

EXcel U

Health, Strength & Nutrition Curriculum



Instructor Edition

Learn . Play . Win Together

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Health Strength & Nutrition Curriculum

Acknowledgment

I want to take the opportunity to thank two of my former Strength and Conditioning Coaches that I had the honor and privilege of working with. These two gentlemen helped prepare me sustain the physical rigors of professional basketball. Their programs not only gave me an edge, but helped give me the stamina to outlast my opponents and set NBA records. Previously, I had two surgeries on both of my knees, during the span of my career, and I was able to play professional basketball for 14 years without wearing any type of knee support thanks to them. I am proud to say that both of these men are also USA Strength and Conditioning Coaches Hall of Fame Inductees.

Bill Foran was my first introduction into the NBA. Foran was previously the Strength and Conditioning Coach for the Miami Heat team, and had been since the year 1989. During Foran's tenure with Miami Heat, the team won three NBA Championships, in 2006, 2012, and in 2013. He was also the strength and conditioning coach for the National Champion in the year 1987, as well as the coach for the Miami Hurricanes football team. Foran has also co-authored multiple books on strength and conditioning.

Mike Brungardt was my first introduction into heavy plyometrics. Brungardt is a retired strength and conditioning coach in which he worked for the San Antonio Spurs for 17 years. During his tenure with the Spurs, the team won four NBA Championships, in 1999, 2003, 2005 and 2007. He has co-authored multiple books on strength and conditioning, is a proud NBA Champion Strength Coach, and has also worked as a teacher, wrestling coach, and football coach.

Preface

The Excel U Health Strength and nutrition program is designed to meet the physical needs of the entire student population, with custom specialized workouts. Especially in today's educational environment, I've seen a lack of resources for students who would like to improve their strength and conditioning, multiple times during the year, even if they are not involved in athletics. Think about it, if a student went to the principal or a teacher about their physical fitness level, would the administrators and teachers be able to give them a lesson plan to build their physical fitness level like they do with math or English? The answer is no. Thankfully, our New Excel U Health Strength and Nutrition program fills that void. It has been shown that when children and adolescents participate in at least 60 minutes of physical activity each day, multiple health benefits occur. Regular physical activity not only builds healthy bones and muscles, but also improves muscular strength and endurance, reduces the risk for developing chronic disease risk factors, improves self-esteem levels, and reduces stress and anxiety as a whole. Beyond these known health effects, physical activity may also have beneficial influences on academic performance as well. Did you know that in most high school and colleges, the student athlete population has a higher GPA than the non-student athlete? This fact is indeed true.

With our Excel U Health Strength and Nutrition Program, you get year-round workouts plans that come with easy step-by-step instructions. And, the truth is that elementary school-aged children typically engage in free play, running and chasing games, jumping rope, and age-appropriate sports—activities that are aligned with the development of fundamental motor skills. The development of these complex motor skills enables adolescents to engage in active recreation (e.g. canoing, skiing, roller-blading), resistance exercises with weights or weight machines, individual sports (e.g. running, bicycling), and team sports (e.g. basketball and baseball). It was important for us in developing the Excel U Health Strength and Nutrition program that all students would have the ability to participate, and possibly share information with family members in order to create a healthier overall community. Our program includes diagrams for stretching, plyometrics, and proper weightlifting techniques, with descriptions for each phase of the program itself.

Most youth-aged individuals, however, do not engage in the recommended level of physical activity they require due to a lack of exposure to health related programs for students. Defining academic performance is used broadly in order to describe different factors that may influence overall student success in school.

These vital factors fall into three primary areas:

- Cognitive Skills and Attitudes (e.g. attention/concentration, memory, verbal ability).
- Academic Behaviors (e.g. conduct, attendance, time spent on tasks, homework completion times).
- Academic Achievement (e.g. standardized test scores and student grades).

Many schools are now attempting to increase instructional times for mathematics, English, and science courses, in an effort to improve standard-based test scores. As a result, physical education classes, recess periods, and other physical activity breaks are often decreased or even eliminated during the typical school day.

In addition to school-day opportunities, youth-aged students also now have the opportunity to participate in physical activity exercises through extracurricular physical activities (e.g. school sports, recreation, other teams). These activities may be available through schools, communities, and/or after-school programs.

Research has explored the relationships between physical education and physical activity, including fitness levels, motor skill development, and academic performance. For example, several studies have shown that there is a positive relationship between increased physical activity and academics.

How Physical Activity Affects the Brain

Cognitive skills and motor skills appear to develop through a dynamic interaction in the brain.

Research has shown that physical movement can affect the brain's physiology by increasing:

- Cerebral capillary growth.
- Blood flow.
- Oxygenation.
- Production of neurotrophins.
- Growth of nerve cells in the hippocampus (center of learning and memory).
- Neurotransmitter levels.
- Development of nerve connections.
- Density of the neural network.
- Brain tissue volume.

These physiological changes may be associated with:

- Improved attention spans.
- Improved information processing, storage, and retrieval.
- Enhanced coping mechanisms.
- Enhanced positive effects.
- Reduced sensations of cravings and pain.

Reference: https://www.cdc.gov/healthyyouth/health_and_academics/pdf/pa-pe_paper.pd

Table of Contents

ANYBODY PARTICIPATING IN THIS PROGRAM SHOULD CONSULT A PHYSICIAN FIRST. WHEN AN ATHLETE IS INJURED, HE OR SHE SHOULD CONSULT A PHYSICIAN BEFORE INITIATING OR RESUMING TRAINING.

FIRST EDITION

For more information about Excel U and Health Strength and Nutrition contact:

NEIGHBORHOOD LEGAL SERVICES

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WHY HAVE A STRENGTH AND CONDITIONING PROGRAM?

Over the past few decades strength training has become an important component of athletics non athlete, on all levels. Why? Because it works. The empirical evidence supporting strength training is overwhelming. But beyond the science, you just have to look at successful athletic teams and individuals to see the positive effects.

Strength training today is prevalent in all sports and daily life. Through research and education the common myths have been expelled. Instead of loss of flexibility we now know proper strength training actually improves flexibility. Instead of becoming muscle bound and slow, we now know that a well executed strength program will greatly enhance speed and explosion. As a result strength training is now an important part of sports where it was once taboo, such as basketball and baseball, and it has also crossed the gender gap becoming just as important in women's sports, as men's.

Despite the proven virtues of strength training, there are still numerous athletes in high schools across the country that are not reaping the benefits of a proper strength training program. For whatever reason, lack of qualified coaches, money, time, equipment, or other variables, there are still schools and athletes that are deprived of a quality strength program. Hopefully this manual will help alleviate that issue.

Why?

Many athletes and coaches prescribe to strength training because the other guys are doing it, their competition is doing it, or they see the success of some outstanding team or individual. These are not bad reasons for starting a program, but beyond this there are proven physiological adaptations and mental factors for undertaking a proper strength training program.

Injury Prevention

Research has proven that strength training can reduce the possibility of injury. Because of improved strength in tendons and muscles, those programs that have proper strength programs have been shown to have fewer injuries and the severity of injuries that do occur are less. In addition, when an athlete who has been strength training is injured, the time it takes to rehab the injury is less. It all goes back to the popular cliché, an ounce of prevention is worth a pound of cure.

Improved Performance

Research has documented that strength training helps improve performance, especially in the areas of improved strength, speed, agility, and explosion.

Psychological Factors

Besides the physical factors that strength training enhances, there are also mental factors that are just as important. Confidence is a huge component for an athlete, and the athlete who strength trains develops confidence for two primary reasons. The first is an athlete knows they have put in extra work

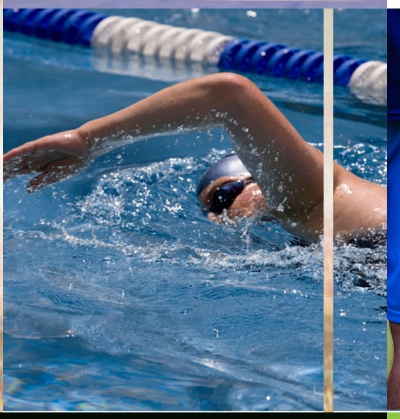
to help make them better. The second is the athlete knows they are stronger and faster. These factors help promote a positive self-esteem. The athlete knows they have the discipline to work to get better, they feel better, and they look better.

The End Result

Because of the factors discussed it is evident that a proper strength program should be an integral part of any athletic program. It will help prepare and enhance your athletes for competition and for life. Many of the habits they develop will carry over as they grow older, and help promote a continuing healthy and productive lifestyle.





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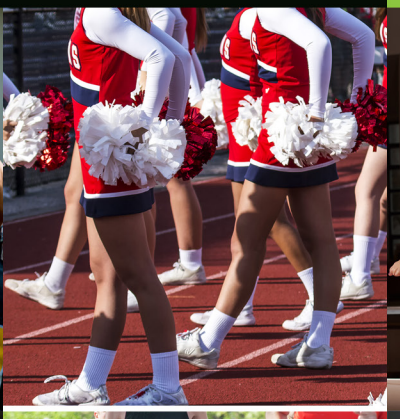
THE BASICS




THE BASICS

Knowing the fundamentals in any field is always important. No less important is it for a proper strength and conditioning program. Without the knowledge and application of the basic principles involved, any strength program is doomed to failure. On the other hand, a program that encompasses these principles will reap the rewards that a solid strength and conditioning program creates. In order to enhance an athlete's performance you have to apply the proven fundamentals. The objective of this chapter is to give you those fundamentals so that you can create a successful strength and conditioning program.

All or None Principle

When a muscle fiber contracts it does so maximally, or it does not contract at all.

Principle of Isolation

The muscle that benefits the most from any given exercise will be the weakest one that is acting to overcome the resistance. To train the muscle of interest it must be isolated from the other muscles in order to maximize training results.

General Adaptation Syndrome (G.A.S)

The purpose of any strength training program is to present the muscles to a workload which will force the muscles to adapt physiologically to that stress. This forced adaptation results in strength increases. If there is not enough stress to force an overload then the adaptations will not sufficiently occur.

Dr. Hans Selye established the General Adaptation Syndrome. This has three phases that are a result of training.

Alarm Stage – This is the initial response to stress or a stimulus. The body's response would be classified as a "strain". The starting mobilizations of the systems and processes within the body occur at this time.

Resistance Stage – The body build reserves and generates the capacity to improve its function, or in other words make the adaptations to improve, as a result of the training. This is the goal of a strength and conditioning program.

Exhaustion – When the workload becomes too tough to handle exhaustion results. The stresses that result from this may be either "acute" (muscle soreness) or "chronic" (muscle injury).

S.A.I.D Principle

This is the concept of specificity. Specific Adaptation to Imposed Demands.

In order to obtain specific results, strength training must be specific to not only certain muscle groups, but also to the movement patterns of the sport. For example, if you wanted to improve jumping, utilizing a lifting program that trained the muscles in the jumping movement pattern would be desired.

Progressive Overload

This important principle would involve forcing the muscle to adapt to increasing workloads. This would be done increasing resistances above those that are normally encountered. The result will be physiological adaptations that result in strength gains over time.

Basic Properties of Muscle Function

Strength – This is the ability of the muscle to exert force. It is the amount of effort a muscle can produce in a single contraction. Strength can be divided into two categories.

Dynamic Strength – This is the application of strength through a full range of motion. This is the predominant strength in sports and is achieved through the S.A.I.D. and Overload Principles.

Static Strength – This would involve the maximum amount of resistance a muscle can overcome involving little or no joint movement. An example would be an isometric exercise

Power – This is the rate at which work is done. It is a combination of strength and velocity. It is also referred to as explosive strength. An example would be dunking the basketball.

Muscular Endurance – This is the ability of the muscle to exert itself, submaximally, repeatedly over a period of time. Most sports require repeated movements to one degree or another over time.

Hypertrophy – This is an increase in the size of the muscle fiber.

Atrophy – The opposite of hypertrophy, this would be a decrease in the size of the muscle fiber. This would be a result of submaximal training levels or disease.

The Muscle System

A way of picturing a muscle is to think of a telephone cable with hundreds of stranded, tightly packed, bundled wires, running sided by side, each individually insulated from one another. As few as five, or as many as several hundred muscle fibers may contract together in order to form a muscle unit. The motor unit is the smallest functioning unit of contraction within each muscle. Depending on the demands of the muscle (All Or None principle), certain numbers of these contract when a threshold is reached. Stimulations travel from the brain to the muscle through the nervous system. Muscle fibers may vary in size from 1/25 to 2 inches in length. Thickness may vary from 1/250 to 1/2500 inches. The largest fibers would approximate the size of a human hair.

Muscular Contraction

Within every muscle fiber there are individual components called myofybrils. These exhibit alternating light and dark bands of contracting proteins called Actin and Myosin. When the muscle contracts the Actin and Myosin slide across and link up with each other, which causes the muscle to shorten (contract). This sliding effect as the Actin draws past the Myosin is called the Sliding Filament Theory.

Muscle Fiber Types

In general terms there are two basic types of muscle fibers, Fast Twitch and Slow Twitch. Fast Twitch fibers are high in glycogen (sugar) and are predominately involved in activities involving high speed or explosion for a short duration. They contract with great force, but tire quickly. The athlete with a high percentage of fast Twitch fibers would be predisposed to events that involve sprinting and jumping.

Slow Twitch fibers have a much bigger blood vessel supply and have a greater capacity to oxidate fat, thus allowing them to fatigue slowly. The athlete with a high percentage of these would be predisposed to endurance activities such as long distance running and triathlons.

It is important to recognize that you want to train your muscles so that you enhance the fibers your sport requires.

Muscle Tissue Classification

There are three distinct types of muscle tissue and they are classified by their structure and function.

Smooth – This muscle receives it's signal from the autonomic nervous system (involuntary) and ordinarily contracts independently of voluntary control. An example of this would be the in the walls of the blood vessel.

Cardiac – These tissues are found in the heart. They contract involuntarily, rhythmically, and without outside stimulation.

Skeletal – These are all of the muscles attached to the skeleton. They provide the force of movement for the bony leverage system. They act voluntarily. An example would be the triceps.

Skeletal Muscle Contractions

There are two basic types of muscular movement.

Isometric – This would allow for maximal muscle contraction without joint movement. You would develop strength specific to only one angle, not through a range of motion.

Isotonic – Involves limb movement through a full range of motion. The muscle shortens or lengthens.

There are three types of isotonic contractions. The Concentric contraction would create a shortening of the muscle to overcome resistance. The Eccentric contraction would create a lengthening of the muscle. An example would be when you lower the weight performing a bicep curl. An Isokinetic contraction would be when the speed of the movement is controlled. This would allow for a maximum muscle contraction through a full range of motion by eliminating biomechanical advantages and disadvantages that occur through the full range of motion.

Factors Determining Contractile Force Of Muscles

Physiological status – If the muscle is tired the contractile force will be reduced. Also, a reduced amount of nutrients at the muscle site at the time of the contraction will create a weaker response.

Percentage of fiber contraction – The greater the percentage of fiber recruitment, the stronger the contraction.

Heredity – Your DNA will be a predetermined variable in your attempt to get bigger and stronger. Despite this, strength training will allow you to make significant improvements.

Lever system – Bones combine with the muscles and joints to make human movement possible. The bones are levers, the joints are fulcrums, and the muscles apply the force.

Muscles size – There is a strong relationship between the cross sectional area of the muscle and it potential to exert force. Consistent and correct weight training will create muscle hypertrophy which will increase the potential for improving that force.

Resistance – The heavier the workload the lower the velocity of the contraction as the muscle tries to overcome resistance.

Muscle length – At its resting length the muscle is under slight tension and moderately stretched. When you shorten a resting muscle you reduce the potential for a maximal contraction.

Lifting Biomechanics

Understanding human movement and activity is critical. Incorporating this knowledge into a strength program will increase its effectiveness significantly.

Movement Terminology

Joint Action:

Flexion – The angle of the joint decreases such as in a leg curl.

Extension – Opposite of flexion, the angle of the joint increases such as in a leg extension.

Hyperextension – Movement beyond normal extension such as in a back hyperextension.

Abduction – Movement in the frontal plane away from the body such as a lateral raise.

Adduction – Opposite of abduction, it involves movement toward the midline of the body such as in a lat pulldown.

Circumduction – Movement of a segment in a circular motion such as a circular movement of the thumb.

Rotation – Movement of a segment in a rotary action around it's longitudinal axis such as the humorous when throwing.

Supination – Outward rotation of the palm

Pronation – Opposite of supination in that the palm is rotated downward

Inversion – Turning the sole of the foot inward.

Eversion – Opposite of inversion in that the sole of the foot is turned outward.

Muscle Action

Prime Mover – A muscle that is directly responsible for a movement such as the quadriceps during a leg extension.

Agonist – A concentric contraction resulting in joint action such as the bicep during an arm curl.

Antagonist – A muscle contracting in opposition to the Agonist such as the triceps during an arm curl.

Synergist – A muscle which contributes to movement but isn't the prime mover.

Fixator – A muscle that holds a part steady so that other muscles can function.

Laws of Motion

Newton's First Law, known as the Law Of Inertia describes how any object that is at rest or moving tends to remain at rest, or moving in a straight line at the same velocity, unless acted on by an outside force. An example of this would the hammer throw in track. The head of the hammer has tendency to fly off in a straight line. The pull exerted in order to prevent this would be Centripetal Force. The rotational force which is trying to throw it away would be the Centrifugal Force. Because of these external forces the constant movement through inertia is impossible.

Newton's Second Law, or the Law Of Acceleration describes what happens when velocity is altered. This law states that when a body is acted upon by a net force, acceleration is proportional to the force which produces it. Therefore if a bicyclist exerts a force "y" to travel at 20 MPH, then an increase in force of 100% would cause the speed to increase to 40 MPH (2y). However wind and tire resistance also come into play which causes him to only achieve 30 MPH.

Newton's Third Law, the Law Of Reaction states that for every action there is an equal and opposite reaction. An example would be a high jumper. When he jumps he exerts downward force into the ground which creates an equal and opposite upward.

Levers

Basically all human movements are leverage movements. Each set of muscles, joints, and bones is a lever. There are three different types of levers and they apply to the human body and how it moves. Each lever is classified on the basis of the relationship between the fulcrum, the force, and the resistance.

First Class Lever – A lever in which the fulcrum lies between the application of force and resistance such as heel raises.

Second Class Lever – A lever in which the resistance lies between the fulcrum and the force such as a wheel barrow.

Third Class Lever – A lever in which the application of force is between the fulcrum and resistance such as performing a biceps curl.

The human body is comprised mostly of Third Class Levers which puts us at a disadvantage. We would be much stronger if they were mostly Second Class Levers. It is important to note that increasing the mechanical advantage for force production is not always in the best interest of certain training objectives. For example, many "cheating" movements in weight training make it easier on specific muscle groups. The result is wasted effort, ineffective movement patterns, and increased risk of injury. Olympic Lifts are prime examples of the need for mechanical efficiency and proper lifting technique. A common mistake in the Clean is to swing the bar too far out front and away from the body which puts pressure on the hamstrings and lower back and could result in injury.

Energy Systems

The processes that provide energy for the body are chemical in nature. Simply put, energy is stored and released from the molecules of carbohydrates, fats, and proteins. Once it is released it must be transported by an intermediary to the muscles.

ATP

Adenosine Triphosphate allows for the transfer of energy. It acts as a bridge between the energy producers (carbs, fats, and proteins) to the muscles. The body has very small quantities of stored ATP. It can run roughly between 3 to 4 seconds what is stored. Therefore the replenishment of ATP is critical. There are 3 basic energy systems that help replenish ATP. Two of the systems are anaerobic, and one is aerobic. The three systems are the ATP-CP system, the Anaerobic Glycolysis System (Lactic Acid), and the Oxidative System (Aerobic System).

ATP-CP System

Used ATP is replenished immediately through Creatine Phosphate. ATP-CP is stored in small quantities (about 15 seconds worth) but can deliver energy quickly. This system is used during very high intensity activities such as running 100 meter sprint.

Anaerobic Glycolysis

This system gets its fuel from glucose in the blood or stored glycogen in the muscles. This system used during moderately high intensity activities that last between 30 seconds to two minutes such as a 400 meter run.

Oxidative Glycolysis

This system is used for low intensity/high volume activities such as long distance running. This system can use carbs, fats, and proteins for fuel.

Specificity Of Training

A specific energy system can trained by choosing appropriate intensities and rest intervals. This is the basis for interval training. Interval training allows for training to be accomplished at a higher intensity.

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