



CrossFit Kids is a method for teaching CrossFit to children and teens, ages 3-18. CrossFit is a fitness regimen developed by Coach Greg Glassman over several decades. He was the first person in history to define fitness in a meaningful, measurable way (increased work capacity across broad time and modal domains). CrossFit itself is defined as that which optimizes fitness (constantly varied functional movements performed at relatively high intensity).

In the latter half of 2003, Jeff and Mikki Lee Martin started using CrossFit with the teens at their small martial arts studio in Ramona, California. Soon after that, Coach Glassman requested that the Martins create a program specifically for children, and the first CrossFit Kids workout appeared on the Internet (www.crossfitkids.com). The CrossFit Kids program is now in thousands of gyms and schools around the world.

CrossFit Kids is a strength-and-conditioning program that is specially designed for kids and teenagers and their specific developmental needs and helps them to develop a lifelong love of fitness. In a group setting, children and teens participate in fun and engaging workouts that deliver measurable results and prepare them to be well-rounded athletes.

CrossFit Kids workouts consist of **constantly varied, functional movements** that deliver a fitness that is **broad, inclusive and general (B.I.G.)** and are **scalable** for any participant at any level.

What Does This Mean?

Constantly varied means that, for the most part, **no two workouts are the same**, so kids and teens never get bored and the novelty of each workout keeps them excited about participating.

The **functional movements** involve exercises that are fundamental to all things that kids need to do when they play--- pull, push, run, throw, climb, lift and jump. All of the movements are taught safely and effectively under the close supervision of thoroughly trained CrossFit Kids trainers.

When fitness is defined as **broad, inclusive, and general (B.I.G.)** it means that participants will become well-rounded athletes who will be better at *any* and *every* sport that they play because CrossFit Kids doesn't coach them to be good at just one thing. Our workouts will increase physical competence in 10 fitness domains: Cardiovascular

and Respiratory Endurance, Stamina, Strength, Flexibility, Power, Speed, Coordination, Agility, Balance, and Accuracy.

With workouts that are **scalable**, CrossFit Kids can equally benefit a person who is less active or an accomplished athlete by tailoring workouts so that each participant is challenged just enough to deliver measurable results and personal athletic progress.

CrossFit Kids aims to avert childhood obesity by creating an excitement about exercising and providing the foundation for a lifetime of healthy eating by focusing on the importance of good nutrition that complements physical activity. While workouts are fun, they also increasingly demand strength, stamina and perseverance. The physical and mental demands of CrossFit Kids foster self-confidence, discipline, persistence, problem solving, and integrity that can be applied in all areas of children's lives.

Important Safety Note: Start slow. Yes, we want the kids to work hard, but we never demand children to work harder or faster during a workout. This is a critically important point: With children, we **always** privilege good movement over speed. (1) We do not want them so sore the next day that they are hurting. (2) It is our long-standing experience that **when children move well consistently over time, they will eventually move faster safely.**

General Age-Appropriate Guidelines:

Preschool (Ages 3-5): Able to focus enough to engage in supervised play that involves fundamental movement skills and the simplest foundational movements, e.g., the squat. All movements are done **without** weights. To make this clear: **We NEVER load preschool-age kids during a workout. NEVER.**

Elementary (Ages 5-12): Able to focus and take instruction on the foundational CrossFit movements. Introduction to gymnastics-style resistance training with very light external objects, e.g., starting with a PVC pipe and moving toward 10-pound dumbbells contingent on capacity.

Novice (Ages 12-14): Approaching proficiency in body weight movements and seeing an increase in volume. Familiar with light dumbbell movements and beginning to use barbells with light loads.

Junior Varsity (Ages 13-16): Proficient in body weight movements. Starting to explore heavier loads with weighted movements and higher volumes and intensity more generally.

Varsity (Ages 13-18): Comfortable with high-volume, high-intensity body weight movements. Capable of executing some complex gymnastic movements, eg, the muscle-up, handstand walking, and the handstand push-up, and is starting to explore, under experienced supervision, more advanced gymnastics movements, eg, levers, ring

handstand push-ups. Comfortable with powerlifting and Olympic weight lifting movements. **It should be noted that Varsity-level kids ages 13-14 are exceptional and would likely have many years of training at a registered CrossFit Kids program.**

FAQ

Is CrossFit Kids safe?

This is a pretty broad question, but it does serve as a starting point to discuss the many levels of safety that CrossFit Kids takes into account. The primary way in which CrossFit Kids ensures the safety of participants is to require that ALL trainers attend the two-day CrossFit Kids Trainer Course. This course also requires previous attendance at the two-day CrossFit Level One Trainer Certificate Course as well as passing the associated written exam. Therefore, CrossFit Kids trainers not only have a working knowledge of CrossFit but also how CrossFit Kids differs from the adult program. Further, all CrossFit Kids trainers in the United States must submit to a yearly background check regardless of whether this is required for their occupation (internationally, laws vary and many require governmental background checks for those individuals who work with children). Perhaps most significantly, Crossfit Kids is an exercise program that views good movement as a key factor in maintaining health for children from preschool to high school. CrossFit Kids stresses proper movement mechanics at all ages, and consistency of good movement is a necessity before loads are added or intensity is increased.

What about kids who are severely overweight or out of shape?

One of the hallmarks of CrossFit Kids is inclusion. Training in a group of peers can have a profound positive effect, increasing daily compliance with the program, pushing mental and physical limits, and maintaining a positive sense of self (Beets et al. and Vorhees et al.). Children that are deconditioned will also benefit from exercising in a group. The key to incorporating children with various physical abilities is in modulating the planned workout of the day (WOD), often referred to as scaling. During the CrossFit Kids Trainer Course many scaling scenarios and solutions are discussed with the intention of showing how deconditioned children can be integrated into a class simply by modifying the WOD or its component movements to accommodate differing abilities and capacities. The CrossFit Kids website also provides scaling options for each day's WOD, from the varsity to pre-school ability level. The immediate goal is inclusion and maintenance of the general movement patterns, the long-term goal is to have each individual continue to improve and require a decreasing amount of scaling.

Beets MW *et al.* Social support and youth physical activity: The role of provider and type. *American Journal of Health Behavior* 30(3): 278-289, May 2006.

<http://www.ncbi.nlm.nih.gov/pubmed/16712442>

Vorhees CC *et al.* The role of peer social network factors and physical activity in adolescent girls. *American Journal of Health Behavior* 29(2): 183-190, 2005.

<http://www.ncbi.nlm.nih.gov/pubmed/15698985>

Is strength training safe for children?

Yes. But first, let's look at the benefits of a strength-training program for kids.

Potential benefits of pediatric resistance training*

- Increase muscle strength
 - Increase muscle power
 - Increase local muscle endurance
 - Enhance motor skill performance
 - Increase bone mineral density
 - Improve body composition
 - Improve insulin sensitivity
 - Improve blood lipid profile
 - Reduce risk of sport-related injuries
 - Enhance sports performance
 - Stimulate a more positive attitude toward lifetime physical activity
- Faigenbaum AD and Myer GD. Pediatric resistance training: Benefits, concerns, and program design considerations. *Current Sports Medicine Reports* 9(3): 161–168, May/June 2010.

<http://www.ncbi.nlm.nih.gov/pubmed/20463500>

In fact, in 2001, and subsequently in 2008, the American Academy of Pediatrics published position statements endorsing strength training for children (Bernhardt et al. and Council on Sports Medicine & Fitness). Other institutions have also come forward to approve of strength training for children: the National Strength and Conditioning Association (Faigenbaum et al.), the Canadian Society for Exercise Physiology (Behm et al.), and the National Institute for Clinical Excellence (British – NICE position paper). Strength training “may include the use of free weights, weight machines, elastic tubing, or body weight” (Bernhardt et al.). Of particular interest are the gender-specific benefits that strength training offers. Faigenbaum and Myer stipulate that “boys naturally demonstrate that power, strength, and body coordination increase with chronological age, which correlates to maturational stage, whereas untrained girls on average show little improvement in strength, balance, and power throughout puberty.” This disparity in natural development leaves open the possibility that additional training might close the gap. Indeed, “girls have been shown to improve strength measures up to 92% with just 6 [weeks] of training” (Faigenbaum & Myer). Resulting in “reduced knee injuries in adolescent and mature female athletes” (Faigenbaum & Myer).

The Academy recommends that a strength-training program for children have several attributes in order to be acceptable:

Recommendations for a youth strength-training program*

1. Overall program design elements

- a. Follow proper resistance techniques and precautions to ensure safety and efficacy.
 - b. Provide qualified instruction and close supervision.
 - c. Ensure the exercise environment is safe and free of hazards.
 - d. Address all major muscle groups, including the core, and exercise through the complete range of motion. More sports-specific areas may be addressed subsequently.
 - e. Include exercises that require balance and coordination.
 - f. Keep the program fresh and challenging by systematically varying the training program.
2. Preadolescents and adolescents should avoid powerlifting, bodybuilding, and maximal lifts until they reach physical and skeletal maturity.
3. As the AAP has stated previously, athletes should not use performance-enhancing substances or anabolic steroids. Athletes who participate in strength-training programs should be educated about the risks associated with the use of such substances.
4. Class Structure
 - a. Athletes should have adequate intake of fluids and proper nutrition, because both are vital in maintenance of muscle energy stores, recovery, and performance.
 - b. Any sign of illness or injury from strength training should be evaluated fully before allowing resumption of the exercise program.
 - c. Begin each session with a 10- to 15-minute dynamic warm-up.
 - d. Focus on developing proper exercise technique and learning fundamental training principles. Once the exercise technique has been mastered, incremental loads can be added using either body weight or other forms of resistance. Resistance train 2-3 times each week on nonconsecutive days.
 - e. Aerobic conditioning should be coupled with resistance training if general health benefits are the goal.
 - f. Cool down with less intense activities and stretching.
5. Instructors or personal trainers should have certification reflecting specific qualifications in pediatric strength training.
6. Medical approvals
 - a. Before beginning a formal strength-training program, a medical evaluation should be performed by a pediatrician or family physician. Youth with uncontrolled hypertension, seizure disorders, or a history of childhood cancer and chemotherapy should be withheld from participation until

additional treatment or evaluation. When indicated, a referral may be made to a pediatric or family physician sports medicine specialist who is familiar with various strength-training methods as well as risks and benefits for preadolescents and adolescents.

- b. Children with complex congenital cardiac disease (cardiomyopathy, pulmonary artery hypertension, or Marfan syndrome) should have a consultation with a pediatric cardiologist before beginning a strength-training program.

- Adapted and modified from:

Academy of Pediatrics Council on Sports Medicine and Fitness. Strength training by children and adolescents. *Pediatrics* 121(4): 835-840, April 2008.

<http://www.ncbi.nlm.nih.gov/pubmed/18381549>

Faigenbaum AD and Myer GD. Pediatric resistance training: Benefits, concerns, and program design considerations. *Current Sports Medicine Reports* 9(3): 161–168, May/June 2010.

<http://www.ncbi.nlm.nih.gov/pubmed/20463500>

The CrossFit Kids program complies with these suggestions.

Dr. Avery Faigenbaum is a leader in the field of pediatric exercise science. He has more than seventy referenced papers in the PubMed database (pubmed.gov) on this topic. Faigenbaum et al. directly address the injury risk associated with strength training, citing several research articles, including a prospective study (Zaricznyj et al.) documenting all types of sports-related injuries in school-aged children over a one-year period. This paper found that “resistance training resulted in 0.7% of 1576 injuries whereas football, basketball, and soccer resulted in approximately 19, 15, and 2%, respectively, of all injuries” (Faigenbaum et al.). Proper training of technique and constant supervision are potentially the largest reasons behind these impressive safety statistics (Faigenbaum et al.). Faigenbaum and Myer also note that the vast majority of injuries sustained by adolescents during resistance training can be classified as “accidental,” where the descriptions of the incidents include such words as “pinching” and “dropping” (Faigenbaum & Myer). Finally, Faigenbaum et al. explain that current research and clinical observation indicate that plyometric movements are also safe for children as long as volume, intensity, and frequency are taken into consideration (Faigenbaum et al.). This topic is discussed during the two-day CrossFit Kids Trainer Course.

Academy of Pediatrics Council on Sports Medicine and Fitness. Strength training by children and adolescents. *Pediatrics* 121(4): 835-840, April 2008.

<http://www.ncbi.nlm.nih.gov/pubmed/18381549>

Behm DG *et al.* Canadian Society for Exercise Physiology position paper: Resistance training in children and adolescents. *Applied Physiology, Nutrition, and Metabolism*. 33(3): 547-561, June 2008.

<http://www.ncbi.nlm.nih.gov/pubmed/18461111>

Bernhardt DT *et al.* Strength training by children and adolescents. *Pediatrics* 107(6): 1470-1472, June 2001.

<http://www.ncbi.nlm.nih.gov/pubmed/11389279>

Faigenbaum AD *et al.* Youth resistance training: Updated position statement paper from the national strength and conditioning association. *Journal of Strength and Conditioning Research* 23(5 Suppl): S60-S79, August 2009.

<http://www.ncbi.nlm.nih.gov/pubmed/19620931>

Faigenbaum AD and Myer GD. Pediatric resistance training: Benefits, concerns, and program design considerations. *Current Sports Medicine Reports* 9(3): 161–168, May/June 2010.

<http://www.ncbi.nlm.nih.gov/pubmed/20463500>

National Institute for Health and Clinical Excellence. Promoting physical activity, active play and sport for pre-school and school-age children and young people in family, pre-school, school and community settings. *Public Health Guidance* 17: 1-89, January 2009.

<http://www.bases.org.uk/write/documents/NICE%202009.pdf>

Zaricznyj B *et al.* Sports-related injuries in school-aged children. *American Journal of Sports Medicine* 8(5): 318-324, September-October 1980.

<http://www.ncbi.nlm.nih.gov/pubmed/7416348>

Will my child not grow properly if weights are used?

This question is particularly common and stems from the fact that the very ends of *growing* bones (growth plates) are softer than adjacent bone and even the surrounding connective tissue. Additionally, the cartilage lining joint surfaces and the attachment sites of major tendons to bone is also susceptible to injury during developmental growth phases. As far as a properly run strength-training program is concerned, Faigenbaum *et al.* state that “there is no evidence to suggest that resistance training will negatively impact growth and maturation during childhood and adolescence.” Proper coaching, spotting, and loading are a requirement to maintain an injury-free program; the CrossFit Kids program mandates all three aspects. In addition, CrossFit Kids’ directives for age-appropriate movements as well as mechanical perfection and consistency before increasing loads have resulted in no cases of growth-plate damage being reported. Indeed, “Current findings from pediatric resistance training studies indicate a low risk of injury in children and adolescents who follow age-appropriate training guidelines” (Faigenbaum and Myer) and “[a]lthough a few retrospective case reports noted injury to the growth cartilage in youth, most of these injuries were caused by improper lifting techniques, poorly chosen training loads, or lack of qualified adult supervision” (Faigenbaum & Myer). It is important to note that not all growth-plate injuries are acute, some may be associated with repetitive use, especially in baseball players and gymnasts (Perron, Miller, & Brady and Frush & Lindenfeld). Therefore, if these injuries are suspected to have occurred, one should seek medical attention immediately. For

additional reading, please see Martin and Rodi's "Weightlifting and kids: Dispelling the myths" in the February 2008 edition of the *CrossFit Kids Magazine*.

Faigenbaum AD and Myer GD. Pediatric resistance training: Benefits, concerns, and program design considerations. *Current Sports Medicine Reports* 9(3): 161–168, May/June 2010.

<http://www.ncbi.nlm.nih.gov/pubmed/20463500>

Faigenbaum AD *et al.* Youth resistance training: Updated position statement paper from the national strength and conditioning association. *Journal of Strength and Conditioning Research* 23(5 Suppl): S60-S79, August 2009.

<http://www.ncbi.nlm.nih.gov/pubmed/19620931>

Frush TJ and Lindenfeld TN. Peri-epiphyseal and overuse injuries in adolescent athletes. *Sports Health*: 1, 201–211, 2009.

<http://www.ncbi.nlm.nih.gov/pubmed/23015873>

Martin J and Rodi C. Weightlifting and kids: Dispelling the myths. *CrossFit Kids Magazine* 27: 3-12, February 2008.

<http://catalog.brandxmartialarts.com/pub/CFKKids&WeightLiftingFeb2008.pdf>

Perron AD, Miller MD, and Brady WJ. Orthopedic pitfalls in the ED: Pediatric growth plate injuries. *American Journal of Emergency Medicine* 20(1): 50-54, January 2002.

<http://www.ncbi.nlm.nih.gov/pubmed/11781914>

Why is jumping incorporated into CrossFit Kids classes on a daily basis?

As referenced above, plyometric movements are acceptable for children to perform; in fact, they have been shown to improve athletic abilities and prevent injuries (Faigenbaum *et al.*). Besides these benefits, jumping, or impact loading of any sort, is beneficial to bone health (Chen *et al.*), specifically, those that increase bone-force strain and rate (Skerry). In pre- and early peri-puberty where bone growth velocity and bone mineral content are increasing, a window of opportunity opens for interventions to be of great benefit, such as fracture prevention (MacKelvie, Khan, & McKay and Karlsson & Rosengren). Not only are these benefits relevant in the short term, research also indicates the effects may be rather long-lasting (Karlsson & Rosengren and Weeks & Beck). Realizing this opportunity, CrossFit Kids recommends programming some form of impact loading for every class. Box jumps, burpees, tuck jumps, jump rope, and certain weightlifting movements (for appropriate ages and abilities) are just some examples of how to incorporate increased load, high-rate movements into some component of every CrossFit Kids class. Please note that care should be taken implementing impact loading for adolescents that are severely overweight. Keeping in mind the excess load their skeletal system is carrying, the initial goal for this population is to get them to a healthier bodyweight.

Chen JH *et al.* Boning up on Wolff's Law: Mechanical regulation of the cells that make and maintain bone. *Journal of Biomechanics* 43(1): 108-118, January 2010.

<http://www.ncbi.nlm.nih.gov/pubmed/19818443>

Faigenbaum AD *et al.* Youth resistance training: Updated position statement paper from the national strength and conditioning association. *Journal of Strength and Conditioning Research* 23(5 Suppl): S60-S79, August 2009.

<http://www.ncbi.nlm.nih.gov/pubmed/19620931>

Karlsson MK and Rosengren BE. Training and bone—From health to injury. *Scandinavian Journal of Medicine & Science in Sports* 22(4): e15-e23, August 2012.

<http://www.ncbi.nlm.nih.gov/pubmed/22429254>

MacKelvie KJ, Khan KM, and McKay HA. Is there a critical period for bone response to weight-bearing exercise in children and adolescents? A systematic review. *British Journal of Sports Medicine* 36(4): 250-257, August 2002.

<http://www.ncbi.nlm.nih.gov/pubmed/12145113>

Skerry TM. Mechanical loading and bone: What sort of exercise is beneficial to the skeleton? *Bone* 20(3): 179-181, March 1997.

<http://www.ncbi.nlm.nih.gov/pubmed/9071466>

Weeks BK and Beck BR. Are bone and muscle changes from POWER PE, an 8-month in-school jumping intervention, maintained at three years? *PLoS ONE* 7(6, e39133): 1-6 June 2012.

<http://www.ncbi.nlm.nih.gov/pubmed/22720051>

What are the benefits of all the tumbling the kids do in CrossFit Kids classes?

Tumbling is only part of the programming CrossFit Kids uses to make sure that the vestibular system is properly stimulated. The program also utilizes many additional exercises such as handstands, skin-the-cats, and bar roll-overs to further accomplish this goal. The vestibular system begins with the inner ear; from here sensory neurons reach the brain and are able to integrate information in order to determine orientation and acceleration. The vestibular system is estimated to have evolved ~500 million years ago (humans split from their nearest evolutionary relative only 6 million years ago) and may be as important as self-locomotion itself (Smith, Darlington, & Zheng). Dysfunction of the vestibular system, including the sensory mechanism as well as all downstream connections, can be the cause of various learning disabilities, anxiety and depression (Smith, Darlington, & Zheng and Wiss). For example, individuals who suffer from inner-ear fluid leakage present with “a variety of cognitive and emotional symptoms, including memory and attention deficits, anxiety, and depression” (Smith, Darlington, & Zheng). Further, astronauts experience what is called the “space stupids,” a result of the interactions of microgravity on the inner ear (Smith, Darlington, & Zheng). To this end, CrossFit Kids has made it a priority to include these types of movements everyday.

Smith PF, Darlington CL, and Zheng Y. Move it or lose it—Is stimulation of the vestibular system necessary for normal spatial memory? *Hippocampus* 20(1): 36-43, January 2010.

<http://www.ncbi.nlm.nih.gov/pubmed/19405142>

Wiss T. Vestibular dysfunction in learning disabilities: Differences in definitions lead to different conclusions. *Journal of Learning Disabilities* 22(2): 100-101, February 1989.

<http://www.ncbi.nlm.nih.gov/pubmed/?term=2783723>

Why do kids and teens study after a CrossFit Kids class at an affiliate and why does CrossFit Kids believe so strongly in implementing the program within schools?

The primary goals of CrossFit Kids are to improve movement and instill a positive lifelong association between health and fitness; however, if in doing so, the program also generates a multitude of cognitive benefits (as suggested by the studies cited below), we feel it is our responsibility to maximize their impact. For this reason, at affiliates, we suggest providing 15-20 minutes of study time immediately after a CrossFit Kids class (focusing on high-school aged children). And on a larger scale, implementing more movement into what is a long, sedentary day at school may actually improve overall scholastic performances.

There are dozens of studies showing the correlation between exercise and aerobic fitness with improved brain function. A statistical, meta-analysis published in 1997 of 134 of these studies (Etnier et al.) showed that “exercise had a small positive effect on cognition.” Although the effect they observed among these studies was small, the paper brought to light some weaknesses in the design of previous studies. Subsequently, many new studies have been done to bolster the evidence supporting the connection between exercise and cognitive abilities. A more recent review of the topic published in 2008 (Tomprowski et al.) clearly delineates the difference between the association of exercise/fitness with academic achievement, standardized test results, and cognitive test results. Tomporowski et al. conclude that “exercise training programs may prove to be simple, yet important, methods of enhancing aspects of children’s mental functioning that are central to cognitive and social development.” Additional scientific research into the connection of specific brain functions with exercise or fitness has also been conducted. Comparing fit and unfit 9-10-year-old children, Chaddock et al. show that the fit kids had higher recognition memory performances than the less fit kids. And Hillman et al. demonstrate the advantages of even a single bout of exercise on cognitive performance. Perhaps the strongest evidence supporting the notion that it is “what you do” rather than “what you are born with” comes from a statistical analysis of 1.2 million men upon entry into the Swedish military (Aberg et al.), where analysis of nearly 1500 twin pairs indicate that <15% of the association between aerobic fitness and cognitive performance was due to genetics!

Although Tomporowski et al. accurately state that “at this time, no theory has been proposed that satisfactorily addresses the relation between exercise and cognition,” it is not for lack of research. One of the more intriguing findings came from two papers published in 1999 (van Praag, Kempermann, & Gage and van Praag et al.). In these papers the researchers note that voluntary wheel running in rodents actually resulted in the growth of new neurons in a part of the brain called the hippocampus, a region

involved in memory and learning. Correlative experiments have since been done relating this to humans (Pereira et al.). These gross anatomical changes also correlate with signaling cascades happening on the molecular level. The hormone insulin-like growth factor 1 (IGF-1) and the neurotrophin brain-derived neurotrophic factor (BDNF) are elevated during and after the cessation of exercise (Zolad & Pilc and Trejo, Carro, & Torres-Alemán). The elevation of BDNF following exercise (Schmidt-Kassow et al. and Rojas Vega et al.) and its role in hippocampal function provides a window of opportunity where studying may be doubly beneficial. For additional reading on this topic please see John Medina's *Brain Rules* (<http://brainrules.net/>) and John Ratey's *Spark* (<http://www.johnratey.com/newsite/index.html>).

Aberg, MAI *et al.* Cardiovascular fitness is associated with cognition in young adulthood. *Proceedings of the National Academy of Sciences of the United States of America* 106(49): 20906-20911, December 8, 2009.

<http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2785721/>

Chaddock L *et al.* Aerobic fitness and executive control of relational memory in preadolescent children. *Medicine and Science in Sports and Exercise* 43(2): 344-349, February 2010.

<http://www.ncbi.nlm.nih.gov/pubmed/20508533>

Etnier JL *et al.* The influence of physical fitness and exercise upon cognitive functioning: A meta-analysis. *Journal of Sport & Exercise Psychology* 19(3): 249-277, 2002.

<http://www.cabdirect.org/abstracts/19981807108.html>

Hillman CH *et al.* The effect of acute treadmill walking on cognitive control and academic achievement in preadolescent children. *Neuroscience* 159(3): 1044-1054, March 31, 2009.

<http://www.ncbi.nlm.nih.gov/pubmed/19356688>

Pereira AC *et al.* An *in vivo* correlate of exercise-induced neurogenesis in the adult dentate gyrus. *Proceedings of the National Academy of Sciences of the United States of America* 104(13): 5638-5643, March 27, 2007.

<http://www.pnas.org/content/104/13/5638.full.pdf+html>

Rojas Vega S *et al.* Acute BDNF and cortisol response to low intensity exercise and following ramp incremental exercise to exhaustion in humans. *Brain Research* 1121(1): 59-65, November 22, 2006.

<http://www.ncbi.nlm.nih.gov/pubmed/17010953>

Schmidt-Kassow M *et al.* Kinetics of serum brain-derived neurotrophic factor following low-intensity versus high-intensity exercise in men and women. *Neuroreport* 23(15): 889-893, October 24, 2012.

<http://www.ncbi.nlm.nih.gov/pubmed/22964969>

Tomprowski PD *et al.* Exercise and children's intelligence, cognition, and academic achievement. *Educational Psychology Review* 20(2): 111-131, 1 June 2008.

<http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2748863/>

Trejo JL, Carro E, and Torres-Alemán I. Circulating insulin-like growth factor I mediates exercise-induced increases in the number of new neurons in the adult hippocampus. *Journal of Neuroscience* 21(5): 1628–1634, March 1, 2001.

<http://www.jneurosci.org/content/21/5/1628.full.pdf>

van Praag H, Kempermann G, and Gage FH. Running increases cell proliferation and neurogenesis in the adult mouse dentate gyrus. *Nature Neuroscience* 2(3): 266-270, March 1999.

http://neurogenesisresearch.com/Runing_and_Neurogenesis_Nat.pdf

van Praag H *et al.* Running enhances neurogenesis, learning, and long-term potentiation in mice. *Proceedings of the National Academy of Sciences of the United States of America* 96(23): 13427-13431, November 9, 1999.

<http://www.pnas.org/content/96/23/13427.full.pdf+html>

Zoladz JA and Pilc A. The effect of physical activity on the brain derived neurotrophic factor: From animal to human studies. *Journal of Physiology and Pharmacology* 61(5): 533-541, October 2010.

<http://www.ncbi.nlm.nih.gov/pubmed/21081796>

Do kids need to eat immediately after a CrossFit Kids class?

As a general response the answer is no, kids do not need to eat immediately following a CrossFit Kids class. They can go directly back to an academic class period or onto other activities. Our primary recommendation for all age groups is to maintain proper hydration, both before and after CrossFit Kids classes. Often exercise can actually act as an appetite suppressant. Perhaps the only time where post-workout nutrition should be actively considered is with kids or teens that attend a CrossFit Kids class after lunch period and may have additional sports practice after school or no ready access to food until much later, e.g., at dinner. Under these circumstances, a snack of high-quality, whole foods is recommended.

Martins C *et al.* Effects of exercise on gut peptides, energy intake and appetite. *Journal of Endocrinology* 193(2): 251-258, May 2007.

<http://www.ncbi.nlm.nih.gov/pubmed/17470516>

Can I train teen athletes in my adult CrossFit classes?

Training teens within your adult CrossFit classes absolutely allowed, but it is not your best option. If you have one or two teens in your gym, then having them workout with your adult classes is better than not letting them workout. However, as soon as you have three teenagers and appropriately trained staff, you should start your teens program. The CrossFit Kids Teens curriculum is designed to target the specific developmental needs of that population in terms of the following:

- Physical growth and development
- Impact of vestibular training
- Assisting cognitive development

- Relative work capacity
- Fun and peer interactions
- Safety

Physical development

Teens are growing, often rapidly and inconsistently, which introduces some neuromuscular and musculoskeletal system challenges that do not exist in adults. It is possible for a teen to grow several inches in a very short period of time, which lengthens the levers he or she are operating during weight lifting and gymnastic-type movements. The rapid change in dimensions also affects their sense of “body awareness” or understanding of where they are in space. This is why teens often appear more clumsy or uncoordinated after a period of rapid growth. For this reason, the CrossFit Kids Teen programming gives considerably more attention to skill work than your average adult class. This allows the opportunity to teach or reteach complex skills and weight-lifting movements outside of the context of the WOD.

Along with rapid growth of the skeletal system comes the risk for muscle and tendon impairments. Often the muscles cannot keep up with the rate of skeletal growth, which leads at best to inflexibility and potentially to muscle or joint injury such as tendonitis, bursitis, tendon tears, or even complete ruptures at the attachment sites. All CrossFit Kids Teen classes include dedicated and appropriately supervised stretching and mobility work in order to combat sudden changes in muscular length-tension relationships.

Finally, teen programming incorporates considerably more impact-loading activities than the average adult class. Please refer to the FAQ titled “*Why is jumping incorporated into CrossFit Kids classes on a daily basis?*” for additional information regarding the importance of impact loading for normal bone development and long-term health in kids and teens.

Neurological development

The area of the brain responsible for judgment and behavior modulation is typically still developing until age 20-30. Teen decision-making skills (as any parent can appreciate) are sometimes not what we would like them to be. In general, teen athletes require more vigilance and direct supervision than our adult clients. It would be challenging to give a teen all the coaching he or she needs in the context of your adult class and still give your adult clients the coaching and attention they need. Whereas, in a teens class all the athletes require a similar amount of supervision and the format of the class is designed around that need.

It is crucial to include lots of activities that challenge the vestibular system in our teens programming due to its impact on development of movement strategies, ability to decrease sports injury risk, and potential influence on cognitive processing. Refer to

the FAQ titled “*What are the benefits of all the tumbling the kids do in CrossFit Kids classes?*” for details and references regarding the importance of vestibular stimulation for kids and teens. In general, adults cannot (or will not) tolerate the amount of vestibular activities that are a standard part of our teens program because we have not continued to challenge our vestibular systems into adulthood (and they have suffered from the disuse). It is a disservice to our teens to prevent them from getting this optimal stimulation.

There is extensive evidence supporting the impact of exercise on cognitive function. See the FAQ titled “*Why do kids and teens study after a CrossFit Kids class at an affiliate and why does CrossFit Kids believe so strongly in implementing the program within schools?*” for a detailed explanation and reference information on this subject. The CrossFit Kids Teens class structure includes 15-20 minutes of study time built in to the end of each class. This facilitates an opportunity for teens to capitalize on all the biochemical processes that enhance learning ability immediately following exercise versus sending teens home at the end of class and potentially missing that window of opportunity to support academic performance.

Work capacity

Teens, specifically fit teens, have significantly greater work capacity for high-intensity exercise than their middle-aged adult counterparts. Their recovery time is also faster. Because the age range in teens classes is limited to preadolescents and adolescents, there is significantly less moderation in intensity to accommodate older athletes with injury/overuse concerns, especially when considering the increased utilization of impact-loading and vestibular activities. For this reason, the CrossFit Kids Teens format allows the more elite high school athletes to be challenged in a way that may or may not be accessible in the context of the adult classes in your gym. On the flip side, deconditioned teens will be placed in an environment that fosters their capacity for more rapid improvements than their adult counterparts and so are less likely to get “lost in the crowd.” A skilled CrossFit Kids trainer will be able to create a supportive environment that meets the needs of both athletes.

Social factors

Maybe the key question is this: When you were 14, who did you want to hang out with—your parents or your friends?

Although safety is our paramount concern, fun is an indispensable component of the CrossFit Kids program across every age group. And quite simply, teens are going to have more fun and be more motivated by working alongside their peers (even if they don’t realize it initially). While it might seem “cool” to a teen to workout with the adults in the gym, their brains operate on a different wavelength. Not to mention there are inherent risks in placing teens in the adult CrossFit environment. The music, state of

dress, language, and conversational topics common to and entirely appropriate in your adult classes may not be appropriate for impressionable teenagers. Finally, placing teens in adult class invites the opportunity for an inappropriate relationship between an adult and a minor. In the CrossFit Kids Trainer Course, an entire lecture is dedicated to discussing the potential risks and preventative measures you can take to ensure the safety of the children and teens in your gym.

The bottom line

It is not categorically wrong to train teens within your adult class, but the CrossFit Kids Teen class is designed to meet the specific developmental needs (be it physical, cognitive, or social) of adolescents and allow you as a trainer to optimize the effectiveness of CrossFit intervention with these clients. Why miss out on all the additional benefits or take the risk of possible harm by forcing them to an adult environment?

De Becker G. *Protecting the Gift: Keeping Children and Teenagers Safe (and Parents Sane)*. NY: Dell, 2000.
<http://www.amazon.com/Protecting-Gift-Keeping-Children-Teenagers/dp/0440509009>

Diseases & Conditions. *TeensHealth*. Available at http://kidshealth.org/teen/diseases_conditions/#cat20158. Accessed April 12, 2013.

Faigenbaum AD and Myer GD. Pediatric resistance training: Benefits, concerns, and program design considerations. *Current Sports Medicine Reports* 9(3): 161–168, May/June 2010.

<http://www.ncbi.nlm.nih.gov/pubmed/20463500>

Henschel A. Effects of age on work capacity. *American Industrial Hygiene Association Journal* 31(4): 430-436, July-August 1970.
<http://www.ncbi.nlm.nih.gov/pubmed/5473752>

Pompeiano O and Allum JHJ, eds. *Vestibulospinal Control of Posture and Locomotion*. Amsterdam, Netherlands: Elsevier Science, 1988.
<http://www.amazon.com/VESTIBULOSPINAL-CONTROL-LOCOMOTION-Progress-Research/dp/0444809767>

Stop Sports Injuries. Available at <http://www.stopsportsinjuries.org>. Accessed April 12, 2013.

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