing jaw deformation. Diet and habits pre- and postconception are well known to affect normal bone development.

Almost half (50%) of jaw bone growth occurs before birth, especially in the maxilla. At birth, the tongue is also about 50% grown. The palate of a newborn is relatively short and high vaulted compared to the adult. As early as 1900, the palate of the average newborn was reported to be approximately 27 mm wide from ridge to ridge at the mid-palate.11

Other sources have stated an average palate at birth is over 50% of an adult mid-palate width of 40–50 mm. At birth, palates come in a number of different but rather specific shapes and sizes. The preferred palatal shape at birth could be called a "U" palate because it resembles a broad "U" shaped horseshoe. Substandard palatal shapes such as the narrow palate, high palate, channel palate or high peaked palate would be non-preferred shapes. These "non-U" shaped palates commonly cause a number of problems. Non-U shaped palates can interfere with breastfeeding, which is needed for early jaw and fetal development. Non-U shaped palates can reduce nasal breathing space, which reduces healthful nasal breathing, promotes harmful mouth breathing and deforms jaws. Untreated non-U shaped palates can restrict and prevent full growth and development of both the maxilla and mandible for life.

The forces of birth (contractions and forces) often produce undiagnosed asymmetrical maxillas and mandibles. Just as the forces of delivery are strong enough to produce a "cone-headed" infant, they can also alter the naso-septum, the maxilla and the mandible. Birth pressures have been blamed as a major cause of nose septum deformation12 and dental malocclusion.13 After birth, the maxilla and mandible must grow forward and position down and forward in order to attain full size during their 20-plus year growth cycle. It is essential to understand that the maxilla and mandible interact throughout life, especially during the early stages of development. The size and position of either jawbone can affect the other jawbone during growth and development, and continue to do so for life. If either jawbone is distorted — too small, too narrow, too large, too wide, too protruded or too retruded — normal growth of both bones can be negatively affected. The earliest possible jaw treatment can have the greatest effect on jawbone growth. The type of early orthodontic treatment matters because the type of deformity treatment continues to affect the other. For example, either a small maxilla or distal forces on a maxilla can distalize a mandible.

Most jaw bone growth (80–90%) occurs by age 8, especially in the maxilla, which generally grows a bit faster than the mandible. Since most orthodontic treatment occurs after age 8 it can only impact about 10–20% of remaining jaw growth potential. This is further evidence that earlier treatments are warranted so they can have a greater overall impact on jawbone growth and development. It also confirms that braces at age 8 can be too late for some children.

Abnormal jaw growth can be distinct and has been recorded for both the maxilla and the mandible at birth. A cleft-palate is commonly diagnosed when present at birth. A severely retruded (retrogнатic) mandible is the common abnormal feature of the mandible recorded at birth because it signals a high risk for a blocked airway, breathing difficulties and even sudden infant death. Less distinctive abnormal upper and lower jaws are harder to recognize and diagnose.

Abnormal substandard jaws can develop for many reasons. Jaw bones need a good start like other bones in the body. Maternal diet preconception, during gestation and after delivery can greatly influence proper jawbone development. It has been shown that a maternal lack of both vitamin A and vitamin B can cause fetal jawbone deformation. Malnutrition can alter normal maxilla growth so severely that a fetal cleft-palate forms. Too many vitamins can also deform bone. Food, drugs and smoking can also affect fetal jawbone growth, although we are in the early stages of understanding their full impact. Tonsils and mouth breathing contribute to abnormal jaw development often seen as a skeletal open bite. Lack of breastfeeding, use of pacifiers and bottles, and the very associated finger sucking habits also can deform jaws, especially the maxilla.

Abnormal maxilla shape can promote continuous abnormal upper and lower jaw growth. When the palatal shelves join in utero but do not fall and flatten, they can remain high and obstruct the nasal space. Small, palate, high vaulted, "peaked" and "double-peaked" palates promote jaw deforming mouth breathing as they restrict volume of the nasal space. It is well documented that mouth breathing promotes upper and lower jaw deformation and malocclusion. Since mandible growth depends to a great degree upon normal maxilla growth, achieving early normal maxilla shape should be a priority. When abnormal growth continues unabated, the maxilla often takes on a "V" palate shape, which is quite different from the preferred "U" palate. Functional treatments and forceps are used to correct this.

Upper and lower jaw growth can best be guided with early appliances instead of extractions for most patients. The past few decades saw a back and forth swing in orthodontics from extraction to non-extraction techniques. Just a few decades ago, over 70% of teenage orthodontic patients had numerous teeth removed in order to align crowded dental arches. Now less than 25% have the need for such extensive extractions because of dental arch and jaw development techniques. Serial extractions, a form of guided dental arch collapse, have declined dramatically. Phased orthodontic treatments have increased and so have the end-sizes of dental arches and related airways. Guided jaw growth is becoming the norm for progressive practitioners, to the benefit of their patients.

Lifelong interceptive Functional Jaw Orthopedics (FJO) can help develop and maintain good airways, good jaw balance and changing dental occlusions. Multi-phase FJO treatments have contributed dramatically to the decline in extractions and reduced overall lengths of treatment for many patients. Earlier application of FJO appliance...
Step 1 Recommend preconception and prebirth nutrition counseling. This is the first step in the new era of early preventive orthodontics. A few cultures worldwide encourage mothers to go on special nutritional diets for months before conception, not just afterward, in order to increase the chances for a healthy full-term baby. This action makes good nutritional sense. Our modern society emphasizes good nutrition, vitamins and avoidance of drugs, smoking and alcohol after conception, but it does not promote the vital need to have a nutritionally healthy mother before conception. Simple Vitamin A or B deficiency has been shown to cause bone deformities and even cleft palates.14 FJO dentists should encourage patients who want children to consult with a nutritionist before conception in order to promote optimum fetal growth and development.

Step 2 Recommend exclusion breastfeeding (no concurrent pacifier or bottle use) for 3–6 months (6–12 months overall) and recommend lactation consultant counseling before delivery. This is the next step in early preventive orthodontics. Breastfeeding after birth, true sucking, is usually better for infant jaw growth and development as well as overall lifelong health. More women are learning about the many health benefits of breastfeeding and choosing to breastfeed for longer periods of time than just a few decades ago. Some women still choose not to breastfeed at all for various reasons including lack of convenience and ignorance of the many health benefits to the infant and mother. FJO dentists should encourage new parents to be consult with a breastfeeding consultant before delivery because many hurdles exist to successful exclusive breastfeeding.

Breastfeeding places beneficial orthofacial forces on the jaws, similar to the forces of FJO, the newest form of orthodontics. Breastfeeding affects orofacial anatomy and physiology at our respiratory system gateway during the most important craniofacial formative years. Breastfeeding can orthopedically jump start proper jaw growth and have positive lifelong health affects. FJO dentists should recommend exclusive breastfeeding for a minimum of 3–6 months and total breastfeeding for a minimum of 6–12 months.

Breastfeeding is early preventive orthodontics and orthopedics because sucking forces impact the jaws during a critical period of postnatal growth. Postnatal growth is strongest in the first year of life so positive forces are important to proper growth and development. By 12 months of age, unimpeded, the maxilla increases markedly in size, and the anterior part of the mandible that contains the baby teeth (deciduous dentition) more or less attains its adult size.15 Rhythmic elevation and lowering of the jaw provides sequential changes in tongue positions coordinated with sucking contractions to stimulate growth.16 The forces of sucking actively act on the jaws like orthopedic appliances to induce forward and lateral jaw growth and early growth on.

Breast sucking aids proper development of the jaws, which form the gateway to the human airway. It also cultures positive down and forward growing forces required by both upper and lower jaws. Sucking forces act to spread and widen dental arches and promotes good swallow muscle tone, which aids proper jaw and airway growth. Research shows children breast-feeding about one year rarely develop dummy or finger sucking habits.17

Bottle, pacifier and digit sucking create backward destructive forces on the upper and lower teeth and jaw. Pacifier sucking magnifies negative jaw forces because the pacifier is often sucked more extensively and with more force than a bottle. Sucking forces generally act to constrict and form narrow dental arches out of soft moldable cartilaginous bone. Sucking promotes poor swallow muscle tone, which may interfere with proper jaw and airway growth. Essentially, sucking forces during the first year of life are as critical post-natal growth period block the full genetic potential.

Breast-fed babies (suckled infants) are less likely to develop malocclusion-high pre-maxilla, abnormal alveolar ridges and palate, and posterior cross-bite.18 They are less likely to develop allergies.19 Breast-fed infants are much less likely to be overweight.20 A major risk factor for diabetes, kidney and heart disease. They are much less likely to develop ear infections,21 insulin-dependent diabetes,22 respiratory infections,23 gastro-intestinal infections, diarrhea,24 and lymphomas (type of childhood cancer).25 Breast-fed babies are also less likely to be hospitalised for serious illnesses,26 less likely to die of SIDS,27 and generally have higher IQs.28

Bottle-fed babies (suckled infants) are more likely to develop malocclusion.29 Sucking habits (bottle, pacifier and digits) result in narrower upper and lower dental arches. Sucking infants often have decreased upper and increased lower inter-canine arch width along with a high prevalence of posterior cross-bite.30 A strong association has been found between exclusive bottle-feeding and malocclusion.31 Non-breast-sucking habits such as finger sucking are also strongly associated with crooked teeth and/or jaws (malocclusion).32 Most bottle-fed infants are sicker in general than successfully breast-fed infants. They are sicker as infants and often for a lifetime. The added health-care costs for four of the many medical illnesses that result from not breastfeeding was recently estimated to be over $1 billion per year.33

Step 3 Recommend at or near birth is the manipulation of an abnormal naso-septal and maxilla. Birth trauma can cause nasal obstruction and lead to mouth breathing and the development of facial and occlusal abnormalities.34 The palate shape and airway growth early on.35 The palate shape and airway growth early on.36 The palate shape and airway growth early on.

Bonding can be used to close vertical dimension. Early correction of closed vertical dimension aids growth and development, increases tongue and airway space and reduces treatment need later. Low vertical dimension, usually seen as a deep bite, often creates a Class II malocclusion mandible trap. A closed bite prevents the mandible from translating forward as the posterior condyle area grows. One way to open the bite and free the mandible is to place bonded composite on the occlusal surface of the lower primary molars. About 1–2 mm added to the primary second molar, and about 2–3 mm added to the primary first molar will usually open the closed bite in the anterior area about 2–4 mm. This allows the mandible to translate forward 1–2 mm. If the mandible is trapped in a deep Class II Division 2 malocclusion, then a removable maxillary appliance or utility arch can be added to increase space for the mandible to translate forward.

Bonding can be used to balance arches to reduce ear disease. Vertical dimension bonding has been shown to reduce or eliminate ear infections in children. Research shows deep bites increase the chance for chronic middle ear disease, as well as chronic ear disease. Patients have the ability to reduce or eliminate a great deal of costly child and adult ear disease without drugs or surgery.

Serial bonding can be used progressively to act as braces without braces. This “fixed” form of early orthodontic treatment allows FJO dentists to successfully correct small problems before they grow larger. Composite bonded power chain can be used over bonded composites or stainless steel crowns for serial bonding. Composites can rather simply be re-bonded over and over to increase space.

Pedodontic crown lengthening, bonding to open molar vertical dimension may be used with a manual Jaw Orthopedic technique, which can be used to allow adult 6-year molars to erupt into the dental arches. Short clinical crowns are a sign of obstructed or incomplete vertical eruption. FJO dentists may be able to use composite bonding during the eruption of permanent first
molars to increase the vertical, allow normal full molar vertical eruption and decrease the need for orthodontic appliance treat-
ment later. Composite bonding can match primary tooth colors so it is very patient friendly. Young patients quickly adjust to
the vertical change, and remain-
ing bonding on the primary teeth
usually exfoliates months or years later when the baby teeth exfoliate.

When the first molars erupt, around 5–7 years of age, if a deep bite or closed vertical exists, dental composite bonding can be
added to the primary first and/or primary second molars to increase the vertical. While lab-
fabricated bonded ceramics and stainless steel crowns can be used to achieve the same effect, direct bonded composites work
very well. Direct composite may last until the primary tooth ex-
foliates. It only needs to remain in place for 1–2 months to get 1–2 mm of eruption out of the op-
posing and erupting first molars. The speed of eruption usually
allows plenty of time to apply more
bonding to get more eruption if desired. There are times, as in the case of a very over-closed bite, when a second or even a
third bonding procedure can help to further reduce the need for orthodontic appliance ther-
apy later.

Vertical dimension primary molar composite build-ups work especially well in Class II Divi-
sion I situations from age 2 to age 10 to open deep bites. When a Class II Division I maloccu-
sion is opened, the mandible gains room to translate forward and often does so on its own. This occurs frequently when the composites are inclined prop-
erly, allowing forward mandible positioning without side inter-
ference. The tongue gains more room so it can act to orthope-
dically develop small dental arches during swallowing that can occur thousands of times during a day. Also, when normal
room becomes available for a normal sized tongue, impaired speech can be affected and can improve.

Cephalometric evaluation and diagnosis is important to review before vertical occlusion treatment is altered because three-dimen-
sional planes of occlusion can be altered too. For example, Class II Division 2 malocclusions may benefit from vertical dimension
primary molar build-ups. But Class II Division 2 malocclusions may require a three-sagittal
maxillary expansion appliance or utility arch to move a retruded
antero- posterior segment forward. The maxillary three-sagittal appliance may be needed to turn the Class II Division 2 into a Class II Division 1. Then bonding to open the bite can free the mandible to trans-
late forward into a Class I Divi-
sion 1 without going into an anter-
or Class III malocclusion.

Composite bonding can act like other “fixed” orthodontic ap-
plicances to help guide tooth and jaw growth. It has advantages
over all other forms of treatment when applied correctly. Appli-
cation and occlusal shaping of composite on two to four teeth takes only 50–60 minutes, but it can
cause changes for months or even years. The biggest advan-
tage is in preparing dental teeth, jaws and arches for much more
routine fixed bracket therapy if and when needed later.

This article has shown “real” early Functional Jaw Orthopedics (FJO) diagnosis and treatment is needed from birth to age 8. Earlier orthodontic treatments may create better patient outcomes, especially when orthopedic
changes are desired. Patient co-
operation with early removable
appliances and fixed utility
arches can be better than at later
ages. Early treatment usually
reduces later treatment needs
and sometimes overall treatment
time. And early orthodontics and
orthopedics can even prevent the
need for surgery at a later age.

Early orthodontic treatment is
finally gaining the attention it deserves. It was Hippocrates who commented over 2,400 years ago about craniofacial deformity. "Among those individuals with
long shaped heads, some have thick
necks, strong parts and bones. Others have strongly
arched palates, their teeth are ir-
regularly arrayed, crowding one another and they are bothered
by headaches and stutters." It is
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narrow, vaulted palates and ab-
normal upper and lower arches,
early treatment can free the
mandible to translate forward
from birth to age 8, to give them a better
chance for a healthier life.

Step 83 Recommend early re-
movable and fixed Functional
and orthopedic appliances when
appropriate, which could even
be at age 5. Multi-phased treat-
ment using early appliances can
create better patient outcomes,
especially when orthopedic
changes are desired. Patient co-
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This article has shown “real”
early Functional Jaw Orthopedics (FJO) diagnosis and treatment is needed from birth to age 8. Earlier orthodontic treatments may make good preventive sense, so a
timely new FJO standard is war-
ted and has been introduced. Earlier orthodontic treatments, specifically unique Functional
Jaw Orthopedic treatments have
been discussed and described, and should be prescribed by pro-
gressive general dentists, pe-
donodontists and orthodontists for
the benefit of their patients.  

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