STRENGTH AND CONDITIONING FOR KIDS IN 2015

Is strength training for kid’s safe and effective? What age should they start and what should they do?

By: David Abernethy, MS, MSCC, CTBS

I am asked this question over and over again. As I attempt to answer this question, I will give you 1) my experience as a kid, 2) my experience as a strength coach and 3) my findings of what research tells us, which I have found, that validates the idea of strength and conditioning for kids.

I grew up on farm in Lincoln County, NC. We had about every type of farm animal and crops that a young boy could dream of being around. We had cows, pigs, goats, ponies, horses, chickens, turkeys, dogs, cats, rats, snakes, crawdads in the creek and June bugs, that we used to tie yarn to their legs and watch them fly around like a kite. We grew all types of vegetables and fruit and my dad sewed soybeans, corn, wheat, etc. and we always gathered the crops at harvest time. We also had a saw mill on the farm and several barns located throughout the farm that we built from that saw mill.

On a farm when you learn to walk and talk and eat solid food, you begin working on that farm. That farm teaches you many lessons that the general population has no clue about. It teaches you time management, because the job has to get done or the animals, nor you get to eat. It teaches you hard work and how to work in tough environments. It teaches you to have faith, that your hard work will produce a harvest. It teaches you how to eat and rest properly, because if you don’t, the farm work will beat you down, and you will not be able to recover. Last but not the least, it makes you strong. You lift and move heavy things over and over again.

I remember getting hay out of the field at a young age. I learned to drive tractors and trucks before I was ten years old. I remember learning to saw and split wood and work on a saw-mill with my dad, cutting lumber before I was twelve years old. I remember sacking soy beans and taking them to the mill to sell when I was young. Somebody (that being me), had to help load all those bales of hay and tote all those bags of soybeans. We had to split all those logs and cut all that timber to build barns and fences to house our hay and animals and keep our tractors and trucks in the dry. I never forget digging fence post holes with a post hole digger one slam at a time. I remember using a go-devil and a sledge hammer to split wood. I remember climbing trees and building forts out of lumber with my cousins. The point I am trying to make is, that I have done strength and conditioning my whole life. My granddads and dad where my strength coaches and the farm was my training facility. They knew nothing about proper biomechanics, functional movement screens or soft tissue repair. We did no dynamic warm up or thoracic mobility. We just went out and got the job done.

My mom is 5’4” tall and my dad is around 5”11” tall and about 200 pounds. I am 6’3” and 300 pounds plus or minus depending on what meal of the day it is. In my prime, I was able to squat over 700 lbs. I was able to deadlift over 700 lbs. and I have benched 600 lbs. I have never used steroids or drugs and I have never used lifting shoes, bench shirts, singlets or whatever else people use to get that extra weight. I have never had a serious injury throughout my career of playing sports.

The fact of the matter is, that I outgrew my mom and dad and everybody else in my family. I ate organic fruits, vegetables, nuts, grass fed beef and free range chickens, without knowing that it was super healthy for me and in the future it would be rare for kids to eat this way.

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So now that brings me to my next point. The majority of kids grow up in subdivisions or inner city complexes. They only get about 20 minutes of exercise a day at school and they eat out roughly 75% of their meals. We hardly ever ate out. We would go to the local fried chicken restaurant, barbecue restaurant or what we Carolinians call the fish camp, on Saturday nights. We didn’t eat there, we got it to go. Dad and I would work while mom and my little brother went and picked it up. When I was a kid, this was a treat.

**What’s the next best thing to train a kid up in a way they should go besides a family farm?**

My answer would be a strength and conditioning facility. I feel like all the injuries we have these days are a result of kids not working anymore before playing sports. We have kids in all these activities now, but there is no foundation of strength built before they play. They generally play one sport and hope they can excel in that sport to earn recognition as a high school star, earn a college scholarship or if they are really fortunate make it as a pro.

I have been a college athlete and strength and conditioning coach now for over 20 years. I see kids come in with all types of physical injuries, physical, mental and emotional deficiencies and the inability to work hard. As a whole, kids seem to be softer at times than they used to be. There are some exceptions but kids are spoiled and we are setting them up for failure. We give them everything and lay everything out for them in a step by step process.

We now live in the greatest times of world history. We have food on every corner. We have any bit of information we need at the tips of our fingers due to the smart phones and the internet. We can have instant access to anything we want in this world other than teleporting goods or people from place to place.

Consequently, we have conditioned our society to expect things to happen now. I want to get big, fast and strong now. I want to have a bachelors, masters and PhD now. I want to come out of college and make a million bucks now. We have this unrealistic expectation of reality.

Now when it comes to building strength we have to do it the way God intended. Through hard work and time. This is what I preach to my athletes all time. We need to have a plan and follow through with that plan having the faith and belief that the plan is going to get us the desire we had hoped to achieve. I tell them it is the power of accumulation. Day by day, training session by training session, rep by rep, we will build them into the athlete they want to become. If they systematically and consistently train effectively one small step at a time they will have a huge return on that investment. It is the same advice my financial advisor gives me in planning for retirement and saving for college for my kids. I have to be consistent and adding to my body of work I am building. If I am not consistent and start thinking about what I want right now instead of what I need later down the road then I get off track.

As we apply this to young athletes we need to have the same approach. Step by step, day by day and always be consistent and progressive with our plan. The plan is to start small. Take baby steps. Begin with the most basic concepts of biomechanical movement.

The first thing I would teach is the simple progression of 1. **Stance**, 2. **Alignment**, 3. **Start**, & 4. **Assignment**. I had a wise old coach at Clemson who shared this concept, and it is a simple catchy phrase that will teach young kids how to progress “Stance, Alignment, Start, and Assignment”.

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The first step is **Stance**. How do I get into a good stance? I teach the power position. The young athlete gets their feet hip width apart, feet are under the hips or slightly outside and they have good knee bend. Not too deep, about a quarter bend and they have their hips back. They have their head up back flat, core set. Before performing any lift, I teach my guys to set their core. This is done by taking a deep breath and contracting the anterior and posterior core muscles.

The second step is **Alignment**. This coincides with stance in which we have our feet hip width or slightly outside. I want shoulders, hips, knees and toes lined up pointing north and south. This will give the athlete the best chance for success whether they are moving linearly, laterally, vertically or downward.

The third step is **Start**. After we have them in a great stance and we have perfect alignment they are ready to take the first action movement. If that is a power clean, then have them keep that stance and alignment set and work on vertical shin angles. This is done, so their start produces force through the heels and extends through the toes and then back to the heels. If it is a squat, they are set and aligned to perform an effective squat. If it is a bench press, we lay them on the bench, feet are still pulled back under the hips, and it becomes a total body lift with five points of pressure. 1) feet pressure, 2) butt on bench pressure, 3) back and lats on the bench pressure, 4) head on the bench pressure and 5) grip placement on the bar pressure. If it is a plyometric movement, we put them in the same power stance and alignment with hips back. If we are doing starts and our hand is on the ground, we stagger the stance aligned with hand placement on the ground. If the right hand is down, then the right foot is back. If the left hand is down, the left foot is back. But we emphasize the same downward force on both feet no matter what hand is down.

The final step is **Assignment**. For the power clean, what is our assignment? To get the weight off the ground and in a catch position safely and effectively. The squat is to get to down to parallel and stand back up with the weight. The bench press is to take weight from rack to chest back to rack safely and effectively. A great resource to use to determine if you are doing the lifts safely and effectively is the through the Collegiate Strength and Conditioning Associations (CSCCa) website. The web address is [www.cscca.org](http://www.cscca.org) and click on resources and Coach Greg Warner does an excellent job outlining the primary and secondary purposes of the lift, starting procedures, equipment set up and assignment of the lift.

**What is the stance of leading researchers in the field of strength and conditioning for kids?**

Now let’s take a look into what resources and research we have to validate the use of resistance training for kids, tweens and teens. The National Strength and Conditioning Research is an excellent resource to use because we have all the latest research from doctors and practitioners that have submitted their findings.

**The current position of National Strength and Conditioning Association (NSCA) is that:**

1. A properly designed and supervised resistance training program is relatively safe for youth.
2. A properly designed and supervised resistance training program can enhance the muscular strength and power of youth.
3. A properly designed and supervised resistance training program can improve cardiovascular risk profile of youth.
4. A properly designed and supervised resistance training program can improve motor skill performance and may contribute to enhanced sports performance in youth.
5. A properly designed and supervised resistance training program can increase a young athlete’s resistance to sports related injuries.
6. A properly designed and supervised resistance training program can help improve the psychosocial well-being of youth.
7. A properly designed and supervised resistance training program can help promote and develop exercise habits during childhood and adolescence.

What is the effectiveness of youth resistance training?

Dr. Avery Faigenbaum, EdD states that “The scientific literature is quite clear that strength training is safe for young people, if it is properly supervised.” “It will not stunt growth or lead to growth plate injuries.”

The New York Times wrote an article on the benefits of weight training for children. They found that back in the 1970’s researchers in Japan studied child laborers and discovered that among their many misfortunes, the juvenile workers tended to be abnormally short. Physical labor, the researchers concluded, with its hours of lifting and moving heavy weights had stunted the children’s growth. Dr. Faigenbaum states that this is somewhat improbable, due to the scientific findings and other similar reports that have been recently discovered. He states that idea retains a sturdy hold in the popular imagination. As a recent position paper on the topic of children and resistance training points out, many parents, coaches, and pediatricians, remain convinced that weight training by children will “result in short stature, epiphyseal plate” or growth plate-damage, lack of strength increases due to a lack of testosterone and a variety of safety issues.” In other words most people believe children will not get stronger by lifting weights and will probably hurt themselves. However, a major new review just published in Pediatrics, together with a growing body of other scientific reports, suggest that in fact, weight training can be not only safe for young people, it can also be beneficial, even essential. In the Pediatrics review, researchers with the institute of Training Science and Sports Informatics in Cologne, Germany, analyzed 60 years’ worth of studies of children and weightlifting. The studies covered boys and girls from 6 to 18 years of age. The researcher found that, almost without exception, children adolescents benefited from weight training. They grew stronger. Overall, the researchers concluded, regardless of maturational age, children generally seem to be capable of increasing muscular strength.”

According to Faigenabau et al., during childhood and adolescence, physiological factors related to growth and development are in a constant state of evolution. Due to the progression of growth, it can be expected that healthy children will show noticeable gains in height, weight, maximal oxygen uptake, anaerobic capacity, and muscle strength during the developmental years. Faigenbaum states, “We have worked with kindergartners, having them use just balloons and dowel rods and found that they developed strength increases”. Dr. Faigenbaum is a widely acknowledge expert on the topic of
youth strength training. His most recent book is titled “Youth Strength Training” Dr. Faigenabaum states their strength gains seem generally to involve “neurological changes”. Their nervous system and muscles start interacting more efficiently. Studies have shown that children develop a significant increase in motor-unit activation within their muscles after strength training. A motor unit consists of a single neuron and all of the muscle cells that it controls. When more motor units fire, a muscle contracts more efficiently. Consequently, strength training in children stimulates the potential strength of the muscle to activate the power that has been dormant or unused. Therefore, from both a physiological and philosophical standpoint is why strength training is so important for kids. Dr. Lyle Micheli, MD director of Sports Medicine at Children’s Hospital Boston and professor of orthopedic surgery at Harvard university, as well as Co-author with Dr Faigenbaum on the NSCA 2009 position paper, states that there was a time when children weight trained by carrying milk pails and helping around the farm. Now few children, even young adults get sufficient activity to fully strengthen their muscles, tendons and other tissue. “They don’t have the tissue strength to withstand the forces of their sports.”

The Mayo Clinic asked the question “is strength training effective for kids?” Their answer is; “you bet!” “Done properly, strength training offers many benefits to young athletes.” They state that strength training will put them on a lifetime path to better health and fitness. The Mayo staff says “light resistance and controlled movements are best, with a huge emphasis on proper technique and safety.” They go on to say, “that done properly, strength training will increase your child’s muscle strength and endurance, help protect muscles and joints from sports related injuries, improve your child’s performance in dancing, skating and sports.” They also state, “that it is not just for athletes because it will strengthen your child’s bones, help promote healthy blood pressure and cholesterol levels, maintain a healthy weight and improve a child’s confidence and self-esteem.” Lastly the Mayo staff states, “that during childhood as early as 7 or 8, kids improve their body awareness, control and balance through active play and strength training can enhance that development.”

According to Dr Dahab and Dr Metcalf from Johns Hopkins Hospital, they found that children can improve strength by 30% to 50% after just 8 to 12 weeks of a well-designed strength training program. They state, “that youth need to train at least 2 times per week to maintain strength.” The case reports of injuries related to strength training, including epiphyseal plate fractures and lower back injuries were mostly due to misuse of equipment, inappropriate weight, improper technique and lack of qualified adult supervision. Their conclusions state, ‘that athletes and non-athletes alike can safely improve their strength and overall health by participating in a well supervised program.” Trained professionals play an essential role in ensuring technique, progression form and safety.

Now being a co-developer with my partner Gordon Brown, of an Oscillatory resistance training system, that incorporates the Tsunami Bar® flexible light-weight barbell; I get very excited for the future of youth strength and speed development. This light weight bar has many features and benefits which relate directly to more effective strength training for kids plus the bar offers features that enhance safety. Looking back at what we know from the human body, the central nervous system begins from birth and as the kids grow, they get closer to their muscle building stage as they reach puberty with their hormones kicking in, which optimizes potential growth. This is a critical window of opportunity to enhance a kid’s opportunity for growth.
As we conclude, what are the next steps to take to ensure we give future generations the capabilities to maximizing strength, speed and better mobilization. From my experience as a child, athlete and as a coach everything is cumulative. Somewhere down the line it can add or take away from the results depending on how the process was managed.

Resistance strength training is the best option for kids of all ages to gain strength, confidence, emotional wellbeing and overall health. We can develop the central nervous system, the skeletal muscular system and bone density safely and effectively, meanwhile adding value to the kid mentally, physically and spiritually.

I was blessed to meet a man by the name of Gordon Brown, who introduced me to Cyclic Oscillatory Resistance training back in 2011. He brought me a thermoplastic tube with a fiberglass composite shape inside that was around 36 inches long and ask me what I thought of its whipping, bending and flexing characteristics. I thought it was effective but asked if he could make it bigger. He did and the bigger tube was more conducive to me, and it ignited an influx of ideas from both he and I, and the Cyclic Oscillatory Resistance device was born called the Tsunami Bar®. The Tsunami Bar® is a light-weight flexible barbell with Olympic disc weights placed on each end with the user performing any of the standard Olympic lifts.

The Tsunami Bar® barbell is light, therefore it ensures proper biomechanics before any resistance progression takes place. As we have seen in the research from Faigenbaum, when he used the dowel rods with balloons, he produced results. This is the stance and alignment process I spoke of earlier. As we produce proper biomechanical stance and alignment we are ready to start a resistance training program. Now the final step is assignment and that entails a safe and effective resistance program. This can be achieved with the Tsunami Bar with minimal amounts of weight placed on the light-weight barbell and achieving, at least, the same results or better than using maximal loads. Yes this is true, and the Research performed to date supports these claims. How this takes place is by using momentum forces or what we like to call impulse forces created when the flexible barbell moves while increasing our movement efficiency or also known as explosive strength deficit. Basically we are taking a weight on a flexible bar and applying speed movement to achieve maximal resistance forces. This stimulates the central nervous system up to three times greater than traditional resistance training methods which will result in CNS development optimization in prepubescent kids. This is the future for strength and conditioning and it is being practiced widely today. Today’s sports teams are more concerned with movement than actual 1 rep strength. Sport’s athletes are dependent upon consistent strength and mobility. Consequently, I believe by applying these principles we can optimize an athlete’s true potential from the inside out.

In conclusion, from my own experiences and research; I believe without a doubt that a safe and effective strength training program can change and enhance a kid’s life. Whether they are an athlete or not, it will create opportunities and enhance the ability of the child to take advantage of the opportunities the child is facing now. At the very least, confidence will be increased, which will give kids the opportunity to go and compete for excellence on the field of play, in the classroom and in life.

What can you do now? First, recommend that your school system incorporate strength and conditioning training into the curriculum, and bring on staff at the school qualified strength and conditioning professionals. And, if you want and have the financial ability, have a qualified strength and conditioning professional.
conditioning coach or personal trainer work with your child on Stance, Alignment, Start and Assignment as explained above. We believe that one of our flexible composite Tsunami Bars® would be an excellent choice for your child to begin their weight lifting experience (www.tsunamibarbell.com). In the selection of a coach or trainer, insist that the coach or trainer become a ‘Certified Tsunami Bar® Specialist’. This will enable them to teach your child to use the bar in the most effective manner. Tsunami Bar, LLC has designed a 5 part online ‘video’ training course that teaches all phases of safety protocols when using a Tsunami Bar®, proper lifting methods, the scientific research findings, the Tsunami Bar® product line and selected sports specific uses of the Tsunami Bar®. Then encourage your child to try several sports and access which sport or sports best fit your child’s capabilities and interest. Then continue to love, encourage and support your child as he/she grows and matures.

"An athlete that is trained in the correct use of the flexible Tsunami Barbell® is able to maximize the impulse forces for only a short period of time at critical points in a lift by properly timing their concentric contractions against the acceleration of the oscillating flexible barbell. This stimulates strength development by recruiting maximal motor units similar to lifting a 1RM and enhances speed of muscle contraction once the bar changes direction, thereby allowing the athlete to minimize their Explosive Strength Deficit (ESD) and achieve optimum Power (Explosive Strength = The Ability to Exert Force Quickly). These results are achievable with the Tsunami Barbell® using submaximal weights, moving weights at maximal speeds, stimulating stabilizer muscles and accelerating through the end of the lift. The coach can determine which joint angle corresponds to specific athletic movements and instruct the athlete in when to apply the opposing force to the downward flex of the bar." by Tony Caterisano, PhD, FACSM, CSCS*D