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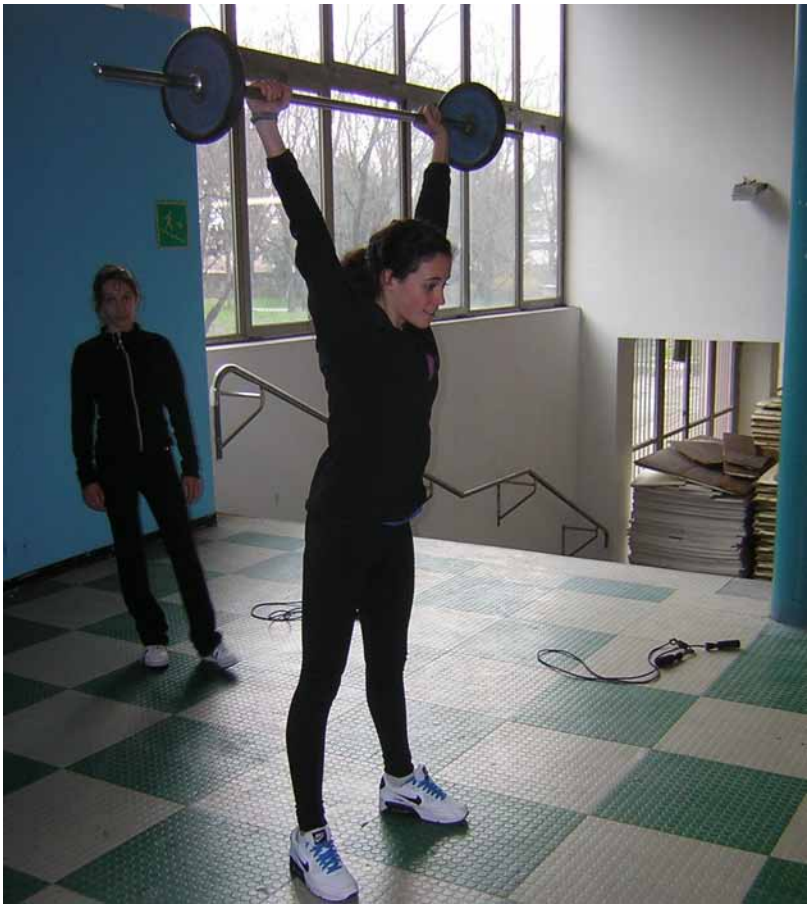
CrossFit Kids and Youth Resistance Training: An Italian Perspective

Resistance training and kids is a contentious issue. Maurizio Guarrata and Dan Edelman offer some perspective from athletic training in Europe.

By Maurizio Guarrata and Dan Edelman **May 2011**



All images courtesy of Maurizio Guarrata

Youth resistance training has generated a lot of controversy over the years. Through the 1980s, the common wisdom held that youth resistance training was ineffective; i.e., children's trainability, or their response to a resistance-training stimulus, was deemed indemonstrable (6,19,32). In addition, a myth that weight training stunts children's growth, typically seen as stemming from Kato and Ishiko's study (18), persists even today. It is possible that methodological factors might have influenced the outcomes of these early studies, but their findings informed much of the common wisdom, not to mention many authoritative position statements, that held sway for many years.

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However, over time, better-designed studies (10,27,31) indicated that, indeed, strength can be increased in children and that resistance programs were not only safe but integral to children's general fitness and sports performance. The wealth of empirical evidence specifying the positive impact of resistance training for kids has led many key authorities, such as the American Academy of Pediatrics, the American College of Sports Medicine, the American Orthopaedic Society of Sports Medicine, the National Strength and Conditioning Association, the British Association of Sport and Exercise Sciences, the National Institute for Health and Clinical Excellence, and the Canadian Society for Exercise Physiology (1,2,3,5,30), to come out in support of youth resistance training.

A myth that weight training stunts children's growth … persists even today.

Safety is a critical dimension, no doubt, especially with respect to technique, but, again, practice and statistics show that when done with adequate supervision, resistance training with children and teens is relatively injury- and accident-free when compared to sports (11,16), while strength gains are genuine and help decrease the incidence of sports-related injuries. That said, workouts with unevenly applied intensity and that are arbitrary in terms of strategy, method and/or program—and especially devoid of passion, motivation and fun—will lack dimension and, more importantly, effectiveness. Without a careful, progressive increase in intensity and volume and due attention to appropriate recovery, which presupposes an appropriate understanding of developmental idiosyncrasies and expectations for this age group, effects are reduced and the risk of injury increased.

A successful youth program requires participants to master technique before adding load or increasing intensity; properly scales volume, load, and intensity thereafter; works key muscle groups; focuses on functional or compound movements; understands and accounts for developmental specificities of that age group; and pays particular attention to rest and recovery. These components are foundational to a smart propaedeutic approach and to providing an increased stimulus characterized by incremental progress toward proficient performance initially beyond the athlete's capacity. These components are foundational to a CrossFit Kids program. After a more general discussion of resistance training with kids and teens, we will take a brief look at how Guarrata applies the basic CrossFit Kids methodology to the training of young figure skaters (ages eight to 17) competing nationally and internationally.

Young athletes require close supervision and instruction to create a foundation for strength training.

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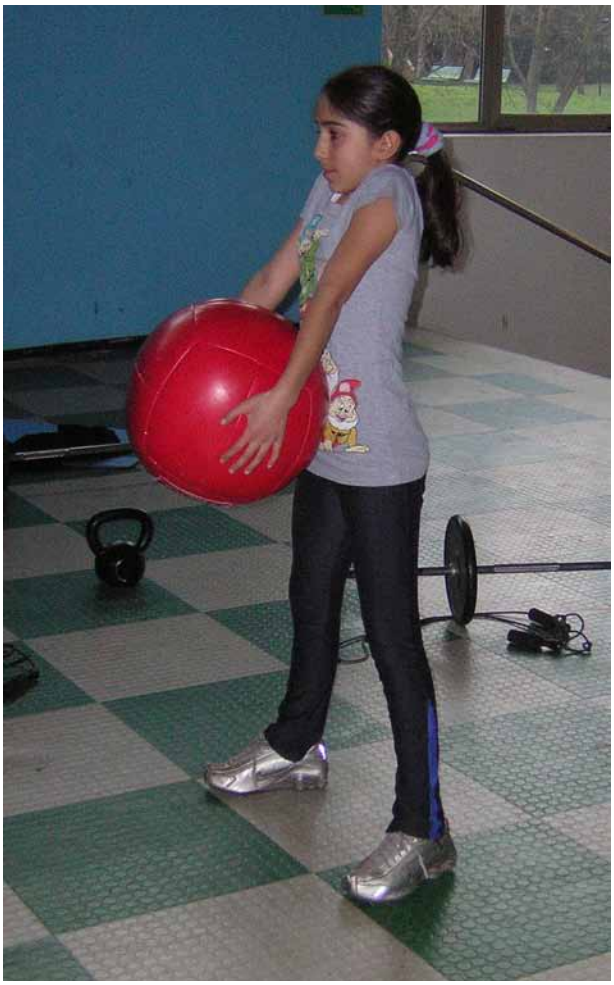

Children develop at different rates and will require an individual approach for best results.

Developmental Considerations

Development does not progress at the same rate for all kids (7). Every phase of development has its own character and trajectory and requires that, within the broader program framework, the trainer tailor resistance-training protocols for the age group and individual. For example, in preadolescence, strength training can comprise jumping and throwing and accuracy and agility drills—with increasing intensity—focusing on muscular sensibility (kinaesthetic awareness). These drills can be varied by distance and targets of different difficulty. Adolescent strength training would include similar drills but could also integrate, among other things, barbell work with varying complexity (e.g., Olympic lifts) and intensity.

Although it is not possible to say unequivocally that muscular hypertrophy will not occur at all, it should not be the goal of any preadolescent resistance-training program. Rather, the key objective should be neuromuscular adaptation; e.g., improved motor-unit coordination and firing. During and after puberty, however, hypertrophic factors figure far more prominently in the expression of muscular strength (7).

Strength development parallels somatic growth, which plays a fundamental role in movement. Preadolescent and adolescent somatic development disrupts coordination, in a sense, rendering a child's body alien to him or her. What we find is that a young athlete who had been moving beautifully one week suddenly does not move so well. And even though it is his body that is changing, the young athlete is not necessarily aware of the impact this transformation has on his movement. Coaches need to bear in mind that the loss of coordination and kinaesthetic awareness concomitant with a growth spurt is temporary, and the athlete will usually return to moving more competently in a short time. However, it is also incumbent on the trainer to observe any retrograde movement consistent with a growth spurt—or any other reason for that matter—and fine-tune the programming for that individual to prevent injury.

In this spirit, CrossFit Kids stresses the importance of trainers' getting to know their preadolescent and adolescent clients as distinct individuals with differential and fluid needs. Thus, it is imperative to learn how to tweak the programming to accommodate the progress (and occasional regress) of each athlete—often on the fly.

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In a CrossFit Kids preschool class, the children, approximately ages three to five, do not learn movements under load. At the next age level, approximately ages six to 12, CrossFit Kids minimizes the use of external resistive loads, and children remain unloaded until they demonstrate proficiency in the movement, at which time only very light dumbbells, medicine balls and other objects are employed. At this level, barbells are introduced in the form of PVC pipe, with very light training bars reserved for the older or more technically accomplished children on the verge of matriculating into the teen/advanced class.

At the teen/advanced level, the CrossFit Kids methodology advocates the introduction of a focused, invite-only weight-training class centered on the back squat and deadlift (although other lifts are taught and performed) for the highly proficient, highly motivated athlete. The class structure comprises multiple tiers with beginning, typically younger, lifters learning technique under very light loads and rather tight supervision, while the advanced, usually older, teens pursue maximum effort sets within a CrossFit strength bias protocol. Again, supervision is intense as there are multiple platforms and multiple bars and loads in use; it is essential to have at least one trainer per platform, eyes on every rep and meticulous records kept. Further, your CrossFit Kids teen/advanced programming must consider the work being done in this special class to prevent overuse/overtraining.

Strength as a Dimension of Fitness

In terms of strength training's role in general fitness, one of its benefits is its capacity to increase bone density and strengthen ligaments. However, because bones, tendons, and ligaments adapt more slowly than muscles, care must be taken. An inadequately supervised program, where intensity outstrips adaptation, exposes the young athlete to risk of injury. Instead, a well-balanced and patient method that pursues progressive incremental increases in load, volume and intensity will help consolidate the positive, risk-ameliorating effects of strength training. Moreover, gains related to bone density and ligament strength show a remarkable capacity to sustain throughout life. Thus, youth resistance training may, for example, help provide a prophylactic effect against osteoporosis in women (20,22). To address bone density in particular, CrossFit Kids advocates programming in a lot of jumping movements, preferably on hard surfaces; e.g., box jumps and broad jumps for kids and teens.

As one of the 10 general physical skills, strength relates to other general skills. Let's look quickly at just two. A lack of strength can compromise endurance and has a deleterious impact on technique and long-endurance sport activities, while research evidences a positive impact of a properly administered strength-training regimen on endurance. Whereas strength assists endurance, it is often seen as mutually exclusive of flexibility. However, strength's expression relies on, among other things, flexibility. Flexibility is critical to coordination and, more to the point, efficient power production.

Mobility is often not an issue for children and adolescents. Take the squat, for instance. In adults, consistently squatting high and the butt wink are typically (though not always) consequences of inflexibility. In kids, these problems can more likely be attributed to a lack of kinaesthetic awareness or, in the case of the wink, a general relaxation at the bottom. That said, there are cases where, indeed, the young athlete does have some flexibility issues, and, in this light, CrossFit Kids recommends that trainers begin to address mobility as part of the teen/advanced program.

Once young athletes show proficiency with PVC, they can then lift light barbells under tight supervision.

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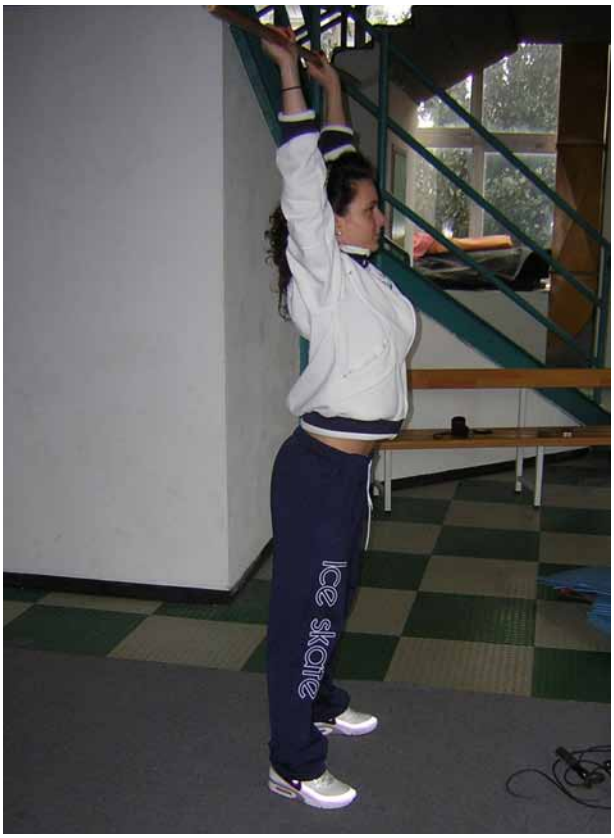
CrossFit Kids and Youth Resistance Training: Elite Figure Skaters in Italy

Guarrata is the strength and conditioning coach for the Italian National Figure Skating Team, and, as of this writing, he is the first and only CrossFit Kids trainer in Italy. With partners, he operates CrossFit M1 in Milan, which includes a CrossFit Kids program.

At the outset of his collaboration with the Italian Figure Skating Federation, management, the ice director and the ice coaches all articulated a desire to see the skaters develop more midline stability, and hence better balance. They urged Guarrata to mimic the more conventional approaches of other coaches from around the world. Guarrata resisted this and argued for a return to the basics—that is, CrossFit—applied with precision, methodological rigor and an understanding of his athlete population. Time and perseverance—and results—proved Guarrata right.



Repeated drilling with PVC or wooden dowels will allow trainers to eliminate all form errors so young athletes can be loaded safely.

The figure-skating season runs from September to March, with events occurring almost every weekend. The young skaters attend skating technique, ballet and choreography classes five days a week in addition to their GPP work with Guarrata. Given the demanding schedule, Guarrata programs with utmost care to avoid overloading and overtraining the athletes, while attending to proper nutrition and pursuing maximum supercompensation.

Children (ages eight to 11, about 20 girls) meet with Guarrata on Tuesdays and Thursdays for an hour. Warm-up depends on the day's technical and skills/drills focus. The majority of the session is given over to improving basic CrossFit movement technique. Guarrata addresses midline stability in the form of games; fun is a must in every session for these young athletes. Fundamental mobility and recovery, based on Kelly Starrett's program, occupy the final portion of the session. Initially, Guarrata assumed the athletes would have an understanding of these movements, but he discovered early on that he had to start from scratch to teach proper technique.

Guarrata also trains 20 teens averaging 14-17 years old. This group comprises mostly girls, although it also includes a couple of boys ages 10 and 12. He provides private training to two pairs, a junior pair (girl age 13 and boy age 15) and a senior pair (girl age 15 and boy age 17), given the specific nature of their work on the ice. These teens meet with Guarrata three times per week and have been CrossFitting for about two years. They have developed a strong understanding of what CrossFit is all about and comprehend the role of their muscles in maintaining a tight midsection while skating, thanks to a variety of midline-stability exercises. The teens execute CrossFit's nine basic movements proficiently and perform benchmark WODs with high intensity, precision and accuracy.

In August 2010, Guarrata arrived in Oberstdorf, Germany, for the summer stage, a session devoted to technical and athletic preparation. He was quite curious to compare his athletes to others from around the world. No doubt about it, the athletes at the summer stage were amazing. But Guarrata saw lots of machines and sauna suits as part of the programming. He observed a distinct lack of GPP and training regimens conspicuously void of gymnastics, throwing, powerlifting and weightlifting—all key components occupying CrossFit's five-tier hierarchy of athletic development.

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Watching plastic-wrapped athletes attempting to sweat off weight via low-intensity running and cycling, Guarrata was reminded of a deeply entrenched, and deeply disturbing, idea in the figure skating world: girls … must be thin.

Watching plastic-wrapped athletes attempting to sweat off weight via low-intensity running and cycling, Guarrata was reminded of a deeply entrenched, and deeply disturbing, idea in the figure skating world: girls, if they are to be taken seriously as competitors, particularly in pairs, must be thin, and dangerously so in his opinion. Guarrata asserts that, within the federation, basic knowledge of sports nutrition is lacking, and the nutritionists tasked with designing a diet for the skaters seem content providing a 1,000-1,200-calorie-a-day framework to ensure no weight gain. From the perspective of CrossFit's hierarchy, this would appear to compromise the very foundation of athleticism.

Thus, at the outset of his work with the young skaters, he found their diets deficient. They consumed mostly carbohydrates and bad fats. Guarrata has changed that. He dedicates the first five to 10 minutes of each session to nutrition, and his athletes are eager to share with him their daily food choices. During the summer stage, he took meals with his skaters and let them select the foods and proportions. Guarrata's thinking is in line with the CrossFit Kids philosophy.

For CrossFit Kids, nutrition is often a topic of discussion during the skill-work segment of a class. CrossFit Kids recognizes the sensitivity of the subject matter, and the goal is simply to present nutritional information to the children and teens—food for thought, if you will. Focus is on explaining macronutrients, shedding light on food labels and portions, and understanding food's role in a healthy body and athletic performance. CrossFit Kids trainers should not approach nutrition dogmatically; we are not pushing an agenda but disseminating information based on sound empirical science.

Maurizio Guarrata has found that the core strength created by functional movements translates well onto the ice during figure skating.

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The CrossFit Kids program incorporates intensity, but only after sounds mechanics are consistently demonstrated.

It should by now come as no surprise that Guarrata consistently emphasizes better technique. One of his main goals is improved accuracy, coordination, agility and balance—the four general skills linked to the central nervous system and the ones requiring practice. Lots of practice. His athletes never fail to thank Guarrata for this, reminding their coach of the many times he yelled, "Tighten your belly! Tight, tight, tight!"

One thing Guarrata brought to his coaching was a fondness for gymnastics. He instilled that same enthusiasm within his skaters and marvels at how easily they picked up fundamental gymnastics skills, such as skin-the-cats and rope climbs. In whimsical moments, he sometimes ponders the idea of converting these athletes to gymnasts.

Guarrata's passion for CrossFit is manifest in the performance of his athletes, as evidenced by some recent results from national and international competitions. Skating in Ljubljana, Slovenia, in February 2011, 10-year-old Adrien Bannister placed fourth in the novice boys category, and 16-year-old Jennifer Cucinella placed sixth in the junior ladies in pursuit of the Dragon Trophy, while 12-year-olds Sonia Manfredi and Anna Costa placed first and third, respectively, in the Debs Girls category in Tivoli Cup action. In January 2011, the annual figure-skating competition in Merano, Italy, saw Manfredi and Niccolò Macii (ages 12 and 16) and Anna Chiara Laffranchi and Benjamin Naggiar (ages 13 and 16) place second and third, respectively, in the novice pairs category. At the GAM Nestle Nesquik Cup in Toruń, Poland, Cucinella and Victoria Manni (age 16) placed first and second, respectively, in the junior ladies, while Manfredi and Macii took 1st in the novice pairs.

Guarrata sometimes finds that the line blurs between coaching his kids and being involved in their everyday life, and he gets incredible satisfaction from helping them and watching them grow up. In return, he receives their gratitude and trust. He credits this continued success to not only properly training these athletes but also to learning from them as well. Above, we noted the importance of knowing your athletes from a programming perspective. Taking this to a broader level, Guarrata urges trainers to pay close attention to their athletes after a session. First of all, are they hanging around? Do they seem happy and excited? Are they discussing among themselves what they just accomplished, be it bragging, encouraging or commiserating?

If so, you as a CrossFit Kids trainer have performed well and should continue to strive for that. If, on the other hand, your athletes make themselves scarce after a workout, seem gloomy or discouraged, or are reticent, you must take a look at your program—and, really, yourself as a coach—in search of a reason why. Remember, the No. 1 objective of a CrossFit Kids program, be it for our "average, everyday" children or the elite athletes, is big fun!

Even today, the stigma of risky business still haunts strength training for children. However, much empirical research can be marshalled to demonstrate clearly its relative safety and positive impact on general physical preparedness and sports-specific performance for kids of all ages. Across the board, this research qualifies these assertions with the caveat that all resistance training be supervised by qualified trainers and follow a careful and disciplined progression. As a strength-and-conditioning program, CrossFit Kids offers exactly that supervision and incremental progression, tailored for a specific population—children and adolescents—demanding proper mechanics and consistency before increased intensity or load.

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About the Authors

Courtesy of Maurizio Guarrata

Maurizio Guarrata is a Level 1 CrossFit trainer and has also obtained his CrossFit Kids designation. He runs CrossFit M1 in Milan, Italy, with three colleagues. In addition to being an IV Dan Judo and self-defense coach for FIJLKAM (Judo, Wrestling, Karate and Martial Arts Italian Federation), he is the strength and conditioning coach for the Italian National Figure Skating Team.

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