Quiz Policies

Eligibility
The NCSF online quizzes are open to any currently certified fitness professional, 18 years or older.

Deadlines
Course completion deadlines correspond with the NCSF Certified Professionals certification expiration date. Students can obtain their expiration dates by reviewing either their certification diploma or certification ID card.

Cancellation/Refund
All NCSF continued education course studies are non-refundable.

General Quiz Rules

- You may not have your quiz back after sending it in.
- Individuals can only take a specific quiz once for continued education units.
- Impersonation of another candidate will result in disqualification from the program without refund.

Disqualification
If disqualified for any of the above-mentioned reasons you may appeal the decision in writing within two weeks of the disqualification date.

Reporting Policy
You will receive your scores within 4 weeks following the quiz. If you do not receive the results after 4 weeks please contact the NCSF Certifying Agency.

Re-testing Procedure
Students who do not successfully pass an online quiz have the option of re-taking. The fees associated with this procedure total $15 (U.S) per request. There are no limits as to the number of times a student may re-test.

Special Needs
If special needs are required to take the quiz please contact the NCSF so that appropriate measures can be taken for your consideration.

Quiz Rules

What Do I Mail Back to the NCSF?
Students are required to submit the quiz answer form.

What do I Need to Score on the Quiz?
In order to gain the .5 NCSF continued education units students need to score 80% (8 out of 10) or greater on the CEU quiz.

Where Do I Mail My Quiz Answer Form?
You will mail your completed answer form to:

NCSF
Attn: Dept. of Continuing Education
5915 Ponce de Leon Blvd., Suite 60
Coral Gables, FL 33146

How Many CEUs Will I Gain?
Professionals who successfully complete the any continuing education quiz will gain .5 NCSF CEUs per quiz.

How Much does each quiz cost?
Each quiz costs the student $15.00.

What Will I Receive When The Course Is Completed?
Students who successfully pass any of the NCSF online quizzes will receive their exam scores, and a confirmation letter.

How Many Times Can I Take The Quizzes For CEUs?
Individuals can take each NCSF quiz once for continuing education credits.

Sport Performance and Resistance Training for Young Clients

Participation in organized youth sports and training for performance is occurring at increasingly younger ages in recent years. There are various sport preparation clinics as well as high-intensity group exercise programs currently available that specifically target young aspiring athletes and fitness enthusiasts. This has raised concern among parents, clinicians, coaches and other fitness professionals as to the competency of these groups as well as the potential negative implications of participating in such programs. The key question arises – how young is too young to safely engage in specialized physical training involving high-intensity weightlifting activities? There are a number of factors that must be considered to properly address this question such as chronological age, sex (gender), psychological maturity, current training age physical experience and the specific activities/programmatic stresses being prescribed. The term *youth* refers to children (approximately up to age 11 among girls and 13 among boys) and adolescents (approximately ages 12-18 among girls and 14-18 among boys). The term *preadolescent* refers to boys and girls who have not yet developed secondary sex characteristics.

In the past, resistance training activities performed by youth (children and adolescents) has raised concerns due to the belief that there is a risk for damage to the epiphyseal plates of long bones. All growth and bone length occur at these plates. Research examining the risk for epiphyseal fractures among children performing resistance exercise is equivocal; nevertheless, due to the developmental stage of bone and the stresses associated with weightlifting it is believed there may be some increased vulnerability. Premature cessation of bone growth is another potential adverse event associated with intense resistance training in children. The epiphyseal plates close naturally in response to high levels of sex hormones that exist during post-pubescence. Some scientists have theorized that the increased androgenic hormones produced in response to intense resistance training may actually promote this process at an earlier age; attenuating natural bone growth and limiting total height depending on the bones affected. Again, these are individualized theories as there is no clear evidence to support this conception. In fact, most physicians will encourage age-appropriate resistance activity when performed under supervision of a competent and appropriately prudent professional. No clinical trial to date has indicated that appropriately-applied weightlifting directly damages, or prematurely closes, the epiphyseal plates of long bones. To the contrary, childhood play (jumping and landing activities, sports) creates greater bone stresses than experienced during controlled weightlifting using 65-70% of a lifter's max (10RM). This includes intense, compound lifts such as squatting or overhead pressing. This does not suggest shipping children off to Olympic weightlifting clinics, but rather suggests using developmental programs to teach foundational strategies and provide education on proper biomechanics with instruction-compliant children.

To allow for optimal bone development, children must consume adequate calcium and vitamin D as well as participate in regular physical activity. Exercise stimulates bone growth and development in a manner somewhat similar to muscles. Bone mineral density and mass can be improved upon until about age 30, at which time the rate of bone health decline is dictated by genetics as well as nutritional and

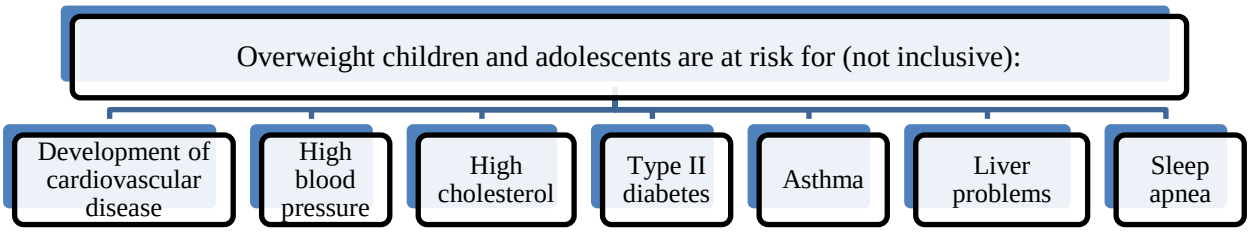
lifestyle behaviors; but the critical time to maximize density is during youth. Safe and appropriate play as well as structured exercise has a large part to play in maximizing bone mineral density. In actuality, children have greater risks to bone health from malnutrition, disease and/or trauma due to an accident.

Fitness professionals should recognize that the prevalence of overweight and obese children/adolescents in the United States has increased dramatically in the last few decades; making safe and effective activity programming for this age group particularly important. Research demonstrates that children who are overweight have a much greater risk of becoming obese during adulthood and suffer a higher risk for a number of specific ailments. Furthermore, consequences stem from psychosocial-related factors among overweight youth as they are often targets of social discrimination, have lower self-esteem and may not fully develop key social skills.

Conversely, routine appropriate participation in exercise and sport-related activities can 1) improve cardiovascular fitness, 2) improve bone health and development, 3) reduce the susceptibility to weight gain, 4) improve glucose tolerance and 5) reduce the risk of early development of health problems. To safely attain these benefits, personal trainers must recognize the major difference between children and adults.

When employing relatively higher-intensity, glycolytic-based training with youth, the trainer or coach must understand that children demonstrate a reduced performance capacity compared to adults. Research shows that children maintain an immature glycolytic system until puberty, and glycolytic enzyme activity is markedly lower. Essentially, children have a hard time dealing with continual, moderate-to-high intensity work with limited rest making the popular HIT training inappropriate. This though does not mean that children or adolescents cannot handle high intensities altogether; the chief issue is the limited rest. As a matter of fact, children may have a ***greater*** ability to recover from short, intermittent high-intensity exercise set up in a station-based fashion with adequate rest intervals due to a number of factors including 1) lower relative peak power outputs and muscle mass (lower attainable training intensities), 2) lower stimulation of type II muscle fibers (reduced progression of acidity), 3) faster phosphocreatine resynthesis, 4) a greater relative oxidative capacity, and 4) a faster removal of metabolic by-products.

When comparing aerobic metabolism, children perform better in terms of achieving a steady-state heart rate and more effectively use lipids as a fuel source. The latter has been demonstrated by lower respiratory exchange ratios during moderate-intensity endurance exercise. This greater reliance on fat is most likely due to an increased concentration of growth hormone in circulation, natural to an individual's formative years. Even with these efficiencies however, children exhibit higher heart rates with lower stroke volume and cardiac output during maximal and submaximal work due to a smaller heart size and lower total blood volume.



Finally, thermoregulatory functions are also different among children; they essentially overheat quicker than their adult counterparts. The major physiological difference is related to the sweating mechanism. Children produce less sweat due to smaller sweat gland sizes, a lower sensitivity of the sweating mechanism to thermal stimuli and lower sweat gland metabolic capacity. Adults also have an advantage due to a higher surface-area-to-mass ratio, allowing for greater heat loss into the environment. Again, children have a lower total blood volume; this will limit the internal transfer of heat to the body's surface. Children are at a disadvantage during most forms of high-intensity locomotion in the heat due to a higher metabolic cost of locomotion (motor inefficiency) and greater cardiovascular strain from lower cardiac output and hemoglobin concentrations so caution must be made when working with children during moderate to high intensity activities.

New research recently published in the *ACSM's Health & Fitness Journal* has provided additional insight into training this special population. The review focused on the safest time during maturation to start engaging in specialized physical training (e.g., strength and conditioning) among youth. The focus of the literature was on a concept known as "Integrative Neuromuscular Training" (INT), defined by the authors operationally as a training program that incorporates general and specific strength and conditioning activities, including resistance training, dynamic stability exercises, core focused training, plyometric drills and agility training that are designed specifically to enhance the health and skill-related components of physical fitness.

General guidelines for training children and adolescents:

Aerobic training
•Children can train at steady-state levels similar to adults •Avoid extended periods of activity •Children can perform short bouts (≤10 min) of intense aerobic exercise on an intermittent basis •Emphasize enjoyable activities that stimulate play •Be cautious of overheating and make sure children remain fully hydrated

Anaerobic training
•Age-appropriate exercise can start when children begin organized sports (Olympic weightlifting often begins at 10-11 years) measured by competent adherence to instructions •Higher repetition schemes with lighter weight are more effective for pre-pubescent children •Encourage motor learning and proper technique •In general, two sets are sufficient for improvements in strength and endurance •Multi-joint activities that develop motor skills are preferred over isolated training •It is not recommended that children lift loads greater than 80% of their 1RM •Progressive overload should emphasize increased repetitions rather than load •Pubescent adolescents can follow similar prescriptions as adults, but the emphasis should be on motor learning and efficient movement patterns

According to the review, the factor of training age is very important for aspiring young athletes who are often ill prepared for the physical demands of sports practice and competition. Insufficient readiness for sports practice and competition may be a consequence of the current decline in unstructured physical activity among children and adolescents in the US (schools often cut recess and physical education programs). This lack of physical competency attainment during youth increases the risk for injury when sports-related specialized training commences (often as early as 7-8 years of age). Many factors can contribute to sport-related injuries among youth such as a history of previous injury, muscle imbalances, nutritional deficiencies or improper footwear/gear - but poor physical fitness exacerbated by the trend of decreased muscular strength and functional capacity among US youth likely plays a primary role. Simply stated, children born in the 1980s and 1990s could perform multiples of the pull-ups and push-up values many children can perform today; kids were more active and therefore developed a level of functional strength.

The review also explained that even though chronological age has been used historically used to determine for initial participation in sports and structured training, it is clear that maturity-related differences in body size and motor skill performance emerge as early as 6-7 years of age. These developmental differences in stature and skill can make programming for youth based on chronological age arguable. Based on this understanding, somatic (body shape-related) maturational assessments have been proposed as a method to identify rapid adolescent growth and to help guide program development for youth. Assessing the percentage of adult height also has been used as a noninvasive indicator of maturity status. Either way, it is recommended to implement appropriate INT before youth hit their maximum growth rate during the adolescent growth spurt, which occurs at about age 12 years in girls and age 14 years in boys. Youth programs based on either biological or chronological indicators often miss the mark related to this critical timing. Regular exposure to INT early in life will increase the training age of the youth and likely will set the stage for greater physical competency during their post-pubertal years. This is dependent on the training program being well-designed and consistent with an individual's needs, goals and abilities. Currently, there is no evidence that indicates a specific minimum age for participation in INT programs, but the earlier appears optimal (even the preschool years) due to the greater receptiveness to physical improvements (motor learning, greater tissue nuclei concentration). However, any participating youth must be able to follow coaching instructions and have adequate focus and social skills; aspects dictated by the rate of psychological maturation.

Because of the differing demands of available sport choices, it is recommended that aspiring young athletes engage in a variety of sports and physical activities to improve motor skill performance, enhance joint mobility and stability, and increase strength and power while gaining confidence in their abilities to be physically active and engage in sport. The young athlete should be exposed to various activities that challenge pattern recognition, hand-eye coordination, and decision-making skills. This has important implications as early specialization has been linked previously to increased injury risk in young athletes and burnout.

Children are able to learn basic movement patterns (such as squatting, pushing, pulling,

core bracing and jumping) and progress to more complex actions over time with a limited risk for injury when under the supervision of a qualified professional. The limiting factor is not chronological or biological age but rather the amount of time that they have been practicing these basic movements. Developing a greater training age earlier on influences the youth's ability to perform simple and complex movement patterns with energy, vigor and confidence. The importance of increasing a child's training age cannot be underestimated as it truly sets the stage for further physical development during adolescence. Conversely, a sedentary lifestyle and failure to participate in routine, structured or unstructured physical activity before and around the onset of puberty will typically lead to poor posture, poor movement mechanics and muscular strength that does not reach the individual's expected adult potential.

In summary, the initiation of appropriate basic and specialized training early during youth can help increase training age that is vital for children and adolescents whose motor capabilities are highly responsive (plastic) to training. Because of the growing interest in youth fitness and pediatric exercise, qualified fitness professionals must meet the challenge of helping children improve their movement mechanics and gain confidence to be physically active, but the special needs of this population must be well understood.

Sport Performance and Resistance Training for Young Clients
CEU Quiz

1. Resistance training activities performed by youth has raised concerns due to the belief that there is a risk for damage to the _____ of long bones.

A. Marrow cavity
B. Corticol component
C. Spongy component
D. Epiphyseal plates

2. Premature closure of the epiphyseal plates is believed to be promoted by resistance training before puberty due to which of the following?

A. Compressive forces reduce cellular replication
B. Increased androgenic hormone release
C. Torsion stress damages the bone marrow compartment
D. All of the above are correct

3. True or False? No clinical trial to date has indicated that appropriately-applied weightlifting among youth directly damages long bones in a way that stunts natural growth.

A. True
B. False

4. Childhood play, including jumping/landing activities, often creates greater bone stresses than experienced during controlled weightlifting using _____ of the lifter's 1RM.

A. 45-55%
B. 50-60%
C. 65-70%
D. 70-80%

5. Bone mineral density and mass can be improved upon until about age ____, at which time the rate of bone health decline is dictated by genetics as well as nutritional and lifestyle behaviors.

A. 18
B. 25
C. 30
D. 35

6. As opposed to the bone stress produced by structured resistance training, children experience greater risks to their bone health due to which of the following?

A. Malnutrition
B. Disease
C. Trauma
D. All of the above

7. Which of the following statement concerning the differences between children and adults in **not** correct?

A. Children have a greater relative capacity to endure continuous glycoltyic-based training
B. Children may have a greater ability to recover from short, intermittent high-intensity exercise
C. Children more effectively use lipids as a fuel source during aerobic training
D. Children exhibit higher heart rates during maximal and submaximal work due to a smaller heart size and lower total blood volume

8. It is not recommended that children lift loads greater than ____ of their 1RM.

A. 60%
B. 70%
C. 80%
D. 90%

9. True or False? Developing a greater training age as early and safely as possible during youth appears to be a critical factor for maximizing a child's propensity towards athletic endeavors.

A. True
B. False

10. True or False? It is recommended that aspiring athletes participate in only one or two sports during youth to maximize motor patterns that will be performed following adolescence.

A. True
B. False

Quiz Answer Form

FIRST NAME_____ **LAST NAME**_____ **M.I.**_____

TITLE_____

ADDRESS_____ **APT.**_____

ADDRESS _____

CITY_____ **STATE**_____ **ZIP**_____

COUNTRY_____ **POSTAL CODE**_____

CERTIFICATION NO. _____ **CERTIFICATION EXP.** ____/____/____

MEMBERSHIP NO. _____ **MEMBERSHIP EXP.** ____/____/____

Quiz Name	Member Price	Total
	$15	



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_____ _____ _____
Account No. Exp. Date Security Code

_____ _____
Signature Date

Quiz Answers

1. _____ 6. _____
2. _____ 7. _____
3. _____ 8. _____
4. _____ 9. _____
5. _____ 10. _____

Fill in each blank with the correct choice on the answer sheet. To receive 0.5 CEUs, you must answer 8 of the 10 questions correctly.

Please mail this Quiz answer form along with the proper enclosed payment to:

NCSF
5915 Ponce de Leon Blvd., Suite 60
Coral Gables, FL 33146

Questions? 800-772-NCSF