



SWISS BIOLOGIC DENTISTRY



Dr. Amelia, DMD

AIRWAY ORTHODONTICS:
Optimizing jaw and airway
development while
straightening teeth
naturally

*Elevate
Your Oral
Health!*

Dr. Amelia Ellingson, DMD



Welcome to Swiss Biologic Dentistry! If you're new to biologic dentistry, I look forward to getting to know you; and, I'm sure you want to get to know me better too. And, if you are a regular, you can also get to know me better! I

grew up in Tucson, where I attended the University of Arizona (Bear down!). After college, I received my doctorate in dentistry in 2011 from the University of Pennsylvania, an Ivy League institution and top 10 dental school in the world (go Quakers!). A decade in dentistry; where did the time go!

While I was taught traditional dentistry from some of the best in the country, I felt something was missing from the bigger picture of oral health. And thankfully six years ago, I was offered the associate job at Integrative Dental Associates, one of Phoenix's best biological dental practices. It was here that the final pieces fell into place and the light bulb went off: True oral health requires looking at the body as a whole!

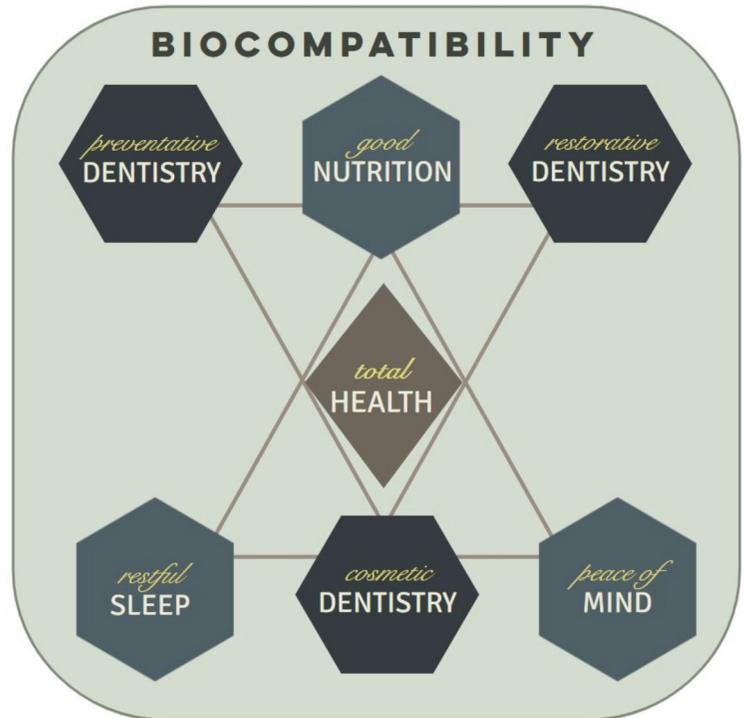
To more thoroughly understand whole body dental health, I am constantly expanding my knowledge and skill-set through continuing education courses and clinics. I've worked at the SDS clinics in Switzerland and Costa Rica, and other top clinics in Mexico, New Orleans, Miami, Chicago, to name just a few. I will go anywhere in the world that helps me help you because the learning journey never ends!



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DENTISTRY**

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Services provided by an Arizona licensed general dentist



Total oral health is found at the intersection of great habits and great dentistry. We help you achieve optimal oral health by working on your dental issues as a whole, not individually. Our staff is trained to be a resource so feel free to bring your questions!

L. Henderson ★★★★★

"This is without a doubt the best dentist I have ever been to. They are truly professional, knowledgeable and kind-hearted. They worked up a great plan for treatment and I especially love how they are so transparent and explain everything to me before they do it. They don't just jump in and when you are a skittish patient this is probably the most important factor for success in my opinion. Sally is for sure the icing on the cake and makes me want to go back."



Our Therapy Dog

Good Girl, Sally!

VISIT OUR WEBSITE TO LEARN MORE AT
swissbiologic.com

WHAT IS AIRWAY ORTHO AND WHY IS IT BETTER?

Traditional orthodontics is almost exclusively concerned with straightening teeth. The underlying assumption with traditional ortho is that crooked teeth are a result of genetics, not habits. While that may be partially true, the effects of oral muscular habits and nutrition on jaw and palatal development plays a significant role too. Most importantly, since these issues are habitual, they can be solved by simply changing the habit itself. Correct the bad behaviors and change everything.

Unique **Paths to Success!**

Each of our patients is truly unique. From young to old, overbites to massive crowding, the problems are different every time and the solutions are always customized to the patient's particular needs. We mainly use a combination of three programs, *expansion*, *healthystart*, and *myobrace*, with each of these programs having a series of even more individualized options. Using multiple programs and appliances allows us to make effective changes at the granular level which is just not possible with traditional ortho.

Our overall system relies on changing the involuntary habits of the muscles in your cheeks, lips, and tongue. Those muscles apply a constant force on your teeth that can either keep them in the wrong place like they are before ortho, or lock them in the correct place through our program's training. Correcting these habits requires effort and action by the patient. If you want a passive program, go with braces, but it won't fix the underlying issues causing the crooked teeth. If you want a permanent fix, our program works wonders.

STOP
Bad Oral
Habits !

The Science Behind our Success

Our orthodontic program is a non-surgical method of addressing the key problems with patient's dentition: malocclusion (poor bite), airway obstruction, and crowded and crooked teeth. It is specifically tailored to each patient's age, dentition, and orthodontic goals. We never use a one-size-fits-all approach like traditional ortho. It's like the difference between a custom-tailored suit and a track suit.

Malocclusion, a Worldwide Problem

Malocclusion in Latin literally means to shut badly (malus = bad, occlusus = to shut), or in other words, to poorly bite down. It's the problem that most orthodontists attempt to fix solely through braces and fixed appliances. Braces can solve the problem, but they don't cure the cause. Our program sets out to change behaviors, not just teeth position.

WHAT IS MALOCCLUSION?

THE SYMPTOMS OF MALOCCLUSION

- Misaligned teeth
- Speech problems
- Discomfort when biting or chewing food
- Change in the facial structure
- Difficulty in breathing through the mouth
- Frequent biting of tongue or cheeks

COMMON CAUSES OF MALOCCLUSION

- Tooth loss
- Prolonged use of pacifier
- Thumb sucking
- Cleft lip and palate
- Injuries and trauma
- Tumors in the mouth
- Bottle feeding
- Impacted tooth
- Lack of oral care
- Airway obstructed by enlarged adenoids or allergies

DIFFERENT TYPES OF MALOCCLUSIONS

- Overcrowding
- Spacing
- Diastema
- Crossbite
- Overjet
- Impacted Tooth
- Openbite
- Underbite
- Overbite
- Missing Tooth

HOW IS MALOCCLUSION TREATED?

- Growth Modification
- Invisalign
- Orthodontic Braces
- Retainers

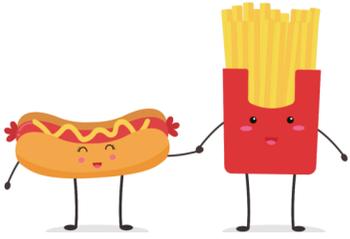
SWISS BIOLOGIC DENTISTRY

Malocclusions come in a variety of terrible shapes and styles!

Numerous studies have shown that proper jaw development through childhood is the key to preventing malocclusion. Specifically, they have shown that while there are certainly genetic components to jaw growth, early-life habitual factors like bottle feeding, pacifiers, finger sucking, and mouth breathing¹ can severely affect proper jaw development. Post-infancy, the two most important environmental factors in jaw development are regular oral care and proper nutrition². Creating and fostering a positive oral regimen at home and making regular visits to the dentist for cleanings and check-ups will certainly help in early diagnosis of potential malocclusion.

¹Traebert, E. et al (2020) Nutritional and non-nutritional habits and occurrence of malocclusions in the mixed dentition. *Annals of the Brazilian Academy of Sciences*, 92(1).

²Moimaz, S. et al (2014) Longitudinal study of habits leading to malocclusion development in childhood. *BMC Oral Health* 14:96.



Not your friends!

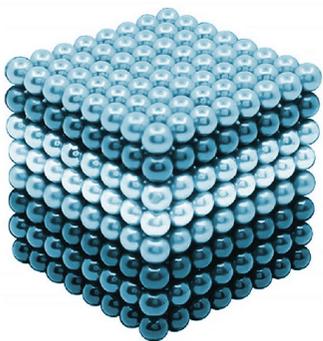
The more difficult task is in dealing with today's western diet of high-processed, low nutrition, and high-sugar content foods. Low nutritional foods directly lead to stunted jaw development because by definition, good nutrition is needed for growth, and candy, soda, and the like have virtually no nutritional value. That stunted jaw development then fails to allow enough space for the teeth to come in.

So, taking into account all of those environmental factors, we are seeing a worldwide malocclusion rate of approximately 56%³. Another study more directly found that around 93% of its subject children had one occlusal trait, with one or two anomalies recorded in 63% of the children⁴. And equally as bad, crowding has been attributed to at least 70 to 80% of the population, regardless of age⁵. Given the number of children and adults we see for ortho, none of these numbers are surprising.

Issues Caused by Malocclusion

What makes malocclusion so bad? Since malocclusion usually sees asymmetric bites, issues involved can include: joint pain, TMJ issues, cracking of teeth, problems with swallowing, cavities, and periodontal disease. It can also interfere with the chewing of food. The worse the malocclusion, the worse the chewing action is that breaks up the food for digestion⁶; and, the less chewed the food is, the worse the body's uptake of nutrients is from that food^{7,8}.

Losing nutrition due to poor chewing habits isn't something that registers to most people, but it makes sense when you think about it. Let's say you ate a perfect one-inch cube of mashed potatoes without chewing it. Each side of the cube is one square inch, and there are six sides to a cube, so there are six cubic inches of surface area for your stomach to attempt to digest it from. But let's say you chewed that one-inch cube into pieces that are each an eighth of an inch long, that would make eight-by-eight-by-eight pieces, for a total of 512 pieces. So, you have an 1/8th of an inch (.125) squared times six sides per cube times 512 cubes for a total of 48 square inches (.125 x .125 x 6 x 512 = 48). The more surface area in the food you eat, the easier digestion will be.



If you glossed over all of that, just think about this: how long does it take to melt a solid ice cube versus how long it takes to melt an ice cube that has been crushed up. It's the same idea, but with nutrition absorption! On the next page is a little chart so you can see how surface area scales up the smaller something is broken down into.

³Lombardo, G. et al (2020) Worldwide prevalence of malocclusion in the different states of dentition: A systematic review and meta-analysis. *European Journal of Paediatric Dentistry*. 21/2 115-122.

⁴Ciuffolo, Fabio et al (2005) Prevalence and distribution by gender of occlusal characteristics in a sample of Italian secondary school students: a cross-sectional study. *European Journal of Orthodontics* 27 601-606.

⁵Little, R.M. (1975) The irregularity index: a quantitative score of mandibular anterior alignment. *American Journal of Orthodontics* 68: 554-563.

⁶Zarrinkelk, H.M. et al (1995) A longitudinal study of changes in masticatory performance of patients undergoing orthognathic surgery. *J Oral Maxillofac Surg* 53:777-82.

⁷English, J.D. et al (2002) Does malocclusion affect masticatory performance? *Angle Orthodontist* 72 (1): 21-27.

⁸Kobayashi, T. et al (1993) Masticatory function in patients with mandibular prognathism before and after orthognathic surgery. *J Oral Maxillofac Surg* 51:997-1001.

You can see how much more the surface area is increased by breaking down a one-inch cube into smaller parts. Again, with food, the more surface area available, the greater the body's ability to absorb and consume the nutrients.

Number of segments	1	2	3	4	5	6	7	8
Length of each segment	1	0.5	0.33	0.25	0.2	0.167	0.143	0.125
# of smaller cubes	1	8	27	64	125	216	343	512
Total surface area*	1	12	18	24	30	36	42	48

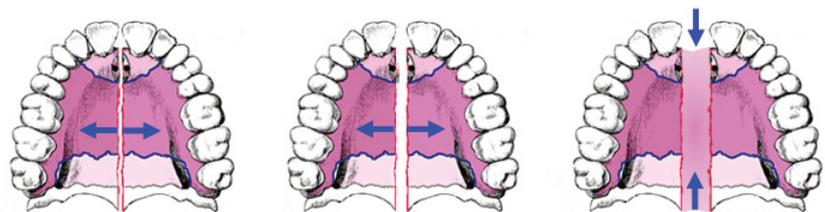
* length of a side squared x six sides x number of smaller cubes = total surface area.

One final issue, but a very important one involves aesthetics. Malocclusion itself always involves teeth being out of place. Out of place and crowded teeth are not ideal, and the worse it is, the more self-conscious you are likely to be. In fact, a study was performed on adolescents, aged 12 to 19, which found significant correlation between malocclusion and self-esteem⁹. While there may be any number of factors that can cause poor self-esteem, a poor set of teeth will always be front and center when people meet you.

⁹Taibah, S. M. and Al-Hummayani, F. M. (2017) Effect of Malocclusion on the Self-Esteem of Adolescents. *J Orthod Sci*. Oct-Dec; 6(4): 123-28.

Solving the Malocclusion Problem

Fixing malocclusions usually comes in two complimentary parts: 1) expansion, and 2) muscle retraining. Most of our patient's jaws are underdeveloped, meaning they are smaller than they should be due to stunted growth. Rectifying this underdevelopment requires a palatal expander. The space is too small, so we simply make it larger. We do that by expanding the jaw at the mandibular and palatal sutures through the application of constant outward pressure. The sutures of the jaw will loosen through this pressure and will begin to expand outwardly. Expansion of up to six millimeters is possible and once finished, the sutures will heal, permanently setting and locking in the expansion.



Actual expansion occurs more uniformly between all the teeth; this diagram is just to highlight how the suture is expanded.

The second part involves retraining the soft tissue and muscles in the mouth, like the tongue, cheeks, and lips. We use these muscles all the time, but we almost never think about them individually. Unfortunately, the muscles on expansion patients have become habituated incorrectly due to their underdeveloped jaw. The muscles are habituated for a small jaw and crowded teeth. We don't want that, we want to habituate the muscles, for a fully developed jaw with no crowding. Just expanding the jaw will not fix the issue alone because those muscles have not been re-trained and will do what they have been doing the whole time the teeth were crowded.



One Newton of soap!

Ok, but what does that mean exactly? Re-training these muscles will allow them to direct their applied force into moving and keeping the teeth in their correct positions. You may ask, how much force does it take to move a tooth over time and can those muscles really move a tooth? So yes, it

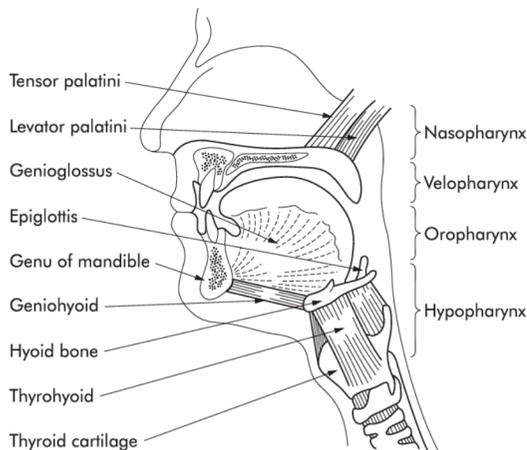
only takes about one Newton of force¹⁰ to move a tooth, or roughly the amount of force a bar of soap (or two Snickers bars) applies to your hand if you were holding it out in front of you¹¹. That is not much, but it is a bit more than the resting forces of the muscles exert on your teeth¹². Now, those resting forces can move teeth eventually, since pressure is being constantly applied. But remember too, the mouth's muscles are not just resting. They are chewing, swallowing, talking, fidgeting, etc. Those active forces apply substantially more force to the teeth and will drive the teeth to improper alignment if not corrected. It is these muscle behaviors that our program retrains, and it is this retraining that helps keep the teeth set in their proper place permanently.

To summarize, malocclusions and crowding is a problem that can be fixed through a combination of expansion and muscle retraining. These are near-permanent solutions and best implemented early in childhood development given the plasticity in their bone development. Adults can take advantage of these solutions as well; it will just take longer due to the lack of bone plasticity as we get older.

Airway Obstruction and Sleep Interruption

Traditional orthodontics has typically focused on correcting malocclusions almost exclusively through the use of braces and other orthodontic appliances. As we discussed above, it is important to fix those issues, and we go about it in a different way. However, we have another goal in our program that you won't find in any traditional ortho office: improving airway passages and air flow for improved breathing.

Breathing is fundamental, and as anyone with allergies, a clogged nose, or a chest cold can attest to, blocked and obstructed airway passages make it hard to breathe.



We can't stop your allergies or the flu, but we can improve your breathing through our ortho program in two important ways: 1) we can expand your upper palate which will open up the nasopharyngeal airway; and, 2) expand and advance the lower jaw into optimal alignment which opens up the velopharyngeal, oropharyngeal and hypopharyngeal airways.

¹⁰Işeri, H. et al (2010) Biomechanics of rapid tooth movement by dentoalveolar distraction osteogenesis. *Current Therapy in Orthodontics*. 321-37.

¹¹HOW MUCH FORCE IS 1 NEWTON | (GREAT EXAMPLE + MAGIC) https://www.youtube.com/watch?v=Qngs_o8-FMk.

¹²Valentim, A.F. et al (2014) Evaluation of the force applied by the tongue and lip on the maxillary central incisor tooth. *CoDAS*. May-Jun 26(3) 235-40.

¹³Tomfohr, L.M. (2011) Effects of continuous positive airway pressure on fatigue and sleepiness in patients with obstructive sleep apnea; data from a randomized controlled trial. *Sleep*. 34(1) 121-6.

¹⁴Ellis, R.R. (2021) Surprising Reasons to Get More Sleep, <https://www.webmd.com/sleep-disorders/benefits-sleep-more>.

¹⁵Fernandez-Mendoza, J. et al. (2019) interplay of objective sleep duration and cardiovascular and cerebrovascular diseases on cause-specific mortality. *Journal of the American Heart Association*. Vol. 8 No. 20.

¹⁶Almuzian, M. (2018) Does rapid maxillary expansion affect nasopharyngeal airway? A prospective cone beam computerised tomography (CBCT) based study. *The Surgeon*. 16(1) 1-11.

¹⁷Erdur, E.A. (2020) Effects of symmetric and asymmetric rapid maxillary expansion treatments on pharyngeal airway and sinus volume. *Angle Orthod*. 90(3) 425-31.

¹⁸Iwasaki, T. et al. (2013) Tongue posture improvement and pharyngeal airway enlargement as secondary effects of rapid maxillary expansion: a cone-beam computed tomography study. *American Journal of Orthodontics and Dentofacial Orthopedics*. 143(2) 235-45.

That sounds good, but why is opening up the airways so important to us? Well, it's all about sleep. You simply cannot have a night of restful sleep if you have obstructed breathing¹³. Breathe well, sleep well; sleep well, live well! Good sleep provides you with a sharper mind, a boost in your mood, a healthier heart, more energy during the day, steadier daily blood sugar consumption, better immune response, and weight control¹⁴. And, poor sleep does the opposite. In fact, poor sleep can also lead to an early death¹⁵ by causing heart disease and strokes. We're trying to avoid that type of sleep for as long as possible, so let's get some good sleep now!



an x-ray of an obstructed airway passage.

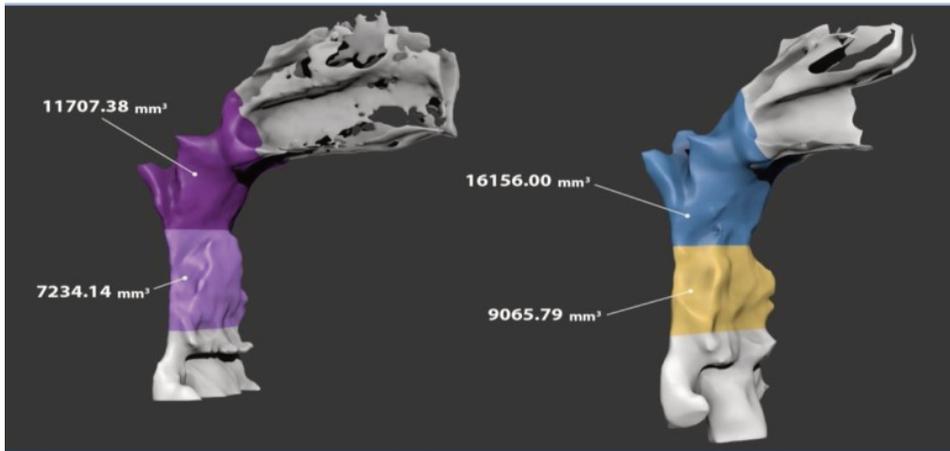
Orthodontic Corrections for Maximized Airflow

The first element of our airway ortho plan involves the rapid expansion of the maxillary arch. A range of studies have shown significant improvements to nasopharyngeal airway obstruction through rapid maxillary expansion^{16,17}, and ¹⁸. This specific type of expansion opens up the upper palatal suture by widening the upper arch itself. The opening of the palate spreads out the airway passage from the nose to the nasopharynx. It's the same form of expansion we use to address the crowding issues discussed earlier. You can even get a feel for how this works if you try to use the muscles of your upper lip to pull back on your nose. Imagine the difference it would make if you could breathe like that all the time!

The second element involves mandibular (lower jaw) advancement. Unlike expansion of the upper arch, expansion of the mandible may be necessary for crowding and biting issues, but does not materially affect the lower airway passages. However, mandibular advancement does open up those lower airways quite effectively. Mandibular advancement comes in three forms: 1) surgical, 2) via appliance, or 3) naturally through proper jaw development. Because of the young age range most of our patients begin the program at, we effectively use our set of appliances to bring the jaw into the position it should have developed into. Sleep apnea appliances work similarly, but they do not permanently cure the issue.

Those systems, like the EMA (Elastic Mandibular Advancement) appliance open airways by pushing the tmj and jaw forward. You can get a feel for how this works by pushing your jaw forward and taking a breath. Then, pull the jaw back toward your spine, and try breathing again. You can feel the difference in airflow between the two, and holding the jaw out

Applying that same theory, our program (including the Myobrace protocols) has been shown to permanently increase airway volumes by 25 to 38% ¹⁹. That is a huge change in airway volume and a marked improvement over any other non-surgical program on the market.



3D images pharyngeal airway before and after expansion and mandibular advancement.

Without intervention, breathing is an automatic bodily action which can be consciously overridden for short periods of time, but will always default back to its automatic nature²⁰. So, while yogis may be able to change their breathing habits, most of us revert to our baseline automatic breathing habits quickly. We can't help it. But through expansion and mandibular advancement, we change those habits at a structural level, permanently improving your airflow, and your sleep without the need for conscious intervention.

But keep in mind that sleep deprivation is a multi-faceted problem, running the gamut from looking at your phone too close to bedtime to cranio-facial development issues. Our airway ortho program is the best non-surgical method to solving the oral and airway structural and alignment issues that interfere with breathing during sleep, but there can be other obstructions to sleep as well.

Aesthetic Improvements through Orthodontics

The main issues we fix are malocclusions and airway obstructions; but, let's not forget about aesthetics. The good news is that by fixing malocclusions and by bringing your jaw into alignment, you have achieved the smile you were supposed to always have. And, that's as beautiful as it gets.

¹⁹Eun-Suk Ahn, et al. (2017) Oropharyngeal airway three-dimensional changes after treatment with myobrace in class ii retrognathic children. *Iran J. Public Health*. Feb 46(2) 265-67.

²⁰Mitchell, G.S. (2009) Breathing is automatic and not autonomic. *Encyclopedia of Neuroscience*. 121-30.

One of the biggest benefits of our system is that we almost always use removable appliances. This means that if you're eating, having your picture taken, interviewing, etc., you can simply remove the appliance and put it back in when you're done. So, no more awkward school photos with braces. We all wish we had these options when we were kids!

You can see some of our results on Page 11 of this booklet, or you can go to our website swissbiologic.com/ortho-results to see even more.

We all want to look good and we all want a great smile. Our whole disposition improves when we feel better about ourselves. Don't underestimate what a great smile can accomplish for you!

EXPANDERS

We use a variety of expansion devices, but the most common is the Schwartz appliances as shown to the right. These expanders expand the palates in the most directions possible. Most expanders are removable, but fixed versions can be used in certain cases.



healthystart.

Healthystart is most often used by our youngest patients. Our program can start as early as when the patient's first molars erupt. Early intervention is always easier given the greater plasticity in the patient's bone structure.



Healthy Start Kids
Habit Corrector

myobrace®

STRAIGHT TEETH THE NATURAL WAY

Our most comprehensive option. Myobrace can be used on practically anyone, with younger patients seeing results faster than adults; but, adults can still use the program. Like our other ortho devices, these are removable. Patients do have to perform a number of activities to achieve their desired results.



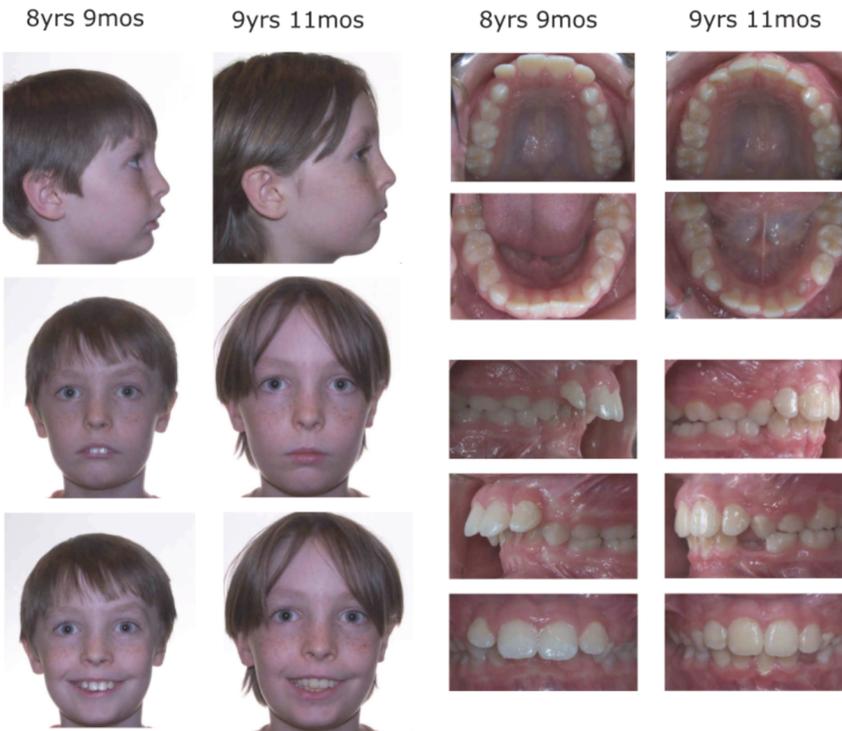
BIOLINERS

Rarely used, but some patients want some minor positional adjustments after the myobrace/healthystart treatments.



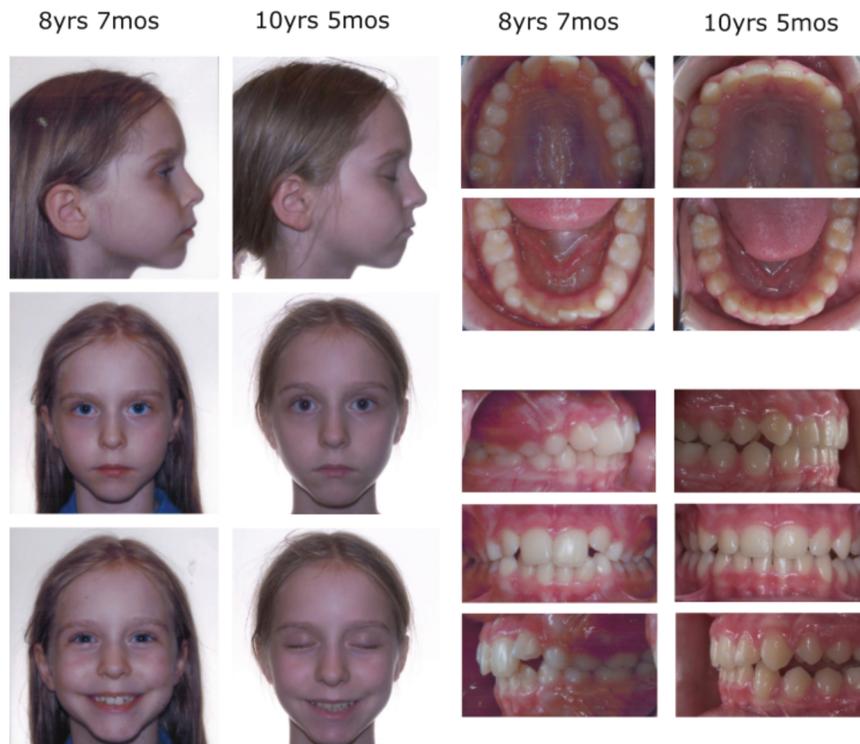
Real Results From Our Patients

CASE STUDY: Male child's extreme overjet



At the beginning of treatment, patient experienced severe overjet on the maxillary arch and crowding on the mandibular arch. Patient was very compliant with treatment and was able to complete treatment in 14 months.

CASE STUDY: Female child w/ early crowding

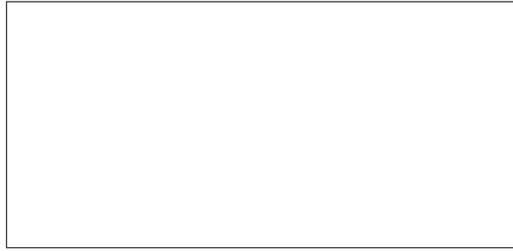
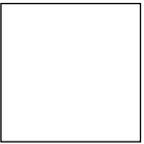


Patient experienced moderate crowding with corresponding airway obstruction. Myobrace treatment was successful with minor post treatment myobrace usage needed to maintain space. Usage to be phased out entirely within 12 months.

These patients were, and are patients at Swiss Biologic Dentistry. Each patient's guardian has given permission to SBD to use these images to show their child's results. Any reproduction of these patient's images is strictly prohibited.



SWISS BIOLOGIC DENTISTRY
 4202 North 32nd Street, Ste. A
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WHY "SWISS" BIOLOGIC DENTISTRY?



+ When we started this practice, we thought of what we should call ourselves. We were originally called Integrative Dental Associates, one of the first holistic offices in town, but we found out that almost everyone we talked to didn't know what "integrative" meant. So, we thought about the roots of Biological Dentistry and about what we cared about. We thought about Dr. Amelia's roots and about what kind of service we strive to achieve.

And then it came to us. Dr. Amelia's family is from Switzerland (Neuchâtel) and the leader of biological dentistry is from Switzerland, so as an homage to our roots, we landed on Swiss Biologic Dentistry. We aim to bring the precision, professionalism, and practices from the leaders of dentistry in Switzerland to everyone here, in the United States.

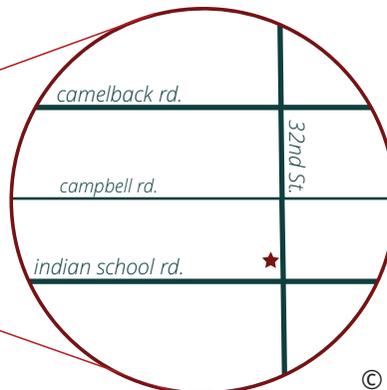
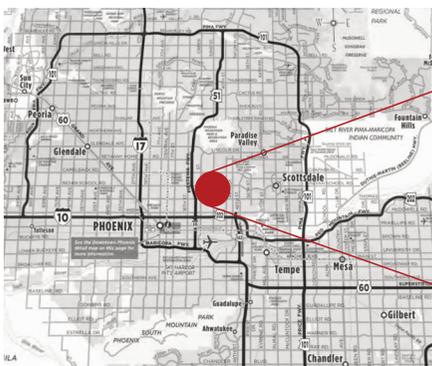
And, it never hurts to think of the cool mountains in the middle of July out here in Phoenix! Welcome to our practice and welcome to your new dental home!

CALL 602.956.4800

TODAY TO SCHEDULE YOUR APPOINTMENT

Dr. Amelia

www.swissbiologic.com



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