

# THE CrossFit TRAINING GUIDE



The CrossFit Training Guide is a collection of CrossFit Journal Articles written over the last 10 years primarily by Coach Greg Glassman on the foundational movements and concepts that comprise the CrossFit methodology.

This Guide is designed to be used in conjunction with our CrossFit Level 1 Trainer Course to help you develop your training knowledge and skills, and to help you prepare for the Level 1 Trainer Test. This is an essential, not an exhaustive resource. Some of the knowledge required to pass the test comes from these articles; all other material comes directly from the two-day course.

The information contained in these articles is foundational to the CrossFit methodology, and, along with the rest of the Journal, should support any successful training venture.

# THE CrossFit TRAINING GUIDE

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# THE CrossFit TRAINING GUIDE

## CrossFit

### Understanding CrossFit

The aims, prescription, methodology, implementation, and adaptations of CrossFit are collectively and individually unique, defining of CrossFit, and instrumental in our program's successes in diverse applications.

#### Aims

From the beginning, the aim of CrossFit has been to forge a broad, general, and inclusive fitness. We sought to build a program that would best prepare trainees for any physical contingency—prepare them not only for the unknown but for the unknowable. Looking at all sport and physical tasks collectively, we asked what physical skills and adaptations would most universally lend themselves to performance advantage. Capacity culled from the intersection of all sports demands would quite logically lend itself well to all sport. In sum, our specialty is not specializing. The second issue (“What is Fitness?”) of the CrossFit Journal details this perspective.

#### Prescription

The CrossFit prescription is “constantly varied, high-intensity, functional movement.” Functional movements are universal motor recruitment patterns; they are performed in a wave of contraction from core to extremity; and they are compound movements—i.e., they are multi-joint. They are natural, effective, and efficient locomotors of body and external objects. But no aspect of functional movements is more important than their capacity to move large loads over long distances, and to do so quickly. Collectively, these three attributes (load, distance, and speed) uniquely qualify functional movements for the production of high power. Intensity is defined exactly as power, and intensity is the independent variable most commonly associated with maximizing favorable adaptation to exercise. Recognizing that the breadth and depth of a program's stimulus will determine the breadth and depth of the adaptation it elicits, our prescription of functionality and intensity is constantly varied. We believe that preparation for random physical challenges—i.e., unknown and unknowable events—is at odds with fixed, predictable, and routine regimens.

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## Understanding CrossFit... (continued)

**Methodology**

The methodology that drives CrossFit is entirely empirical. We believe that meaningful statements about safety, efficacy, and efficiency, the three most important and interdependent facets of any fitness program, can be supported only by measurable, observable, repeatable facts, i.e., data. We call this approach “evidence-based fitness”. The CrossFit methodology depends on full disclosure of methods, results, and criticisms, and we’ve employed the Internet (and various intranets) to support these values. Our charter is open source, making co-developers out of participating coaches, athletes, and trainers through a spontaneous and collaborative online community. CrossFit is empirically driven, clinically tested, and community developed.

**Implementation**

In implementation, CrossFit is, quite simply, a sport—the “sport of fitness.” We’ve learned that harnessing the natural camaraderie, competition, and fun of sport or game yields an intensity that cannot be matched by other means. The late Col. Jeff Cooper observed that “the fear of sporting failure is worse than the fear of death.” It is our observation that men will die for points. Using whiteboards as scoreboards, keeping accurate scores and records, running a clock, and precisely defining the rules and standards for performance, we not only motivate unprecedented output but derive both relative and absolute metrics at every workout; this data has important value well beyond motivation.

**Adaptations**

Our commitment to evidence-based fitness, publicly posting performance data, co-developing our program in collaboration with other coaches, and our open-source charter in general has well positioned us to garner important lessons from our program—to learn precisely and accurately, that is, about the adaptations elicited by CrossFit programming. What we’ve discovered is that CrossFit increases work capacity across broad time and modal domains. This is a discovery of great import and has come to motivate our programming and refocus our efforts. This far-reaching increase in work capacity supports our initially stated aims of building a broad, general, and inclusive fitness program. It also explains the wide variety of sport demands met by CrossFit as evidenced by our deep penetration among diverse sports and endeavors. We’ve come to see increased work capacity as the holy grail of performance improvement and all other common metrics like  $\text{VO}_2$  max, lactate

threshold, body composition, and even strength and flexibility as being correlates—derivatives, even. We’d not trade improvements in any other fitness metric for a decrease in work capacity.

**Conclusions**

The modest start of publicly posting our daily workouts on the Internet beginning six years ago has evolved into a community where human performance is measured and publicly recorded against multiple, diverse, and fixed workloads. CrossFit is an open-source engine where inputs from any quarter can be publicly given to demonstrate fitness and fitness programming, and where coaches, trainers, and athletes can collectively advance the art and science of optimizing human performance.



## NOTES

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## Foundations

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CrossFit is a core strength and conditioning program. We have designed our program to elicit as broad an adaptational response as possible. CrossFit is not a specialized fitness program but a deliberate attempt to optimize physical competence in each of ten recognized fitness domains. They are Cardiovascular and Respiratory endurance, Stamina, Strength, Flexibility, Power, Speed, Coordination, Agility, Balance, and Accuracy.

The CrossFit Program was developed to enhance an individual's competency at all physical tasks. Our athletes are trained to perform successfully at multiple, diverse, and randomized physical challenges. This

fitness is demanded of military and police personnel, firefighters, and many sports requiring total or complete physical prowess. CrossFit has proven effective in these arenas.

Aside from the breadth or totality of fitness the CrossFit Program seeks, our program is distinctive, if not unique, in its focus on maximizing neuroendocrine response, developing power, cross-training with multiple training modalities, constant training and practice with functional movements, and the development of successful diet strategies.

## Foundations... (continued)

Our athletes are trained to bike, run, swim, and row at short, middle, and long distances guaranteeing exposure and competency in each of the three main metabolic pathways.

We train our athletes in gymnastics from rudimentary to advanced movements garnering great capacity at controlling the body both dynamically and statically while maximizing strength to weight ratio and flexibility. We also place a heavy emphasis on Olympic Weightlifting having seen this sport's unique ability to develop an athletes' explosive power, control of external objects, and mastery of critical motor recruitment patterns. And finally we encourage and assist our athletes to explore a variety of sports as a vehicle to express and apply their fitness.

### **An Effective Approach**

In gyms and health clubs throughout the world the typical workout consists of isolation movements and extended aerobic sessions. The fitness community from trainers to the magazines has the exercising public believing that lateral raises, curls, leg extensions, sit-ups and the like combined with 20-40 minute stints on the stationary bike or treadmill are going to lead to some kind of great fitness. Well, at CrossFit we work exclusively with compound movements and shorter high intensity cardiovascular sessions. We've replaced the lateral raise with pushpress, the curl with pull-ups, and the leg extension with squats. For every long distance effort our athletes will do five or six at short distance. Why? Because compound or functional movements and high intensity or anaerobic cardio is radically more effective at eliciting nearly any desired fitness result. Startlingly, this is not a matter of opinion but solid irrefutable scientific fact and yet the marginally effective old ways persist and are nearly universal. Our approach is consistent with what is practiced in elite training programs associated with major university athletic teams and professional sports. CrossFit endeavors to bring state-of-the-art coaching techniques to the general public and athlete who haven't access to current technologies, research, and coaching methods.

### **Is This For Me?**

Absolutely! Your needs and the Olympic athlete's differ by degree not kind. Increased power, strength, cardiovascular and respiratory endurance, flexibility, stamina, coordination, agility, balance, and coordination are each important to the world's best athletes and

to our grandparents. The amazing truth is that the very same methods that elicit optimal response in the Olympic or professional athlete will optimize the same response in the elderly. Of course, we can't load your grandmother with the same squatting weight that we'd assign an Olympic skier, but they both need to squat. In fact, squatting is essential to maintaining functional independence and improving fitness. Squatting is just one example of a movement that is universally valuable and essential yet rarely taught to any but the most advanced of athletes. This is a tragedy. Through painstakingly thorough coaching and incremental load assignment CrossFit has been able to teach anyone who can care for themselves to perform safely and with maximum efficacy the same movements typically utilized by professional coaches in elite and certainly exclusive environments.

### **Who Has Benefited From CrossFit?**

Many professional and elite athletes are participating in the CrossFit Program. Prize-fighters, cyclists, surfers, skiers, tennis players, triathletes and others competing at the highest levels are using the CrossFit approach to advance their core strength and conditioning, but that's not all. CrossFit has tested its methods on the sedentary, overweight, pathological, and elderly and found that these special populations met the same success as our stable of athletes. We call this "bracketing". If our program works for Olympic Skiers and overweight, sedentary homemakers then it will work for you.

### **Your Current Regimen**

If your current routine looks somewhat like what we've described as typical of the fitness magazines and gyms don't despair. Any exercise is better than none, and you've not wasted your time. In fact, the aerobic exercise that you've been doing is an essential foundation to fitness and the isolation movements have given you some degree of strength. You are in good company; we have found that some of the world's best athletes were sorely lacking in their core strength and conditioning. It's hard to believe but many elite athletes have achieved international success and are still far from their potential because they have not had the benefit of state-of-the-art coaching methods

### **Just What is a "Core Strength and Conditioning" Program?**

CrossFit is a core strength and conditioning program in two distinct senses. First, we are a core strength and

## Foundations... (continued)

conditioning program in the sense that the fitness we develop is foundational to all other athletic needs. This is the same sense in which the university courses required of a particular major are called the “core curriculum”. This is the stuff that everyone needs. Second, we are a “core” strength and conditioning program in the literal sense meaning the center of something. Much of our work focuses on the major functional axis of the human body, the extension and flexion, of the hips and extension, flexion, and rotation of the torso or trunk. The primacy of core strength and conditioning in this sense is supported by the simple observation that powerful hip extension alone is necessary and nearly sufficient for elite athletic performance. That is, our experience has been that no one without the capacity for powerful hip extension enjoys great athletic prowess and nearly everyone we’ve met with that capacity was a great athlete. Running, jumping, punching and throwing all originate at the core. At CrossFit we endeavor to develop our athletes from the inside out, from core to extremity, which is by the way how good functional movements recruit muscle, from the core to the extremities.

**Can I enjoy optimal health without being an athlete?**

No! Athletes experience a protection from the ravages of aging and disease that non-athletes never find. For instance, 80-year-old athletes are stronger than non-athletes in their prime at 25 years old. If you think that strength isn’t important consider that strength loss is what puts people in nursing homes. Athletes have greater bone density, stronger immune systems, less coronary heart disease, reduced cancer risk, fewer strokes, and less depression than non-athletes

**What is an athlete?**

According to Merriam Webster’s Collegiate Dictionary, an athlete is “a person who is trained or skilled in exercises, sports, or games requiring strength, agility, or stamina”.

The CrossFit definition of an athlete is a bit tighter. The CrossFit definition of an athlete is “a person who is trained or skilled in strength, power, balance and agility, flexibility, and endurance”. The CrossFit model holds “fitness”, “health”, and “athleticism” as strongly overlapping constructs. For most purposes they can be seen as equivalents.

**What if I don’t want to be an athlete; I just want to be healthy?**

You’re in luck. We hear this often, but the truth is that fitness, wellness, and pathology (sickness) are measures of the same entity, your health. There are a multitude of measurable parameters that can be ordered from sick (pathological) to well (normal) to fit (better than normal). These include but are not limited to blood pressure, cholesterol, heart rate, body fat, muscle mass, flexibility, and strength. It seems as though all of the body functions that can go awry have states that are pathological, normal, and exceptional and that elite athletes typically show these parameters in the exceptional range. The CrossFit view is that fitness and health are the same thing. It is also interesting to notice that the health professional maintains your health with drugs and surgery each with potentially undesirable side effect whereas the CrossFit Coach typically achieves a superior result always with “side benefit” vs. side effect.





Foundations... (continued)

### What is the CrossFit Method?

The CrossFit method is to establish a hierarchy of effort and concern that builds as follows:

Diet - lays the molecular foundations for fitness and health.

Metabolic Conditioning - builds capacity in each of three metabolic pathways, beginning with aerobic, then lactic acid, and then phosphocreatine pathways.

Gymnastics - establishes functional capacity for body control and range of motion.

Weightlifting and throwing - develop ability to control external objects and produce power.

Sport - applies fitness in competitive atmosphere with more randomized movements and skill mastery.

### Examples of CrossFit Exercises

Biking, running, swimming, and rowing in an endless variety of drills. The clean&jerk, snatch, squat, deadlift, push-press, bench-press, and power-clean. Jumping, medicine ball throws and catches, pull-ups, dips, push-ups, handstands, presses to handstand, pirouettes, kips, cartwheels, muscle-ups, sit-ups, scales, and holds. We make regular use of bikes, the track, rowing shells and ergometers, Olympic weight sets, rings, parallel bars, free exercise mat, horizontal bar, plyometrics boxes, medicine balls, and jump rope.

There isn't a strength and conditioning program anywhere that works with a greater diversity of tools, modalities, and drills.



### What if I don't have time for all of this?

It is a common sentiment to feel that because of the obligations of career and family that you don't have the time to become as fit as you might like. Here's the good news: world class, age group strength and conditioning is obtainable through an hour a day six days per week of training. It turns out that the intensity of training that optimizes physical conditioning is not sustainable past forty-five minutes to an hour. Athletes that train for hours a day are developing skill or training for sports that include adaptations inconsistent with elite strength and conditioning. Past one hour, more is not better!

### "Fringe Athletes"

There is a near universal misconception that long distance athletes are fitter than their short distance counterparts. The triathlete, cyclist, and marathoner are often regarded as among the fittest athletes on earth. Nothing could be farther from the truth. The endurance athlete has trained long past any cardiovascular health benefit and has lost ground in strength, speed, and power, typically does nothing for coordination, agility, balance, and accuracy and possesses little more than average flexibility. This is hardly the stuff of elite athleticism. The CrossFit athlete, remember, has trained and practiced for optimal physical competence in all ten physical skills (cardiovascular/respiratory endurance, stamina, flexibility, strength, power, speed, coordination, agility,

## Foundations... (continued)

balance, and accuracy). The excessive aerobic volume of the endurance athlete's training has cost him in speed, power, and strength to the point where his athletic competency has been compromised. No triathlete is in ideal shape to wrestle, box, pole-vault, sprint, play any ball sport, fight fires, or do police work. Each of these requires a fitness level far beyond the needs of the endurance athlete. None of this suggests that being a marathoner, triathlete or other endurance athlete is a bad thing; just don't believe that training as a long distance athlete gives you the fitness that is prerequisite to many sports. CrossFit considers the Sumo Wrestler, triathlete, marathoner, and power lifter to be "fringe athletes" in that their fitness demands are so specialized as to be inconsistent with the adaptations that give maximum competency at all physical challenges. Elite strength and conditioning is a compromise between each of the ten physical adaptations. Endurance athletes do not balance that compromise.

### Aerobics and Anaerobics

There are three main energy systems that fuel all human activity. Almost all changes that occur in the body due to exercise are related to the demands placed on these energy systems. Furthermore, the efficacy of any given fitness regimen may largely be tied to its ability to elicit an adequate stimulus for change within these three energy systems.

Energy is derived aerobically when oxygen is utilized to metabolize substrates derived from food and liberates energy. An activity is termed aerobic when the majority of energy needed is derived aerobically. These activities are usually greater than ninety seconds in duration and involve low to moderate power output or intensity. Examples of aerobic activity include running on the treadmill for twenty minutes, swimming a mile, and watching TV.

Energy is derived anaerobically when energy is liberated from substrates in the absence of oxygen. Activities are considered anaerobic when the majority of the energy needed is derived anaerobically. These activities are of less than two minutes in duration and involve moderate to high power output or intensity. There are two such anaerobic systems, the phosphagen system and the lactic acid system. Examples of anaerobic activity include running a 100-meter sprint, squatting, and doing pull-ups.

Our main purpose here is to discuss how anaerobic and aerobic training support performance variables like strength, power, speed, and endurance. We also support the contention that total conditioning and optimal health necessitates training each of the physiological systems in a systematic fashion.

It warrants mention that in any activity all three energy systems are utilized though one may dominate. The interplay of these systems can be complex, yet a simple examination of the characteristics of aerobic vs. anaerobic training can prove useful.

Aerobic training benefits cardiovascular function and decreases body fat. This is certainly of significant benefit. Aerobic conditioning allows us to engage in moderate/low power output for extended period of time. This is valuable for many sports. Athletes engaging in excessive aerobic training witness decreases in muscle mass, strength, speed, and power. It is not uncommon to find marathoners with a vertical leap of several inches and a bench press well below average for most athletes. Aerobic activity has a pronounced tendency to decrease anaerobic capacity. This does not bode well for athletes or the individual interested in total conditioning or optimal health.

Anaerobic activity also benefits cardiovascular function and decreases body fat. Anaerobic activity is unique in its capacity to dramatically improve power, speed, strength, and muscle mass. Anaerobic conditioning allows us to exert tremendous forces over a very brief time. Perhaps the aspect of anaerobic conditioning that bears greatest consideration is that anaerobic conditioning will not adversely affect aerobic capacity! In fact, properly structured, anaerobic activity can be used to develop a very high level of aerobic fitness without the muscle wasting consistent with high volume aerobic exercise!

Basketball, football, gymnastics, boxing, track and field events under one mile, soccer, swimming events under 400 yards, volleyball, wrestling, and weightlifting are all sports that require the majority of training time spent in anaerobic activity. Long distance and ultra-endurance running, cross-country skiing, and 1500+ yard swimming are all sports that require aerobic training at levels that produce results unacceptable to other athletes or individuals concerned with total conditioning or optimal health.

## Foundations... (continued)



The CrossFit approach is to judiciously balance anaerobic and aerobic exercise in a manner that is consistent with the athlete's goals. Our exercise prescriptions adhere to proper specificity, progression, variation, and recovery to optimize adaptations.

### The Olympic Lifts, a.k.a., Weightlifting

There are two Olympic lifts, the clean and jerk and the snatch. Mastery of these lifts develops the squat, deadlift, powerclean, and split jerk while integrating them into a single movement of unequalled value in all of strength and conditioning. The Olympic lifters are without a doubt the world's strongest athletes.

These lifts train athletes to effectively activate more muscle fibers more rapidly than through any other modality of training. The explosiveness that results from this training is of vital necessity to every sport.

Practicing the Olympic lifts teaches one to apply force to muscle groups in proper sequence, i.e., from the center of the body to its extremities (core to extremity). Learning this vital technical lesson benefits all athletes who need to impart force to another person or object as is commonly required in nearly all sports.

In addition to learning to impart explosive forces, the clean and jerk and snatch condition the body to receive such forces from another moving body both safely and effectively.

Numerous studies have demonstrated the Olympic lifts unique capacity to develop strength, muscle, power, speed, coordination, vertical leap, muscular endurance, bone strength, and the physical capacity to withstand

stress. It is also worth mentioning that the Olympic lifts are the only lifts shown to increase maximum oxygen uptake, the most important marker for cardiovascular fitness.

Sadly, the Olympic lifts are seldom seen in the commercial fitness community because of their inherently complex and technical nature. CrossFit makes them available to anyone with the patience and persistence to learn.

### Gymnastics

The extraordinary value of gymnastics as a training modality lies in its reliance on the body's own weight as the sole source of resistance. This places a unique premium on the improvement of strength to weight ratio. Unlike other strength training modalities gymnastics and calisthenics allow for increases in strength only while increasing strength to weight ratio!

Gymnastics develops pull-ups, squats, lunges, jumping, push-ups, and numerous presses to handstand, scales, and holds. These skills are unrivaled in their benefit to the physique as evident in any competitive gymnast.

As important as the capacity of this modality is for strength development it is without a doubt the ultimate approach to improving coordination, balance, agility, accuracy, and flexibility. Through the use of numerous presses, handstands, scales, and other floor work the gymnast's training greatly enhances kinesthetic sense.

The variety of movements available for inclusion in this modality probably exceeds the number of exercises known to all non-gymnastic sport! The rich variety here contributes substantially to the CrossFit program's ability to inspire great athletic confidence and prowess.

For a combination of strength, flexibility, well-developed physique, coordination, balance, accuracy, and agility the gymnast has no equal in the sports world. The inclusion of this training modality is absurdly absent from nearly all training programs.

### Routines

There is no ideal routine! In fact, the chief value of any routine lies in abandoning it for another. The CrossFit ideal is to train for any contingency. The obvious implication is that this is possible only if there is a tremendously varied, if not randomized, quality to the breadth of stimulus. It is in this sense that the CrossFit Program is a core strength and conditioning program.

## Foundations... (continued)

Anything else is sport specific training not core strength and conditioning.

Any routine, no matter how complete, contains within its omissions the parameters for which there will be no adaptation. The breadth of adaptation will exactly match the breadth of the stimulus. For this reason the CrossFit program embraces short, middle, and long distance metabolic conditioning, low, moderate, and heavy load assignment. We encourage creative and continuously varied compositions that tax physiological functions against every realistically conceivable combination of stressors. This is the stuff of surviving fights and fires. Developing a fitness that is varied yet complete defines the very art of strength and conditioning coaching.

This is not a comforting message in an age where scientific certainty and specialization confer authority and expertise. Yet, the reality of performance enhancement cares not one wit for trend or authority. The CrossFit Program's success in elevating the performance of world-class athletes lies clearly in demanding of our athletes total and complete physical competence. No routine takes us there.

### Neuroendocrine Adaptation

"Neuroendocrine adaptation" is a change in the body that affects you either neurologically or hormonally. Most important adaptations to exercise are in part or completely a result of a hormonal or neurological shift. Current research, much of it done by Dr. William Kraemer, Penn State University, has shown which exercise protocols maximize neuroendocrine responses. Earlier we faulted isolation movements as being ineffectual. Now we can tell you that one of the critical elements missing from these movements is that they invoke essentially no neuroendocrine response.

Among the hormonal responses vital to athletic development are substantial increases in testosterone, insulin-like growth factor, and human growth hormone. Exercising with protocols known to elevate these hormones eerily mimics the hormonal changes sought in exogenous hormonal therapy (steroid use) with none of the deleterious effect. Exercise regimens that induce a high neuroendocrine response produce champions! Increased muscle mass and bone density are just two of many adaptative responses to exercises capable of producing a significant neuroendocrine response.

It is impossible to overstate the importance of the

neuroendocrine response to exercise protocols. This is why it is one of the four defining themes of the CrossFit Program. Heavy load weight training, short rest between sets, high heart rates, high intensity training, and short rest intervals, though not entirely distinct components, are all associated with a high neuroendocrine response.

### Power

Power is defined as the "time rate of doing work." It has often been said that in sport speed is king. At CrossFit "power" is the undisputed king of performance. Power is in simplest terms, "hard and fast." Jumping, punching, throwing, and sprinting are all measures of power. Increasing your ability to produce power is necessary and nearly sufficient to elite athleticism. Additionally, power is the definition of intensity, which in turn has been linked to nearly every positive aspect of fitness. Increases in strength, performance, muscle mass, and bone density all arise in proportion to the intensity of exercise. And again, intensity is defined as power. Power is one of the four defining themes of the CrossFit Program. Power development is an ever-present aspect of the CrossFit Daily Workout.

### Cross-Training

Cross training is typically defined as participating in multiple sports. At CrossFit we take a much broader view of the term. We view cross training as exceeding the normal parameters of the regular demands of your sport or training. The CrossFit Program recognizes functional, metabolic, and modal cross training. That is we regularly train past the normal motions, metabolic pathways, and modes or sports common to the athlete's sport or exercise regimen. We are unique and again distinctive to the extent that we adhere to and program within this context.

If you remember the CrossFit objective of providing a broad based fitness that provides maximal competency in all adaptive capacities, cross training, or training outside of the athletes normal or regular demands is a given. The CrossFit coaching staff had long ago noticed that athletes are weakest at the margins of their exposure for almost every measurable parameter. For instance, if you only cycle between five to seven miles at each training effort you will test weak at less than five and greater than seven miles. This is true for range of motion, load, rest, intensity, and power, etc. The CrossFit workouts are engineered to expand the margins of exposure as broad as function and capacity will allow. Cross training is one of the four CrossFit defining themes.



## Foundations... (continued)

**Functional Movements**

There are movements that mimic motor recruitment patterns that are found in everyday life. Others are somewhat unique to the gym. Squatting is standing from a seated position; deadlifting is picking any object off the ground. They are both functional movements. Leg extension and leg curl both have no equivalent in nature and are in turn nonfunctional movements. The bulk of isolation movements are non-functional movements. By contrast the compound or multi-joint movements are functional. Natural movement typically involves the movement of multiple joints for every activity.

The importance of functional movements is primarily two-fold. First of all the functional movements are mechanically sound and therefore safe, and secondly they are the movements that elicit a high neuroendocrine response.

CrossFit has managed a stable of elite athletes and dramatically enhanced their performance exclusively with functional movements. The superiority of training with functional movements is clearly apparent with any athlete within weeks of their incorporation.

The soundness and efficacy of functional movement is so profound that exercising without them is by comparison

a colossal waste of time. For this reason functional movement is one of the four dominant CrossFit themes.

**Diet**

The CrossFit dietary prescription is as follows:

Protein should be lean and varied and account for about 30% of your total caloric load.

Carbohydrates should be predominantly low-glycemic and account for about 40% of your total caloric load.

Fat should be predominantly monounsaturated and account for about 30% of your total caloric load.

Calories should be set at between .7 and 1.0 grams of protein per pound of lean body mass depending on your activity level. The .7 figure is for moderate daily workout loads and the 1.0 figure is for the hardcore athlete.

**What Should I Eat?**

In plain language, base your diet on garden vegetables, especially greens, lean meats, nuts and seeds, little starch, and no sugar. That's about as simple as we can get. Many have observed that keeping your grocery cart to the perimeter of the grocery store while avoiding the aisles is a great way to protect your health. Food is perishable. The stuff with long shelf life is all circumspect.

## Foundations... (continued)



If you follow these simple guidelines you will benefit from nearly all that can be achieved through nutrition.

### **The Caveman or Paleolithic Model for Nutrition**

Modern diets are ill suited for our genetic composition. Evolution has not kept pace with advances in agriculture and food processing resulting in a plague of health problems for modern man. Coronary heart disease, diabetes, cancer, osteoporosis, obesity and psychological dysfunction have all been scientifically linked to a diet too high in refined or processed carbohydrate. Search “google” or “Alta Vista” for Paleolithic nutrition, or diet. The return is extensive, compelling, and fascinating. The Caveman model is perfectly consistent with the CrossFit prescription.

### **What Foods Should I Avoid?**

Excessive consumption of high-glycemic carbohydrates is the primary culprit in nutritionally caused health problems. High glycemic carbohydrates are those that raise blood sugar too rapidly. They include rice, bread, candy, potato, sweets, sodas, and most processed carbohydrates. Processing can include bleaching, baking, grinding, and refining. Processing of carbohydrates greatly increases their glycemic index, a measure of their propensity to elevate blood sugar.

### **What is the Problem with High-Glycemic Carbohydrates?**

The problem with high-glycemic carbohydrates is that they give an inordinate insulin response. Insulin is an essential hormone for life, yet acute, chronic elevation of insulin leads to hyperinsulinism, which has been

positively linked to obesity, elevated cholesterol levels, blood pressure, mood dysfunction and a Pandora’s box of disease and disability. Research “hyperinsulinism” on the Internet. There’s a gold mine of information pertinent to your health available there. The CrossFit prescription is a low-glycemic diet and consequently severely blunts the insulin response

### **Caloric Restriction and Longevity**

Current research strongly supports the link between caloric restriction and an increased life expectancy. The incidence of cancers and heart disease sharply decline with a diet that is carefully limited in controlling caloric intake. “Caloric Restriction” is another fruitful area for Internet search. The CrossFit prescription is consistent with this research.

The CrossFit prescription allows a reduced caloric intake and yet still provides ample nutrition for rigorous activity.



## NOTES

## What is Fitness?

### What Is Fitness and Who Is Fit?

Outside Magazine crowned triathlete Mark Allen “the fittest man on earth” (<http://web.outsidemag.com/magazine/0297/9702fefit.html>). Let’s just assume for a moment that this famous six-time winner of the IronMan Triathlon is the fittest of the fit, then what title do we bestow on the decathlete Simon Poelman (<http://www.decathlon2000.ee/english/legends/poelman.htm>) who also possesses incredible endurance and stamina, yet crushes Mr. Allen in any comparison that includes strength, power, speed, and coordination?

Perhaps the definition of fitness doesn’t include strength, speed, power, and coordination though that seems rather odd. Merriam Webster’s Collegiate Dictionary defines “fitness” and being “fit” as the ability to transmit genes and being healthy. No help there. Searching the Internet for a workable, reasonable definition of fitness yields disappointingly little (<http://www.google.com/search?hl=en&ie=UTF-8&oe=UTF-8&q=fitness+definition>). Worse yet, the NSCA, the most respected publisher in exercise physiology, in their highly authoritative Essentials of Strength Training and Conditioning doesn’t even attempt a definition.

### Crossfit’s Fitness

For CrossFit the specter of championing a fitness program without clearly defining what it is that the program delivers combines elements of fraud and farce. The vacuum of guiding authority has therefore necessitated that CrossFit’s directors provide their own definition of fitness. That’s what this issue of CrossFit Journal is about, our “fitness.”

Our pondering, studying, debating about, and finally defining fitness have played a formative role in CrossFit’s successes. The keys to understanding the methods and achievements of CrossFit are perfectly imbedded in our view of fitness and basic exercise science.

It will come as no surprise to most of you that our view of fitness is a contrarian view. The general public both in opinion and in media holds endurance athletes as exemplars of fitness. We do not. Our incredulity on learning of Outside’s awarding a triathlete title of “fittest man on earth” becomes apparent in light of CrossFit’s standards for assessing and defining fitness.

CrossFit makes use of three different standards or models for evaluating and guiding fitness. Collectively, these three standards define the CrossFit view of fitness. The first is based on the ten general physical skills widely recognized by exercise physiologists. The second standard, or model, is based on the performance of athletic tasks, while the third is based on the energy systems that drive all human action.

Each model is critical to the CrossFit concept and each has distinct utility in evaluating an athlete’s overall fitness or a strength and conditioning regimen’s efficacy. Before explaining in detail how each of these three perspectives works, it warrants mention that we are not attempting to demonstrate our program’s legitimacy through scientific principles. We are but sharing the methods of a program whose legitimacy has been established through the testimony of athletes, soldiers, cops, and others whose lives or livelihoods depend on fitness.

### World-Class Fitness in 100 Words:

- *Eat meat and vegetables, nuts and seeds, some fruit, little starch and no sugar. Keep intake to levels that will support exercise but not body fat.*
- *Practice and train major lifts: Deadlift, clean, squat, presses, C&J, and snatch. Similarly, master the basics of gymnastics: pull-ups, dips, rope climb, push-ups, sit-ups, presses to handstand, pirouettes, flips, splits, and holds. Bike, run, swim, row, etc, hard and fast.*
- *Five or six days per week mix these elements in as many combinations and patterns as creativity will allow. Routine is the enemy. Keep workouts short and intense.*
- *Regularly learn and play new sports.*



What is Fitness?... (continued)

### Crossfit's First Fitness Standard

There are ten recognized general physical skills. They are cardiovascular/respiratory endurance, stamina, strength, flexibility, power, coordination, agility, balance, and accuracy. (See "General Physical Skills", pg. 17, for definitions.) You are as fit as you are competent in each of these ten skills. A regimen develops fitness to the extent that it improves each of these ten skills.

Importantly, improvements in endurance, stamina, strength, and flexibility come about through training. Training refers to activity that improves performance through a measurable organic change in the body. By contrast improvements in coordination, agility, balance, and accuracy come about through practice. Practice refers to activity that improves performance through changes in the nervous system. Power and speed are adaptations of both training and practice.

### Crossfit's Second Fitness Standard

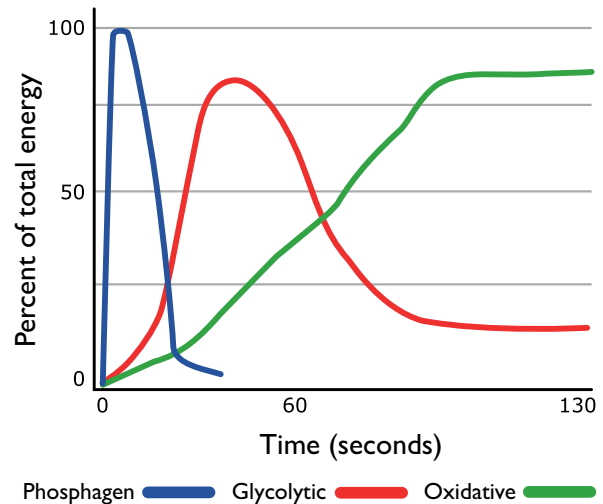
The essence of this model is the view that fitness is about performing well at any and every task imaginable. Picture a hopper loaded with an infinite number of physical challenges where no selective mechanism is operative, and being asked to perform fetes randomly drawn from the hopper. This model suggests that your fitness can be measured by your capacity to perform well at these tasks in relation to other individuals.

The implication here is that fitness requires an ability to perform well at all tasks, even unfamiliar tasks, tasks combined in infinitely varying combinations. In practice this encourages the athlete to disinvest in any set notions of sets, rest periods, reps, exercises, order of exercises, routines, periodization, etc. Nature frequently provides largely unforeseeable challenges; train for that by striving to keep the training stimulus broad and constantly varied.

### Crossfit's Third Fitness Standard

There are three metabolic pathways that provide the energy for all human action. These "metabolic engines" are known as the phosphagen pathway, the glycolytic pathway, and the oxidative pathway. The first, the phosphagen, dominates the highest-powered activities, those that last less than about ten seconds. The second pathway, the glycolytic, dominates moderate-powered activities, those that last up to several minutes. The third pathway, the oxidative, dominates low-powered activities, those that last in excess of several minutes. Here's an excellent reference for additional information: <http://predator.pnb.uconn.edu/beta/virtualtemp/muscle/exercise-folder/muscle.html>

Total fitness, the fitness that CrossFit promotes and develops, requires competency and training in each of these three pathways or engines. Balancing the effects of these three pathways largely determines the how and why of the metabolic conditioning or "cardio" that we do at CrossFit.

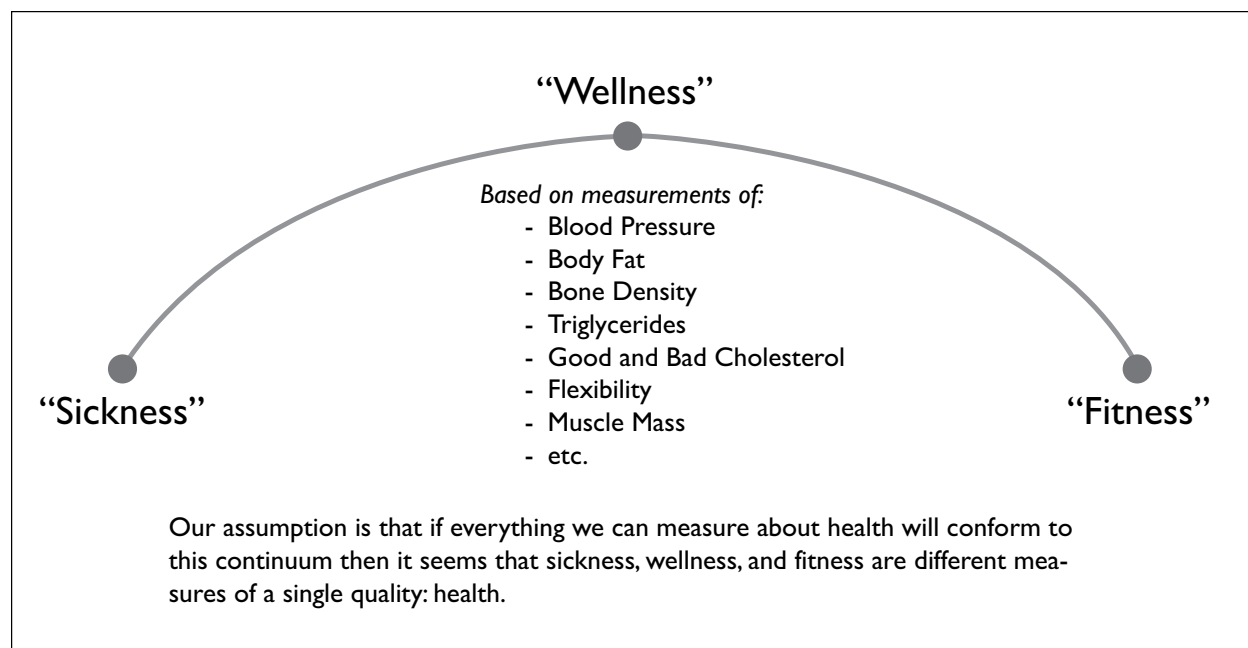


Favoring one or two to the exclusion of the others and not recognizing the impact of excessive training in the oxidative pathway are arguably the two most common faults in fitness training. More on that later.

### Common Ground

The motivation for the three standards is simply to ensure the broadest and most general fitness possible. Our first model evaluates our efforts against a full range of general physical adaptations, in the second the focus is on breadth and depth of performance, with the third the measure is time, power and consequently energy systems. It should be fairly clear that the fitness that CrossFit advocates and develops is deliberately broad, general, and inclusive. Our specialty is not specializing. Combat, survival, many sports, and life reward this kind of fitness and, on average, punish the specialist.

## What is Fitness?... (continued)

**Sickness, Wellness, and Fitness**

There is another aspect to the CrossFit brand of fitness that is of great interest and immense value to us. We have observed that nearly every measurable value of health can be placed on a continuum that ranges from sickness to wellness to fitness. See table below. Though tougher to measure, we would even add mental health to this observation. Depression is clearly mitigated by proper diet and exercise, i.e., genuine fitness.

For example, a blood pressure of 160/95 is pathological, 120/70 is normal or healthy, and 105/55 is consistent with an athlete's blood pressure; a body fat of 40% is pathological, 20% is normal or healthy, and 10% is fit. We observe a similar ordering for bone density, triglycerides, muscle mass, flexibility, HDL or “good cholesterol”, resting heart rate, and dozens of other common measures of health. Many authorities (e.g. Mel Siff, the NSCA) make a clear distinction between health and fitness. Frequently they cite studies that suggest that the fit may not be health protected. A close look at the supporting evidence invariably reveals the studied group is endurance athletes and, we suspect, endurance athletes on a dangerous fad diet (high carb, low fat, low protein).

Done right, fitness provides a great margin of protection against the ravages of time and disease. Where you find otherwise examine the fitness protocol, especially diet.

Fitness is and should be “super-wellness.” Sickness, wellness, and fitness are measures of the same entity. A fitness regimen that doesn't support health is not CrossFit.

(As a note of interest, Mel Siff PhD, whom we often respect and admire, holds his atherosclerotic disease and subsequent heart attack as anecdotal evidence of the contention that fitness and health are not necessarily linked because of his regular training and “good diet”. When we researched his dietary recommendations we discovered that he advocates a diet ideally structured for causing heart disease—low fat/high carb. Siff has fallen victim to junk science!)

**Implementation**

Our fitness, being “CrossFit”, comes through molding men and women that are equal parts gymnast, Olympic weightlifter, and multi-modal sprinter or “sprintathlete.” Develop the capacity of a novice 800-meter track athlete, gymnast, and weightlifter and you'll be fitter than any world-class runner, gymnast, or weightlifter. Let's look at how CrossFit incorporates metabolic conditioning (“cardio”), gymnastics, and weightlifting to forge the world's fittest men and women.

What is Fitness?... (continued)

### Metabolic Conditioning, or “Cardio”

Biking, running, swimming, rowing, speed skating, and cross-country skiing are collectively known as “metabolic conditioning.” In the common vernacular they are referred to as “cardio.” CrossFit’s third fitness standard, the one that deals with metabolic pathways, contains the seeds of the CrossFit “cardio” prescription. To understand the CrossFit approach to “cardio” we need first to briefly cover the nature and interaction of the three major pathways.

Of the three metabolic pathways the first two, the phosphagen and the glycolytic, are “anaerobic” and the third, the oxidative, is “aerobic.” We needn’t belabor the biochemical significance of aerobic and anaerobic systems; suffice it to say that the nature and interaction of anaerobic exercise and aerobic exercise is vital to understanding conditioning. Just remember that efforts at moderate to high power and lasting less than several minutes are anaerobic and efforts at low power and lasting in excess of several minutes are aerobic. As an example the sprints at 100, 200, 400, and 800 meters are largely anaerobic and events like 1,500 meters, the mile, 2,000 meters, and 3,000 meters are largely aerobic.

Aerobic training benefits cardiovascular function and decreases body fat—all good. Aerobic conditioning allows us to engage in low power extended efforts efficiently (cardio/respiratory endurance and stamina). This is critical to many sports. Athletes engaged in sports or training where a preponderance of the training load is spent in aerobic efforts witness decreases in muscle mass, strength, speed, and power. It is not uncommon to find marathoners with a vertical leap of only several inches! Furthermore, aerobic activity has a pronounced tendency to decrease anaerobic capacity. This does not bode well for most athletes or those interested in elite fitness.

Anaerobic activity also benefits cardiovascular function and decreases body fat! In fact, anaerobic exercise is superior to aerobic exercise for fat loss! (<http://www.cbass.com/FATBURN.HTM>) Anaerobic activity is, however, unique in its capacity to dramatically improve power, speed, strength, and muscle mass. Anaerobic conditioning allows us to exert tremendous forces over brief time intervals. One aspect of anaerobic conditioning that bears great consideration is that anaerobic conditioning will not adversely affect aerobic

### General Physical Skills

If your goal is optimum physical competence then all the general physical skills must be considered:

1. Cardiovascular/respiratory endurance - The ability of body systems to gather, process, and deliver oxygen.
2. Stamina - The ability of body systems to process, deliver, store, and utilize energy.
3. Strength - The ability of a muscular unit, or combination of muscular units, to apply force.
4. Flexibility - the ability to maximize the range of motion at a given joint.
5. Power - The ability of a muscular unit, or combination of muscular units, to apply maximum force in minimum time.
6. Speed - The ability to minimize the time cycle of a repeated movement.
7. Coordination - The ability to combine several distinct movement patterns into a singular distinct movement.
8. Agility - The ability to minimize transition time from one movement pattern to another.
9. Balance - The ability to control the placement of the bodies center of gravity in relation to its support base.
10. Accuracy - The ability to control movement in a given direction or at a given intensity.

(Ed. - Thanks to Jim Crawley and Bruce Evans of Dynamax, [www.medicineballs.com](http://www.medicineballs.com))

capacity. In fact, properly structured, anaerobic activity can be used to develop a very high level of aerobic fitness without the muscle wasting consistent with high volumes of aerobic exercise!! The method by which we use anaerobic efforts to develop aerobic conditioning is “interval training.”

## What is Fitness?... (continued)

	Sprint	Mid-Distance	Distance
Primary Energy System	Phosphagen	Glycolytic	Oxidative
Duration of work (in seconds)	10-30	30-120	120-300
Duration of recovery (in seconds)	30-90	60-240	120-300
Load:Recovery Ratio	1:3	1:2	1:1
Repetitions	25-30	10-20	3-5

Basketball, football, gymnastics, boxing, track events under one mile, soccer, swimming events under 400 meters, volleyball, wrestling, and weightlifting are all sports that require the vast majority of training time spent in anaerobic activity. Long distance and ultra endurance running, cross country skiing, and 1500+ meter swimming are all sports that require aerobic training at levels that produce results unacceptable to other athletes or the individual concerned with total conditioning and optimal health.

We strongly recommend that you attend a track meet of nationally or internationally competitive athletes. Pay close attention to the physiques of the athletes competing at 100, 200, 400, 800 meters, and the milers. The difference you're sure to notice is a direct result of training at those distances.

### Interval Training

The key to developing the cardiovascular system without an unacceptable loss of strength, speed, and power is interval training. Interval training mixes bouts of work and rest in timed intervals. Figure 3 (pg. 5) gives guidelines for interval training. We can control the dominant metabolic pathway conditioned by varying the duration of the work and rest interval and number of repetitions. Note that the phosphagen pathway is the dominant pathway in intervals of 10-30 seconds of work followed by rest of 30-90 seconds (load:recovery 1:3) repeated 25-30 times. The glycolytic pathway is the dominant pathway in intervals of 30-120 seconds work followed by rest of 60-240 seconds (load: recovery 1:2) repeated 10-20 times. And finally, the oxidative pathway is the dominant pathway in intervals of 120-300

seconds work followed by rest of 120-300 seconds (load:recovery 1:1). The bulk of metabolic training should be interval training.

Interval training need not be so structured or formal. One example would be to sprint between one set of telephone poles and jog between the next set alternating in this manner for the duration of a run.

One example of an interval that CrossFit makes regular use of is the Tabata Interval, which is 20 seconds of work followed by 10 seconds of rest repeated six to eight times (<http://www.cbass.com/INTERVAL.HTM>). Dr. Izumi Tabata published research that demonstrated that this interval protocol produced remarkable increases in both anaerobic and aerobic capacity.

It is highly desirable to regularly experiment with interval patterns of varying combinations of rest, work, and repetitions.

One of the best Internet resources on interval training comes from Dr. Stephen Seiler (<http://home.hiano/~stephens/interval.htm>). This article on interval training and another on the time course of training adaptations (<http://home.hia.no/~stephens/timecors.htm>) contain the seeds of CrossFit's heavy reliance on interval training. The article on the time course of training adaptations explains that there are three waves of adaptation to endurance training. The first wave is increased maximal oxygen consumption. The second is increased lactate threshold. The third is increased efficiency. In the CrossFit concept we are interested in maximizing first wave adaptations and procuring the second systemically through multiple modalities, including weight training, and avoiding completely third wave adaptations. Second and third wave adaptations are highly specific to the activity in which they are developed and are detrimental to the broad fitness that we advocate and develop. A clear understanding of this material has prompted us to advocate regular high intensity training in as many training modalities as possible through largely anaerobic efforts and intervals while deliberately and specifically avoiding the efficiency that accompanies mastery of a single modality. It is at first ironic that this is our interpretation of Dr. Seiler's work for it was not his intention, but when our quest of optimal physical competence is viewed in light of Dr. Seiler's more specific aim of maximizing endurance performance our interpretation is powerful.

## What is Fitness?... (continued)

Dr. Seiler's work, incidentally, makes clear the fallacy of assuming that endurance work is of greater benefit to the cardiovascular system than higher intensity interval work. This is very important: with interval training we get all of the cardiovascular benefit of endurance work without the attendant loss of strength, speed, and power.

### Gymnastics

Our use of the term "gymnastics" not only includes the traditional competitive sport that we've seen on TV but all activities like climbing, yoga, calisthenics, and dance where the aim is body control. It is within this realm of activities that we can develop extraordinary strength (especially upper body and trunk), flexibility, coordination, balance, agility, and accuracy. In fact, the traditional gymnast has no peer in terms of development of these skills.

CrossFit uses short parallel bars, mats, still rings, pull-up and dip bars, and a climbing rope to implement our gymnastics training. (See CrossFit Journal, September 2002, "The Garage Gym" for recommended equipment and vendors.)

The starting place for gymnastic competency lies with the well-known calisthenic movements: pull-ups, push-ups, dips, and rope climb. These movements need to form the core of your upper body strength work. Set goals for achieving benchmarks like 20, 25, and 30 pull-ups; 50, 75, and 100 push-ups; 20, 30, 40, and 50 dips; 1, 2, 3, 4, and 5 consecutive trips up the rope without any use of the feet or legs.

At fifteen pull-ups and dips each it is time to start working regularly on a "muscle-up." The muscle-up is moving from a hanging position below the rings to a supported position, arms extended, above the rings. It is a combination movement containing both a pull-up and a dip. Far from a contrivance the muscle-up is hugely functional. With a muscle-up you'll be able to surmount any object on which you can get a finger hold – if you can touch it you can get up on it. The value here for survival, police, fire fighter, and military use is impossible to overstate. We will in future issues be covering the details of this great movement. The key to developing the muscle-up is pull-ups and dips.

While developing your upper body strength with the pull-ups, push-ups, dips, and rope climb, a large measure of balance and accuracy can be developed through mastering the handstand. Start with a headstand against

the wall if you need to. Once reasonably comfortable with the inverted position of the headstand you can practice kicking up to the handstand again against a wall. Later take the handstand to the short parallel bars or parallettes ([http://www.american-gymnast.com/technically\\_correct/paralletteguide/titlepage.html](http://www.american-gymnast.com/technically_correct/paralletteguide/titlepage.html)) without the benefit of the wall. After you can hold a handstand for several minutes without benefit of the wall or a spotter it is time to develop a pirouette. A pirouette is lifting one arm and turning on the supporting arm 90 degrees to regain the handstand then repeating this with alternate arms until you've turned 180 degrees. This skill needs to be practiced until it can be done with little chance of falling from the handstand. Work in intervals of 90 degrees as benchmarks of your growth – 90, 180, 270, 360, 450, 540, 630, and finally 720 degrees.

Walking on the hands is another fantastic tool for developing both the handstand and balance and accuracy. A football field or sidewalk is an excellent place to practice and measure your progress. You want to be able to walk 100 yards in the handstand without falling.

Competency in the handstand readies the athlete for handstand presses. There is a family of presses that range from relatively easy, ones that any beginning gymnast can perform to ones so difficult that only the best gymnasts competing at national levels can perform. Their hierarchy of difficulty is bent arm/bent body (hip)/bent leg; straight arm/bent body/bent leg; straight arm/bent body/straight leg, bent arm/straight body/straight leg, and finally the monster: straight arm/straight body/straight leg. It is not unusual to take ten years to get these five presses!

The trunk flexion work in gymnastics is beyond anything you'll see anywhere else. Even the beginning gymnastic trunk movements cripple bodybuilders, weightlifters, and martial artists. In a future issue of CFJ (CrossFit Journal) we'll cover in great detail many of the better trunk/ab exercises, but until then the basic sit-up and "L" hold are the staples. The "L" hold is nothing more than holding your trunk straight, supported by locked arms, hands on bench, floor, or parallel bars, and hips at 90 degrees with legs straight held out in front of you. You want to work towards a three minute hold in benchmark increments of 30 seconds – 30, 60, 90, 120, 150, and 180 seconds. When you can hold an "L" for three minutes all your old ab work will be silly easy.



## What is Fitness?... (continued)

We recommend Bob Anderson's Stretching. This is a simple no nonsense approach to flexibility. The science of stretching is weakly developed and many athletes like gymnasts who demonstrate great flexibility receive no formal instruction. Just do it. Generally, you want to stretch in a warm-up to establish safe, effective range of motion for the ensuing activity and stretch during cool down to improve flexibility.

There's a lot of material to work with here. We highly recommend an adult gymnastics program if there is one in your area. Our friends at [www.drillsandskills.com](http://www.drillsandskills.com) have a gymnastics-conditioning page with enough material to keep you busy for years (<http://www.drillsandskills.com/skills/cond>). This is among our favorite fitness sites.

Every workout should contain regular gymnastic/calisthenic movements that you've mastered and other elements under development. Much of the rudiments of gymnastics come only with great effort and frustration – that's O.K. The return is unprecedented and the most frustrating elements are most beneficial -long before you've developed even a modicum of competency.

### Weightlifting

"Weightlifting" as opposed to "weight lifting", two words, and "weight training" refers to the Olympic sport, which includes the "clean and jerk" and the "snatch." Olympic weightlifting, as it is often referred to, develops strength (especially in the hips), speed, and power like no other training modality. It is little known that successful weightlifting requires substantial flexibility. Olympic weightlifters are as flexible as any athletes.

The benefits of Olympic weightlifting don't end with strength, speed, power, and flexibility. The clean and jerk and the snatch both develop coordination, agility, accuracy, and balance and to no small degree. Both of these lifts are as nuanced and challenging as any movement in all of sport. Moderate competency in the Olympic lifts confers added prowess to any sport.

The Olympic lifts are based on the deadlift, clean, squat, and jerk. These movements are the starting point for any serious weight-training program. In fact they should serve as the core of your resistance training throughout your life.

Why the deadlift, clean, squat, and jerk? Because these movements elicit a profound neuroendocrine

response. That is, they alter you hormonally and neurologically. The changes that occur through these movements are essential to athletic development. Most of the development that occurs as a result of exercise is systemic and a direct result of hormonal and neurological changes.

Curls, lateral raises, leg extensions, leg curls, flyes and other body building movements have no place in a serious strength and conditioning program primarily because they have a blunted neuroendocrine response. A distinctive feature of these relatively worthless movements is that they have no functional analog in everyday life and they work only one joint at a time. Compare this to the deadlift, clean, squat, and jerk which are functional and multi-joint movements.

Start your weightlifting career with the deadlift, clean, squat, and jerk then introduce the "clean and jerk" and snatch. There are many excellent sources for learning the deadlift, clean, squat, and jerk but for the clean and jerk and the snatch we know of only one outstanding source and that is a couple of videotapes produced by World Class Coaching LLC (<http://www.worldclasscoachingllc.com/>) These tapes are not only the best instruction available anywhere they are as good as any instructional tape we've seen on any subject. Much of the material on the tapes, both in terms of pedagogy and technical understanding, is unique to the producers. You need both tapes, "The Snatch" and "The Clean and Jerk."

Much of the best weight training material on the Internet is found on "powerlifting" sites. Powerlifting is the sport of three lifts: the bench press, squat, and deadlift. Powerlifting is a superb start to a lifting program followed later by the more dynamic clean and the jerk and finally the "clean & jerk" and the "snatch".

The movements that we are recommending are very demanding and very athletic. As a result they've kept athletes interested and intrigued where the typical fare offered in most gyms (bodybuilding movements) typically bores athletes to distraction. Weightlifting is sport; weight training is not.

What is Fitness?... (continued)

### Throwing

Our weight training program includes not only weightlifting and powerlifting but also throwing work with medicine balls. The medicine ball work we favor provides both physical training and general movement practice. We are huge fans of the Dynamax medicine ball ([www.medicineballs.com](http://www.medicineballs.com)) and the throwing exercises elaborated in the Dynamax training manual that comes with their balls. The medicine ball drills add another potent stimulus for strength, power, speed, coordination, agility, balance, and accuracy.

There is a medicine ball game known as Hoover Ball. It is played with an eight-foot volleyball net and scored like tennis. This game burns three times more calories than tennis and is great fun. The history and rules of Hoover Ball are available from the Internet (<http://www.hooverassoc.org/hooverballrules.htm>).

### Nutrition

Nutrition plays a critical role in your fitness. Proper nutrition can amplify or diminish the effect of your training efforts. Effective nutrition is moderate in protein, carbohydrate, and fat. Forget about the fad high carbohydrate, low fat, and low protein diet. 70% carbohydrate, 20% protein, and 10% fat may work for your rabbit, but it won't do anything for you except increase your risk of cancer, diabetes, and heart disease or leave you weak and sickly. Balanced macronutrient and healthy nutrition looks more like 40% carbohydrate, 30 % protein, and 30% fat. Dr. Barry Sears' Zone Diet (<http://www.drsears.com/>) still offers the greatest precision, efficacy, and health benefit of any clearly defined protocol. The Zone diet does an adequate job of jointly managing issues of blood glucose control, proper macronutrient proportion, and caloric restriction the three pillars of sound nutrition whether your concern is athletic performance, disease prevention and longevity, or body composition. We recommend that every one read Dr. Sears book Enter the Zone. We will cover nutrition in great detail in an upcoming issue of the CFJ.

### Sport

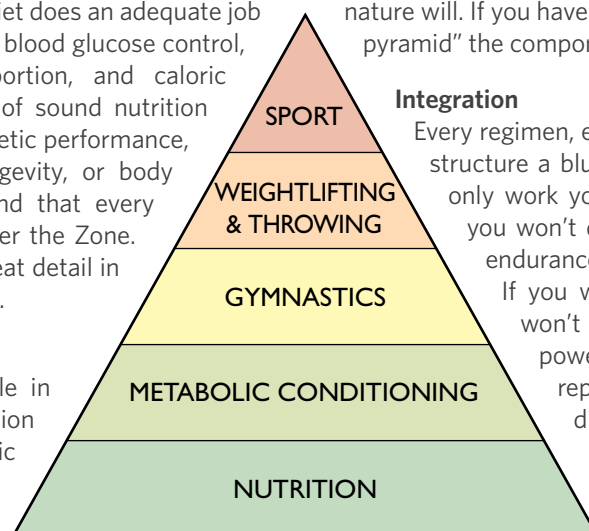
Sport plays a wonderful role in fitness. Sport is the application of fitness in a fantastic atmosphere of competition and mastery. Training

efforts typically include relatively predictable repetitive movements and provide limited opportunity for the essential combination of our ten general physical skills. It is, after all, the combined expression, or application, of the ten general skills that is our motivation for their development in the first place. Sports and games like soccer, martial arts, baseball, and basketball in contrast to our training workouts have more varied and less predictable movements. But, where sports develop and require all ten general skills simultaneously, they do so slowly compared to our strength and conditioning regimen. Sport is better, in our view, at expression and testing of skills than it is at developing these same skills. Both expression and development are crucial to our fitness. Sport in many respects more closely mimics the demands of nature than does our training. We encourage and expect our athletes to engage in regular sports efforts in addition to all of their strength and conditioning work.

### A Theoretical Hierarchy of Development

A theoretical hierarchy exists for the development of an athlete. It starts with nutrition and moves to metabolic conditioning, gymnastics, weightlifting, and finally sport. This hierarchy largely reflects foundational dependence, skill, and to some degree, time ordering of development. The logical flow is from molecular foundations, cardiovascular sufficiency, body control, external object control, and ultimately mastery and application. This model has greatest utility in analyzing athletes' shortcomings or difficulties.

We don't deliberately order these components but nature will. If you have a deficiency at any level of "the pyramid" the components above will suffer.



### Integration

Every regimen, every routine contains within its structure a blueprint for its deficiency. If you only work your weight training at low reps you won't develop the localized muscular endurance that you might have otherwise. If you work high reps exclusively you won't build the same strength or power that you would have at low rep. There are advantages and disadvantages to working out slowly, quickly, high weight, low weight, "cardio" before, cardio after, etc.

## What is Fitness?... (continued)

For the fitness that we are pursuing, every parameter within your control needs to be modulated to broaden the stimulus as much as possible. Your body will only respond to an unaccustomed stressor; routine is the enemy of progress and broad adaptation. Don't subscribe to high reps, or low reps, or long rests, or short rests, but strive for variance (<http://www.cbass.com/EvolutionaryFitness.htm>).

So then, what are we to do? Work on becoming a better weightlifter, stronger-better gymnast, and faster rower, runner, swimmer, cyclist is the answer. There are an infinite number of regimens that will deliver the goods.

Generally, we have found that three days on and one day off allows for a maximum sustainability at maximum intensities. One of our favorite workout patterns is to warm-up and then perform three to five sets of three to five reps of a fundamental lift at a moderately comfortable pace followed by a ten-minute circuit of gymnastics elements at a blistering pace and finally finish with two to ten minutes of high intensity metabolic conditioning. There is nothing sacred in this pattern. The magic is in the movements not the routine. Be creative.

Another favorite is to blend elements of gymnastics and weightlifting in couplets that combine to a dramatic metabolic challenge. An example would be to perform five reps of a moderately heavy back squat followed immediately by a set of max reps pull-ups repeated three to five times.

On other occasions we'll take five or six elements balanced between weightlifting, metabolic conditioning, and gymnastics and combine them in a single circuit that we blow through three times without a break.

We can create routines like this forever. In fact our archives (<http://www.crossfit.com/misc/arc.html>) contain four or five hundred daily workouts consciously mixed and varied in this manner. Perusing them will give you an idea of how we mix and modulate our key elements.

We've not mentioned here our penchant for jumping, kettlebells, odd object lifting, and obstacle course work. The recurring theme of functionality and variety clearly suggest the need and validity for their inclusion though.

Finally, strive to blur distinctions between "cardio" and strength training. Nature has no regard for this distinction

or any other, including our ten physical adaptations. We'll use weights and plyometrics training to elicit a metabolic response and sprinting to improve strength.

**Scalability and Applicability**

The question regularly arises as to the applicability of a regimen like CrossFit's to older and deconditioned or detrained populations. The needs of an Olympic athlete and our grandparents differ by degree not kind. One is looking for functional dominance the other for functional competence. Competence and dominance manifest through identical physiological mechanisms.

We've used our same routines for elderly individuals with heart disease and cage fighters one month out from televised bouts. We scale load and intensity; we don't change programs.

We get requests from athletes from every sport looking for a strength and conditioning program for their sport. Firemen, soccer players, triathletes, boxers, and surfers all want programs that conform to the specificity of their needs. While admitting that there are surely needs specific to any sport, the bulk of sport specific training has been ridiculously ineffective. The need for specificity is nearly completely met by regular practice and training within the sport not in the strength and conditioning environment. Our terrorist hunters, skiers, mountain bikers and housewives have found their best fitness from the same regimen.





## CrossFit's New Three-Dimensional Definition of Fitness and Health



In this two part lecture, Coach Greg Glassman unifies fitness and health. This lecture is the first time we've published a revolutionary new component (a three-dimensional model) that has the potential to both redefine and unite the health and fitness fields forever.

Health can now be concisely and precisely defined as increased work capacity across broad time, modal, and age domains. Work capacity is the ability to perform real physical work as measured by force x distance / time (which is average power). Fitness is this ability in as many domains as possible.

Science is about measurement and prediction. Without measurable, observable, repeatable data concerning the fundamental physical units of kinematics (mass, distance, and time or MKS) there is no science of human performance. This is true of the planets, automobiles, and exercise.

Physical output can be measured in terms of foot-pounds/min. We move our own bodies and we move external objects. We can measure how heavy those bodies and objects are, how far they travel, and in what time period. Your ability to move large loads, long distances, quickly, in the broadest variety of domains is fitness. And the ability to sustain that fitness throughout your life is a defining measure of health.

CrossFit's prescription for achieving this fitness is constantly varied high intensity functional movements. We can accurately predict improvements in work capacity across broad time, modal, and age domains through this prescription. We have tens of thousands of examples at this point.

The new component introduced in this lecture is age. Fitness can be graphed in two-dimensions with duration of effort on the x-axis and power on the y-axis. At each duration, we average your power capacity across a variety of modal domains (skills and drills). This creates a power curve, the area under which is your work capacity across broad time and modal domains (aka fitness).

We can now add a third dimension to this graph, the z-axis, which is age. By reassessing your two-dimensional fitness at various times throughout your life, we graph the form of a solid. The power curve takes on the shape of a plateau or blanket. This three-dimensional graph is a defining measure of health. Health, therefore, is nothing other than sustained fitness.

In Part 1, Coach covers the first three operational models of fitness originally published in the seminal What is Fitness article, and how they become united by the work capacity graph. 20min 0sec.

### Part 1

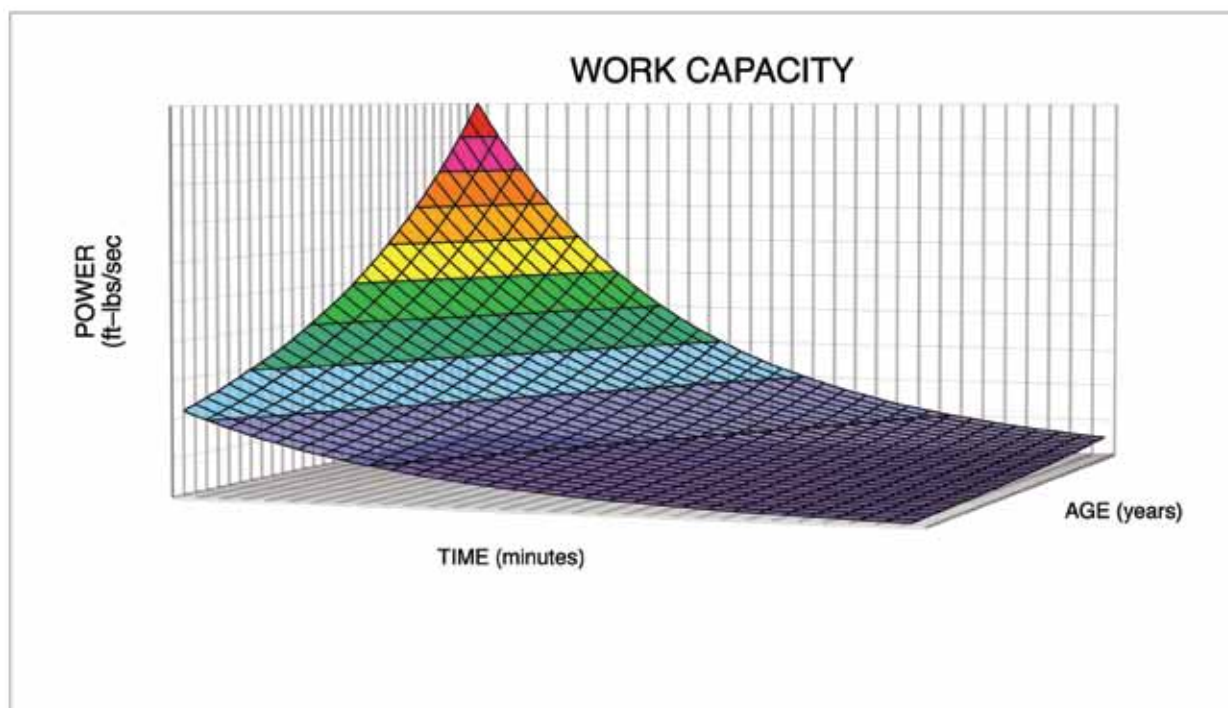
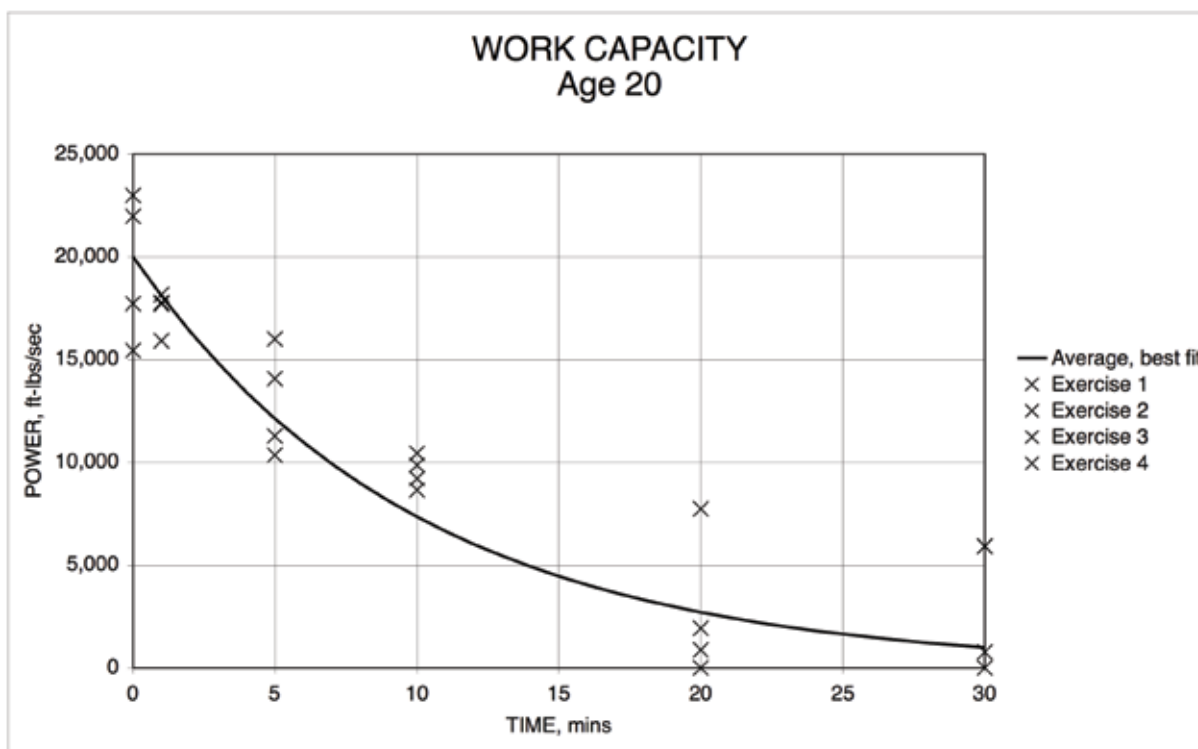
<http://journal.crossfit.com/2009/02/crossfits-new-definition-of-fitness-volume-under-the-curve-1.tpl>

In Part 2, Coach explains the fourth model, the sickness, wellness, fitness continuum, and how that becomes subordinate to the metric of maximizing the volume of work capacity across broad time and modal domains throughout your life. 17min 51sec.

### Part 2

(<http://journal.crossfit.com/2009/02/crossfits-new-definition-of-fitness-volume-under-the-curve-1.tpl>)





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## Technique

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In his earlier video article “Better Movements” (Oct 2007 CrossFit Journal) Coach Glassman explained that high power functional movements such as the jerk and the kipping pull-up are better exercises—in several critical ways—than their simpler relatives, the press and the strict pull-up. In “Productive Application of Force” (Jan 2008) he explained why our definition of strength is not equivalent to just muscular contractile force. What really matters is the ability to apply that muscular force to do real physical work, which cannot be independent of the skills and mechanics of functional movement.

In this month’s video, Glassman elaborates further on the relationship between technique and functional movement, power, and fitness. Technique, he explains—like its cousins mechanics, form, and style—is not at odds with intensity but is in fact essential to maximizing power and thus fitness. Proper technique is the mechanism by which potential human energy and strength are translated into real work capacity.

<http://journal.crossfit.com/2008/02/technique-part-1-by-greg-glassman>




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## At the Chalkboard: Threshold Training

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Finding a balance between technique and intensity is one of the things that separates good trainers from great trainers, and it’s one of the keys to getting optimal results from the CrossFit program.

According to Greg Glassman, “control” is just another thing that can be stressed to produce favorable adaptations, just like your cardiorespiratory system must be stressed to produce greater endurance. The ability to maintain greater control at higher speeds must be trained, and CrossFit will help you do that. As you develop better technique and control at high speeds, your power output will increase.

As an analogy, consider a typing test: an outstanding score is a combination of great speed and precise accuracy, and the goal is to improve the output both through practice and training. Working with weights is very similar.

“No one has ever suggested in any endeavor that the best accuracy came about, the highest overall proficiency ever came about, by never testing the speed of the movement.”

<http://journal.crossfit.com/2010/03/chalkboard-threshold>

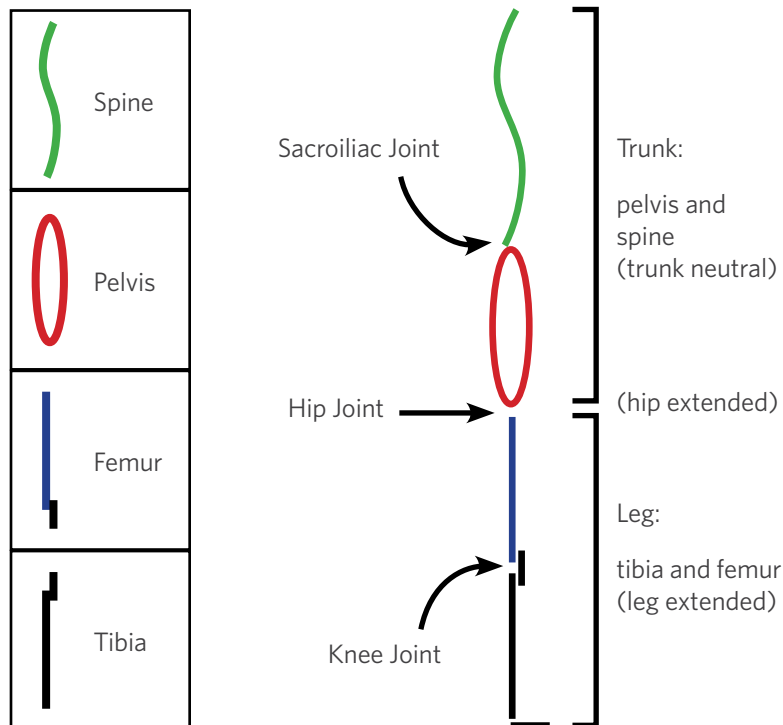


## NOTES

# THE CrossFit TRAINING GUIDE

## Movements

### Anatomy and Physiology for Jocks



#### Anatomy and Physiology for Jocks

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#### The Overhead Squat

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#### The Deadlift

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#### Medicine Ball Cleans

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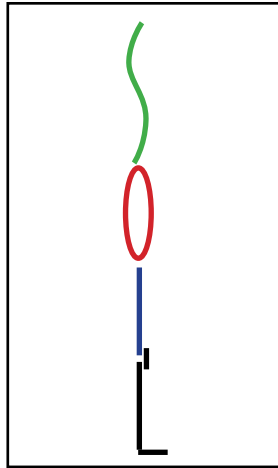
#### The Glute-Ham Developer Sit-up

Page 63

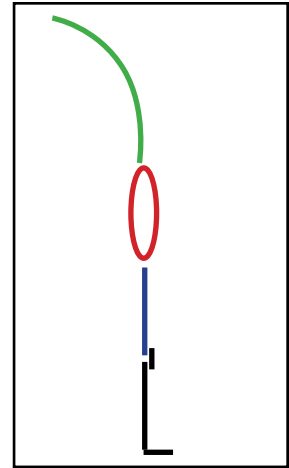
Effective coaching requires efficient communication. This communication is greatly aided by coach and athlete sharing a terminology for both human movement and body parts.

We've developed an exceedingly simple lesson in anatomy and physiology that we believe has improved our ability to accurately and precisely motivate desired behaviors and enhanced our athletes' understanding of both movement and posture.

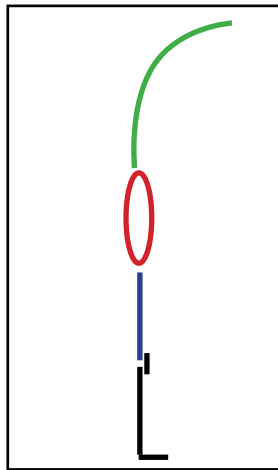
## Anatomy and Physiology for Jocks... (continued)



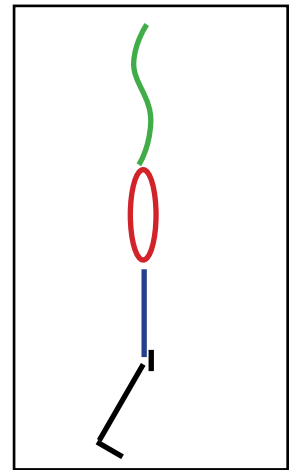
Trunk neutral, hip extension, leg extension



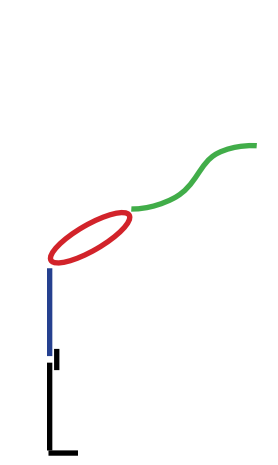
Trunk extension



Trunk flexion



Leg flexion



Hip flexion

Basically, we ask that our athletes learn four body parts, three joints (not including the spine), and two general directions for joint movement. We cap our A&P lesson with the essence of sports biomechanics distilled to three simple rules.

We use a simple iconography to depict the spine, pelvis, femur, and tibia. We show that the spine has a normal "S" shape and where it is on the athlete's body. We similarly demonstrate the pelvis, femur, and tibia.

We next demonstrate the motion of three joints. First, the knee is the joint connecting tibia and femur. Second, working our way up, is the hip. The hip is the joint that connects the femur to the pelvis. Third, is the sacroiliac

## Anatomy and Physiology for Jocks... (continued)

joint (SI joint), which connects the pelvis to the spine. (We additionally make the point that the spine is really a whole bunch of joints.)

We explain that the femur and tibia constitute “the leg” and that the pelvis and spine constitute “the trunk.”

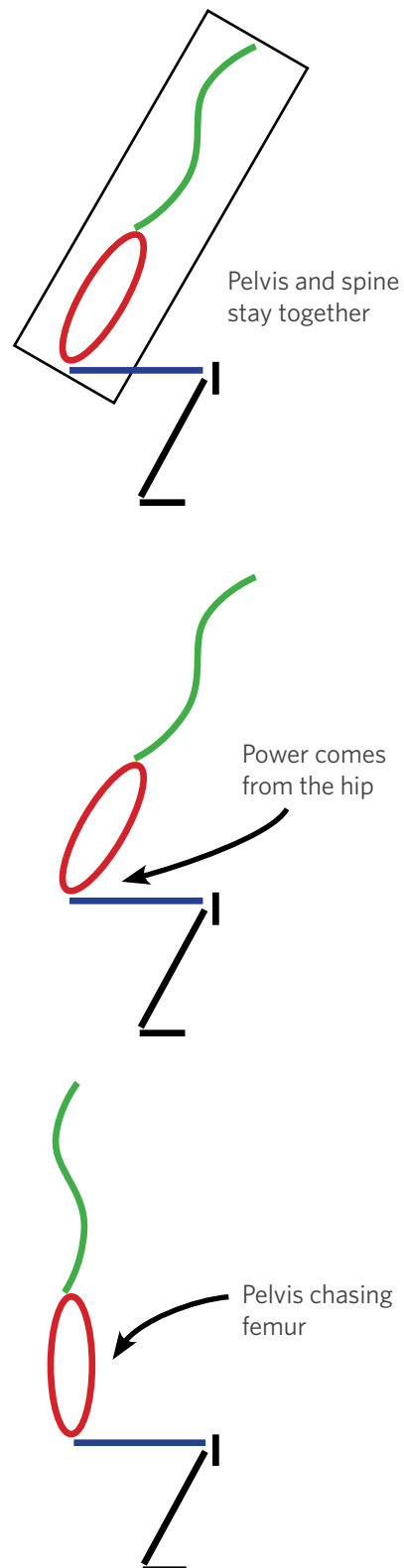
That completes our anatomy lesson – now for the physiology. We demonstrate that “flexion” is reducing the angle of a joint and that “extension” is increasing the angle of a joint.

Before covering our distillation of essential biomechanics we test our students to see if everyone can flex and extend their knee (or “leg”), hip, spine and sacroiliac joint (or “trunk”) on cue. When it is clear that the difference between flexion and extension is understood at each joint we cue for combinations of behaviors, for instance, “flex one leg and trunk but not your hip”.

Once the joints, parts, and movements are clear we offer these three tidbits of biomechanics:

- Functional movement generally weds the spine to the pelvis. The SI joint and spine were designed for small range movement in multiple directions. Endeavor to keep the trunk tight and solid for running, jumping, squatting, throwing, cycling, etc...
- The dynamics of those movements comes from the hip – primarily extension. Powerful hip extension is certainly necessary and nearly sufficient for elite athletic capacity.
- Do not let the pelvis chase the femur instead of the spine. We’ve referred to this in the past as “muted hip function” (Jan ‘03:5). We also call it “frozen hip” because when the pelvis chases the femur the hip angle remains open and is consequently powerless to extend.

Four parts, three joints, two motions, and three rules give our athletes and us a simple but powerful lexicon and understanding whose immediate effect is to render our athletes at once more “coachable”. We couldn’t ask for more.





## Squat Clinic



The squat is essential to your well-being. The squat can both greatly improve your athleticism and keep your hips, back, and knees sound and functioning in your senior years.

Not only is the squat not detrimental to the knees it is remarkably rehabilitative of cranky, damaged, or delicate knees. In fact, if you do not squat, your knees are not healthy regardless of how free of pain or discomfort you are. This is equally true of the hips and back.

The squat is no more an invention of a coach or trainer than is the hiccup or sneeze. It is a vital, natural, functional, component of your being.

The squat, in the bottom position, is nature's intended sitting posture (chairs are not part of your biological make-up), and the rise from the bottom to the stand is the biomechanically sound method by which we

stand-up. There is nothing contrived or artificial about this movement.

Most of the world's inhabitants sit not on chairs but in a squat. Meals, ceremonies, conversation, gatherings, and defecation are all performed bereft of chairs or seats. Only in the industrialized world do we find the need for chairs, couches, benches, and stools. This comes at a loss of functionality that contributes immensely to decrepitude.

Frequently, we encounter individuals whose doctor or chiropractor has told them not to squat. In nearly every instance this is pure ignorance on the part of the practitioner. When a doctor that doesn't like the squat is asked, "by what method should your patient get off of the toilet?" they are at a loss for words.

In a similarly misinformed manner we have heard trainers and health care providers suggest that the knee should not be bent past 90

degrees. It's entertaining to ask proponents of this view to sit on the ground with their legs out in front of them and then to stand without bending the legs more than 90 degrees. It can't be done without some grotesque bit of contrived movement. The truth is that getting up off of the floor involves a force on at least one knee that is substantially greater than the squat.

Our presumption is that those who counsel against the squat are either just repeating nonsense they've heard in the media or at the gym, or in their clinical practice they've encountered people who've injured themselves squatting incorrectly.

It is entirely possible to injure yourself squatting incorrectly, but it is also exceedingly easy to bring the squat to a level of safety matched by walking. In the accompanying article we explain how that is done.



## Squat Clinic... (continued)

On the athletic front, the squat is the quintessential hip extension exercise, and hip extension is the foundation of all good human movement. Powerful, controlled hip extension is necessary and nearly sufficient for elite athleticism. “Necessary” in that without powerful, controlled hip extension you are not functioning anywhere near your potential. “Sufficient” in the sense that everyone we’ve met with the capacity to explosively open the hip could also run, jump, throw, and punch with impressive force.

Secondarily, but no less important, the squat is among those exercises eliciting a potent neuroendocrine response. This benefit is ample reason for an exercise’s inclusion in your regimen.

**The Air Squat**

All our athletes begin their squatting with the “air squat”, that is, without any weight other than body weight. As a matter of terminology when we refer to the “squat” we are talking about an unladen, bodyweight only squat. When we wish to refer to a weighted squat we will use the term back squat, overhead squat, or front squat referring to those distinct weighted squats. The safety and efficacy of training with the front, back, and overhead squats, before the weightless variant has been mastered retards athletic potential.

When has the squat been mastered? This is a good question. It is fair to say that the squat is mastered when both technique and performance are superior. This suggests that none of the twenty-three points above are deficient and fast multiple reps are possible. Our favorite standard for fast multiple reps would be the Tabata Squat (20 seconds on/10 seconds off repeated 8 times) with the weakest of eight intervals being between 18-20 reps. Don’t misunderstand - we’re looking for 18-20 perfect squats in twenty seconds, rest for ten and repeat seven more times for a total of eight intervals.

The most common faults to look for are surrendering of the lumbar curve at the bottom, not breaking the parallel plane with the thighs, slouching in the chest and shoulders, looking down, lifting the heels, and not fully extending the hip at the top. Don’t even think about weighted squats until none of these faults belong to you.

A relatively small angle of hip extension (flat back) while indicative of a beginner’s or weak squat and caused by weak hips extensors is not strictly considered a fault as long as the lumbar spine is in extension.

**How to Squat**

Here are some valuable cues to a sound squat. Many encourage identical behaviors.

1. Start with the feet about shoulder width apart and slightly toed out.
2. Keep your head up looking slightly above parallel.
3. Don’t look down at all; ground is in peripheral vision only.
4. Accentuate the normal arch of the lumbar curve and then pull the excess arch out with the abs.
5. Keep the midsection very tight.
6. Send your butt back and down.
7. Your knees track over the line of the foot.
8. Don’t let the knees roll inside the foot.
9. Keep as much pressure on the heels as possible.
10. Stay off of the balls of the feet.
11. Delay the knees forward travel as much as possible.
12. Lift your arms out and up as you descend.
13. Keep your torso elongated.
14. Send hands as far away from your butt as possible.
15. In profile, the ear does not move forward during the squat, it travels straight down.
16. Don’t let the squat just sink, but pull yourself down with your hip flexors.
17. Don’t let the lumbar curve surrender as you settle in to the bottom.
18. Stop when the fold of the hip is below the knee - break parallel with the thigh.
19. Squeeze glutes and hamstrings and rise without any leaning forward or shifting of balance.
20. Return on the exact same path as you descended.
21. Use every bit of musculature you can; there is no part of the body uninvolved.
22. On rising, without moving the feet, exert pressure to the outside of your feet as though you were trying to separate the ground beneath you.
23. At the top of the stroke stand as tall as you possibly can.

## Squat Clinic... (continued)

**Causes of the Bad Squat**

1. Weak glute/hamstring. The glutes and hams are responsible for powerful hip extension, which is the key to the athletic performance universe.
2. Poor engagement, weak control, and no awareness of glute and hamstring. The road to powerful, effective hip extension is a three to five year odyssey for most athletes.
3. Resulting attempt to squat with quads. Leg extension dominance over hip extension is a leading obstacle to elite performance in athletes.
4. Inflexibility. With super tight hamstrings you're screwed. This is a powerful contributor to slipping out of lumbar extension and into lumbar flexion - the worst fault of all.
5. Sloppy work, poor focus. This is not going to come out right by accident. It takes incredible effort. The more you work on the squat the more awareness you develop as to its complexity.

**Common Faults or Anatomy of a Bad Squat***Not breaking the parallel plane**Rolling knees inside feet**Dropping head**Losing lumbar extension  
(rounding the back - this may be the worst)**Dropping the shoulders**Heels off the ground**Not finishing the squat - not completing hip extension*

## Squat Clinic... (continued)

**Therapies for Common Faults**

**Bar Holds:** Grab a bar racked higher and closer than your normal reach at bottom of squat, then settle into perfect bottom with chest, head, hands, arms, shoulders, and back higher than usual. Find balance, let go, repeat closer and higher, etc. Lifts squat (raises head, chest, shoulders, and torso) putting more load on heels and glute/ham. This immediately forces a solid bottom posture from which you have the opportunity to feel the forces required to balance in good posture. This is a reasonable shoulder stretch but not as good as the overhead squat. (See page 32). This is a very effective therapy.



**Box Squatting:** Squat to a ten inch box, rest at bottom without altering posture, then squeeze and rise without rocking forward. Keep perfect posture at bottom. This is a classic bit of technology perfected at the Westside Barbell Club. See their site and links.

**Bottom to Bottoms:** Stay at the bottom and come up to full extension and quickly return to bottom spending much more time at bottom than top. For instance sitting in the bottom for five minutes coming up to full extension only once every five seconds, i.e. sixty reps.



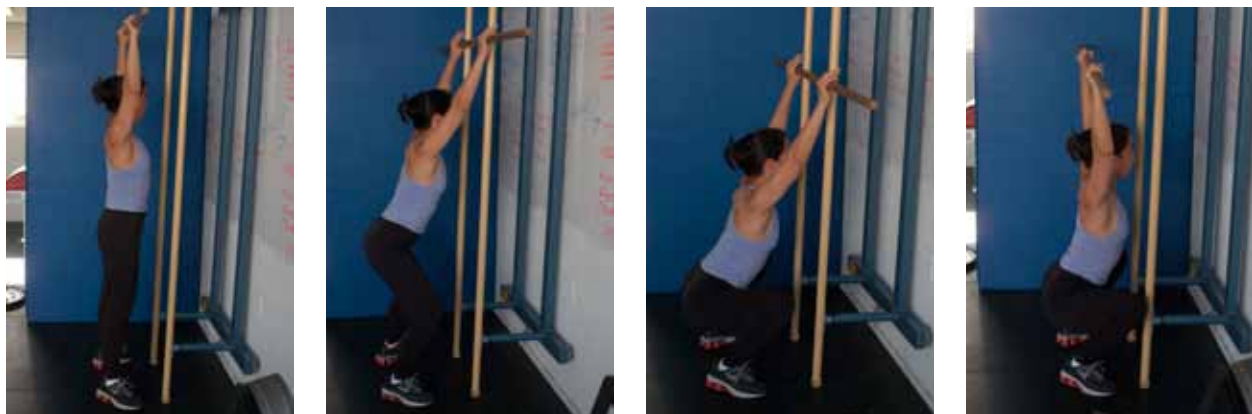
## Squat Clinic... (continued)

Many will avoid the bottom like the plague. You want to get down there, stay down there, and learn to like it.

**Overhead Squats:** (*illustrated below*) Hold broom stick at snatch grip width directly overhead, arms locked. Triangle formed by arms and stick must stay perfectly perpendicular as you squat. Good shoulder stretch and lifts squat. With weight, this exercise demands good balance and posture or loads become wildly unmanageable. The overhead squat is a quick punisher of sloppy technique. If shoulders are too tight this movement will give an instant diagnosis. You can move into a doorway and find where the arms fall and cause the stick to bang into doorway. Lift the arms, head, chest, back, and hip enough to travel up and down

without hitting the doorway. Over time, work to move feet closer and closer to doorway without hitting. The broomstick foundation is critical to learning the Snatch – the world's fastest lift.

**String Touch:** Hang something on a string, like a tennis ball or shrunken head, at max reach, and touch it at every rep. Alternate hands touching. This is a great Tabata drill. This drill will knock the Tabata Interval score (lowest number of squats in any of eight intervals) down for those people who don't complete their squats by not fully extending the hip.



## Squat Troubleshooting - Common Faults and Therapies

<b>Faults</b>	<b>Causes</b>	<b>Therapies</b>
Not going to parallel (not deep enough)	Weak hip extensors, laziness, quad dominance	Bottom to bottoms, Bar Holds, Box Squatting
Rolling knees inside feet	Weak adductors, cheat to quads	Push feet to outside of shoe, deliberately adduct (attempt to stretch floor apart beneath feet)
Dropping head	Lack of focus, weak upper back, lack of upper back control	Bar Holds, Overhead Squats
Losing lumbar extension	Lack of focus, tight hamstrings, cheat for balance due to weak glute/hams	Bar Holds, Overhead Squats
Dropping shoulders	Lack of focus, weak upper back, lack of upper back control, tight shoulders	Bar Holds, Overhead Squats
Heels off ground	Cheat for balance due to weak glute/hams	Focus, Bar Holds
Incomplete hip extension	Cheating, sets wrong neurological pattern avoiding most important part of squat	String Touch



## Squat Clinic... (continued)

**Air Squat**

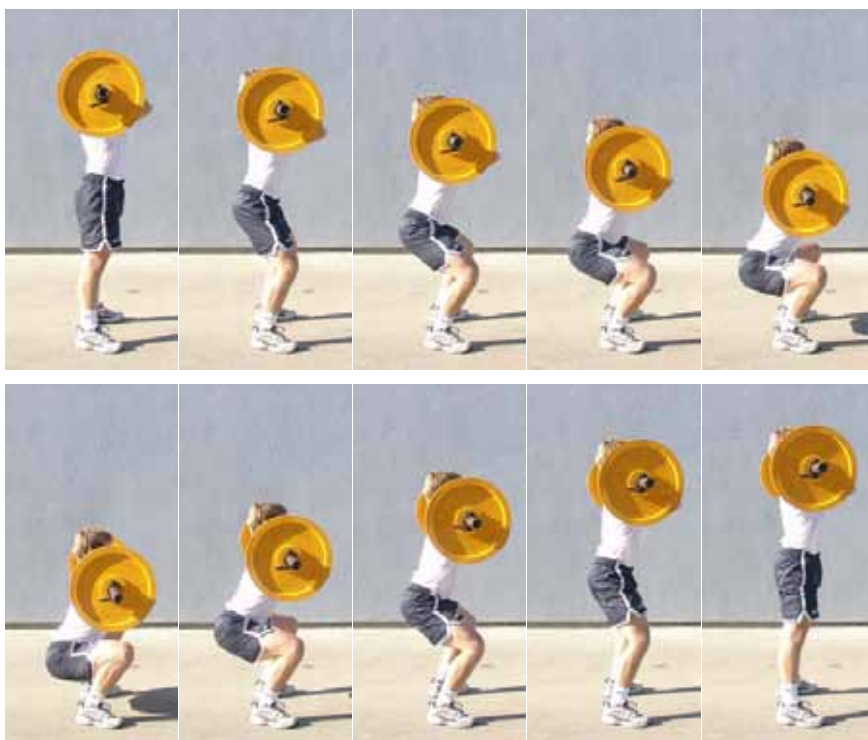
- Back arched
- Look straight ahead
- Keep weight on heels
- Good depth = below parallel
- Chest high
- Midsection tight

The squat is essential to human movement, a proven performance enhancer and a gateway movement to the best exercise in strength and conditioning.

**Front Squat**

- Bar rests on chest and shoulders with loose grip - "racked"
- Mechanics like other squats

The hardest part of the front squat may be the "racked position". Practice until your wrists are "O.K." with it. Handstands help. This one will force shoulder and wrist flexibility.



## NOTES

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## The Overhead Squat

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The overhead squat is the ultimate core exercise, the heart of the snatch, and peerless in developing effective athletic movement.

This functional gem trains for efficient transfer of energy from large to small body parts – the essence of sport movement. For this reason it is an indispensable tool for developing speed and power.

The overhead squat also demands and develops functional flexibility, and similarly develops the squat by amplifying and cruelly punishing faults in squat posture, movement, and stability.

The overhead squat is to midline control, stability, and balance what the clean and snatch are to power—unsurpassed.

Ironically, the overhead squat is exceedingly simple yet universally nettlesome for beginners. There are three common obstacles to learning the overhead squat. The first is the scarcity of skilled instruction—outside of the Olympic lifting community most instruction on the overhead squat is laughably horribly, wrong—dead wrong. The second is a weak squat—you need to have a rock-solid squat to learn the overhead squat. We strongly recommend you review the December 2002 issue of the CrossFit Journal on squatting before attempting the overhead squat; you could save yourself a lot of time in the long run. The third obstacle is starting with too much weight—you haven't a snowball's chance in hell of learning the overhead squat with a bar. You'll need to use a length of dowel or plastic PVC pipe; use anything over five pounds to learn this move and your overhead squat will be stillborn.

## The Overhead Squat... (continued)

**Here is our seven step process for learning the overhead squat:**

1. Start only when you have a strong squat and use a dowel or PVC pipe, not a weight. You should be able to maintain a rock-bottom squat with your back arched, head and eyes forward, and body weight predominantly on your heels for several minutes as a prerequisite to the overhead squat. Even a 15-pound training bar is way too heavy to learn the overhead squat.



2. Learn locked-arm “dislocates” or “pass-throughs” with the dowel. You want to be able to move the dowel nearly three-hundred and sixty degrees starting with the dowel down and at arms length in front of your body and then move it in a wide arc until it comes to rest down and behind you without so much as slightly bending your arms at any point in its travel. Start with a grip wide enough to easily pass through, and then repeatedly bring the hands in closer until passing through presents a moderate stretch of the shoulders. This is your training grip.





## The Overhead Squat... (continued)

3. Be able to perform the pass-through at the top, the bottom, and everywhere in between while descending into the squat. Practice by stopping at several points on the path to the bottom, hold, and gently, slowly, swing the dowel from front to back, again, with locked arms. At the bottom of each squat slowly bring the dowel back and forth moving from front to back.



4. Learn to find the frontal plane with the dowel from every position in the squat. Practice this with your eyes closed. You want to develop a keen sense of where the frontal plane is located. This is the same drill as step 3 but this time you are bringing the dowel to a stop in the frontal plane and holding briefly with each pass-through. Have a training partner check to see if at each stop the dowel is in the frontal plane.



## The Overhead Squat... (continued)

5. Start the overhead squat by standing straight and tall with the dowel held as high as possible in the frontal plane. You want to start with the dowel directly overhead, not behind you, or, worse yet, even a little bit in front.

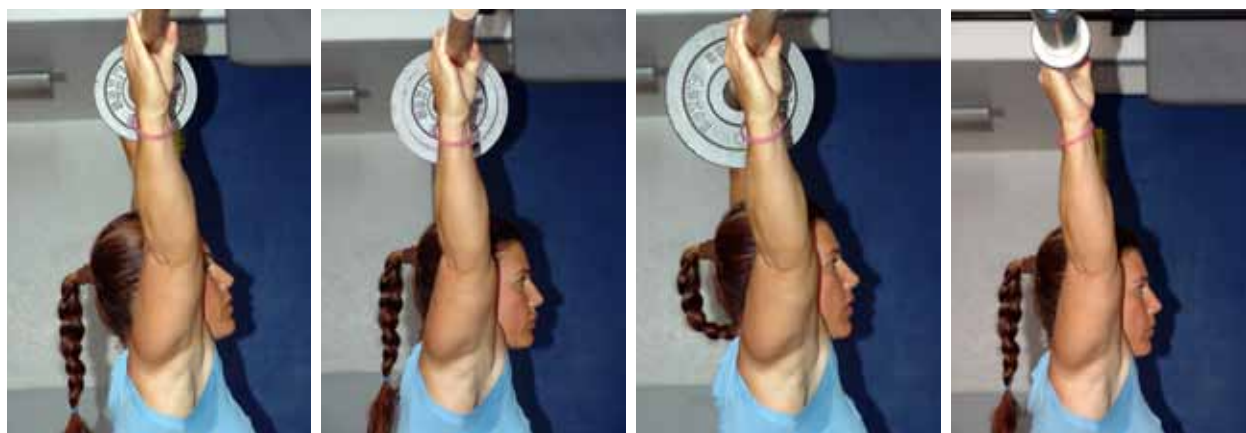


6. Very slowly lower to the bottom of the squat, keeping the dowel in the frontal plane the entire time. Have a training partner watch from your side to make sure that the dowel does not move forward or backward as you squat to bottom. Moving slightly behind the frontal plane is O.K., but forward is dead wrong. If you cannot keep the dowel from coming forward your grip may be too narrow. The dowel will not stay in the frontal plane automatically; you'll have to pull it back very deliberately as you descend.



## The Overhead Squat... (continued)

- Practice the overhead squat regularly and increase load in tiny increments. We can put a 2.5-pound plate on the dowel, then a 5, then a 5 and a 2.5, and then a 10. Next use a 15-pound training bar, but only while maintaining perfect form. There's no benefit to adding weight if the dowel, and later the bar, cannot be kept in the frontal plane.



With practice, you will be able to bring your hands closer together and still keep the bar in the frontal plane. Ultimately you can develop enough control and flexibility to descend to a rock bottom squat with your feet together and hands together without the dowel coming forward. Practicing for this is a superb warm-up and cool-down drill and stretch.

The overhead squat develops core control by punishing any forward wobble of the load with an enormous and instant increase in the moment about the hip and back. When the bar is held perfectly overhead and still, which is nearly impossible, the overhead squat does not present greater load on the hip or back, but moving too fast, along the wrong line of action, or wiggling can bring even the lightest loads down like a house of cards. You've two, and only two, safe options for bailing out – dumping the load forward and stepping or falling backward or dumping backward and stepping or falling forward. Both are safe and easy. Lateral escapes are not an option.

The difference between your overhead squat and your back or front squat is a solid measure of your midline stability and control and the precision of your squatting posture and line of action. Improving and developing your overhead squat will fix faults not visible in the back and front squat.

As your max overhead, back, and front squat each rise, their relative measure reveals much about your developing potential for athletic movement.

An average of your max back and front squat is an excellent measure of your core, hip, and leg strength. Your max overhead squat is an excellent measure of your core stability and control and ultimately your ability to generate effective and efficient athletic power.

Your max overhead squat will always be a fraction of the average of your max back and front squat but, ideally, with time, they should converge rather than diverge.

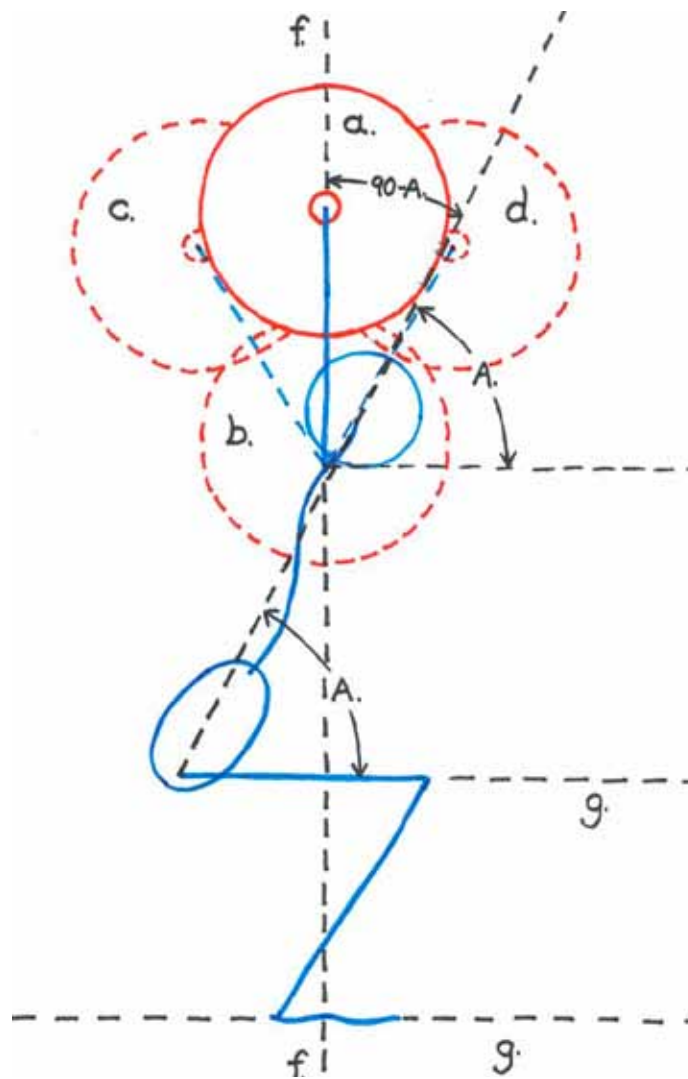
Should they diverge, you are developing hip and core strength, but your capacity to efficiently apply power distally is reduced. In athletic pursuits you may be prone to injury. Should they converge, you are developing useful strength and power that can be successfully applied to athletic movements.

The functional application or utility of the overhead squat may not be readily apparent, but there are many real-world occurrences where objects high enough to get under are too heavy or not free enough to be jerked or pressed overhead yet can be elevated by first lowering your hips until your arms can be locked and then squatting upwards.

Once developed, the overhead squat is a thing of beauty—a masterpiece of expression in control, stability, balance, efficient power, and utility. Get on it.



## The Overhead Squat... (continued)



**A:** The torso's angle of inclination above horizontal. As a squat matures this angle increases. The squat becomes more upright as the athlete's strength and neural "connectedness" to the posterior chain increase. Lower angles of inclination are created in an attempt to cantilever away from a weak posterior chain and onto the quadriceps. While technically correct, the lower angle is mechanically disadvantaged.

**90-A:** This is the angle of rotation of the arms, at the shoulders, past overhead. The lower A is, the greater the rotation, 90-A, required of the shoulders to keep the bar in the frontal plane. The larger 90-A is, the wider the grip required to allow the shoulders to rotate to keep the bar in the frontal plane. Ultimately the connectedness/strength of the posterior chain will determine the width of the grip, elevation of the squat, and degree of rotation of the shoulders. Maturity and quality of the squat is a determinant of all of the mechanics of the overhead squat.

**g:** These lines mark horizontal

**f:** This line defines the frontal plane. It divides the athlete front half from back half. In the squat (as with most weightlifting movements) the athlete endeavors to keep the load in this plane. If a load deviates substantially from this plane the athlete has to bring the load back, which in turn pulls the athlete off balance.

**b:** This is roughly the position for a back or front squat.

**a:** This is the position for the overhead squat. With perfect stability, movement, and alignment this position does not increase the moment about the hip or back. The difference in an athlete's strength when squatting here, overhead, as opposed to position b, the back or front squat, is a perfect measure of instability in the torso, legs, or shoulders, and improper line of action in the shoulders, hips, or legs, and weak or flawed posture in the squat.

**c:** This position has the load behind the frontal plane. It can actually decrease the moment on the hip and back. As long as balance is maintained the position is strong.

**d:** This is a fatal flaw in the overhead squat. Even slight movement in this direction greatly increases the moment in the hip and back. Moving in this direction with even a small load can collapse the squat like a house of cards.



The Overhead Squat... (continued)

### Overhead Squat

- Grip as wide as needed
- Go slowly
- Head up!
- Stay on heels
- Break parallel

The overhead squat is an important stretch, perfect for warmups, integral to the snatch and will expose most functional inflexibility and any mechanical deficiency in your squat.



## NOTES



## Shoulder Press, Push Press, Push Jerk

### Introduction

Learning the progression of lifts that moves from the shoulder press, to the push press, to the push jerk has long been a staple of the CrossFit regimen. This progression offers the opportunity to acquire some essential motor recruitment patterns found in sport and life (functionality) while greatly improving strength in the “power zone” and upper body. In terms of power zone and functional recruitment patterns, the push press and push jerk have no peer among the other presses like the “king” of upper body lifts, the bench press. As the athlete moves from shoulder press, to push press, to push jerk, the importance of core to extremity muscle recruitment is learned and reinforced. This concept alone would justify the practice and training of these lifts. Core to extremity muscular recruitment is foundational to the effective and efficient performance of athletic movement.

The most common errors in punching, jumping, throwing, and a multitude of other athletic movements typically express themselves as a violation of this concept. Because good athletic movement begins at the core and radiates to the extremities, core strength is absolutely



essential to athletic success. The region of the body from which these movements emanate, the core, is often referred to as the “power zone.” The muscle groups comprising the “power zone” include the hip flexors, hip extensors (glutes and hams), spinal erectors, and quadriceps.

These lifts are enormous aids to developing the power zone. Additionally, the advanced elements of the progression, the push press and jerk, train for and develop power and speed. Power and speed are “king” in sport performance. Coupling force with velocity is the very essence of power and speed. Some of our favorite and most developmental lifts lack this quality. The push press and jerk are performed explosively –

that is the hallmark of speed and power training. Finally, mastering this progression gives ideal opportunity

to detect and eliminate a postural/mechanical fault that plagues more athletes than not – the pelvis “chasing” the leg during hip flexion. (See article) This fault needs to be searched out and destroyed. The push press performed under great stress is the perfect tool to conjure up this performance wrecker so it can be eliminated.

### Mechanics

#### 1. The Shoulder Press

- a. Set up: Take bar from supports or clean to racked position. The bar sits on the shoulders with the grip slightly wider than shoulder width. The elbows are below and in front of bar. Stance is approximately shoulder width. Head is tilted slightly back allowing bar to pass.
- b. Press: Press the bar to a position directly overhead.



## Shoulder Press, Push Press, Push Jerk... (continued)

**2. The Push Press**

- a. Set up: The set up is the same as the shoulder press.
- b. Dip: Initiate the dip by bending the hips and knees while keeping the torso upright. The dip will be between  $\frac{1}{8}$  and  $\frac{1}{4}$  of a squat in depth.
- c. Drive: With no pause at the bottom of the dip, the hips and legs are forcefully extended.
- d. Press: As the hips and legs complete extension the shoulders and arms forcefully press the bar overhead until the arms are fully extended.

**3. The Push Jerk**

- a. Set up: The set up is the same as for the shoulder press and push press.
- b. Dip: The dip is identical to the push press
- c. Drive: The drive is identical to the push press
- d. Press and Dip: This time instead of just pressing, you press and dip a second time simultaneously, catching the bar in a partial squat with the arms fully extended overhead.
- e. Finish: Stand or Squat to fully erect with bar directly overhead identical to terminal position in push press and shoulder press.

Shoulder Press, Push Press, Push Jerk... (continued)

### The Role of the Abs in the Overhead Lifts

Athletically, the abdominals primary role is midline stabilization, not trunk flexion. They are critical to swimming, running, cycling, and jumping, but never is their stabilizing role more critical than when attempting to drive loads overhead, and, of course, the heavier the load the more critical the abs role becomes. We train our

athletes to think of every exercise as an ab exercise but in the overhead lifts it's absolutely essential to do so. It is easy to see when an athlete is not sufficiently engaging the abs in an overhead press – the body arches so as to push the hips, pelvis, and stomach ahead of the bar. Constant vigilance is required of every lifter to prevent and correct this postural deformation.



### Summary

From shoulder press to push jerk the movements become increasingly more athletic, functional, and suited to heavier loads. The progression also increasingly relies on the power zone. In the shoulder press the power zone is used for stabilization only. In the push press the power zone provides not only stability, but also the primary impetus in both the dip and drive. In the push jerk the power zone is called on for the dip, drive, second dip, and squat. The role of the hip is increased in each exercise.

With the push press you will be able to drive overhead as much as 30% more weight than with the shoulder press. The push jerk will allow you to drive as much as 30% more overhead than you would with the push press.

In effect the hip is increasingly recruited through the progression of lifts to assist the arms and shoulders in raising loads overhead. After mastering the push jerk you will find that it will unconsciously displace the push press as your method of choice when going overhead.

The second dip on the push jerk will become lower and lower as you both master the technique and increase the load. At some point in your development, the loads will become so substantial that the upper body cannot contribute but a fraction to the movement at which point the catch becomes very low and an increasing amount of the lift is accomplished by the overhead squat.

On both the push press and jerk the “dip” is critical to the entire movement. It may come as a surprise to some that the dip is not a relaxed fall but an explosive dive. The stomach is held very tightly and the resultant turn around from dip to drive is sudden, explosive, and violent.

### Try This:

Start with 95 pounds and push press or jerk 15 straight reps rest thirty seconds and repeat for total of five sets of 15 reps each. Go up in weight only when you can complete all five sets with only thirty seconds rest between each and do not pause in any set.

Shoulder Press, Push Press, Push Jerk... (continued)

### And This:

Repetition one: shoulder press, repetition two: push press, repetition three: push jerk. Repeat until shoulder press is impossible then continue until push press is impossible then five more push jerk. Start with 95 pounds and go up only when the total reps exceed thirty.

Check out these sites for more push press technique:

<http://www.exrx.net/WeightExercises/OlympicLifts/PushPress.html>

[http://www.hhs.csus.edu/homepages/khs/Kilogram4/public/Exercises/table\\_of\\_contents\\_Exercises.htm](http://www.hhs.csus.edu/homepages/khs/Kilogram4/public/Exercises/table_of_contents_Exercises.htm)



## Push Press

- Dip (quick drop of the hip)
- Drive (rebound extension of leg and hip)
- Press

A gateway movement to the jerks, the push press is an important introduction to the “core to extremity” nature characteristic of most functional movement.



## Push Jerk

- Dip (quick drop of the hip)
- Drive (rebounding extension of leg and hip)
- Press and dip (press overhead while dropping hip again)
- Rise to full extension (extend hip and leg again)
- Lower bar to shoulders and repeat

More functional, efficient, and effective than the push-press, this is an important lift. The push-jerk with a great cycling time is a powerful conditioning tool.

## NOTES



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## The Deadlift

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The deadlift is unrivaled in its simplicity and impact while unique in its capacity for increasing head to toe strength.

Regardless of whether your fitness goals are to “rev up” your metabolism, increase strength or lean body mass, decrease body fat, rehabilitate your back, improve athletic performance, or maintain functional independence as a senior, the deadlift is a marked shortcut to that end.

To the detriment of millions, the deadlift is infrequently used and seldom seen either by most of the exercising public and/or, believe it or not, by athletes.

It might be that the deadlift’s name has scared away the masses; its older name, “the healthlift,” was a better choice for this perfect movement.

In its most advanced application the deadlift is prerequisite to, and a component of, “the world’s fastest lift,” the snatch, and “the world’s most powerful lift,” the clean; but it is also, quite simply, no more than the safe and sound approach by which any object should be lifted from the ground.

The deadlift, being no more than picking a thing off the ground, keeps company with standing, running, jumping, and throwing for functionality but imparts quick and prominent athletic advantage like no other exercise. Not until the clean, snatch, and squat are well developed will the athlete again find as useful a tool for improving general physical ability.

The deadlift’s primal functionality, whole-body nature, and mechanical advantage with large loads suggest its strong neuroendocrine impact, and for most athletes the deadlift delivers such a quick boost in general strength and sense of power that its benefits are easily understood.

If you want to get stronger, improve your deadlift. Driving your deadlift up can nudge your other lifts upward, especially the Olympic lifts.

Fear of the deadlift abounds, but like fear of the squat, it is groundless. No exercise or regimen will protect the back from the potential injuries of sport and life or the certain ravages of time like the deadlift. (See the inset “Doc & Coach” on page 3)

We recommend deadlifting at near max loads once per week or so and maybe one other time at loads that would be insignificant at low reps. Be patient and learn to celebrate small infrequent bests.

Major benchmarks would certainly include bodyweight, twice bodyweight, and three times bodyweight deadlifts representing a “beginning,” “good,” and “great” deadlifts respectively.

For us, the guiding principles of proper technique rest on three pillars: orthopedic safety, functionality, and mechanical advantage. Concerns for orthopedic stresses and limited functionality are behind our rejection of wider than hip to shoulder width stances. While acknowledging the remarkable achievements of many powerlifters with the super wide deadlift stance we feel that its limited

functionality (we can’t safely, walk, clean, or snatch from “out there”) and the increased resultant forces on the hip from wider stances warrant only infrequent and moderate to light exposures to wider stances.

Experiment and work regularly with alternate, parallel, and hook grips. Explore carefully and cautiously variances in stance, grip width, and even plate diameter – each variant uniquely stresses the margins of an all-important functional movement. This is an effective path to increased hip capacity.

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**The deadlift keeps company  
with standing, running, jumping,  
and throwing for functionality  
but imparts quick and  
prominent athletic advantage  
like no other exercise.**

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## The Deadlift... (continued)

Consider each of the following cues to a sound deadlift. Many motivate identical behaviors, yet each of us responds differently to different cues.

- Natural stance with feet under hips
- Symmetrical grip whether parallel, hook, or alternate
- Hands placed where arms won't interfere with legs while pulling from the ground
- Bar above juncture of little toe and foot
- Shoulders slightly forward of bar
- Inside of elbows facing one another
- Chest up and inflated
- Abs tight
- Arms locked and not pulling
- Shoulders pinned back and down
- Lats and triceps contracted and pressing against one another
- Keep your weight on your heels
- Bar stays close to legs and essentially travels straight up and down
- Torso's angle of inclination remains constant while bar is below the knee
- Head straight ahead
- Shoulders and hips rise at same rate when bar is below the knee
- Arms remain perpendicular to ground until lockout



Mixed Grip



Parallel Grip



## The Deadlift... (continued)

**Doc and Coach**

(Transcript of actual conversation)

Doc: Many of my patients shouldn't be doing the deadlift.

Coach: Which ones are those, Doc?

Doc: Many are elderly, marginally ambulatory, and frail/feeble and osteoporotic.

Coach: Doc, would you let such a patient, let's say an old woman, walk to the store to get cat food?

Doc: Sure, If the walk weren't too far, I'd endorse it.

Coach: All right, suppose after walking home she came up to the front door and realized that her keys were in her pocket. Is she medically cleared to set the bag down, get her keys out of her pocket, unlock the door, pick the bag back up, and go in?

Doc: Of course, that's essential activity

Coach: As I see it the only difference between us is that I want to show her how to do this "essential activity" safely and soundly and you don't.

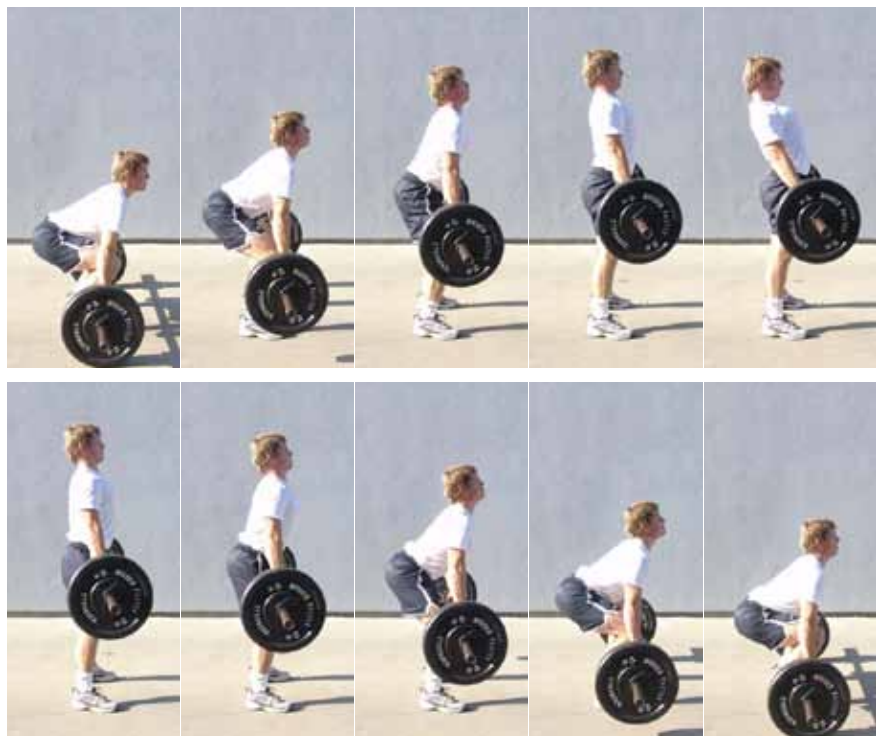
Doc: I see where you're going. Good point.

Coach: Doc, we haven't scratched the surface.

**Deadlift**

- Look straight ahead
- Keep back arched
- Arms don't pull, they're just straps
- Bar travels along legs
- Push with the heels

The deadlift, like the squat, is essential functional movement and carries a potent hormonal punch. This is core training like no other.



## Sumo Deadlift Highpull

- Start on ground
- Wide, “Sumo” stance
- Take narrow grip on bar
- Look straight ahead
- Keep back arched
- Pull with hips and legs only until both are at full extension
- Flick hip near full extension
- Powerfully shrug
- Immediately pull with arms continuing the bars travel up
- Keep the elbows as far above your hands as possible
- Bring the bar right up under the chin briefly
- Lower to hang
- Lower to ground

For range of motion, line of action, and length and speed of action, the Sumo Deadlift High Pull is a great conjugate to the “Thruster”. At low loads this is our favorite substitute for Concept II Rowing.



## NOTES



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## Medicine Ball Cleans

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The clean and jerk and the snatch, the Olympic lifts, present the toughest learning challenge in all of weight training. Absent these lifts, there are no complex movements found in the weight room. By contrast, the average collegiate gymnast has learned hundreds of movements at least as complex, difficult, and nuanced as the clean or snatch. In large part because most weight training is exceedingly simple, learning the Olympic lifts is for too many athletes a shock of frustration and incompetence.

Sadly, many coaches, trainers, and athletes have avoided these movements precisely because of their technical complexity. Ironically, but not surprisingly, the technical complexity of the quick lifts exactly contain the seeds of their worth. They train for, that is, they simultaneously demand and develop strength, power, speed, flexibility, coordination, agility, balance, and accuracy.

When examining the reasons offered for not teaching the Olympic lifts we cannot help but suspect that the lifts' detractors have no first hand (real) experience with them. We want to see someone, anyone, do a technically sound clean or snatch at any weight and then offer a rationale for the movement's restricted applicability. Were they dangerous or inappropriate for any particular population, we'd find coaches intimate with the lifts articulating the nature of their inappropriateness. We do not.

At CrossFit everyone learns the Olympic lifts—that's right, everyone.

We review here the bad rap hung on the Olympic lifts because we've made exciting progress working past the common misconceptions and fears surrounding their

Medicine Ball Clean... (continued)

## The Medicine Ball Clean



## Medicine Ball Clean... (continued)

introduction, execution, and applicability to general populations. The medicine ball clean has been integral to our successes.

In the June 2003 issue of the CrossFit Journal we covered the foundation of one of the lifts, the clean. In that issue we made brief mention of our use of the medicine ball to teach the clean. This month we revisit and update that work.

The *Dynamax* medicine ball is a soft, large, pillowy ball that ranges in weight from four to twenty-eight pounds available in twopound increments to twenty pounds. It is unthreatening, even friendly.

Working with *Dynamax* balls we introduce the starting position and posture of the deadlift then the lift itself. In a matter of minutes we then shift our efforts to front squatting with the ball. After a little practice with the squat we move to the clean. (A similar approach is used to teach the shoulder press, push press, and push jerk.)

The clean is then reduced to “pop the hip and drop – catch it in a squat” and it’s done. The devil’s in the details, but the group is cleaning in five minutes. It’s a legitimate, functional clean. This clean may in fact have clearer application, than cleaning with a bar, to heaving a bag of cement into a pick-up or hucking up a toddler to put in a car seat.

**Common Faults ...and Their Corrections***Heels up**Back rounded**Head down**Corrected starting position: heels down, head up, back arched**Arms bent**Pulling too high*



Medicine Ball Clean... (continued)

**Common Faults ...and Their Corrections** (cont'd)



*No hip extension*



*No shrug*



*Curling the ball*



*Corrections: Arms locked, full extension, shrug, not pulling too high, ball kept close to body*



*Low slow elbows in catch*



*Correction: Catch with elbows high*



*Arms bent overhead*



*Arms not straight overhead*



*Corrected overhead position*

## Medicine Ball Clean... (continued)

The faults universal to lifting initiates are all there in as plain sight with the ball as with the bar. Any subtleties of matured and modern bar technique not possible with the ball are not immediate concerns, and their absence is plainly justified by the imparted understanding that this is functional stuff and applicable to all objects we may desire to heave from ground to chest.

In a group of mixed capacities the newbies get the light balls and the veterans get the heavy ones. In thirty rep doses whoever ends up with the twenty-eight pound ball is going to get a workout regardless of their abilities. The heavier balls impart a nasty wallop far beyond the same work done with a bar or dumbbell of equal weight; considerable additional effort is expended adducting the arms, which is required to “pinch” the ball and keep it from slipping.

We use the medicine ball clean in warm-ups and cool downs to reinforce the movement and the results are clearly manifest in the number and rate of personal records we’re seeing in bar cleans with all our athletes. Yes, the benefit transfers to the bar - even for our better lifters!

In the duration of a warm-up there are uncountable opportunities to weed out bad mechanics. Pulling with the arms, not finishing hip extension, failing to shrug, pulling too high, lifting the heels in the first pull, curling

the ball, losing back extension, looking down, catching high then squatting, slow dropping under, slow elbows... all the faults are there.

With several weeks practice, a group will go from “spastic” to a precision medicine ball drill team in perfect synch. In fact, that is how we conduct the training effort.

We put the athletes in a small circle, put the best clean available in the center as leader, and ask the athletes to mirror the center. Screw-ups are clearly evident by being in postures or positions out of synch. Attention is riveted on a good model while duplicating the movement in real time. The time required for “paralysis through analysis” is wonderfully not there. Thinking becomes doing.

Individuals generally impervious to verbal cues become self-correcting of faults made apparent by watching and comparing to others. It is not uncommon for shouts of correction to be lobbed across the circle from participant to participant. The number of coaching cues and discussion becomes reduced to the minimum and essential as the process is turned into a child’s game of “follow the leader”.

Where this becomes “dangerous”, “bad for the joints”, “too technical to learn” or any other nonsense routinely uttered about weightlifting we don’t know.




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We review here the bad rap hung on the Olympic lifts because we’ve made exciting progress working past the common misconceptions and fears surrounding their introduction, execution, and applicability to general populations. The medicine ball clean has been integral to our successes.

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## NOTES

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## The Glute-Ham Developer Sit-up

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We have four glute-ham developers (GHDs) ([http://store.sorinex.com/product\\_p/ghb-1.htm](http://store.sorinex.com/product_p/ghb-1.htm)) at CrossFit Santa Cruz. We use them for back extensions and sit-ups. This month we explore the glute-ham developer sit-up, once more commonly referred to as a “roman chair sit-up.”

The GHD sit-up was once a gym staple. In the gym today only rarely will someone be found doing other than back extensions on the GHD. In no small measure the decline of the GHD or roman chair sit-up coincided with the advent of the crunch. The crunch came to fashion on warnings and claims in popular media of the traditional sit-up’s destructive impact on the back.

It was argued that the GHD style sit-up’s primary movers were the hip flexors and not the abs and consequently this sit-up, and sit-ups like it, were actually not good abdominal exercises. It was further argued that recruiting the hip flexors to lift the torso was destructive to the lumbar spine.

Once every couple of years we get lucky and find an exercise physiologist to repeat this message of poor ab recruitment and lower back destruction standing in front of the GHD apparatus. What we do is ask them to mount the GHD and perform a set of thirty sit-ups for us while rehashing the poor recruitment claim.

The fun comes the following day when the report comes back from the exercise scientist that they are almost too sore to sit upright. Laughing, walking, standing, and moving are all excruciating. Where are they hit? The abs.

Our favorite story along these same lines comes from Matt Weaver ([www.speed101.com](http://www.speed101.com)), arguably the world’s fastest human being. On top of being known for hitting 85 mph on a bike, Matt was crowned “King Sit-Up” in high school for completing 100 perfect-form bodyslapping sit-ups in one minute. In one of his earlier visits to CrossFit Santa Cruz he found himself in a multi-station circuit with a group of CrossFit veterans that included twenty-one reps of GHD sit-ups with a full range of motion, hands reaching back to the floor.

The workout left Matt sick in the immediate aftermath. This was a surprise for sure but nothing prepared Matt for what came the following morning: “I awoke later without the slightest ability to sit up. It was as if the six pack was totally gone, though all ribs remained. The curse had left me merely able to roll over and slither like a snake off the edge of the bed. From there I had to use my arms in humiliating ways to move about. I avoided being seen. A week passed, and I began to revitalize.”

The worst was yet to come! In the wake of Matt’s being dethroned as King Sit-Up, his abs had swollen and distended markedly. This kid looked fat and sunburned where the week before he’d been ripped and lily white. As the swelling subsided, his scrotum grew and grew and grew. Matt’s father, John, is an ER doc, so he was consulted. He laughed himself to near seizure. (Our kind of doc.)

Before the swelling stopped Matt’s scrotum had become the size of a small and very ugly cantaloupe. Why we have no pictures we’ll never understand.

Apparently the fluids that had swollen Matt’s abs had drained into the inguinal canal and filled the scrotum. Oh, and apparently GHD sit-ups recruit the abs. Matt is convinced.

The lesson we’ve drawn from the GHD sit-up is that in spite of the primacy of hip flexors over trunk flexors, or the abs, in this sit-up it recruits the abs powerfully in two ways. First, the movement takes the trunk from hyperextension to full flexion, albeit with negligible load. (No crunch can match this range of motion.) Second, the role of the abs in this sit-up is powerful and largely isometric—i.e., they stabilize the torso from undue extension.

This second point is consistent with our belief that the most powerful, functional, and developmental contractions of the trunk are isometric, not isokinetic. Our favorite ab exercises are predominantly stabilization or isometric exercises. The GHD sit-up, the L sit, and the overhead squat share this stabilization role. The lack of

## The Glute-Ham Developer Sit-Up... (continued)

trunk flexion in these moves hides their potency from the uninitiated.

Our experience with athletes and static hip flexion work like the L sit and more dynamic exercises like the GHD sit-up have led us to several conclusions:

1. The hip flexors' purchase and strength suggest their importance to functional movement. One expert calculated that they are capable of generating many times the force that the abs can. To think that muscles with that much mechanical advantage should not be used to that advantage is ridiculous.
2. Most modern athletes are hip flexion weak and it affects most performance.
3. Weak hip flexors assure weak abs—especially weak lower abs—and no amount of crunches can compensate. (It seems that every gym has an abs class instructor who has a prominent lower abdominal pooch. Ask her to hold one knee up while standing on the other leg and to resist your pushing the knee downward with a couple of fingers. It's easy to push the knee down, and it shouldn't be).
4. Without static contraction/stabilization exercises, the abs never learn to perform their most critical, functional, role—midline stabilization.

What about the danger to the lower back purported to be induced by strong hip flexor work? We have neither induced nor seen this damage. We do however have some hunches as to how this might have occurred in communities where roman chair sit-ups and traditional military PT sit-ups were in wide acceptance.

First, in military and law enforcement PT where the sit-up was king, it was and is essentially a biphasic movement. With feet anchored and knees bent, this situp comes up with a slight pause in the middle of the action. Look at video of someone doing these sit-ups and you'll see the pause.

What is happening is that the upper back makes solid contact with the ground under the upper abs and so they can flex the trunk and fulcrum off the contact point. As the sit-up continues, the middle abs flex the torso but

the lumbar curve surrenders without finding resistance and at full middle rectus contraction the spine is neutral and not flexed. The contraction occurred with no real load; the belly and back just sank closer to the ground. This stalls the sit-up but the pelvis and low back have solid contact with the ground so the hip flexors complete the movement. The natural, biphasic, one-two count of the military sit-up is a repeat of upper abs throwing the movement to the hip flexors where they complete the movement. Upper abs, hip flexors. Upper abs, hip flexors. No effective middle ab work.

This deficiency of middle ab work, and consequently strength in the middle rectus, and the violence of the toss from upper to lower abs may have presented unhealthy wear and tear on the lumbar spine. This understanding came, in part, from some brilliant work by Koch, Blom, and Jacob in producing the "Ab Mat" ([http://www.backbuilder.com/abmat\\_situps.htm](http://www.backbuilder.com/abmat_situps.htm)).

Second, in watching people perform situps on the GHD we note that very few employ the full complement of hip flexors in sitting up. The hip flexors include the iliopsoas and rectus femoris. The iliopsoas originates at the lumbar spine and attaches to the femur. In the sit-up it pulls the athlete to seated by the lumbar spine, potentially creating nettlesome shear forces on the spine. Rectus femoris is the top piece of the quadriceps and it both extends the leg and flexes the hip. Rectus femoris originates at the pelvis and attaches to the patella via the patellar tendon. In the sit-up rectus femoris pulls the athlete to seated from both the pelvis and the iliac spine. The activation of rectus femoris during the GHD sit-up does two important things. First, it adds significant force to the movement. The acceleration of the torso to upright is so forceful when rectus femoris is engaged that our trainers can detect its use or lack of participation from their peripheral vision. What it adds to the movement is obvious in speed and acceleration of the torso. Second, rectus femoris reduces the shear force on the lumbar vertebrae by pulling from the pelvis and iliac spine instead of the lumbar spine.

When coaching the GHD sit-up, we cue for the athlete to sharply



<http://media.crossfit.com/cf-video/cfj-oct-2005/glute-ham-demo.wmv>

## The Glute-Ham Developer Sit-Up... (continued)



extend the legs while coming up. The difference is obvious to everyone watching when rectus femoris kicks in. Those who have identified the GHD sit-up and other feet-anchored sit-ups as a source of low-back pain seem to always pull with the iliopsoas alone and never use rectus femoris. Those who've had problems with low back pain from GHD or roman chair sit-ups will find considerable relief by training to use the full complement of hip flexors in performing sit-ups.

Third, all too often communities that have held the sit-up in high regard have typically neglected hip extension work. Military and police physical training has historically been enamored of the sit-up. It is one of the yard sticks by which police and military fitness is traditionally measured. In most of these programs there are no squats, no deadlifts, no good mornings, no stiff legged deadlifts, and no back or hip extension exercises. The posterior chain in these communities typically sees no work other than running or perhaps burpees. What this imbalance of regular hip flexion exercises with little hip extension and no full-range hip extension portends for injury we don't know. The imbalance can't be a good thing, however. Regardless, we see our back and hip extension drills on the GHD to be indispensable to lower back health.

We start newcomers out on the GHD sit-up by spotting to make sure that they can come down to parallel without collapsing. (Last year, and very briefly, we



trained a Stanford University coach who made a huge point of sharing his focus on core training on the Swiss ball. When we got him on the GHD, he fell back off of the horizon and couldn't get up. He had to be deadlifted back to horizontal.) If our athlete is afflicted with a core as weak as the Stanford coach's, we start him on the AbMat and reintroduce the GHD sit-up at a later date—when more rudimentary strength has been developed.

We also caution against unbridled bouts on the GHD for newcomers to avoid the Matt Weaver cantaloupe syndrome described above. This is a potent exercise and it has sidelined dozens of strong, strong, athletes for a few days to a week.



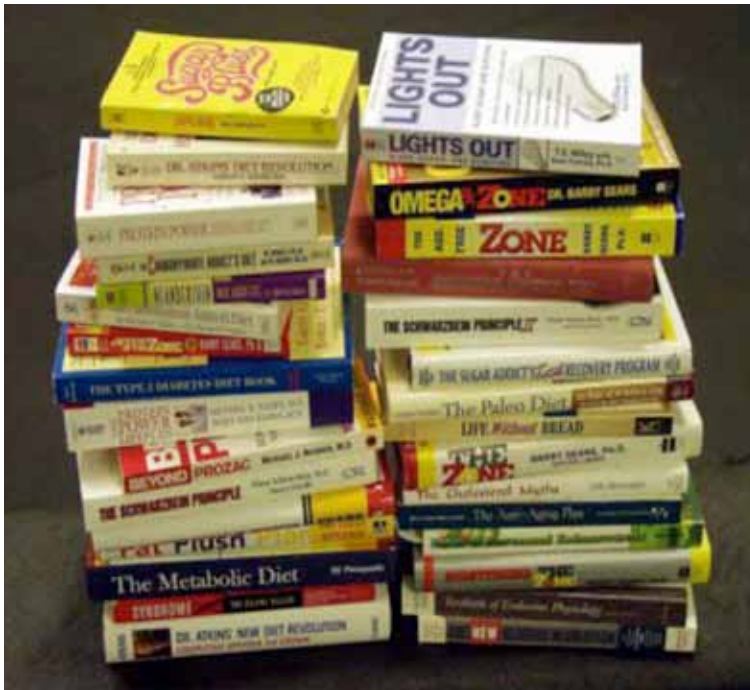
## NOTES



# THE CrossFit TRAINING GUIDE

## Nutrition

### Food



CrossFit has been an active combatant in the diet wars. For decades it has been an exciting world of “us” versus “them”.

“We” were the low carb, low calorie, good fat camp and “they” were the low fat, low calorie, high carb opposition. The battle was for the hearts and minds of the public on the very personal and private matter of nutrition - what diet makes us healthy?

Sheldon Marglin, publisher of the UC Berkeley Wellness Letter, a leader of “them”, accepted this characterization of battle lines when we presented it to him in 1996. In 1996 Dr. Atkins and Barry Sears were both publicly and regularly referred to as “quacks” and “frauds” by mainstream physicians, journalists, and nutritionists. While this was something that Sears would have to get used to, Dr. Atkins had been dealing with vicious assaults on his life’s work and character since publishing his Dr. Atkins’ Diet Revolution in 1972.

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*“What a long strange trip it’s been”*  
- Grateful Dead

Food... (continued)

We write here today in 2003 gloating. Gloating, because it is our perception that we are decisively winning the diet war. In the public square, the realization that carbs, not fat, make you sick and fat is spreading rapidly. Spreading like truth unobstructed. The position that carbohydrate is essentially toxic at common consumption levels was a truth suppressed by political and industrial corruption of science and journalism. Suppressing truth is like holding a beach ball under water; it takes constant work against a tireless resistance. They have slipped and our position sits like the beach ball on top of the water, where everyone can see it.

We interpret our position of being clearly visible, as winning the diet wars because our diet better models human nutrition and will always trump the opposition's model if tested. Ours works, theirs doesn't. Where theirs does work, ours works better. Their success required our being kept out of the marketplace. Underwater preferably.

In countless exchanges with doctors, trainers, nutritionists, and family we shared our position and the common response was, "do you have any science? I need science." We had science and showed it proudly. No one would read it. The cry for peer-reviewed evidence is almost always a smoke screen. The guys who write it read it – the rest pretend. If you can train people to unquestioningly accept proposition X then you've largely inoculated these same folks from even considering "not X".

The science supporting our position while being produced at an increasing rate, was always there and is not responsible for the dramatic change over the last two years.

What has changed is that the public bought some 100 million diet books over the last thirty years running the most important and successful science experiment ever conducted. To a constant and universal barraging of the fat is bad mantra from public health authorities, millions of people with no clinical or scientific credentials tried regimens found in "dangerous" books and found some of them marvelously effective.

Doctor Robert Atkins deserves credit for suffering unimaginable abuse while remaining steadfast, Gary Taubes for being the first journalist to expose the fraud and origins of the low fat position and for later making the point that the science may have been behind Dr. Atkins all along, Barry Sears for super tuning a responsible diet,

and Dr. Uffe Ravnskov for exposing the fraud and slop in anti-fat research so effectively that he needed to be completely ignored to be dealt with.

But the true heroes are each and every one of you who thought for yourselves, ignored the chorus of doctors, nutritionists, journalists and neighbors bleating like sheep, "faaaat is baaad", followed the logic of reduced carbohydrate consumption, and then critically and most importantly, tried the diet. You try one diet and you feel great, you try another and your teeth fall out. Who needs a doctor?

Patients are telling their doctors about the Zone and Protein Power and Atkins, not the other way around. Doctors everywhere are themselves doing the Zone and Atkins on the advice of their patients—on seeing their patients' successes. The peer reviewed literature remains unread, but, the reverberation of the good diet books message is working its way from author to reader to doctor and finally back to patients.

Perhaps, this process isn't so unusual but merely another example of the efficiency of decentralized networks. In any case it is consistent with this bit of philosophy from Dr. Uffe Ravnskov's epilogue to *The Cholesterol Myths*:

"After a lecture, a journalist asked me how she could be certain that my information was not just as biased as that of the cholesterol campaign. At first I did not know what to say. Afterwards I found the answer.

She could not be certain. Everyone must gain the truth in an active way. If you want to know something you must look at all the premises yourself, listen to all the arguments yourself, and then decide for yourself what seems to be the most likely answer. You may easily be led astray if you ask the authorities to do this work for you.

This is also the answer to those who wonder why even honest scientists are misled. And it is also the answer to those who after reading this book, ask the same question."



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## Glycemic Index

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For several decades now, bad science and bad politics have joined hands to produce what is arguably the most costly error in the history of science—the low fat diet. This fad diet has cost millions unnecessary death and suffering from heart disease, diabetes and, it increasingly seems, a host of cancers and other chronic and debilitating illnesses.

Gary Taubes, the esteemed science writer, has written two brilliant and highly regarded pieces on exactly this subject. The first appeared in Science Magazine in 1999 and the second in the New York Times just this summer.

A new age is dawning in nutrition: one where the culprit is no longer seen as dietary fat but excess consumption of carbohydrate—particularly refined or processed carbohydrate. In fact, there's an increasing awareness that excess carbohydrates play a dominant role in chronic diseases like obesity, coronary heart disease, many cancers, and diabetes. This understanding comes directly from current medical research. Amazingly, the near universal perception that dietary fat is the major culprit in obesity has no scientific foundation. (See Taubes, above.)

There's a family of popular diets and diet books based on decreasing carbohydrate consumption. Most of them are excellent.

Chief among these books are Barry Sears' Enter the Zone, Michael Eades' Protein Power, Atkins' Dr. Atkins' Diet Revolution, Cordain's The Paleo Diet, and the Hellers' Carbohydrate Addict's Diet. Each of these is an honest and accurate chronicling the effects of the low fat, fad diet and they all offer a rational, effective regimen for avoiding dietary ills. For those technically inclined, the mechanism by which excess carbohydrate causes disease state is known as "hyperinsulinemia." Hyperinsulinemia is the chronic and acute elevation of insulin as a result of habitual consumption of excess carbohydrate.

The list of ills linked to hyperinsulinemia is staggering and growing. Just recently colorectal cancer was added to the probable list of hyperinsulinemia-mediated diseases. The evidence linking excess carbohydrate

consumption to hyperinsulinemia and coronary heart disease is compelling if not overwhelmingly convincing.

Additionally, excess consumption of carbohydrate may soon be shown to be linked to Alzheimer's, aging, cancers and other disease through a process known as "glycosylation".

At any rate, a search on "Google" for "hyperinsulinemia" reveals hundreds of ills linked to this metabolic derangement. The rapidly growing awareness of the consequences of elevated blood sugar is one of the more promising avenues of medical advancement today.

Though frightening, the diseases brought about through hyperinsulinemia can easily be avoided by minimizing carbohydrate consumption—specifically carbohydrate that gives substantial rise to blood sugar and consequently insulin levels.

There is a singular measure of carbohydrate that gives exactly this information—"Glycemic Index." Glycemic index is simply a measure of a food's propensity to raise blood sugar. Avoid high glycemic foods and you'll avoid many, if not most, of the ills associated with diet.

Rick Mendosa has published one of the most complete glycemic indices available anywhere with a listing of over 750 common food items giving values based on glucose's score of 100.

We can increase the ease and utility of using such a list by dividing commonly eaten foods into two groups—one of high-glycemic foods, "bad foods", and one of low-glycemic foods, or "good foods." This is the rationale behind the CrossFit Shopping List.

You may notice that the "good foods" are typically meats, vegetables, fruits, nuts, and seeds, whereas the bad foods include many man-made or processed foodstuffs. There are some notable exceptions, but the trend is certainly instructive.

High glycemic foods, or "bad foods", are typically starchy, sweet, or processed foods like bread, pasta, rice, potato, grains, and desserts.

## Glycemic Index... (continued)

CrossFit Shopping List					
"Good Foods" - Low Glycemic			"Bad Foods" - High Glycemic		
Water	Tofu	Tuna Steak	Acorn Squash	Raisins	Rolls
Oatmeal	Tomato	Tomato Sauce	Baked Beans	Fruit Juice	Taco Shell
Eggs	Lettuce	Spinach	Beets	Vegetable Juice	Tortillas
Protein Powder	Onion	Carrots	Black Eyed Peas	Bagel	Udon Noodles
Peanut Butter	Mushroom	Orange	Butternut Squash	Biscuit	Waffle
Tahini	Cucumber	Pear	Cooked Carrots	Bread Crumbs	BBQ Sauce
Olives	Blueberries	Pineapple	Corn	Bread	Ketchup
Beef	Milk	Brussel Sprouts	French Fries	Steak Sauce	Cocktail Sauce
Cheese	Broccoli	Eggplant	Hubbard Squash	Bulgar	Honey
Salsa	Zucchini	Sauerkraut	Lima Beans	Sweet Relish	Jelly
Black Beans	Apple	Hot Dogs	Parsnips	Cereal	Sugar
Kidney Beans	Grape	Chick Peas	Peas	Cornstarch	Maple Syrup
Ground Turkey	Plum	Lamb	Pinto Beans	Croissant	Teriyaki Sauce
Soy Sausage	Shrimp	Pork	Potato	Crouton	Chocolate
Chicken	Mayonnaise	Dill Pickles	Refried Beans	Doughnut	Corn Chips
Turkey Sausage	Plain Yogurt	Soy Beans	Sweet Potato	English Muffin	Ice Cream
Salmon	Deli Meat	Asparagus	Turnip	Granola	Potato Chips
Turkey	Ham	Cantaloupe	Banana	Grits	Pretzels
Canned Tuna	Soy Milk	Strawberry	Cranberries	Melba Toast	Saltine Crackers
Canned Chicken	Spirulina	Peach	Dates	Muffin	Molasses
Soy Burgers	Tempeh		Figs	Noodles	
Cottage Cheese	Egg Substitute		Guava	Instant Oatmeal	
Almonds	Oil		Mango	Pancakes	
Macadamia Nuts	Peanuts		Papaya	Popcorn	
Avocado	Swordfish		Prunes	Rice	

More than a few observers have pointed out that low-glycemic foods have limited shelf life and are found on the perimeter of the grocery store where the high-glycemic foods have a longer shelf life and are typically found within the grocery store's aisles.

Though this approach is an oversimplification of much of nutritional science, it has the power to deliver nearly all of what more detailed and elaborate regimens offer such as those by Sears, Eades, Cordain, Atkins, and the Hellers. Eat more of the "good foods" and less of the "bad foods" and you'll garner much of what the more responsible eating plans offer. Many of our friends have radically transformed their health through this single tool.



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## Meal Plans

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Our recommendation to “eat meat and vegetables, nuts and seeds, some fruit, little starch, and no sugar” is adequate to the task of preventing the scourges of diet-induced disease, but more accurate and precise prescription is necessary to optimize physical performance.

Finely tuned, a good diet will increase energy, sense of well-being, and acumen, while simultaneously flensing fat and packing on muscle. When properly composed, the right diet can nudge every important quantifiable marker for health in the right direction.

Diet is critical to optimizing human function, and our clinical experience leads us to believe that Barry Sears’s “Zone diet” closely models optimal nutrition.

CrossFit’s best performers are Zone eaters. When our second-tier athletes commit to “strict” adherence to the Zone parameters, they generally become top-tier performers quickly. It seems that the Zone diet accelerates and amplifies the effects of the CrossFit regimen.

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## Meal Plans... (continued)

## What is a Block?

A block is a unit of measure used to simplify the process of making balanced meals.

7 grams of protein = 1 block of protein

9 grams of carbohydrate = 1 block of carbohydrate

1.5 grams of fat = 1 block of fat

(This assumes that there is about 1.5 grams of fat in each block of protein, so the total amount of fat needed per 1 block meal is 3 grams.)

When a meal is composed of equal blocks of protein, carbohydrate, and fat, it is 40% of its calories are from carbohydrate, 30% from protein and 30% from fat.

Pages 4 and 5 list common foods in their macronutrient category (protein, carbohydrate, or fat), along with a conversion of measurements to blocks.

This “block chart” is a convenient tool for making balanced meals. Simply choose 1 item from the protein list, 1 item from the carbohydrate list, and 1 item from the fat list to compose a 1-block meal. Or choose 2 items from each column to compose a 2-block meal, and so on.

Here is a sample 4-block meal:

4 oz. chicken breast

1 artichoke

1 cup of steamed vegetables w/

24 crushed peanuts

1 sliced apple

This meal contains 28 grams of protein, 36 grams of carbohydrate, and 12 grams of fat. It is simpler, though, to think of it as 4 blocks of protein, 4 blocks of carbohydrate, and 4 blocks of fat.

Choose which body type best fits you to determine your block requirement.

Break-fast	Lunch	Snack	Dinner	Snack	Total Blocks	Body Type
2	2	2	2	2	10	Small female
3	3	1	3	1	11	Medium female
3	3	2	3	2	13	Large female
4	4	1	4	1	14	Athletic, well muscled female
4	4	2	4	2	16	Small male
5	5	1	5	1	17	Medium male
5	5	2	5	2	19	Large male
4	4	4	4	4	20	X-Large male
5	5	3	5	3	21	Hard gainer
5	5	4	5	4	23	Large hard gainer
5	5	5	5	5	25	Athletic, well muscled male

Sample Day | Block requirements for small (“4-block”) male

	Breakfast	Lunch	Snack	Dinner	Snack
Protein	4	4	2	4	4
Carbohydrate	4	4	2	4	4
Fat	4	4	2	4	4

## Meal Plans... (continued)

Protein (cooked qty)		cheese	1 oz.	celery	2 cup	soy milk	1 cup
chicken breast	1 oz	feta cheese	1 1/2 oz.	cucumber	1 (9")	tempeh	1 1/2 oz.
turkey breast	1 oz	ricotta cheese	2 oz.	lettuce, iceberg	1 head	Fat	
ground turkey	1 1/2 oz	Favorable Carb (cooked)		lettuce, romaine	6 cup	almonds	~ 3
veal	1 oz	oatmeal	1/3 cup	mushrooms	3 cup	avocado	1 tbsp
beef	1 oz	artichoke	1 small	onion	2/3 cup	canola oil	1/2 tsp
ground beef	1 1/2 oz	asparagus	12 sprs	peppers	1 1/4 cup	macadamia nuts	~ 1
Canadian bacon	1 oz	green beans	1 cup	radishes	2 cup	olives	~ 5
corned beef	1 oz	beet greens	1 1/4 cup	salsa	1/2 cup	peanut butter	1/2 tsp
duck	1 1/2 oz	black beans	1/4 cup	snow peas	3/4 cup	peanuts	~ 6
ham	1 oz.	bok choy	3 cups	spinach	4 cup	cashews	~ 3
lamb	1 oz.	broccoli	1 1/4 cup	tomato	1 cup	peanut oil	1/2 tsp
ground lamb	1 1/2 oz.	brussels sprouts	3/4 cup	apple	1/2	olive oil	1/2 tsp
pork	1 oz.	cabbage	1 1/3 cup	applesauce	3/8 cup	tahini	1/2 tsp
ground pork	1 1/2 oz.	cauliflower	1 1/4 cup	apricots	3 small	guacamole	1/2 tbsp
calamari	1 1/2 oz.	chick peas	1/4 cup	blackberries	1/2 cup	vegetable oil	1/2 tsp
catfish	1 1/2 oz.	collard greens	1 1/4 cup	cantaloupe	1/4	mayonnaise	1/2 tsp
clams	1 1/2 oz.	dill pickles	3 (3")	cherries	7	mayo, light	1 tsp
crabmeat	1 1/2 oz.	eggplant	1 1/2 cup	fruit cocktail	1/3 cup	sesame oil	1/2 tsp
flounder/sole	1 1/2 oz.	fava beans	1/2 cup	blueberries	1/2 cup	sunflower seeds	1/4 tsp
lobster	1 1/2 oz.	kale	1 1/4 cup	grapes	1/2 cup	bacon bits	2 1/2 tsp
salmon	1 1/2 oz.	kidney beans	1/4 cup	grapefruit	1/2	butter	1/2 tsp
sardines	1 oz.	leeks	1 cup	honeydew	1/2	half and half	1 tbsp
scallops	1 1/2 oz.	lentils	1/4 cup	kiwi	1	cream, light	1/2 tsp
swordfish	1 1/2 oz.	okra	3/4 cup	lemon	1	cream cheese	1 tsp
shrimp	1 1/2 oz.	onion	1/2 cup	lime	1	sour cream	1 tsp
tuna steak	1 1/2 oz.	sauerkraut	1 cup	nectarine	1/2	tartar sauce	1/2 tsp
canned tuna	1 oz.	spaghetti squash	1 cup	orange	1/2	lard	1/2 tsp
protein powder	1 oz.	spinach	1 1/3 cup	peach	1	veg. shortening	1/2 tsp
seitan	1 oz.	swiss chard	1 1/4 cup	pear	1/2	*Note: combo items contain 1 block of protein, and 1 block of carbohydrate	
soy burgers	1/2 patty	tomato sauce	1/2 cup	pineapple	1/2 cup		
soy sausage	2 links	tomatoes	3/4 cup	plum	1		
spirulina (dry)	1/2 oz.	yellow squash	1 1/4 cup	raspberries	2/3 cup		
soy cheese	1 oz.	zucchini	1 1/3 cup	strawberries	1 cup		
firm tofu	2 oz.	Favorable Carb (raw)		tangerine	1		
soft tofu	3 oz.	alfalfa sprouts	7 1/2 cup	watermelon	1/2 cup		
whole egg	1 large	bean sprouts	3 cup	Combo Items (qty)			
egg whites	2 large	broccoli	2 cup	milk	1 cup		
egg substitute	1/4 cup	cabbage	2 1/4 cup	yogurt (plain)	1/2 cup		
cottage cheese	1/4 cup	cauliflower	2 cup	soybeans	1/4 cup		

## Meal Plans... (continued)

## Block Chart for Unfavorable Carbohydrates

Vegetables	
Acorn squash	¾ cup
Baked beans	½ cup
Beets	½ cup
Black-eyed peas	¼ cup
Butternut squash	½ cup
Cooked carrots	½ cup
Corn	¼ cup
French fries	5
Hubbard squash	⅔ cup
Lima beans	¼ cup
Parsnips	½ (9")
Peas	½ cup
Pinto beans	¼ cup
Potato, boiled	½ cup
Potato, mashed	½ cup
Refried beans	¼ cup
Sweet potato, baked	½ (5")
Sweet potato, mashed	½ cup
Turnip	¾ cup
Fruit	
Banana	½ (9")
Cranberries	¼ cup
Cranberry sauce	4 tsp
Dates	2
Figs	¾
Guava	½ cup
Kumquat	3
Mango	½ cup
Papaya	⅔ cup
Prunes	2
Raisins	1 tbsp
Fruit Juice	
Apple juice	½ cup
Cranberry juice	¼ cup
Fruit punch	¼ cup
Grape juice	¼ cup

Grapefruit juice	¾ cup
Lemon juice	½ cup
Orange juice	¾ cup
Pineapple juice	¼ cup
Tomato juice	¾ cup
Grains and Breads	
Bagel	¼
Barley	1 tbsp
Biscuit	¼
Baked potato	½ cup
Bread crumbs	½ oz.
Bread	½ slice
Breadstick	1
Buckwheat	½ oz.
Bulgur wheat	½ oz.
Cereal	½ oz.
Corn bread	1" square
Cornstarch	4 tsp
Croissant	¼
Crouton	½ oz.
Donut	¼
English muffin	¼
Flour	1 ½ tsp
Granola	½ oz.
Grits	½ cup
Melba toast	½ oz.
Muffins	¼
Noodles	¼ cup
Instant oatmeal	½ pkt
Pasta, cooked	¼ cup
Pasta, high protein	½ cup
Pancake	½ (4")
Pita bread	¼
Popcorn	2 cups
Rice	3 tbsp
Rice cake	1
Roll (hamburger, hot dog)	¼

Roll (dinner)	½
Taco shell	1
Tortilla (corn)	1 (6")
Tortilla (flour)	½ (6")
Udon noodles	3 tbsp
Waffle	½
Condiments	
BBQ sauce	2 tbsp
Catsup	2 tbsp
Cocktail sauce	2 tbsp
Honey	½ tbsp
Jelly/jam	2 tsp
Plum sauce	1 ½ tbsp
Molasses	2 tsp
Pickle (bread & butter)	6 slices
Relish (sweet)	4 tsp
Steak sauce	2 tbsp
Brown sugar	1 ½ tsp
Granulated sugar	2 tsp
Confectioners sugar	1 tbsp
Maple syrup	2 tsp
Teriyaki sauce	1 ½ tbsp
Alcohol	
Beer	8 oz.
Liquor	1 oz.
Wine	4 oz.
Snacks	
Chocolate bar	½ oz.
Corn chips	½ oz.
Graham crackers	1 ½
Ice cream	¼ cup
Potato chips	½ cup
Pretzels	½ oz.
Tortilla chips	½ oz.
Saltine crackers	4

*\*Note: When building meals with "unfavorable carbohydrates" quantity becomes critical.*

## 2 Block Menus

## Breakfast

**Breakfast Quesadilla**

1 corn tortilla  
 ¼ cup black beans  
 1 egg (scrambled or fried)  
 1 oz. cheese  
 1 Tbs avocado

**Breakfast Sandwich**

½ pita bread  
 1 egg (scrambled or fried)  
 1 oz. cheese  
 Served with 2 macadamia nuts

**Fruit Salad**

½ cup cottage cheese mixed with  
 ¼ cantaloupe  
 ½ cup strawberries  
 ¼ cup grapes  
 Sprinkled with slivered almonds

**Smoothie**

Blend together:  
 1 cup milk  
 1 Tbs protein powder  
 1 cup frozen strawberries  
 Small scoop of cashews

**Oatmeal**

½ cup cooked oatmeal (slightly watery)  
 ½ cup grapes  
 ¼ cup cottage cheese  
 1 tsp walnuts  
 Spice with vanilla extract and cinnamon  
 Add 1 Tbs protein powder

**Easy Breakfast**

½ cantaloupe  
 ½ cup cottage cheese  
 6 almonds

**Steak and Eggs**

1 oz. grilled steak  
 1 egg over easy  
 1 slice toast with  
 ¾ tsp butter

## Lunch

**Tuna Sandwich**

Mix:  
 2 oz. canned tuna  
 2 tsp light mayo  
 Serve on  
 1 slice bread

**Tacos**

1 corn tortilla  
 3 oz. seasoned ground meat  
 ½ tomato, cubed  
 ¼ cup onion, chopped  
 Lettuce, chopped  
 Served with Tabasco to taste  
 ~6 chopped olives

**Deli Sandwich**

1 slice bread  
 3 oz. sliced deli meat  
 2 Tbs avocado

**Quesadilla**

1 corn tortilla  
 2 oz. cheese  
 2 Tbs guacamole  
 Jalapenos, sliced  
 Topped with salsa

**Grilled Chicken Salad**

2 oz. grilled chicken  
 Served over:  
 2 cup lettuce  
 ¼ tomato, diced  
 ¼ cucumber, diced  
 ¼ green pepper  
 ¼ cup black beans  
 ~1 Tbs salad dressing of choice

**Easy Lunch**

3 oz. deli meat  
 1 apple  
 2 macadamia nuts

**Ground Beef or Turkey Burger**

3 oz. ground meat, grilled  
 ½ bun  
 pickles/mustard/lettuce  
 2 Tbs avocado

## Dinner

**Fresh Fish**

Grill:  
 3 oz. fresh fish (salmon, tuna, halibut, etc.)  
 Saute:  
 1 ½ cup zucchini in herbs  
 Serve with:  
 1 large salad  
 ~1Tbs salad dressing of choice

**Beef Stew**

Saute:  
 ⅔ tsp olive oil  
 ¼ cup onion, chopped  
 ½ green pepper, chopped  
 ~4 oz. (raw weight) beef, cubed  
 Add:  
 ½ cup chopped zucchini  
 1 cup mushrooms  
 ¼ cup tomato sauce  
 Seasoned with garlic, Worcestershire sauce, salt and pepper

**Chili (serves 3)**

Saute:  
 ⅓ cup onion  
 1 green pepper, chopped in garlic, cumin, chili powder, and crushed red peppers  
 Add:  
 1 cup tomato, chopped  
 ½ cup black beans  
 ½ cup kidney beans  
 ~30 olives, chopped  
 Add fresh cilantro to taste

**Turkey and Greens**

2 oz. roasted turkey breast  
 Chop and steam:  
 1 ¼ cup kale  
 Saute:  
 garlic and crushed red peppers in ⅓ tsp olive oil, ,  
 Add steamed kale and mix.  
 1 peach, sliced, for dessert

**Easy Chicken Dinner**

2 oz. baked chicken breast  
 1 orange  
 2 macadamia nuts

## 3 Block Menus

## Breakfast

**Breakfast Quesadilla**

1 corn tortilla  
 ¼ cup black beans  
 ⅓ cup onions, chopped  
 1 green pepper, chopped  
 2 eggs (scrambled or fried)  
 1 oz. cheese  
 3 Tbs avocado

**Breakfast Sandwich**

½ pita bread  
 1 egg (scrambled or fried)  
 1 oz. cheese  
 1 oz. sliced ham  
 Serve with ½ apple and 3 macadamia nuts

**Fruit Salad**

¾ cup cottage cheese  
 ¼ cantaloupe, cubed  
 1 cup strawberries  
 ½ cup grapes  
 Sprinkle with slivered almonds

**Smoothie**

Blend together:  
 1 cup milk  
 2 Tbs protein powder  
 1 cup frozen strawberries  
 ½ cup frozen blueberries  
 1 scoop cashews

**Oatmeal**

⅔ cup cooked oatmeal (slightly watery)  
 ½ cup grapes  
 ½ cup cottage cheese  
 1 ½ tsp walnuts, chopped  
 Spice with vanilla extract and cinnamon  
 Add 1 Tbs protein powder

**Easy Breakfast**

¾ cantaloupe, cubed  
 ¾ cup cottage cheese  
 9 almonds

**Steak and Eggs**

2 oz. grilled steak  
 1 egg over easy  
 1 slice toast w/ 1 tsp butter  
 ¼ cantaloupe, cubed

## Lunch

**Tuna Sandwich**

3 oz. canned tuna  
 3 tsp light mayo  
 1 slice bread  
 Serve with:  
 ½ apple

**Tacos**

2 corn tortillas  
 3 oz. seasoned ground meat  
 1 oz. grated cheese  
 ½ tomato, cubed  
 ¼ cup onion, chopped  
 Lettuce, chopped  
 Serve with Tabasco to taste  
 ~ 9 olives, chopped

**Deli Sandwich**

1 slice bread  
 3 oz. sliced deli meat  
 1 oz. cheese  
 3 Tbs avocado  
 Serve with ½ apple

**Quesadilla**

1 corn tortilla  
 3 oz. cheddar and jack cheese  
 3 Tbs guacamole  
 Jalapenos, sliced, to taste  
 Top with salsa  
 Serve with 1 orange

**Grilled Chicken Salad**

3 oz. chicken, grilled  
 2 cups lettuce  
 ¼ tomato, chopped  
 ¼ cucumber, chopped  
 ¼ green pepper, chopped  
 ¼ cup black beans  
 ¼ cup kidney beans  
 ~1 ½ Tbs salad dressing of choice

**Easy Lunch**

3 oz. deli meat  
 1 oz. sliced cheese  
 1 ½ apple  
 3 macadamia nuts

## Dinner

**Fresh Fish**

4 ½ oz. fresh fish, grilled  
 Saute 1 ½ cup zucchini in herbs  
 1 Large salad with 1 ½ Tbs salad dressing of choice  
 1 cup fresh strawberries for dessert

**Chili (serves 3)**

Saute:  
 ⅓ cup onion, chopped  
 1 green pepper, chopped, with garlic, cumin, chili powder, and crushed red peppers  
 Add:  
 9 oz. ground beef or turkey until browned  
 Add:  
 1 cup tomato sauce  
 ¾ cup black beans  
 ¾ cup kidney beans  
 ~30 olives, chopped  
 Add fresh cilantro to taste  
 Serve each helping with 1 oz. cheese, grated

**Turkey and Greens**

3 oz. turkey breast, roasted  
 Chop and steam:  
 2 ½ cup kale  
 Saute garlic and crushed red peppers in 1 tsp olive oil,  
 Add the steamed kale and mix.  
 1 peach, sliced, for dessert

**Easy Dinner**

3 oz. chicken breast, baked  
 1 ½ orange  
 3 macadamia nuts

**Beef Stew**

Saute: 1 tsp olive oil  
 ¼ cup onion, chopped  
 ½ green pepper, chopped  
 ~6 oz. (raw weight) beef, cubed  
 Add:  
 1 cup chopped zucchini  
 1 cup mushrooms  
 ½ cup tomato sauce  
 Season with garlic, Worcestershire sauce, salt and pepper



## 4 Block Menus

**Breakfast****Breakfast Quesadilla**

1 corn tortilla  
 ½ cup black beans  
 ⅓ cup onions, chopped  
 1 green pepper, chopped  
 2 eggs (scrambled or fried)  
 2 oz. cheese  
 4 Tbs avocado

**Breakfast Sandwich**

½ pita bread  
 2 eggs (scrambled or fried)  
 1 oz. cheese  
 1 oz. sliced ham  
 Serve with 1 apple

**Fruit Salad**

1 cup cottage cheese  
 ½ cantaloupe, cubed  
 1 cup strawberries  
 ½ cup grapes  
 Sprinkled with slivered almonds

**Smoothie**

Blend together:  
 2 cups milk  
 2 Tbs protein powder  
 1 cup frozen strawberries  
 ½ cup frozen blueberries  
 Large scoop cashews

**Oatmeal**

1 cup cooked oatmeal (slightly watery)  
 ½ cup grapes  
 ¾ cup cottage cheese  
 2 tsp walnuts  
 Spice with vanilla extract and cinnamon  
 Add 1 Tbs protein powder

**Easy Breakfast**

1 cantaloupe  
 1 cup cottage cheese  
 12 almonds

**Steak and Eggs**

3 oz. steak, grilled  
 1 egg, over easy  
 1 slice bread with 1 ½ tsp butter  
 ½ cantaloupe

**Lunch****Tuna Sandwich**

4 oz. canned tuna  
 4 tsp light mayo  
 1 slice bread  
 Serve with 1 apple

**Deli Sandwich**

2 slices of bread  
 4 ½ oz. sliced deli meat  
 1 oz. cheese  
 4 Tbs avocado

**Quesadilla**

1 corn tortilla  
 4 oz. cheese  
 4 Tbs guacamole  
 Jalapenos, sliced  
 Top with salsa  
 Serve with 1 ½ oranges

**Tacos**

2 corn tortillas  
 4 ½ oz. seasoned ground meat  
 1 oz. cheese, grated  
 ½ tomato, cubed  
 ¼ cup onion, chopped  
 Lettuce, chopped  
 Serve with Tabasco to taste  
 ~20 olives chopped  
 ½ apple

**Grilled Chicken Salad**

4 oz. chicken, grilled  
 2 cups lettuce  
 ¼ tomato, chopped  
 ¼ cucumber, chopped  
 ¼ green pepper, chopped  
 ½ cup black beans  
 ¼ cup kidney beans  
 ~2 Tbs salad dressing of choice

**Easy Lunch**

4 ½ oz. deli meat  
 1 oz. cheese  
 Serve with:  
 1 apple  
 1 grapefruit  
 4 macadamia nuts

**Dinner****Fresh Fish**

6 oz. fresh fish, grilled  
 Saute: 1 ½ cup zucchini in herbs  
 1 Large salad with 2 Tbs salad dressing of choice  
 2 cups fresh strawberries

**Beef Stew**

Saute:  
 1 ½ tsp olive oil  
 ¼ cup onion, chopped  
 ½ green pepper, chopped  
 ~8 oz. (raw weight) beef, cubed  
 Add:  
 1 cup zucchini, chopped  
 1 cup mushrooms, chopped  
 ½ cup tomato sauce  
 Season with garlic, Worcestershire sauce, salt and pepper  
 Serve with 1 cup fresh strawberries

**Chili (serves 3)**

Saute:  
 ¾ cup onion, chopped  
 2 green peppers, chopped, in garlic, cumin, chili powder, and crushed red peppers  
 Add:  
 18 oz. ground meat until browned  
 Add:  
 2 cups tomato sauce  
 1 cup black beans  
 1 cup kidney beans  
 ~40 chopped olives  
 Fresh cilantro to taste

**Turkey and Greens**

4 oz. turkey breast, roasted  
 2 ½ cup kale, chopped and steamed  
 Saute garlic and crushed red peppers in 1 ½ tsp olive oil,  
 Add kale and mix.  
 2 peaches, sliced, for dessert

**Easy Dinner**

4 oz. chicken breast, baked  
 2 oranges  
 4 macadamia nuts

## 5 Block Menus

## Breakfast

**Breakfast Quesadilla**

2 corn tortillas  
 ½ cup black beans  
 ⅓ cup onions, chopped  
 1 green pepper, chopped  
 3 eggs (scrambled or fried)  
 2 oz. cheese  
 5 Tbs avocado

**Breakfast Sandwich**

½ pita bread  
 2 eggs (scrambled or fried)  
 2 oz. cheese  
 1 oz. ham, sliced  
 Serve with 1 ½ apple

**Fruit Salad**

1 ¼ cup cottage cheese  
 ½ cantaloupe, cubed  
 1 cup strawberries  
 1 cup grapes  
 Sprinkle with slivered almonds

**Smoothie**

Blend together:  
 2 cups milk  
 3 Tbs protein powder  
 2 cups frozen strawberries  
 ½ cup frozen blueberries  
 Extra large scoop cashews

**Oatmeal**

1 cup cooked oatmeal (slightly watery)  
 1 cup grapes  
 1 cup cottage cheese  
 2 ½ tsp walnuts  
 Spice with vanilla extract and cinnamon  
 Add: 1 Tbs protein powder

**Easy Breakfast**

1 ¼ cantaloupe  
 1 ¼ cup cottage cheese  
 ~ 15 almonds

**Steak and Eggs**

3 oz. steak, grilled  
 2 eggs, over easy  
 1 slice bread with 1 ⅓ tsp butter  
 1 ½ apple

## Lunch

**Tuna Sandwich**

5 oz. tuna, canned  
 5 tsp light mayo  
 1 slice bread  
 Serve with 1 ½ apple

**Deli Sandwich**

2 slices bread  
 4 ½ oz. deli meat  
 2 oz. cheese  
 5 Tbs avocado  
 ½ apple

**Quesadilla**

2 corn tortillas  
 5 oz. cheese  
 5 Tbs guacamole  
 Jalapenos, sliced, to taste  
 Serve with 1 ½ orange

**Tacos**

2 corn tortillas  
 6 oz. seasoned ground meat  
 1 oz. cheese, grated  
 ½ tomato, cubed  
 ¼ cup onion, chopped  
 Lettuce, chopped  
 Serve with Tabasco to taste  
 ~20 olives, chopped  
 1 apple

**Grilled Chicken Salad**

5 oz. chicken, grilled  
 2 cups lettuce  
 ¼ tomato, chopped  
 ¼ cucumber, chopped  
 ¼ green pepper, chopped  
 ½ cup black beans  
 ½ cup kidney beans  
 2 ½ Tbs salad dressing of choice

**Easy Lunch**

4 ½ oz. deli meat  
 2 oz. cheese  
 Serve with:  
 2 ½ apples  
 5 macadamia nuts

## Dinner

**Fresh Fish**

7 ½ oz. fresh fish  
 Saute:  
 1 ⅓ cup zucchini in herbs  
 Serve with 1 large salad with 2 ½ Tbs salad dressing of choice  
 ¼ cup black beans  
 2 cups fresh strawberries for dessert

**Beef Stew**

Saute:  
 1 ⅓ tsp olive oil  
 ¼ cup onion, chopped  
 ½ green pepper, chopped  
 ~10 oz. (raw weight) beef, cubed  
 Add:  
 1 cup zucchini, chopped  
 1 cup mushrooms, chopped  
 ½ cup tomato sauce  
 Season with garlic, Worcestershire sauce, salt and pepper  
 Serve with 2 cups fresh strawberries

**Chili (serves 3)**

Saute:  
 1 cup onion, chopped  
 2 ½ green peppers in garlic, cumin, chili powder and crushed red peppers  
 Add:  
 22 ½ oz. ground meat, browned  
 Add:  
 2 ½ cups tomato sauce  
 1 ¼ cup black beans  
 1 ¼ cup kidney beans  
 ~50 olives, chopped  
 Add fresh cilantro to taste

**Turkey and Greens**

5 oz. turkey breast, roasted  
 2 ½ cup kale, chopped and steamed  
 Saute garlic and crushed red peppers in 1 ⅓ tsp olive oil,  
 Add steamed kale and mix.  
 Serve with 3 peaches, sliced

**Easy Dinner**

5 oz. chicken breast, baked  
 2 ½ oranges  
 5 macadamia nuts

## Meal Plans... (continued)

**1 Block Snacks**

1 hard-boiled egg  
 ½ orange  
 Sprinkled w/ peanuts

½ cup plain yogurt  
 Sprinkled w/ pecans

1 oz. cheese  
 ½ apple  
 1 macadamia nut

1 oz. canned chicken or tuna  
 1 peach  
 ½ tsp peanut butter

1 ½ oz. deli-style ham or turkey  
 1 carrot  
 5 olives

1 oz. mozzarella string cheese  
 ½ cup grapes  
 1 Tbs avocado

1 oz. jack cheese  
 1 Tbs guacamole  
 1 tomato

1 oz. hummus  
 ½ tomato  
 1 ½ oz. feta cheese

1 cup strawberries  
 ¼ cup cottage cheese  
 1 macadamia nut

1 poached egg  
 ½ slice bread  
 ½ tsp peanut butter  
 ¼ cup cottage cheese  
 ½ carrot  
 3 celery stalks  
 5 olives

3 oz. marinated and baked tofu  
 ½ apple  
 ½ tsp peanut butter

1 oz. tuna  
 1 large tossed salad  
 1 tsp salad dressing of choice  
 1 hard boiled egg  
 1 large spinach salad  
 1 tsp oil and vinegar dressing

1 oz. grilled turkey breast  
 ½ cup blueberries  
 3 cashews

Blend:  
 1 cup water  
 1 Tbs protein powder  
 ½ cup grapes  
 ⅓ tsp canola oil

Blend:  
 1 cup water  
 1 Tbs spirulina  
 1 cup frozen berries  
 3 cashews

1 oz. cheddar cheese melted over  
 ½ apple  
 Sprinkled w/ walnuts

¼ cup cottage cheese  
 ½ cup pineapple  
 6 peanuts  
 1 oz. sardines  
 ½ nectarine  
 5 olives

1 ½ oz. feta cheese  
 1 cup diced tomato  
 5 olives

1 ½ oz. salmon  
 12 asparagus spears  
 ⅓ tsp olive oil

1 ½ oz. shrimp  
 2 cups broccoli  
 6 peanuts

1 oz. Canadian bacon  
 1 plum  
 1 macadamia nut

1 ½ oz. deli-style turkey  
 1 tangerine  
 1 Tbs avocado  
 ¼ cup cottage cheese  
 1 cup sliced tomato  
 ⅓ tsp olive oil

1 ½ oz. scallops  
 1 sliced cucumber  
 ½ tsp tartar sauce

1 oz. lamb  
 ¼ cup chick peas  
 ⅓ tsp sesame butter

## Meal Plans... (continued)

Unfortunately, the full benefit of the Zone diet is largely limited to those who have at least at first weighed and measured their food.

For a decade we've experimented with sizing and portioning strategies that avoid scales, and measuring cups and spoons, only to conclude that natural variances in caloric intake and macronutrient composition without measurement are greater than the resolution required to turn good performance to great. Life would be much easier for us were this not so!

The "meal plans" and "block chart" below have been our most expedient approach for eliciting athletes' best performances and optimal health.

Even discounting any theoretical or technical content, this portal to sound nutrition still requires some basic arithmetic and weighing and measuring portions for the first week.

Too many athletes, after supposedly reading Sears's book *Enter the Zone* still ask, "So what do I eat for dinner?" They get meal plans and block charts. We can make the Zone more complicated or simpler but not more effective.

We encourage everyone to weigh and measure portions for one week because it is supremely worth the effort, not because it is fun. If you choose to "guesstimate" portions, you'll have the result of CrossFit's top performers only if and when you are lucky.

Within a week of weighing and measuring, you'll have developed an uncanny ability to estimate the mass of common food portions, but, more importantly, you'll have formed a keen visual sense of your nutritional needs. This is a profound awareness.

In the Zone scheme, all of humanity calculates to either 2-, 3-, 4-, or 5-block meals at breakfast, lunch, and dinner, with either 1- or 2-block snacks between lunch and dinner and again between dinner and bedtime. We've simplified the process for determining which of the four meal sizes and two snack sizes best suits your needs. We assume that you are CrossFitters, i.e., very active.

Being a "4-blocker", for instance, means that you eat three meals each day where each meal is composed of 4 blocks of protein, 4 blocks of carbohydrate, and 4 blocks of fat. Whether you are a "smallish" medium-sized

guy or a "largish" medium-sized guy would determine whether you'll need snacks of one or two blocks twice a day.

The "meal plans" we give below stand as examples of 2-, 3-, 4-, or 5-block meals, and the "block chart" gives quantities of common foods equivalent to 1 block of protein, carbohydrate, or fat.

Once you determine that you need, say, 4-block meals, it is simple to use the block chart and select four times something from the protein list, four times something from the carbohydrate list, and four times something from the fat list every meal.

One-block snacks are chosen from the block chart at face value for a single snack of protein, carbohydrates, and fat, whereas two block snacks are, naturally, chosen composed of twice something from the carbohydrates list combined with twice something from the protein list, and twice something from the fats.

Every meal, every snack, must contain equivalent blocks of protein, carbohydrate, and fat.

If the protein source is specifically labeled "non-fat", then double the usual fat blocks for that meal. Read *Enter the Zone* to learn why.

For those eating according to zone parameters, body fat comes off fast. When our men fall below 10 percent body fat and start approaching 5 percent, we kick up the fat intake. The majority of our best athletes end up at X blocks of protein, X blocks of carbohydrate, and 4X or 5X blocks of fat. Learn to modulate fat intake to produce a level of leanness that optimizes performance.

The Zone diet neither prohibits nor requires any particular food. It can accommodate paleo or vegan, organic or kosher, fast food or fine dining, while delivering the benefits of high-performance nutrition.



## Nutrition Lecture: Avoiding Disease



Nutrition can be a touchy topic, like politics or religion, that people take very personally, but good nutrition is the foundation not only for general health but also for high-performance fitness. Much of the public information about diet, particularly the emphasis on low fat and high carbs, has resulted in a near epidemic of obesity and type II diabetes. In this first of a two-part lecture excerpt, Coach Glassman explores some of the science behind nutrition and the body, particularly the role of insulin in health and disease. "Syndrome X," the "deadly quartet" (obesity, glucose intolerance, high blood pressure, high triglycerides), and coronary heart disease, he claims, are avoidable through dietary means.

Part 2 will address the refined dietary needs of the athlete and what's required to optimize performance.

<http://journal.crossfit.com/2007/10/nutrition-lecture-part-1-avoid.tpl>



## Nutrition Lecture: Optimizing Performance



Part 2 of Coach Glassman's discussion of nutrition addresses the refined dietary needs of athletes and what's required to optimize your performance. If you want elite physical output, you must be precise about your intake. "Close enough" won't cut it--or as Coach Glassman more colorfully puts it, "If you want top-fuel-type performance, you need top fuel; you can't just piss into the gas tank."

Most of us are familiar with CrossFit's nutrition prescription: Eat meat and vegetables, nuts and seeds, some fruit, little starch, and no sugar. But to achieve top performance, you have to be specific about the balances of those things and accurate in your macronutrient consumption. You can get far on the workouts alone, but you will not--cannot--reach your true potential without getting particular about your fuel. There's a 1:1 correspondence between elite CrossFit performance and accuracy and precision in your consumption.

<http://journal.crossfit.com/2007/11/nutrition-lecture-part-2-optim.tpl>





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## Diet, Inflammation and Disease (Fish Oil)

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"If I want to have an al-Qaida battle plan How to Destroy Health Care of America, the USDA food pyramid there would be exactly that. I can think of nothing that would accelerate the development of silent inflammation faster."

In Part 4 of this series, Dr. Barry Sears pulls no punches in criticizing USDA nutritional prescriptions that are being adopted by countries around the world. Dr. Sears states that a Western diet that causes silent inflammation is one of the reasons for sick citizens and over-burdened health-care systems.

The cure? Adherence to the Zone Diet and the inclusion of large amounts of fish oils rich in omega 3 fatty acids.

Studies have proven that high concentrations of fish oil can be used to dramatically reduce inflammation, resulting in weight loss, improved blood chemistry and better overall health. More clinical research has shown that fatty acids, even when used to supplement a very poor diet, can help lower the risk of heart disease, cancer, MS, bipolar depression, ADHD, chronic pain and Alzheimer's—all because fish oils reduce inflammation.

"It's as close to a miracle drug as I'll ever see in my lifetime," Dr. Sears states.

<http://journal.crossfit.com/2009/08/diet-inflammation-and-disease-part-4.tpl>



## NOTES

# THE CrossFit TRAINING GUIDE

## Programming & Scaling

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### A Theoretical Template for CrossFit's Programming

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A Theoretical Template for  
CrossFit's Programming

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"The Girls" for Grandmas

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#### Introduction

The October 2002 issue of *The CrossFit Journal* entitled "What is Fitness?" explores the aims and objectives of our program. Most of you have a clear understanding of how we implement our program through familiarity with the Workout of the Day (WOD) from our website. What is likely less clear is the rationale behind the WOD or more specifically what motivates the specifics of CrossFit's programming. It is our aim in this issue to offer a model or template for our workout programming in the hope of elaborating on the CrossFit concept and potentially stimulating productive thought on the subject of exercise prescription generally and workout construction specifically.

So what we want to do is bridge the gap between an understanding of our philosophy of fitness and the workouts themselves, that is, how we get from theory to practice.

At first glance the template seems to be offering a routine or regimen. This may seem at odds with our contention that workouts need considerable variance or unpredictability, if not randomness, to best mimic the often unforeseeable challenges that combat, sport, and survival demand and reward. We've often said, "What your regimen needs is to not become routine." But the model we offer allows for wide variance of mode, exercise, metabolic pathway, rest, intensity, sets, and reps. In fact, it is mathematically likely that each three-day cycle is a singularly unique stimulus never to be repeated in a lifetime of CrossFit workouts.

The template is engineered to allow for a wide and constantly varied stimulus, randomized within some parameters, but still true to the aims and purposes of CrossFit as described in the "What is Fitness?" issue. Our template contains sufficient structure to formalize or define our programming

**Table 1 - Template Macro View**

3 days on, 1 day off												
Day	1	2	3	4	5	6	7	8	9	10	11	12
	<b>M</b>	<b>G</b> <b>W</b>	<b>M</b> <b>G</b> <b>W</b>	OFF	<b>G</b>	<b>W</b> <b>M</b>	<b>G</b> <b>W</b> <b>M</b>	OFF	<b>W</b>	<b>M</b> <b>G</b>	<b>W</b> <b>M</b> <b>G</b>	OFF

5 days on, 2 days off							
Day	1	2	3	4	5	6	7
wk 1	<b>M</b>	<b>G</b> <b>W</b>	<b>M</b> <b>G</b> <b>W</b>	<b>M</b> <b>G</b>	<b>W</b>	OFF	OFF
wk 2	<b>G</b>	<b>W</b> <b>M</b>	<b>G</b> <b>W</b> <b>M</b>	<b>G</b> <b>W</b>	<b>M</b>	OFF	OFF
wk 3	<b>W</b>	<b>M</b> <b>G</b>	<b>W</b> <b>M</b> <b>G</b>	<b>W</b> <b>M</b>	<b>G</b>	OFF	OFF

**Modalities**

**M** = monostructural metabolic conditioning or "cardio"

**G** = gymnastics, bodyweight exercises

**W** = weightlifting, powerlifting and olympic lifts

objectives while not setting in stone parameters that must be left to variance if the workouts are going to meet our needs. That is our mission—to ideally blend structure and flexibility.

It is not our intention to suggest that your workouts should or that our workouts do fit neatly and cleanly within the template, for that is absolutely not the case. But, the template does offer sufficient structure to aid comprehension, reflect the bulk of our programming concerns, and not hamstring the need for radically varying stimulus. So as not to seem redundant, what we are saying here is that the purpose of the template is as much descriptive as prescriptive.

**Template Macro View**

In the broadest view we see a three-day-on, one-day-off pattern. We've found that this allows for a relatively higher volume of high-intensity work than the many others that we've experimented with. With this format

the athlete can work at or near the highest intensities possible for three straight days, but by the forth day both neuromuscular function and anatomy are hammered to the point where continued work becomes noticeably less effective and impossible without reducing intensity.

The chief drawback to the three-day-on, one-day-off regimen is that it does not sync with the five-day-on, two-day-off pattern that seems to govern most of the world's work habits. The regimen is at odds with the seven-day week. Many of our clients are running programs within professional settings, often academic, where the five-day workweek with weekends off is de rigueur. Others have found that the scheduling needs of family, work, and school require scheduling workouts on specific days of the week every week. For these people we have devised a five-days-on, two-days-off regimen that has worked very well.

The workout of the day was originally a five-on, two-off pattern and it worked perfectly. But the three-on, one-off

...the model we offer allows for wide variance of mode, exercise, metabolic pathway, rest, intensity, sets, and reps.

**Table 2 - Exercises by Modality**

<b>Gymnastics</b>	<b>Metabolic Conditioning</b>	<b>Weightlifting</b>
Air Squat	Run	Deadlifts
Pull-up	Bike	Cleans
Push-up	Row	Presses
Dip	Jump Rope	Snatch
Handstand Push-up		Clean and Jerk
Rope Climb		Medicine Ball Drills
Muscle-Up		Kettlebell Swing
Press to Handstand		
Back Extension		
Sit-up		
Jumps		
Lunges		

pattern was devised to increase both the intensity and recovery of the workouts and the feedback we've received and our observations suggest that it was successful in this regard.

If life is easier with the five-on, two-off pattern, don't hesitate to employ it. The difference in potential between the two may not warrant restructuring your entire life to accommodate the more effective pattern. There are other factors that will ultimately overshadow any disadvantages inherent in the potentially less effective regimen, such as convenience, attitude, exercise selection, and pacing.

For the remainder of this article the three-day cycle is the one in discussion, but most of the analysis and discussion applies perfectly to the five-day cycle.

### **Elements by Modality**

Looking at the Template Macro View (Table 1) it can readily be seen that the workouts are composed of three distinct modalities: metabolic conditioning ("M"), gymnastics ("G"), and weightlifting ("W"). The metabolic conditioning is monostructural activities commonly referred to as "cardio," the purpose of which is primarily to improve cardiorespiratory capacity and stamina. The gymnastics modality comprises body weight exercises/elements or calisthenics and its primary purpose is to improve body control by improving neurological components like coordination, balance, agility, and accuracy, and to improve functional upper body capacity

and trunk strength. The weightlifting modality comprises the most important weight training basics, Olympic lifts and powerlifting, where the aim is primarily to increase strength, power, and hip/leg capacity.

Table 2 gives the common exercises used by our program, separated by modality, in fleshing out the routines.

For metabolic conditioning the exercises are run, bike, row, and jump rope. The gymnastics modality includes air squats, pull-ups, push-ups, dips, handstand push-ups, rope climb, muscle-ups, presses to handstand, back/hip extensions, sit-ups, and jumps (vertical, box, broad, etc.). The weightlifting modality includes deadlifts, cleans, presses, the snatch, the clean and jerk, medicine ball drills and throws, and kettlebell swings.

The elements, or exercises, chosen for each modality were selected for their functionality, neuroendocrine response, and overall capacity to dramatically and broadly impact the human body.

### **Workout Structure**

The workouts themselves are each represented by the inclusion of one, two, or three modalities for each day. Days 1, 5, and 9 are each single modality workouts whereas days 2, 6, and 10 include two modalities each, and finally, days 3, 7, and 11 use three modalities each. In every case each modality is represented by a single exercise or element, i.e., each M, W, and G represents a single exercise from metabolic conditioning, weightlifting, and gymnastics modalities respectively.



**Table 3 - Workout Structure**

Days	Single-Element Days (1, 5, 9)	Two-Element Days (2, 6, 10)	Three-Element Days (3, 7, 11)
Priority	Element Priority	Task Priority	Time Priority
Structure (set structure)	M: Single Effort G: Single Skill W: Single Lift	Couplet repeated 3-5 times for time	Triplet repeated for 20 minutes for rotations
(intensity)	M: Long, Slow Distance G: High Skill W: Heavy	Two moderately to intensely challenging ele- ments	Three lightly to moderate- ly challenging elements
Work Recovery Character	Recovery not a limiting factor	Work/rest interval man- agement critical	Work/rest interval mar- ginal factor

When the workout includes a single exercise (days 1, 5, and 9) the focus is on a single exercise or effort. When the element is the single “M” (day 1) the workout is a single effort and is typically a long, slow, distance effort. When the modality is a single “G” (day 5) the workout is practice of a single skill and typically this skill is sufficiently complex to require great practice and may not be yet suitable for inclusion in a timed workout because performance is not yet adequate for efficient inclusion. When the modality is the single “W” (day 9) the workout is a single lift and typically performed at high weight and low rep. It is worth repeating that the focus on days 1, 5, and 9 is single efforts of “cardio”

at long distance, improving high-skill more complex gymnastics movements, and single/low rep heavy weightlifting basics, respectively. This is not the day to work sprints, pull-ups, or high rep clean and jerk - the other days would be more appropriate.

On the single-element days (1, 5, and 9), recovery is not a limiting factor. For the “G” and “W” days rest is long and deliberate and the focus is kept clearly on improvement of the element and not on total metabolic effect.

For the two-element days (2, 6, and 10), the structure is typically a couplet of exercises performed alternately until repeated for a total of 3, 4, or most commonly 5 rounds and performed for time. We say these days are “task priority” because the task is set and the time varies. The workout is very often scored by the time required

to complete five rounds. The two elements themselves are designed to be moderate to high intensity and work-rest interval management is critical. These elements are made intense by pace, load, reps or some combination. Ideally the first round is hard but possible, whereas the second and subsequent rounds will require pacing, rest, and breaking the task up into manageable efforts. If

the second round can be completed without trouble, the elements are too easy.

For the three-element days (3, 7, and 11), the structure is typically a triplet of exercises, this time repeated for 20 minutes and performed and scored by number of rotations completed in twenty minutes. We say these workouts are “time priority” because the athlete is kept moving for a specified time and the goal is to complete

**The template encourages new skill development, generates unique stressors, crosses modes, incorporates quality movements, and hits all three metabolic pathways.**

**Table 4 - Workout Examples**

Days		
1	<b>M</b>	Run 10K
2	<b>GW</b>	(5 handstand push-ups/225 x 5 deadlifts + 20 lbs/round) x 5 for time
3	<b>MGW</b>	Run 400m/10 pull-ups/"Thruster" 50% BW x 15 for 20 min for rotations
4		OFF
5	<b>G</b>	Practice handstands for 45 minutes
6	<b>WM</b>	(Bench press 75% BW x 10/Row 500m) x 5 for time
7	<b>GWM</b>	Lunges 100ft./push-press 50% BW x 15/row 500 m for 20 min for rotations
8		OFF
9	<b>W</b>	Deadlift 5-3-3-2-2-2-1-1-1 reps
10	<b>MG</b>	(Run 200m/box jump 30 in x 10) x 5 for time
11	<b>WMG</b>	Clean 50% BW x 20/bike 1 mile/15 push-ups for 20 min for rotations
12		OFF

as many cycles as possible. The elements are chosen in order to provide a challenge that manifests only through repeated cycles. Ideally the elements chosen are not significant outside of the blistering pace required to maximize rotations completed within the time (typically 20 minutes) allotted. This is in stark contrast to the two-element days, where the elements are of a much higher intensity. This workout is tough, extremely tough, but managing work-rest intervals is a marginal factor.

Each of the three distinct days has a distinct character. Generally speaking, as the number of elements increases from one to two to three, the workout's effect is due less to the individual element selected and more to the effect of repeated efforts.

### Application

The template in discussion did not generate our Workout of the Day, but the qualities of one, two, and three element workouts motivated the template's design. Our experience in the gym and the feedback from our athletes following the WOD have demonstrated that the mix of one, two, and three element workouts are crushing in their impact and unrivaled in bodily response. The information garnered through your feedback on the WOD has given CrossFit an advantage in estimating and evaluating the effect of workouts that may have taken decades or been impossible without the Internet.

Typically our most effective workouts, like art, are remarkable in composition, symmetry, balance, theme, and character. There is a "choreography" of exertion that draws from a working knowledge of physiological response, a well-developed sense of the limits of human performance, the use of effective elements, experimentation, and even luck. Our hope is that this model will aid in learning this art.

The template encourages new skill development, generates unique stressors, crosses modes, incorporates quality movements, and hits all three metabolic pathways. It does this within a framework of sets and reps and a cast of exercises that CrossFit has repeatedly tested and proven effective. We contend that this template does a reasonable job of formally expressing many CrossFit objectives and values.



## "The Girls" for Grandmas

In the September 2003 issue of the *CrossFit Journal* we introduced six benchmark workouts to test performance and improvements through repeated, irregular appearances in the WOD. These workouts were given the names Angie, Barbara, Chelsea, Diane, Elizabeth, and Fran.

We figured these six workouts were as good as any to demonstrate our concept of scalability. Here we offer versions of those workouts that have been "tuned down" in intensity and had exercises substituted to accommodate any audience.

### "Angie"

**Original**

For time:  
100 pull-ups  
100 push-ups  
100 sit-ups  
100 squats

**Modified**

For time:  
25 ring rows  
25 push-ups off the knees  
25 sit-ups  
25 squats

### "Barbara"

**Original**

5 rounds for time of:  
20 Pull-ups  
30 Push-ups  
40 Sit-ups  
50 Squats  
3 minutes rest between rounds

**Modified**

3 rounds for time of:  
20 Ring Rows  
30 push-ups  
40 sit-ups  
50 squats  
3 minutes rest between rounds

### "Chelsea"

**Original**

5 Pull-ups  
10 Push-ups  
15 Squats

Each minute on the minute for 30 minutes

**Modified**

5 Ring rows  
10 push-ups  
15 squats

Each minute on the minute for 20 minutes

Ring Rows



"Girls" for Grandmas... (continued)

Push-ups off the knees



Sit-ups



Squats



"Girls" for Grandmas... (continued)

"Diane"	
Original	Modified
For time: Deadlift 225 lbs Handstand pushups 21-15-9 reps	For time: Deadlift 50 lbs Dumbbell shoulder press 10 lbs 21-15-9 reps

"Elizabeth"	
Original	Modified
For time: Clean 135 lbs Ring dips 21-15-9 reps	For time: Clean 25 lbs Bench dips 21-15-9 reps

Dumbbell shoulder press



The Clean





"Girls" for Grandmas... (continued)

"Fran"	
Original	Modified
For time:	For time:
Thruster 95 lbs	Thruster 25 lbs
Pull-ups	Ring rows
21-15-9 reps	21-15-9 reps

Bench Dips



## NOTES

# THE CrossFit TRAINING GUIDE

## Training & Coaching

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### Fundamentals, Virtuosity, and Mastery

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#### An Open Letter to CrossFit Trainers

In gymnastics, completing a routine without error will not get you a perfect score, the 10.0—only a 9.7. To get the last three tenths of a point, you must demonstrate “risk, originality, and virtuosity” as well as make no mistakes in execution of the routine.

Risk is simply executing a movement that is likely to be missed or botched; originality is a movement or combination of movements unique to the athlete—a move or sequence not seen before. Understandably, novice gymnasts love to demonstrate risk and originality, for both are dramatic, fun, and awe inspiring—especially among the athletes themselves, although audiences are less likely to be aware when either is demonstrated.

Virtuosity, though, is a different beast altogether. Virtuosity is defined in gymnastics as “performing the common uncommonly well.” Unlike risk and originality, virtuosity is elusive, supremely elusive. It is, however, readily recognized by audience as well as coach and athlete. But more importantly, more to my point, virtuosity is more than the requirement for that last tenth of a point; it is always the mark of true mastery (and of genius and beauty).

There is a compelling tendency among novices developing any skill or art, whether learning to play the violin, write poetry, or compete in gymnastics, to quickly move past the fundamentals and on to more elaborate, more sophisticated movements, skills, or techniques. This compulsion is the novice’s curse—the rush to originality and risk.

#### Fundamentals, Virtuosity and Mastery

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#### Killer Workouts

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#### The Truth About Rhabdo

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Fundamentals, Virtuosity, and Mastery ... (continued)

The novice's curse is manifested as excessive adornment, silly creativity, weak fundamentals and, ultimately, marked lack of virtuosity and delayed mastery. If you've ever had the opportunity to be taught by the very best in any field you've likely been surprised at how simple, how fundamental, how basic the instruction was. The novice's curse afflicts learner and teacher alike. Physical training is no different.

What will inevitably doom a physical training program and dilute a coach's efficacy is a lack of commitment to fundamentals. We see this increasingly in both programming and supervising execution. Rarely now do we see prescribed the short, intense couplets or triplets that epitomize CrossFit programming. Rarely do trainers really nitpick the mechanics of fundamental movements.

I understand how this occurs. It is natural to want to teach people advanced and fancy movements. The urge to quickly move away from the basics and toward advanced movements arises out of the natural desire to entertain your client and impress him with your skills and knowledge. But make no mistake: it is a sucker's move. Teaching a snatch where there is not yet an overhead squat, teaching an overhead squat where there is not yet an air squat, is a colossal mistake. This rush to advancement increases the chance of injury, delays advancement and progress, and blunts the client's rate of return on his efforts. In short, it retards his fitness.

If you insist on basics, really insist on them, your clients will immediately recognize that you are a master trainer. They will not be bored; they will be awed. I promise this. They will quickly come to recognize the potency of fundamentals. They will also advance in every measurable way past those not blessed to have a teacher so grounded and committed to basics.

Training will improve, clients will advance faster, and you will appear more experienced and professional and garner more respect, if you simply recommit to the basics.

## What will inevitably doom a physical training program and dilute a coach's efficacy is a lack of commitment to fundamentals.

There is plenty of time within an hour session to warm up, practice a basic movement or skill or pursue a new PR or max lift, discuss and critique the athletes' efforts, and then pound out a tight little couplet or triplet utilizing these skills or just play. Play is important.

Tire flipping, basketball, relay races, tag, Hooverball, and the like are essential to good programming, but they are seasoning—like salt, pepper, and oregano. They are not main courses.

CrossFit trainers have the tools to be the best trainers on earth. I really believe that. But good enough never is, and we want that last tenth of a point, the whole 10.0. We want virtuosity!!

Yours Truly




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# the **CrossFit** JOURNAL ARTICLES

## Killer Workouts

Eugene Allen



Rhabdomyolysis was first described in the victims of crush injury during the 1940- 1941 London, England, bombing raids of World War II - and more recently in Eugene's garage.

A rugby player performs intense sets of squat jumps on a hot day, collapses, and is rushed to the hospital, where he spends two days in intensive care. Doctors notice that his heart is beating abnormally and that he has unusually high levels of potassium in his blood. A soccer player runs a series of 100- meter sprints at near maximum intensity. After his eighth sprint he collapses to the ground; when he gets to the hospital he is found to have high levels of potassium and myoglobin in his bloodstream. He spends several days in the hospital and is unable to train for several weeks. A highly fit marathoner holds a 6:30 pace for 26 miles but collapses only a few feet short of the finish line. Blood tests reveal a potassium concentration three or four times the normal level and he dies.

1 of 3



## Killer Workouts (continued...)

What does all this mean to you? A condition called rhabdomyolysis, brought on by intense athletic activity is what brought these athletes down. Intense athletic activity... Does that sound familiar? Apparently, one of the three CrossFit pillars (functionality, intensity, and variance) done, in extremis, can introduce a character to the scene whom we have dubbed “Uncle Rhabdo”. Uncle Rhabdo is a close relative of “Pukie” the vomiting clown. While Pukie represents a light hearted approach to the discomforts of training with intensity, his uncle depicts the dark, potentially deadly results of the inappropriate use of intensity. The purpose of this article is to make you aware of the potential pitfalls of intense physical training so that you can reap the benefits while remaining cognizant of a small, but not inconsequential possibility of catastrophic physical trauma. Exercise intensity is like nuclear energy--deployed without certain controls the result can literally be meltdown.

So what do we do that opens the door to rhabdo? Rhabdomyolysis is a breakdown of muscle cell contents that results in the release of muscle fiber contents into the bloodstream. Eccentric muscle contractions, in which muscles attempt to shorten while they are being stretched, seem to significantly increase tension on muscle cell membranes, and it is this tension that appears to break them down. When the membranes are compromised, stuff that is normally enclosed inside the wrapper seeps out into the circulation, where it gums up the works. Potassium is normally in high concentrations inside muscles; when it is found in high concentrations in the blood, it is a good indicator of rhabdo. Sodium and calcium also move from outside the muscles inward and start building up inside the muscle cells, causing very painful swelling that can lead to compartment syndrome, which requires urgent surgery to slice open the membranes to relieve the pressure.

But wait, there's more. When everything is working properly, the extra potassium would probably be filtered out of the blood by the kidneys. But with the onset of rhabdo the amount of potassium is overwhelming and that extra volume is complicated by yet another player called myoglobin. Myoglobin is another resident inside the muscle cells that acts as a warehouse for oxygen. When myoglobin leaks out with the potassium and makes its way to the kidneys, it breaks down into a toxic chemical called ferrihemate, which damages kidney cells. This damage prevents the kidneys from working properly and can be permanent. The extra potassium can peak

at such high levels in the blood that heart function is altered; arrhythmia is a common consequence, and eventually the heart may fail completely if the potassium levels are not controlled.

It is likely that you don't know anyone who has had rhabdo, but the truth is that many athletes suffer from a mild case of it from time to time. Dr. Marc Rogers, Ph.D., an exercise physiologist at the University of Maryland, goes so far as to say, “If you've ever had stiff and tender muscles after exercising, you've probably had a slight case of rhabdomyolysis.” Novice exercisers can develop the problem, but so can the most highly trained, accomplished athletes. Moderate cases of rhabdo can sometimes be found in competitors after triathlons. In a test of 25 triathletes who had just completed a half-Ironman triathlon (1.2-mile swim, 56-mile bike ride, and a 13.1-mile run), it was found that most of the 25 participants in the study had unusually high levels of myoglobin in their blood. This suggests that some amount of muscle membrane leakage had occurred.

My interest in this topic peaked when a very close friend of mine spent a week in the hospital after I put him through his very first CrossFit workout. Brian was no couch potato who suddenly jumped into exercise, but he did have a long layoff from intense exercise for nearly two years before that fateful afternoon with me. He was a state champion wrestler from Iowa, an Army Ranger, and a pretty serious weightlifter and member of our department's SWAT team. Although he was not working out hard he had not degenerated to full-blown spudhood. He was running and “staying in shape,” as he said, but he did nothing that could be described as intense. Until he came to my house.

Our workout was nothing crazy hard, but the thing that did him in was the swings. His second set of 50 swings (an eccentric contraction to be sure) was difficult for him and proved to be his undoing. Afterward, he was unable to kneel in my driveway to change from shoes to boots and had to sit. He could barely do that and had to use all the force of his will to get on his Harley and ride home. No pain to speak of during this time, just complete muscle weakness. Brian thought his muscles were tightening up (in fact they were dying) so he put on a heat pad to loosen things up. Instead of relaxing the muscles, the heat released even more fluid and within two minutes the pain started. Excruciating pain. Pain is frequently quantified in the medical community on a scale from 1 to 10. Brian said the pain was way past 10. Once he was at the hospital,

## Killer Workouts (continued...)

our SWAT team doc, who works at the emergency room Brian went to, worked his morphine dose up to 16 mg every two hours, and Brian said that only dulled the pain enough that he didn't scream.

The primary diagnostic indicator of rhabdomyolysis is elevated serum creatine phosphokinase or CPK. The normal value runs below 200; rhabdo brings the CPK level to at least five times this level. When Brian was admitted to the hospital his CPK level was at 22,000. Within two days it peaked at 98,000. He was pumped full of fluids to help flush the kidneys and he puffed up like the Michelin man. His head looked like a big fat white pumpkin from all the fluid and the medical staff was very concerned about mineral imbalances, which could cause heart problems. Any movement brought suppressed screams of pain through gritted teeth. He was out of the hospital after six days but was off from work for two months. The muscles in his lower back had been destroyed and no longer functioned. He was unable to sit or stand without leaning backwards or he would fall over. He brought an empty cereal bowl to the sink one morning and when he reached slightly forward with his arms to put the bowl in the sink he started to fall and would have gone straight to the ground had he not had the edge of the sink to stop his fall.

Brian is now back to normal and works out in true CrossFit fashion, tempting a Pukie visit nearly every time we train. Our resumption of training was a gradual build rather than a jump into the deep end. We ramped up the intensity of the training week by week and made sure he never did anything with great intensity unless he had done it moderately at least one time before. Now he can hammer whatever workout I throw at him.

There is a silver lining to the rhabdo story. A small dose of rhabdo might actually have a positive effect on your development as an athlete. Some scientists have speculated that the build-up of calcium inside muscle cells during rhabdo can stimulate increased protein synthesis inside the cells, which might produce some of the beneficial adaptations we associate with training such as more aerobic enzymes, more contractile proteins, and more mitochondria. But the line between these positive adaptations and the onset of full-blown rhabdo is a fairly thin one. Tread softly; here there be dragons.

There are things you can do to minimize the risk of rhabdomyolysis. The studies in this area are somewhat thin (imagine the protocol...take some people who

never exercise, break them down into groups, and have some of them exercise until they die), but they suggest that as fitness improves and an athlete's training program becomes more challenging and of longer duration, the likelihood of rhabdo declines. While high-volume, highly fit athletes are not immune to rhabdo, fitness is an excellent prophylactic measure.

The warning label for CrossFit, then, counsels gradual introduction to CrossFit at its highest intensity levels. Other rhabdo invitations are heavy alcohol consumption, cocaine usage, and the use of a cholesterol-lowering drug called Mevacor (lovastatin is the generic name). Intense exercise after a recent infection raises the risk as well because certain viral infections can inflame muscle membranes and make their deterioration more likely during exertion. Exercise when it is very hot—especially if it is also humid—can exacerbate the onset of rhabdomyolysis so you must acclimate to increases in temperature before you train hard. The lack of fluid in the body under these conditions increases the risk of heat stress and dehydration, which places strain on the muscles and the kidneys. The Camelbak tag line “Hydrate or die” is more meaningful in light of some understanding of rhabdo.

Interestingly, only two species of animals—humans and horses—are known to develop rhabdomyolysis, and only male humans appear to be susceptible. The exact reasons for this are not completely understood, but some experts speculate that decreased total muscle mass and more efficient heat regulation in females may protect against full-blown rhabdo. Key female sex hormones such as estrogen may also have a soothing and stabilizing effect on muscle membranes, making it hard to mortally wound them during strenuous exercise.

Unfortunately rhabdomyolysis is pretty sneaky and does not make an announcement prior to showing up on your doorstep. But if your urine looks just like Coca-Cola, that's a sign that you have myoglobin in your kidneys and you need to get to the hospital immediately. Brian's initial complaint was not of pain but rather of complete muscle weakness in his back, so be mindful of that. Also, no heat pads after workouts; use ice. Train hard, but pay attention to what you are doing. Practice mindful exercise, thoughtful intensity.



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# THE CrossFit JOURNAL

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## The Truth About Rhabdo

Rhabdomyolysis is only occasionally seen in athletes. Dr. Mike Ray explains why, how the condition is treated and how smart trainers minimize the risk for their athletes.

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By **Dr. Michael Ray** CrossFit Flagstaff

January 2010

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Susannah Dy/CrossFit Journal

*When marathons, hiking and long-distance running became popular, Dr. Ray saw an increase in cases of rhabdo. Still, it is far more common in patients who have experienced crushing injuries or electrocution.*

Rhabdomyolysis is a medical condition that may arise when muscle tissue breaks down and the contents of muscle cells are released into the bloodstream. One molecule in particular, myoglobin, is toxic to the kidneys and can cause kidney failure and, in the most severe cases, death.



## Rhabdo ... (continued)

Rhabdo has been seen after high-intensity exercise. It is well known to emergency department physicians who see it in victims of crushing injuries and electrocutions. It can also occur in those with severe bee-sting allergies and massive infections, and occasionally it is seen in athletes, particularly those who have become dehydrated after prolonged exertion in high heat. I work in northern Arizona and see it most commonly in people who have been hiking in the Grand Canyon.

### Symptoms and Treatments

Symptoms of rhabdo include severe generalized muscle pain, nausea and vomiting, abdominal cramping, and, in significant cases, dark red “Coca-Cola” urine. The color of the urine is from the myoglobin, which is the same molecule that gives red meat its color.

Rhabdo is diagnosed when a patient with an appropriate history has an elevated level of another molecule, creatine kinase, also known as CK or CPK. CPK is easier to measure in the blood than myoglobin and is generally used as a marker for rhabdo, even though it's the myoglobin that does the damage.

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**In real terms, the risk of serious rhabdo is genuine, but it is low.**

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Treatment consists of generous amounts of intravenous fluids to dilute and flush the myoglobin through the kidneys. In the worst cases, patients may need dialysis while the kidneys recover. Death, though rare, can result when the kidney failure causes imbalances in the usual electrolytes, which may cause cardiac arrhythmias. Most patients make a complete recovery after being rehydrated with IV fluids over anywhere from several hours to a week or so, depending on the severity.

Compartment syndrome is occasionally seen in combination with rhabdo. Compartment syndrome results when an area of soft tissue that is encased in non-expandable connective tissue experiences so much swelling that the pressures exceed the pressure



Susanah Dy/CrossFit Journal

***Dr. Ray recommends drinking water after a workout to flush myoglobin out of the kidneys. It's important to consume food as well to prevent hyponatremia, which can occur when you wash all the sodium out of your system.***

## Rhabdo ... (continued)



Staff/CrossFit Journal

*CrossFitting doctor Ahmik Jones wrote that most clients will never get rhabdo even if you do everything wrong. Still, it can happen to any athlete in any sport, but the benefits of high-intensity workouts far outweigh the risks, which can be minimized with careful training.*

There is no way to separate the effectiveness of the training from all risk. A completely safe training program is doomed to produce only couch potatoes. The safety of strength and conditioning programs across the board, including CrossFit, is very good ...

of blood circulating in the small capillaries within the compartment. The resulting ischemia kills the involved soft tissue. When this soft tissue is muscle, myoglobin may again be released into the blood.

Compartment syndrome most commonly occurs in muscle compartments of the extremities and may result from intense exercise, though is more frequently associated with crush injuries or long-bone fractures.

With CrossFit, we perform whole-body functional movements because those are the movements we need in sport, in life, in battle. We execute those movements at high intensity because that intensity produces all the positive adaptations found with CrossFit and maximizes our work capacity across broad time and modal domains. It seems reasonable that exercising a large muscle mass at high intensity might cause some breakdown of muscle cells, releasing myoglobin and CPK.

This seems to happen at dangerous levels only rarely, though in the emergency department when I see patients who have just exercised (running, working out on machines at the Globo Gym, hiking, CrossFit, etc.) I routinely see mildly elevated levels of CPK (when I have reason to check it). Only rarely do they have dangerously high levels or do they experience any ill effect. Generally, these patients are in the emergency department for completely unrelated reasons. We think there may be an adaptive effect to regular high-intensity exercise that allows the body to somehow protect itself from rhabdo in a manner similar to how a person will become acclimatized to altitude upon regular exposure.

### Reducing the Risk

Strategies to reduce the risk of rhabdo include a gradual introduction to intensity. The athletes at highest risk seem to be those with a reasonable baseline level of fitness they have obtained through some non-CrossFit training, or those who are returning to CrossFit after a layoff. These athletes have sufficient muscle mass and conditioning to go hard enough to hurt themselves but do not have the protection that develops with regular exposure to real intensity.

The severely deconditioned don't seem to have enough muscle mass or the capacity to break down enough muscle to do damage. Established CrossFitters seem to be protected, though the mechanism remains unclear.

## Rhabdo ... (continued)

Certain practices seem more associated with the risk of rhabdo. We are particularly cautious about “negatives,” where the athlete intentionally prolongs the eccentric phase of a movement. We are also cautious about reducing the weight on a “new” or deconditioned athlete in order to maintain intensity. In general, it is better to allow them to stop and take the rest needed to complete the workout. We encourage athletes to eat and drink plenty of water after a workout. The water is to flush myoglobin through the kidneys; the food is to prevent hyponatremia, which results from flushing all the sodium out of one’s system by drinking too much water without any salt.

The irony of rhabdo is that after marathons and hiking became so popular, we started to see people come in to the ER with rhabdo. We told them to drink lots of water to prevent rhabdo. Now I see more patients from the Grand Canyon with hyponatremia than I do with rhabdo, and the only deaths I have seen were from hyponatremia.

Ahmik Jones, another CrossFitting doctor, wrote some great advice for rhabdo prevention on the CrossFit Message Board in a thread titled [Top 10 Ways to Avoid Giving a Client Rhabdo](#).

In real terms, the risk of serious rhabdo is genuine, but it is low. As Ahmik mentions in his post, even if you do everything wrong, most of your clients will never get rhabdo. Conversely, even if you do everything right, there is still a risk of rhabdo, however small.

There is no way to separate the effectiveness of the training from all risk. A completely safe training program is doomed to produce only couch potatoes. The safety of strength and conditioning programs across the board, including CrossFit, is very good, especially when compared to sports like basketball, football and soccer.

Every case of an injured athlete is unfortunate. But we believe it’s no more unfortunate than the people who hurt their backs because they never learned how to pick up something heavy or the patient who dies because the firefighters carrying her out of the woods don’t have the heart and lungs to make it in one hour instead of two.



Staff/CrossFit Journal

### About the Author

*Dr. Mike Ray is the co-owner of [CrossFit Flagstaff](#). He enjoys everything from adventure racing to rock climbing, martial arts, trail running and beyond. He is married to Lisa Ray, who finished 44th in the 2009 CrossFit Games and is a member of CrossFit HQ’s traveling certification staff.*



## NOTES

# THE CrossFit TRAINING GUIDE

## Teaching, Seeing, Correcting The 9 Movments

THE STUDY OF MATERIAL PRESENTED HERE GIVES YOU INFORMATION ON TEACHING, SEEING, AND CORRECTING EACH OF CROSSFIT'S 9 FOUNDATIONAL MOVEMENTS.

### 1. TEACHING THE MOVEMENT:

This section describes how to introduce and cue the movement from setup to execution. In addition to these verbal cues, remember that any introduction of a movement should include a visual example—i.e., a demonstration. This section also includes teaching progressions for the more complex moves. These are introduced after the full move is described and shown. They break down the complex moves into simple do-able steps. You will be tested on your use and knowledge of these exact progressions. Memorize them.

### 2. SEEING THE MOVEMENT:

This section includes the Primary Points of Performance for the move. These are the essential mechanics you should be looking for and focused on in teaching each move. These must not be missed or overlooked. Your ability to see the Primary Points of Performance for each movement is essential to being a good trainer.

### 3. CORRECTING THE MOVEMENT:

This section lists common faults and possible fixes for each movement. These relate to the Primary Points of Performance in each movement. Your ability to demonstrate that you know, can identify, and finally correct these common faults directly reflects the quality of your training.

The “fixes” described in this section are to help you, but they are not the only possible corrections. Use them, but do not feel confined to them. The goal is always to get the athlete moving well through the full movement. There are numerous effective ways to achieve this end.

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# AIR SQUAT

The Air Squat is Foundational to the Front Squat and Overhead Squat

## I. TEACHING THE MOVEMENT

### SETUP:

- Stance = shoulder width
- Full extension at hips and knees

### EXECUTION:

- Weight on heels
- Lumbar curve maintained
- Chest up
- Butt travels back and down
- Bottom of squat is below parallel (hip crease is below the top of the kneecap)
- Knees track parallel to feet
- Return to full extension at the hips and knees to complete the move
- Head position is neutral

## 2. SEEING THE MOVEMENT

### PRIMARY POINTS OF PERFORMANCE:

- Lumbar curve maintained
- Weight in heels
- Depth below parallel
- Knees track over feet

## 3. CORRECTING THE MOVEMENT

### FAULT: LAZY LUMBAR CURVE, OR LOSING IT (I.E., "BUTT WINK")

- Fix - Lift the chest while engaging the hip flexors by anteriorly rotating the pelvis strongly.
- Fix - Raise the arms as you descend to the bottom of the squat.

### FAULT - WEIGHT SHIFTS FORWARD TO BALLS OF FEET.

- Fix - Exaggerate weight in the heels by floating the toes slightly throughout the entire movement.

### FAULT - NOT LOW ENOUGH.

- Fix - Cue "Lower!" and do not relent.
- Fix - Squat to a 10" box or medicine ball to develop awareness of depth.

### FAULT - KNEES ROLL IN.

- Fix - Cue "Push your knees out" or "Spread the ground apart with your feet."
- Fix - Touch the outside of the knee and have the athlete press into your hand.

### FAULT - TRAIN WRECK SQUAT: INABILITY TO MAINTAIN LUMBAR CURVE, STAY ON HEELS, AND GET TO DEPTH ALL AT THE SAME TIME.

### FAULT - IMMATURE SQUAT: LUMBAR CURVE IS MAINTAINED, DEPTH MIGHT BE THERE, AND HEELS ARE IN CONTACT WITH THE GROUND, BUT THE ATHLETE HAS TO CANTILEVER FORWARD EXCESSIVELY ONTO THE QUADS TO MAINTAIN BALANCE.

- Fix - Squat Therapy: Set up the athlete facing a wall or pole with a 10" box under their butt. Set them up in the proper stance, with heels to the box, chest close to wall. Have them squat to the box slowly, maintaining control and weight in the heels.

# FRONT SQUAT

The Setup, Execution, Points of Performance, and Corrections carry over exactly from the Air Squat. We now add to those a load in the FRONT RACK POSITION.

## 1. TEACHING THE MOVEMENT

### SETUP:

- Stance = shoulder Width
- Full extension at hips and knees
- Bar “racked” on the shoulders (create a shelf with the shoulders for bar to sit on), hands outside shoulders, loose fingertip grip.
- Elbows high, upper arm parallel to the ground.

### EXECUTION:

- Weight on heels
- Lumbar curve maintained
- Chest up
- Elbows high; arms stay parallel to the ground throughout the whole movement
- Butt travels back and down
- Bottom of squat is below parallel (hip crease is below the top of the kneecap)
- Knees track parallel to feet
- Return to full extension at the hips and knees to complete the move
- Head position is neutral

## 2. SEEING THE MOVEMENT

### PRIMARY POINTS OF PERFORMANCE:

- Bar racked properly: elbows high, hands just outside shoulders, bar rests on shoulders with a loose fingertip grip
- Elbows high throughout the movement

## 3. CORRECTING THE MOVEMENT

ALL FAULTS AND FIXES FROM THE **AIR SQUAT** APPLY TO THIS MOVEMENT, PLUS THE FOLLOWING:

### **FAULT - BAR NOT IN CONTACT WITH THE TORSO OR HOLDING BAR OUT IN FRONT.**

- Fix - Cue “Elbows high and allow bar to roll back onto fingertips.”

### **FAULT - ELBOWS DROP AND CHEST COMES FORWARD.**

- Fix - Cue “Elbows UP UP UP! And big chest.”
- Fix - Tactile Cue - Place a hand or arm under the athlete’s elbows to help keep them lifted.

# OVERHEAD SQUAT

The Setup, Execution, Points of Performance, and Corrections carry over exactly from the Air Squat.

We now add to those a load in the OVERHEAD POSITION

## 1. TEACHING THE MOVEMENT

### SETUP:

- Stance = shoulder width
- Full extension at hips and knees
- Bar held overhead, in the frontal plane, with a wide grip
- Active shoulders
- Elbows locked

### EXECUTION:

- Weight on heels
- Lumbar curve maintained
- Chest up
- Maintain constant upward pressure on the bar, and active shoulders, to support the load
- Bar remains in the frontal plane or slightly behind
- Butt travels back and down
- Bottom of squat is below parallel (hip crease is below the top of the kneecap)
- Knees track parallel to feet
- Return to full extension at the hips and knees to complete the move
- Head position is neutral
- Return to full extension at the top of movement.

## 2. SEEING THE MOVEMENT

### PRIMARY POINTS OF PERFORMANCE:

- Active shoulders throughout movement
- Bar stays overhead, in the frontal plane

## 3. CORRECTING THE MOVEMENT

ALL FAULTS AND FIXES FROM THE **AIR SQUAT** APPLY TO THIS MOVEMENT, PLUS THE FOLLOWING:

### **FAULT - LAZY ELBOWS AND SHOULDERS.**

- Fix - Cue athlete to actively press the bar up; use your hands to push the elbows straight and the shoulders into the ears.

### **FAULT - BAR GOES FORWARD OF THE FRONTAL PLANE.**

- Fix - Cue the athlete to press the bar up and pull it back to overhead or slightly behind.



# SHOULDER PRESS

The key elements of the Shoulder Press, and all the overhead lifts, are the setup position, the overhead position, tight belly, and the bar path. These are foundational to all the overhead lifts.

## 1. TEACHING THE MOVEMENT

SETUP (THIS SETUP IS EXACTLY THE SAME FOR ALL THREE OVERHEAD LIFTS):

- Stance = hip width
- Hands just outside the shoulders
- Bar in front, resting on the “rack” or “shelf” created by the shoulders
- Elbows down and in front of bar; elbows are lower than in the front squat
- Tight midsection
- Closed grip, with thumbs around the bar

EXECUTION:

- The cue for the action is “Press”
- Drive through heels; keep the whole body rigid; tight belly
- Bar travels straight up to locked out, with active shoulders, directly overhead
- Head accommodates bar (bar path is a straight line)

## 2. SEEING THE MOVEMENT

PRIMARY POINTS OF PERFORMANCE:

- Good setup
- Constant tightness in the midsection, ribs locked down
- Overhead and active shoulder at the top of the press; overhead means that the bar is over or just behind the arch of the foot, with the shoulder angle fully open
- Bar travels straight up

## 3. CORRECTING THE MOVEMENT

**FAULT - BAR FORWARD OF FRONTAL PLANE.**

- Fix - Press up and pull back on the bar as it travels to overhead.

**FAULT - LEANING BACK, RIBS STICKING OUT.**

- Fix - Tighten abs / suck rib cage down (be sure to check the overhead position again after this fix).

**FAULT - PASSIVE SHOULDERS OR BENT ELBOWS.**

- Fix - Cue “Press up!” “Shoulders into ears.”

**FAULT - BAR ARCS OUT AROUND THE FACE.**

- Fix - Pull head back out of the way of the bar.
- Fix - Check that elbows are not too low in the setup.

# PUSH PRESS

The Push Press builds on the same setup and overhead position as the Shoulder Press. We add velocity with the dip and drive of the hip. The focus here is on a dip and drive that is explosive and straight down and up.

## 1. TEACHING THE MOVEMENT

### SETUP:

- Stance = hip width
- Hands just outside the shoulders
- Bar in front, resting on the “rack” or “shelf” created by the shoulders
- Elbows down and in front of bar; elbows are lower than in the front squat
- Tight midsection
- Closed grip, with thumbs around the bar

### EXECUTION:

- The cue for the action is “Dip, drive, press”
- Dip: perform a shallow dip (flexion) of the hips, where the knees push forward slightly, the butt goes back, and the chest stays upright
- Drive: extend the hip rapidly and fully
- Press: press the bar to overhead, with locked arms

### PROGRESSION (WITH STICK):

1. Dip (check chest and hip)
2. Dip-drive slow
3. Dip-drive fast
4. Dip-drive-press (full Push Press)

## 2. SEEING THE MOVEMENT

### PRIMARY POINTS OF PERFORMANCE:

- Torso drops straight down on the dip. There is no forward inclination of the chest and no muting of the hip.
- Aggressive turn around from the dip to the drive.

## 3. CORRECTING THE MOVEMENT

ALL FAULTS AND FIXES FROM THE **SHOULDER PRESS** APPLY TO THIS MOVEMENT, PLUS THE FOLLOWING:

### **FAULT** - OUT OF SEQUENCE: PRESS BEGINS BEFORE HIP OPENS UP

- Fix - Take back to step 3 in progression—dip-drive fast

### **FAULT** - COCKING: PAUSING IN THE DIP

- Fix - Cue for dip-drive and more aggressive turnaround of the hip

### **FAULT** - FORWARD INCLINATION OF THE CHEST

- Fix - Have athlete hold in the dip position and then manually adjust them to true upright torso
- Fix - Cue a shallower dip
- Fix - Cue knees forward more
- Fix - Stand in front of athlete to prevent the chest from coming forward
- Fix - Dip therapy: Stand with back against a wall, with heels, butt, and shoulder blades all touching the wall; then dip and drive, keeping everything in contact with wall

### **FAULT** - MUTED HIP

- Fix - Turn the pelvis over (anterior rotation) strongly

# PUSH JERK

The Push Jerk builds from a good setup, a good overhead position, and a solid dip/drive. Now, we focus on coordinating this movement so that the hip comes to full extension before the catch, and the catch occurs with the bar locked out overhead.

## 1. TEACHING THE MOVEMENT

### SETUP:

- Stance = hip width
- Hands just outside the shoulders
- Bar in front, resting on the “rack” or “shelf” created by the shoulders
- Elbows down and in front of bar; elbows are lower than in the front squat
- Tight midsection
- Closed grip, with thumbs around the bar

### EXECUTION:

- The cue for the action is “Dip, drive, press and dip”
- Dip: perform a shallow dip (flexion) of the hips, where the knees push forward slightly, the butt goes back, and the chest stays upright
- Drive: extend the hip rapidly and fully
- Press and dip: retreat the hip downward and drive the body under the bar, while rapidly pressing the bar overhead
- “Catch” the bar with arms locked out overhead
- Stand to full extension with bar overhead.

### PROGRESSION (WITHOUT STICK/BAR):

1. Jump and land with **hands at sides**. Stick the landing.
2. Jump and land with **hands at shoulders** throughout the move. Stick the landing.
3. Jump with **hands at shoulders** and extend them **overhead** at the same time as the land.
4. **With stick** in hands, full Push Jerk.

## 2. SEEING THE MOVEMENT

### PRIMARY POINTS OF PERFORMANCE:

- Full extension of the hip before reversing hip direction from upward to downward
- Landing is in a partial squat with the bar locked out directly overhead
- Fast and aggressive

## 3. CORRECTING THE MOVEMENT

ALL FAULTS AND FIXES FROM THE **SHOULDER PRESS** AND **PUSH PRESS** APPLY TO THIS MOVEMENT, PLUS THE FOLLOWING:

### FAULT - MOVEMENT PATTERN OUT OF SEQUENCE.

- Fix - Break it down via the progression and build back up to the full movement. Reiterate that it is just a simple jump and land in a partial squat.

### FAULT - HIP NEVER GETS TO FULL EXTENSION.

- Fix - Cue: “More extension.”
- Fix - Place your hand at the top of the athlete’s head when fully standing; keep it at that height and then ask the athlete to hit your hand during the drive. Be sure they continue to hit extension even when your hand is not there.
- Fix - Take the athlete back to the jump-and-land steps (1-3) of the progression. You may have to slow it down a bit and then speed it back up once the basic movement pattern is solid.

### FAULT - LANDING TOO WIDE.

- Fix - Exaggerate the correction and cue the athlete do the movement without the feet moving from under the hips.
- Fix - Therapy: Block the feet with plates or boxes or some object so they can’t go too wide.

### FAULT - LAZY LANDING: NOT LOCKED OUT OVERHEAD.

- Fix - Cue to punch up and pull back on the bar. Cue active shoulders.

### FAULT - NOT STANDING ALL THE WAY UP WITH THE BAR BEFORE RE-RACKING IT ON THE SHOULDERS.

- Fix - Cue to stand up with the bar overhead.

# DEADLIFT

The Deadlift is foundational to the Sumo Deadlift High Pull and the Medicine Ball Clean.

## 1. TEACHING THE MOVEMENT

### SETUP:

- Stance = between hip width and shoulder width
- Weight in heels
- Back arched/lumbar curve locked in
- Shoulders slightly in front of the bar
- Bar in contact with the shins
- Arms locked straight
- Symmetrical grip outside the knees, just wide enough to not interfere with knees

### EXECUTION:

- Drive through the heels
- Extend legs while hips and shoulders rise at the same rate
- Once the bar passes the knees, the hip opens all the way up
- Bar maintains contact with the legs the entire time
- Head neutral
- On return to the floor, push hips back and shoulders forward slightly; delay the knee bend
- Once bar descends below the knees and the torso angle is set, return the bar down to the setup position

## 2. SEEING THE MOVEMENT

### PRIMARY POINTS OF PERFORMANCE:

- Lumbar curve maintained
- Weight on heels
- Shoulders slightly in front of bar on setup
- Hips and shoulders rise at same rate
- Bar stays in contact with legs throughout the movement
- At the top the hip is completely open and knees are straight

## 3. CORRECTING THE MOVEMENT

### FAULT – LOSS OF LUMBAR CURVE

- Fix – Cue to pull hips back and lift the chest
- Fix – Touch person at lumbar curve and say, “Arch!” Do not relent.
- Fix – Abort and decrease the load to where the lumbar arch can be maintained.

### FAULT – WEIGHT ON OR SHIFTING TO TOES.

- Fix – Have athlete settle into the heels and pull hips back, maintaining tension in the hamstrings at start of movement, and focus on driving through heels.
- Fix – Check that the bar stays in contact with legs throughout the movement.

### FAULT – SHOULDERS BEHIND BAR ON SETUP.

- Fix – Raise hips to move shoulder over or slightly in front of the bar.

### FAULT – HIPS RISE BEFORE THE CHEST (STIFF-LEGGED DEADLIFT).

- Fix – Allow the shoulders and chest to rise sooner. Cue “Lift your chest more aggressively” or “Lift the chest and hips at the same rate until the bar passes your knees.”

### FAULT – SHOULDERS RISE WITHOUT THE HIPS. BAR TRAVELS AROUND THE KNEES INSTEAD OF STRAIGHT UP.

- Fix – Be sure athlete is set up correctly: weight in heels and with shoulders in front of the bar. Cue “Push knees back as your chest rises.”
- Fix – Block the knees’ travel with your hand.
- Fix – Stick trick: Lock the person in between two sticks on either side of the bar and have them execute the move without hitting the sticks.

### FAULT – BAR COLLIDES WITH KNEES ON THE DESCENT.

- Fix – Initiate the return by pushing the hips back and delay the knee bend.

### FAULT – BAR LOSES CONTACT WITH LEGS.

- Fix – Cue “Pull the bar in to your legs the whole time.”
- Fix – Tactile cue: Touch the athlete’s leg where the bar should touch from thigh to shin.

# SUMO DEADLIFT HIGH PULL

The Sumo Deadlift High Pull (SDHP) builds on the Deadlift, widening the stance, bringing the grip inside the knees, adding a shrug, an upward pull with the arms, but, most importantly velocity. The move requires an aggressive extension of the hips and legs before the arms pull.

## 1. TEACHING THE MOVEMENT

### SETUP:

- Stance = wider than shoulder width, but not so wide that the knees roll inside the feet
- Weight in heels
- Back arched/lumbar curve locked in
- Shoulders slightly in front of the bar
- Bar in contact with the shins
- Arms locked straight
- Symmetrical grip inside the knees

### EXECUTION:

- Accelerate through the heels from the ground to full extension of the hips and legs
- Shrug, with straight arms
- Arms follow through by pulling bar to the chin with elbows high and outside
- Return the bar down fluidly in the reverse sequence: arms, then traps, then hips, then knees, back to the setup position

### PROGRESSION:

1. Sumo deadlift
2. Sumo deadlift shrug, slow
3. Sumo deadlift shrug, fast
4. Full Sumo Deadlift High Pull

## 2. SEEING THE MOVEMENT

### PRIMARY POINTS OF PERFORMANCE:

- Hips open before shrug and arm bend
- Bar is pulled up to just below the chin
- Fast and aggressive
- Elbows travel and finish high and outside; elbows are higher than the hands at all times during the movement

## 3. CORRECTING THE MOVEMENT

ALL FAULTS AND FIXES FROM THE **DEADLIFT** APPLY TO THIS MOVEMENT, PLUS THE FOLLOWING:

### **FAULT - PULLING TOO EARLY WITH THE ARMS. HIP NOT COMPLETELY OPEN BEFORE SHRUG OR ARM PULL.**

- Fix - Take the athlete to step 3 in the progression (Sumo Deadlift Shrug). Emphasize that the hip needs to fire first, before arms. Try two Sumo Deadlift Shrugs for every full SDHP; do as many times as needed to get it right.

### **FAULT - NO SHRUG.**

- Fix - Back to progression. Do two Sumo Deadlift Shrugs and one High Pull; do as many times as needed to get it right.

### **FAULT - ELBOWS LOW AND INSIDE.**

- Fix - Cue: "Elbows high!"

### **FAULT - INCORRECT DESCENT (HIPS BEFORE ARMS).**

- Fix - Slow down the movement; return arms then hips, then legs; then speed it up again.

### **FAULT - TOO SLOW.**

- Fix - Cue "Faster!"

### **FAULT - SEGMENTING THE MOVEMENT.**

- Fix - Cue to accelerate or jump the bar off the ground.

### **FAULT - LOSING CONTROL AND LEVELNESS OF BAR.**

- Fix - Widen the grip a bit. Make sure the grip is symmetrical on the bar.

### **FAULT - RUNNING INTO THE KNEES**

- Fix - Narrow the grip and make sure the hips aren't too low in the setup position.

# MEDICINE BALL CLEAN

The medicine ball clean builds on the set up and movement pattern of the Sumo Deadlift High Pull adding a pull under the object.

## 1. TEACHING THE MOVEMENT

### SETUP:

- Stance = shoulder width or slightly wider
- Weight in heels
- Back arched/lumbar curve locked in
- Shoulders over the ball
- Ball on the floor between the legs with clearance for the arms
- Arms straight, palms on outside of the ball; fingertips pointing down

### EXECUTION:

- Accelerate through the heels from the ground to full extension of the hips and legs
- Shrug, with straight arms
- Hip retreats; land in a full front squat, with the elbows beneath the ball
- Stand to full extension with ball in the rack position to complete the movement
- Return to setup

### PROGRESSION:

1. Deadlift (focus on good setup)
2. Deadlift Shrug (focus on fast extension and shrug with no arm bend)
3. Front Squat (focus on depth of the catch)
4. Shrug and Drop Under (focus on shrug and beating the ball down, catching low and tight)
5. Full Medicine Ball Clean

## 2. SEEING THE MOVEMENT

### PRIMARY POINTS OF PERFORMANCE:

- Hips reach full extension
- Hip is extended and shrug is initiated before arms pull
- The ball is caught in a low (below parallel) and tight (not collapsed) front squat position
- Fast and aggressive throughout
- Athlete stands all the way up with the ball in the rack position to finish

## 3. CORRECTING THE MOVEMENT

ALL FAULTS AND FIXES FROM THE **DEADLIFT** APPLY TO THIS MOVEMENT, PLUS THE FOLLOWING:

### **FAULT** - HIP DOES NOT OPEN ALL THE WAY.

- Fix - Take athlete back to step 2 of progression (Deadlift Shrug). Have him/her do two Deadlift Shrugs for every Med Ball Clean.
- Fix - Tactile Cue: Place your hand at the top of the athlete's head while he/she is standing tall. Have athlete do a Med Ball Clean being sure to hit your hand with top of the head before dropping into the front squat position.

### **FAULT** - NO SHRUG.

- Fix - Take athlete back to step 2 of progression (Deadlift Shrug). Have him/her do two Deadlift Shrugs for every Med Ball Clean.
- Fix - Cue "Shrug!"

### **FAULT** - PULLING EARLY WITH THE ARMS.

- Fix - Deadlift Shrug, two reps for every Med Ball Clean.
- Fix - Two "Shrug and Drop Unders" (step 4 from progression) for every Med Ball Clean

### **FAULT** - TOSSING THE MED BALL.

- Fix - Have them hold the ball without their fingers, using palms or fists only.

### **FAULT** - CURLING THE BALL.

- Fix - Back to Progression: Deadlift Shrug, 2 reps for every 1 Med Ball Clean.
- Fix - Stand close in front of the athlete to prevent curling. Can also be done with a wall.
- Fix - Require athlete to have the laces of the ball remain up for the entire movement.

### **FAULT** - COLLAPSING IN THE CATCH.

- Fix - Take athlete back to step 4 of the progression (Shrug and Drop Under). Focus on a tight lumbar arch, and keeping the chest up, at the bottom of the catch.

### **FAULT** - UNABLE TO DROP UNDER THE BALL FULLY.

- Fix - Have the athlete do two "Shrug and Drop Unders" (step 4 in the progression) for every Med Ball Clean
- Fix - Tactile Cue: Hold ball at the peak of the shrug and let athlete drop under while you hold ball.



## NOTES

# THE CrossFit TRAINING GUIDE

## YOUR TRAINER LICENSING AGREEMENT in PLAIN ENGLISH

**IN ORDER TO** register for the Level I Trainer Certification, you read and agreed to a Trainer Licensing Agreement. Hopefully, you actually read the agreement and comprehend everything it enables you and precludes you from doing. If you are like most, you just checked the block and continued the registration process.

**IF THIS IS** the case, we highly encourage you to go back and read through the binding agreement you entered. In the meantime this should serve to generalize, in plain language, the agreement.

**TO BEGIN WITH**, we must differentiate between the CrossFit method, and the CrossFit brand. During the past 2 days you have been immersed with an incredible amount of collective intellectual knowledge. Much of this is open source, free to the public, and commonly known/accepted to the fitness industry in some form or fashion. However, it is not so uniquely organized and presented in such a package. The organization and presentation of this information in a manner that gives credibility or motivates others into service is what constitutes the name CrossFit.

**THE BRAND NAME** CrossFit is not free. You are not permitted to advertise, market, promote, or solicit, in business or service, without licensing the CrossFit name. In our community this is called Affiliation (described in detail on the [crossfit.com](http://crossfit.com) website). What you can do is list 'Level I CrossFit Trainer' on your resume, business card, credential, or bio. You can train yourself, workout with friends, introduce the methodology and pique interest in your community, and wear a CrossFit T-shirt proudly. What you can NOT do is advertise/ market (i.e. use the name CrossFit) to sell services on a website, flyer, store front, etc. You can NOT make and sell T-shirts, hats, stickers, sell nutritional supplements, etc. without Affiliation. You can NOT re-package the methodology, rephrase the articulation, and label it your own. This is infringement.

**IT MIGHT HELP** to think in terms of this analogy. You buy a bottle of Coca-Cola and you can drink it, give it to friends, mix it with bourbon, whatever you want, but you cannot use the brand name of Coca-Cola to bottle and sell your own soft drinks.

**OUR LEGAL DEPARTMENT** is aggressively pursuing any unlicensed use of the brand CrossFit. Give credit where credit is due. If you are unsure regarding the appropriate use of the brand CrossFit, contact [AffiliateSupport@CrossFit.com](mailto:AffiliateSupport@CrossFit.com).